The petrology and geochemistry of the Igaliko Dyke swarm, south Greenland.

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THE PETROLOGY AND GEOCHEMISTRY

OF THE

IGALIKO DYKE SWARM,

SOUTH GREENLAND.

VOLUME 2: APPENDICES

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A thesis submitted for the degree of
Doctor of Philosophy, at
The Department of Geological Sciences
Durham University
February 1988

APPENDIX CONTENTS

APPENDIX I

The following pages contain a listing of all samples available for study in this project. The data is not laid out in numerical order but is based on the collector and the year of collection. Thus, samples collected by C. H. Emeleus are separated from those of W. T. Harry. The following table gives a guide as to where a certain sample will be located.

Table AI.1

Sample No.	Year	Camp	Collector	Area
41904-999	1961	1	CHE†	N of Igánaq
43802	1961	1	CHE†	N of Igánaq
43824-855	1961	2	CHE†	S Igdlerfigssalik Centre
43859	1961	–	CHE†	Helicopter reco.
43866-939	1961	3	CHE†	SW Igdlerfigssalik
43967-999	1961	4	CHE†	Mouth of Giesecke's Dal
46203-236	1961	4	CHE†	Mouth of Giesecke's Dal
46237-284	1961	5	CHE†	Mouth of Flink's Dal
46289-296	1961	6	CHE†	Reservoir above Narssarssuaq
52201-247	1961	6	CHE†	Reservoir above Narssarssuaq
52257-291	1963	1	CHE	Østfjordsdal Syenite
52292-298	1963	2	CHE	Giesecke's Dal
58001-061	1962	1	CHE	Flink's Dal, by late Motzfeldt Ring Dyke
58062-117	1962	2	CHE	700m lake, Upper Flink's Dal
58118-217	1962	2	CHE	From 'NV Ussing' in Qôroq
58219-277	1962	6	CHE	at 735m summit, Narssarssuaq Plateau
58290-298	1962	7	CHE	Ilortarfik, N of Igaliko Village
58326-338	1962	8	CHE	88m peninsula, head of QôroqFjord
58344-350	1963	2	CHE	Giesecke's Dal
58357-394	1963	3	CHE	960m summit, N of Motzfeldt Sø
63704-723	1963	4	CHE	Lejrelv, N shores of Motzfeldt Sø
63726-780	1963	5	CHE	The Wall, SW Motzfeldt Centre
63808-845B	1963	9	CHE	Narssarssuk Pegmatite
63881-885	1969	1	CHE	5km SW of Qagssiarssuk
63889-898	1969	2	CHE	River N from Qororssuak to Giesecke's Dal
87118-125	1969	2	CHE	River N from Qororssuak to Giesecke's Dal
126752-775	1969	–	CHE	Traverse across Peninsula near Igaliko Village
59601-637	1962	1	WTH	At 700m lake, Upper Flink's Dal
59652-734	1962	2	WTH	'NV Ussing', mainly in Qôroq Fjord
59741-790	1962	3	WTH	S end of 2.5km lake in fault, North Qôroq
59806-808	1962	4	WTH	Narssarssuk Pegmatite (CHE Camp 6, 1963)

59866-899	1963	1	WTH	570m lake, Qororssuak Valley
54114	1963	2	WTH	Giesecke's Dal
54140-158	1963	3	WTH	East Motzfeldt?
54164-176	1963	4	WTH	'Harry's Dal', 4km of NW River from Motzfeldt Sø
54195-228	1963	5	WTH	Between 2 small lakes, North Qôroq Centre
54230-325	1963	6	WTH	Narssarssuk Pegmatite
304006-772	1982	–	CB	Localities in the Motzfeldt Centre
126806-807	1969	–	DS	Shore sections along Tunugdliarfik (Narssarssuaq Peninsula)
127010-089	1969	–	DS	Shore sections along Tunugdliarfik
141223-244	1969	–	DS	Shore sections along Tunugdliarfik
326201-221	1984	1	NJGP	Storelv (N of glacier, NW end of Motzfeldt Sø)
326222-270	1984	2	NJGP	Lower Flink's Dal
326271-320	1984	3	NJGP	Østfjordsdal
326321-399	1984	4	NJGP	Stream W of 45m lake, ca. 6km N of Igaliko Village
326400	1984	6	CHE	N of River at Narssarssuaq
325901-912	1984	4	NJGP	6km N of Igaliko Village
325913-928	1984	5	NJGP	N shore of Motzfeldt Sø
325929-943	1984	7	NJGP	'Harry's Dal', 4km NW of river from Motzfeldt Sø
325944-970	1984	8	NJGP	'Hotel Motzfeldt', Caravan, at SW Corner of Motzfeldt Sø
325971-6000	1984	6	CHE	N of River at Narssarssuaq
325601-607	1984	8	NJGP	'Hotel Motzfeldt'
325608-620	1984	9	NJGP	N end of 475m lake, Mellemlandet

CHE – C. H. Emeleus, WTH – W. T. Harry, CB – C. Bradshaw, DS – D. Stephenson, NJGP – N. J. G. Pearce, † collected with W. T. Harry – may be either CHE or WHT.

In the following list of data column A contains the sample number and is laid out as described above. The following 12 columns of numbers (columns B-M) contain information on the relative abundance of phenocryst phases: 3 for the most abundant, 1 for the least abundant and – for absent as phenocrysts. These are layed out in the order, (B) Olivine (C) Orthopyroxene, (D) Clinopyroxene (not Na-rich), (E) Aegirine (ie. Na enriched pyroxene), (F) Alkali amphibole (includes poikiloblastic crystals), (G) Hornblende, (H) Plagioclase, (I) Alkali feldspar (includes anorthoclase and binary alkali feldspars), (J) Nepheline, (K) Biotite, (L) Oxides and (M) Others. Others includes Q

Table AI.2

TAS coding used in the following appendix tables, after Cox *et al.* (1979).

1. Nephelinite	10. Trachyte
2. Phonolitic nephelinite	11. Basaltic andesite (BFD xenocrysts)
3. Tephrite/Basanite	12. Trachyandesite
4. Basalt	13. Andesite (no dykes of this comp.)
5. Hawaiite	14. Dacite (no dykes of this comp.)
6. Mugearite	15. Rhyolite
7. Benmoreite	16. Picritic basalt
8. Phonolitic tephrite	17. Carbonatite
9. Phonolite	18. UML

for quartz, A for apatite and P for phlogopite.

Column N containing a number or a space, indicates whether the sample has been analysed by XRF or not, the number being its TAS coding listed in Table AI.2. The following column (O) with a 1-3 figure number or a space, indicates analysis by microprobe or not. The 3 figure number is the sample code number listed in the tables in Appendix II. Column P contains an abbreviation of the name – usually a field/petrographic description but modified if this proved to be grossly in error on chemical grounds. These are hopefully self explanatory. For example,

Tr –	Trachyte	UML –	Ultramafic lamprophyre
PTr –	Porphyritic trachyte	RP –	Rhomb porphyry
SPPhon –	Sparsely porphyritic phonolite		
Lamp –	Lamprophyre		
Cbt –	Carbonatite		

The prefixes 'A' and 'AL' have been used to describe alkali and altered specimens respectively – eg. a rock described ALOLDOL would be an altered olivine dolerite, whereas a sample described ATR would be a trachyte which is alkali-rich, ie. contains appreciable amounts of alkali pyroxene/amphibole.

Column Q contains the strike (3 figures) as recorded in the GGU sample description booklet. These are not corrected to $<180°$.

The final column (R) of information contains any cross cutting relationships and other 'general' information about the dyke. Again this is hoped to be self explanatory. For example, C SI.5 means the dyke cuts the Late Igdlerfigssalik Syenite Unit 5; C DK 58023 means the dyke cuts another dyke, sample number 58023; and similarly AS DK 58203 means that this sample is from the same dyke as 58203.

The syenites have all been referred to as abbreviations. These are SS (or SQC) for South Qôroq; SN (or NQC) for North Qôroq; SM, MZI (or, in the case of samples collected by Bradshaw in 1984, SM with a prefix F for fresh, A for altered) for Motzfeldt and SI for Igdlerfigssalik. The satellite syenites are abbreviated to OSTFJ for Østfjordsdal and NAB for the Narssarssuaq syenite.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
EMELEUS - CAMP 1, 1961 NORTH OF IGANAQ																	
41904	-	-	3	-	-	-	-	-	-	-	-	-		03	LAMP	*	C IGALIKO SST C SST CAL
41906	-	-	-	-	-	-	-	-	-	-	-	-	103	18	LAMP	050	C META SED
41907	-	-	-	-	-	-	-	-	-	-	-	-		03	LAMP	070	C META SED
41908	-	-	-	-	-	-	-	-	-	-	-	-		09	NPMSY	050	C META SED
41909	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	050	C META SED CUT BY SI.4?
41910	-	-	-	-	-	-	-	3	-	-	2	-		09	PTR	050	C META SED
41911	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	110	C META SED
41917	-	-	-	-	-	-	-	3	-	-	-	-			CRBRECC	100	C SI.6 CRUSHED/BRECCIATED DYKE
41925	-	-	-	-	-	-	-	-	-	-	-	-			NPATR	075	C SI.5 AS DK 41926
41926	-	-	-	-	-	-	-	-	-	-	-	-		12	NPTR	075	C SI.5 AS DK 41925
41932	-	-	-	-	-	-	-	3	-	-	-	-		10	SPATR	075	C SI.6 & SI.4
41934	-	-	-	-	-	-	-	3	-	-	-	-		09	SPATR	080	C SI.4
41935	-	-	-	-	-	-	-	3	-	-	-	-		09	PTR	070	C SI.4
41937	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	030	C SI.4
41939	-	-	-	-	-	-	-	-	-	-	-	-		07	ALTR	000	C META SED CUT BY SI.4?
41940	-	-	-	-	-	-	-	-	-	-	-	-			CBT	336	C META SED
41941	-	-	-	-	-	-	-	-	3	-	-	-		09	PHON	090	
41945	-	-	-	1	-	-	-	3	2	-	-	-	17	10	PHON	150	C META SED
41947	-	-	-	-	-	-	-	-	-	-	-	-	106		SY	035	C GRANITE
41951	-	-	-	-	-	-	-	-	-	-	-	-			TR	060	C SI.4
41954	-	-	2	-	-	-	-	3	-	-	-	-	5	06	PATR	040	C SI.4
41958	-	-	-	-	-	-	-	-	-	-	-	-	92	17	CBT	*	C SI.4
41963	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	055	C QZT
41982	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	284	C SI.5
41996	-	-	-	-	-	-	-	-	-	-	-	-			ALCBT	070	C SI.4 ALTD CBT-ITE
41999	-	-	-	-	-	-	-	3	-	-	-	-		10	PTR	070	C SI.4,SI.5,SI.6 & SUPRACRUSTAL SST
43802	-	-	-	-	-	-	-	3	-	-	-	-		09	SPTR	075	C SI.4,SI.5,SI.6,JHG & SUPRACRUSTAL SST AS DK 54325
EMELEUS - CAMP 2, 1961 SOUTH IGDLERFIGSSALIK CENTRE, BETWEEN 1457M AND 1490M PEAKS																	
43824	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	170	C SI.5
43833	-	-	1	-	-	-	-	3	-	-	-	-			PMSY	035	C SI.5
43842	-	-	-	2	-	-	-	3	1	-	-	-	4		PMSY	*	C SI.5 SHEET OR DYKE?
43845	-	-	-	-	-	-	-	-	3	-	-	-		09	MSY	130	C SI.5 AS DK 43846
43846	-	-	-	-	-	-	-	-	-	-	-	-			PEG	130	C SI.5 AS DK 43845 PEGMATITIC FACIES
43855	-	-	-	-	-	-	-	-	-	-	-	-		12	TR	068	C SI.5 - RIEBECKITE
EMELEUS - CAMP 3, 1961 SOUTH WEST IGDLERFIGSSALIK CENTRE																	
43859	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	*	C Q-FS DOL SY - NEAR OSTFJ SY/IGDLER CONTACT
43866	-	-	-	-	-	-	-	-	-	-	-	-			OLDOL	*	C SI.7 ?HYBRID
43867	-	-	-	-	-	-	-	-	-	-	-	-	7	18	AOLDOL	*	C SI.7 ALKALI OL DOL
43881	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	C SI.5 ?IG SY?
43887	-	-	-	-	-	-	3	-	-	-	-	-		05	LAMP	070	C SI.7
43894	1	-	3	-	-	-	-	-	-	-	2	P		03	LAMP	055	C JHG P PHLOGOPITE XENOXTS
43895	-	-	-	-	-	-	-	-	-	-	-	-		07	NPMSY	*	C JHG
43897	-	-	-	1	-	2	-	3	-	-	-	-		09	PTR	090	C SI.7
43898	-	-	-	-	-	-	-	-	-	-	-	-		09	NPMSY	160	C SI.5
43902	-	-	-	-	-	-	-	-	-	-	-	-		06	ADOL	*	C SI.7 AS DK 43903 ALKALI DOL
43903	-	-	-	-	-	-	-	-	-	-	-	-			OLDOL	*	C SI.7 AS DK 43902
43914	-	-	-	-	-	-	-	-	-	-	-	-			AOLDOL	*	C SI.7 LATE INTRUSION ALK OL DOL
43916	-	-	-	-	-	-	-	-	-	-	-	-		04	BASD	065	C SI.7
43918	-	-	-	-	-	-	-	-	-	-	-	-		09	SY	090	C SI.5
43931	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	160	C SI.5
43939	-	-	-	-	-	-	-	-	-	-	-	-		09	?	120	C SI.5 AMPHIBOLE RICH - PHONOLITE?

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
EMELEUS - CAMP 4, 1961 MOUTH OF GIESECKES DAL																	
43967	-	-	-	-	-	-	-	3	-	-	-	-		09	PMSY	330	
43968	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	330	C SI.2
43970	-	-	-	-	-	-	-	3	-	-	-	-		09	PTR	*	C SI.2
43971	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	020	C SI.2
43976	-	-	-	-	-	-	-	3	-	-	-	-		09	PTR	090	C SI.2
43977	-	-	-	-	-	-	-	-	-	-	-	-		10	ALNPTR	020	C SI.2 ALKALI TRACHYTE
43979	-	-	-	-	-	-	-	-	-	-	-	-			METTR	020	C SI.2 METAMORPHOSED, REXTAL'D
43983	-	-	-	-	-	-	-	-	-	-	-	-			METTR	020	C SI.2 METAMORPHOSED, REXTAL'D
43984	-	-	-	-	-	-	-	3	-	-	-	-			PTR	020	C SI.2
43998	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	005	C SI.2
43999	-	-	-	-	-	-	-	3	-	-	-	-			PTR	035	C SI.2 & SS5
46203	-	-	-	-	-	-	-	-	-	-	-	-		03	SYGAB	020	C SI.3
46205	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	025	C SI.2
46208	-	-	-	-	-	-	-	-	-	-	-	-		03	LAMP	025	C SI.2 CUT BY FAULT
46210	-	-	-	-	-	-	-	3	-	-	-	-		09	APTR	020	C SI.2
46211	-	-	-	-	-	-	-	-	-	-	-	-		03	AOLDOL	020	C SI.2
46212	-	-	-	-	-	-	3	-	-	-	-	-			ABAS	025	C SI.2
46214	-	-	-	-	-	-	-	3	-	-	-	-			MAFTR	000	C SI.2 MAFIC TR(AEG-BI TR)
46217	-	-	-	-	-	-	-	-	-	-	-	-			MSY	*	C SI.2 EDGE
46218	-	-	-	-	-	-	-	-	-	-	-	-			MSY	*	C SI.2 CORE
46225	-	-	-	-	-	-	-	3	-	-	-	-		09	SPTR	*	C SI.2
46233	-	-	-	-	-	-	-	-	-	-	-	-	46	03	MAFSY	090	C SI.4 & SI.6
46236	-	-	-	-	-	-	-	-	-	-	-	-		03	AGAB	*	C SS5 CUT BY SI.2 AS DK 46203
EMELEUS - CAMP 5, 1961 MOUTH OF FLINKS DAL																	
46237	-	-	2	-	-	-	-	3	-	-	-	-	21	07	PTR	038	C SS5 ALSO PROBED AGAIN AS SAMPLE 31
46239	-	-	-	-	-	-	-	-	-	-	3	-		07	VARTR	038	C SS5 EDGE
46240	-	-	3	-	-	-	-	2	-	-	-	-	22	09	SPHTR	038	C SS5 CORE AF AT SPH CORE
46247	-	-	2	-	-	-	-	3	-	-	-	-	24	09	PTR	*	C SS5 EDGE
46248	-	-	-	-	-	-	-	-	-	-	-	-		?	?	*	C SS5 CORE FINE GRAINED TR?
46249	-	-	2	-	-	-	-	3	-	-	-	-	43	07	SPTR	035	C SS2 & JHG
46251	-	-	-	-	-	-	-	-	-	-	-	-		07	SPHTR	035	C SS2
46252	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	035	C SS2
46253	-	-	2	-	-	-	-	3	-	-	-	-	42	07	PTR	035	C SS2
46254	-	-	-	-	-	-	-	-	3	-	-	-		09	MAFTR	035	C SS2 MAFIC TRACHYTE
46256	-	-	-	-	-	-	-	-	-	-	-	-	86	17	CBT	*	G JG
46257	-	-	-	-	-	-	-	-	-	-	-	-	87	17	CBT	040	C SM4 & JHG
46274	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	040	C SS2
46275	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	*	C SS2
46277	-	-	-	-	-	-	-	-	-	-	-	-		09	SPHTR	045	C SS2 CORE SPHERULITIC
46278	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	045	C SS2 EDGE
46279	-	-	-	-	-	-	-	-	-	-	-	-	116	01	LAMP	020	
46280	-	-	3	-	-	-	-	-	-	-	2	A		07	SPTR	045	C SS5 A-APATITE
46282	-	-	-	-	-	-	-	1	-	-	-	-		09	NPTR	*	C SS5 EDGE*
46283	-	-	2	-	-	-	-	3	-	-	-	-			PTR	*	C SS5 CORE*
46284	-	-	-	-	-	-	-	3	-	-	-	-		02	PTR	*	C SS5 CORE*
EMELEUS - CAMP 6, 1961 RESERVOIR ABOVE NARSSARSSUAQ																	
46289	-	-	-	-	-	-	-	-	-	-	-	-		12	NPTR	040	C JHG CORE
46290	-	-	-	-	-	-	-	3	-	-	-	-		12	PTR	040	C SN1 & JHG EDGE
46293	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	056	C SN1 EDGE
46294	-	-	-	-	-	-	-	3	-	-	-	-		10	PTR	056	C SN1 CORE

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
46296	-	-	-	-	-	-	-	3	-	-	-	-		07	SPTR	070	C SN1
52201	-	-	-	-	-	-	-	-	-	-	-	-		07	SPHTR	045	C N.A.B. SY CALCITE AFT CPX?
52202	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	030	C N.A.B. SY
52207	-	-	-	-	-	-	-	-	-	-	-	-			ALPMSY	045	C N.A.B. SY - ALTERED
52209	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	015	C SN1
52211	-	-	-	-	-	-	-	3	-	-	-	-		10	SPATR	040	C SN5 AS DK 59774?
52216	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	065	C SN1 & JHG
52220	-	-	1	-	-	-	-	2	3	-	-	-			SPTR	075	C SN1
52228	-	-	-	-	-	-	-	3	-	-	-	-			ALPMSY	020	C SN1 ALKALI PORP MICROSY.
52242	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	075	C SN1
52245	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	020	C SN1
52247	-	-	2	-	-	-	-	3	-	-	-	-	55		PMSY	040	C SN1 & JHG
52248	-	-	-	-	-	-	-	3	-	-	-	-			ALPMSY	*	C JHG
EMELEUS - CAMP 1, 1963 OSTFJORDSDAL SYENITE																	
52257	-	-	2	-	-	-	-	-	-	3	-	-		03	LAMP	*	C SS1
52267	-	-	-	2	-	-	-	3	-	1	-	-	13	09	PMSY	000	C OSTFJ SY
52268	-	-	-	-	-	-	-	-	-	-	-	-				*	C SS1
52274	-	-	3	-	-	-	-	-	-	-	2	-		05	SYGAB	*	C SI.2
52275	-	-	-	-	-	-	-	3	-	-	-	-			METTR	040	C JG
52276	-	-	-	-	-	-	-	2	3	-	-	-	51		NEPORP	040	C JG
52277	-	-	-	-	-	-	-	-	-	-	-	-		09	ALTR	045	C JG
52285	-	-	2	-	-	-	-	-	-	3	-	-	99	03	LAMP	030	C OSTFJ SY
52286	-	-	-	-	-	-	-	-	-	3	-	-		03	FLTR	045	C OSTFJ SY FL-FLOW LAM
52287	-	-	2	-	-	-	-	-	3	-	-	-	120	03	LAMP	050	C OSTFJ SY
52289	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C OSTFJ SY
52291	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	040	C SS5
EMELEUS - CAMP 2, 1963 GIESECKES DAL																	
52292	-	-	-	-	-	-	3	-	-	-	-	-			BFD	055	C GNEISS
52293	-	-	2	-	-	-	-	3	-	-	-	-	6	07	PTR	050	C JG
52298	-	-	2	-	-	-	-	3	-	-	-	-	32	09	PTR	075	C SS3
EMELEUS - CAMP 1, 1962 FLINKS DAL, BY ALK GABBRO RING DYKE																	
58001	-	-	-	-	-	-	-	-	-	-	-	-			BRECC?	*	C SM1
58002	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	055	C SM4
58003	2	-	-	-	-	-	-	3	-	-	-	-	27	09	PTR	050	C SM4
58009	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	*	C SM4
58015	-	-	-	1	-	-	-	3	2	-	-	-	70		PTR	*	INCL IN SM4
58017	-	-	-	-	-	-	-	-	-	-	-	-	2	07	BASICSY	*	C SM4 LATE RING DYKE, MAFIC SYENITE/ALK-GABBRO
58019	-	-	1	-	-	-	-	3	2	-	-	-	111	09	PPHON	160	C SM4
58022A	-	-	-	-	-	-	-	1	-	-	-	-		07	NPTR	065	C SC & C DK 58023 EDGE
58022B	1	-	2	-	-	-	-	3	-	-	-	-	39		PTR	140	C SC & C DK 58023 CORE
58023	2	-	-	-	-	-	-	3	-	-	-	-	62	09	PTR	140	CUT BY 58022
58031	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	068	C SM4
58033	-	-	-	-	-	-	-	3	-	-	-	-		08	PTR	060	
58036	-	-	-	-	-	-	-	-	-	-	-	-	23	06	BASICSY	*	BASIC LARVIKITE SC' LATE RING DYKE EDGE C SM4
58037	-	-	-	-	-	-	-	-	-	-	-	-			BASICSY	*	BASIC LARVIKITE SC' LATE RING DYKE CORE C SM4
58041	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	070	C SM4
58042	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	065	C SM4
58043	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	065	C SM4
58044	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	065	C SM4
58045	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	060	C SM4
58046	2	-	1	-	-	-	-	3	-	-	-	-		07	SPTR	060	C SM4

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
58047	-	-	-	-	-	-	-	-	-	-	-	-		09	FLNPTR	060	SAME DYKE AS DK 58059/60/61 C SI.2
58048	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	055	C DK 58057
58049	-	-	-	-	-	-	-	-	-	-	-	-			TR	*	TRACHYTIC VEIN C SC'
58050	-	-	-	-	-	-	-	-	-	-	-	-		03	BASICSY	*	BASIC LARVIKITE SC' C MZI
58051	1	2	-	-	-	-	-	3	-	-	-	-			PTR	050	C SM4
58059	-	-	-	-	-	-	-	-	-	-	-	-		09	SPHTR	060	C SI.2 AS DK 58047 EDGE
58060	-	-	-	-	-	-	-	1	-	-	-	-		09	FLNPTR	*	C SI.2 AS DK 58047 CORE
58061	-	-	-	-	-	-	-	-	-	-	-	-		09	SPHTR	*	C SI.2 SPH APOPH OF AS DK 58059/60
EMELEUS - CAMP 2, 1962 BY 700M LAKE, UPPER FLINKS DAL																	LATE ALK GAB DYKE
58062	-	-	-	-	-	-	-	-	-	-	-	-		06	SY	*	BASIC LARVIKITE SC' LATE ALK GAB DYKE C MZI
58063	-	-	-	-	-	-	-	-	-	-	-	-		09	VARTR	*	C S
58065	-	-	-	-	-	-	-	-	-	-	-	-	33	04	SYGAB	*	BASIC LARVIKITE SC' LATE ALK GAB DYKE C MZI MARGINAL FACIES
58071	-	-	-	-	-	-	-	-	-	-	-	-			BASICSY	*	C MZI
58074	-	-	-	-	-	-	-	-	-	-	-	-		06	BASICSY	000	C SM4 CORE HYBRID
58075	-	-	-	-	-	-	-	-	-	-	-	-			BASICSY	*	C SM4 CORE
58076	-	-	-	-	-	-	-	-	-	-	-	-		03	BASICSY	*	C SM4 EDGE
58078	-	-	-	-	-	-	-	-	-	-	-	-		05	TRDOL/TR	065	
58083	-	-	-	-	-	-	-	-	-	-	-	-		07	BASICSY	*	C SM4 LATE ALK GAB DYKE
58086	-	-	-	-	-	-	-	-	-	-	-	-		08	SPHTR	045	C SM4 AS DK 58086 EDGE
58092	-	-	-	-	-	-	-	-	-	-	-	-		09	SPHTR	000	C SM4 AS DK 58085 CORE
58097	-	-	-	-	-	-	-	-	-	-	-	-			AGAB	*	C SM4 & SM5 MARGIN OF LATE ALK GAB DYKE
58100	-	-	-	-	-	-	-	-	-	-	-	-	34		MAFSY	*	C MZI
58101	-	-	-	-	-	-	-	-	-	-	-	-			SYGAB	*	C MZI LATE ALK GAB DYKE
58103	-	-	-	-	-	-	-	-	-	-	-	-			SYGAB	*	COARSE SYENITE VAR OF LATE ALK GAB DYKE
58104	-	2	-	-	-	-	-	3	-	1	-	-		09	PTR	040	C SM5
58105	2	-	-	-	-	-	3	-	-	-	-	-		04	ADOL	*	C SM5 10M WIDE EDGE
58106	-	-	-	-	-	-	-	-	-	-	-	-		05	AOLDOL	040	C SM5 10M WIDE CORE
58107	-	-	-	-	-	-	-	-	-	-	-	-			AOLGAB	*	C SM5 LATE ALK GAB DYKE
58109	-	-	-	-	-	-	-	-	-	-	-	-		04	AOLDOL	040	C SM5 LATE ALK GAB DYKE
58110	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	040	C LATE ALK GAB DYKE
58112	-	-	-	-	-	-	-	-	-	-	-	-			MAFSY	*	ALIGNED FSP LATE ALK GAB DYKE
58113	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	AREA IN LATE ALK GAB DYKE
58114	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	C LATE ALK GAB DYKE
58116	-	-	-	-	-	-	3	-	-	-	-	-			AGAB	*	LATE ALK GAB DYKE
58117	-	-	-	-	-	-	-	-	-	-	-	-			AN	*	INCLUSION FROM LATE ALK GAB DYKE
EMELEUS - WORKING FROM NV USSING IN QOROQ, 1962																	
58118	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	*	RHEOMORPHIC SY IN TR DYKE EDGE C SS5
58119	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	125	C SS5
58122	-	-	-	-	-	-	-	-	-	-	-	-				*	C SS5
58123	-	-	-	-	-	-	2	3	-	-	-	-		06	PTR	020	C SI.2 & SI.3
58127	-	-	-	-	-	-	-	-	-	-	3	-			MTSEG	*	C SI.3 AS DK 58128 MAGNETITE SEGREGATION
58128	-	-	-	-	-	-	-	-	-	-	-	-		10	SY	*	C SI.3 AS DK 58127
58130	3	-	-	-	-	-	-	-	-	-	-	-	112	03	SYGAB	*	C SS5 AS DK 46203
58132	-	-	2	-	-	-	-	3	-	-	-	-		07	PTR	*	C SS5
58133A	-	-	-	-	-	-	-	-	-	-	-	-		09	VARTR	*	C SS5 EDGE
58133B	-	-	-	-	2	-	-	-	-	-	3	-		07	PTR/MSY	*	C SS5 CORE A-A POIKOXTS
58135	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	175	C SS5
58138	-	-	-	-	-	-	-	3	-	-	-	-		07	MSY	000	C SS3,C DK 58223,C DK 58253,C DK 58251
58139	1	-	2	-	-	-	-	3	-	-	-	-		07	PTR	000	C SS5
58140A	-	-	-	-	-	-	-	3	-	-	-	-		09	PTR	045	C SS5 CORE
58140B	-	-	-	-	-	-	-	-	-	-	-	-		08	SPHTR	*	C SS5 EDGE

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
58141A	-	-	-	-	-	-	-	3	-	-	2	-		07	PTR	045	C LAM SY & C DK 58140 CORE
58141B	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	*	C LAM SY & C DK 58140 EDGE
58151A	-	-	-	-	-	-	-	3	-	-	-	-		10	PTR	090	C SS4 CORE
58151B	-	-	-	-	-	-	-	-	-	-	-	-		04	MTSEG	*	C SS4 EDGE
58159	-	-	-	-	-	-	-	3	-	-	-	-		07	SPMSY	015	C SS5
58173	-	-	-	-	3	-	-	-	-	-	-	-		07	PMSY	000	C SI.2, CSS5
58197	-	-	-	-	-	-	-	-	-	-	-	-		07	MSY	*	C SS2
58206	-	-	-	-	-	-	-	-	-	-	-	-	19	07	NPTR	050	C SS2
58212	-	-	-	-	-	-	-	3	-	-	-	-		06	PTR	050	C SS2
58216	-	-	-	-	-	-	-	-	-	-	-	-		15	NPTR	040	C SS2
58217	-	-	-	-	-	-	-	-	-	-	-	-				020	C SS2
EMELEUS - CAMP 6, 1962 AT 735M SUMMIT, NARSSARSSUAQ PLATEAU																	
58219	-	-	-	-	-	-	3	-	-	-	-	-		09	BFD	170	C SS5
58223	-	-	-	-	-	-	-	-	-	-	-	-		07	BFD	050	C SS3 & SS4, CUT BY 58138,58240,58241
58224	-	-	1	-	-	-	-	3	2	-	-	-	25	09	PTR	*	C SS4 & SS5
58225	-	-	2	-	-	-	-	3	-	-	-	-		07	SPTR	000	C SS4
58226	-	-	-	-	-	-	-	3	-	-	-	-		07	SPMSY	010	C SS4 & SS5
58227	-	-	-	-	-	-	-	-	-	-	-	-		10	NPTR	030	C SS4 DENDRITIC FSPS
58235	-	-	2	-	-	-	-	3	-	-	-	-		09	SPTR	*	C SS3
58237A	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	C SS4 EDGE BFD
58237B	-	-	-	-	-	-	3	-	-	-	-	-			AN	*	C SS4 ANORTH INCL IN BFD
58238A	-	-	-	-	-	-	-	3	-	-	-	-		10	PTR	025	C DK 58239 & C DK 58252 CORE C SS3
58238B	-	-	-	-	-	-	-	3	-	-	-	-		12	PTR	*	C DK 58239 & C DK 58252 EDGE C SS3
58239	-	-	3	-	-	-	-	-	-	-	-	-		07	SPTR	150	CUT BY 58238 C SS3
58240	2	-	-	-	-	-	-	3	-	-	1	-	71	07	PTR	*	CUT BY 58241 C SS3 C DK 127035,36
58241	-	-	-	-	-	-	-	3	-	-	-	-		07	PMSY	008	C DK ALL AT 970M SUMMIT C SS3
58242	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	130	CUT BY 58237 C SS3 C DK 58262
58243	-	-	-	-	-	-	-	3	-	-	-	-		09	PTR	*	C SS2
58251	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	175	C SS3 & SS4 CUT BY 58238
58252	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	050	CUT BY 58238 C SS3
58253	-	-	1	-	-	-	-	3	2	-	-	-		07	PTR	*	C CGSY & SS2
58254	-	-	-	-	-	-	-	-	-	-	-	-	94	17	CBT	*	C SS2 & FAULT?
58260	-	-	-	-	-	-	-	-	-	-	-	-			AN	*	C SS3 PLAG XENOXT IN BFD
58262	-	-	-	-	-	-	-	-	-	-	-	-		11	AN	*	C SS2 & SS3 CUT BY 58242, PLAG XENOXT
58264	-	-	2	-	-	-	-	3	-	-	-	-	35	10	PTR	030	C SS2 & SS3
58265	-	-	-	-	-	-	-	-	-	-	-	-		10	SPHTR	060	C SS2 & SS3
58276	-	-	-	-	-	-	3	-	-	-	-	-		11	BFD	*	PLAG FROM 58277 C SS3
58277	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	C SS3
EMELEUS - CAMP 7, 1962 IGALIKO AREA																	
58290	-	-	-	-	-	-	3	-	-	-	-	-	102	06	BFD	*	
58291	-	-	-	-	-	-	-	-	-	-	-	-	38	07	NPTR	045	@700m FROM IGDLERFIG C SUPRA CUT BY SI.4
58292	-	-	-	-	-	-	-	3	-	-	-	-	16	07	PTR	*	@650m C SUPRA CUT BY SI.4
58293	-	-	-	-	-	-	-	-	-	-	-	-	15	07	NPTR	*	@600m C SUPRA CUT BY SI.4
58294	-	-	-	-	2	-	-	3	-	-	1	-	9	07	PTR	*	@500m POIK ALK AMPH C SUPRA CUT BY SI.4
58295	-	-	-	-	3	-	-	-	-	-	-	-		07	PTR	*	@470m C SUPRA CUT BY SI.4
58296	-	-	-	-	-	-	-	-	-	-	-	-	101	07	NPTR/MSY	*	@400m C SUPRA CUT BY SI.4
58297	-	-	-	-	3	-	-	-	-	-	-	-	30	07	PTR/MSY	*	@300m POIK ALK AMPH C SUPRA CUT BY SI.4
58298	-	-	-	-	3	-	-	-	-	-	-	-	10	07	REXPTR	*	@150m POIK ALK AMPH C SUPRA CUT BY SI.4
EMELEUS - CAMP 8, 1962 AT 88M PENINSULA, END OF NARSSARSSUAQ PENINSULA																	
58326	-	-	-	-	-	-	-	3	-	-	-	-			PTR	040	C FOY(SN1?) & P SY
58329	-	-	-	-	-	-	-	3	-	-	-	-			PTR	030	C SS3

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
58330	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	C SS3
58331	-	-	-	-	-	-	-	-	-	-	-	-			ALNPTR	*	C SS3 & SS2
58332	-	-	-	-	-	-	3	-	-	-	-	-		11	AN56	*	C SS3 PLAGIOCLASE XENOCRYST
58338	-	-	-	-	-	-	-	-	-	-	-	-		07	NPATR	030	C SS5
EMELEUS – CAMP 2, 1963 GIESECKES DAL																	
58344	-	-	-	-	-	-	-	3	-	-	-	-			ALPTR	055	C GNEISS
58347A	-	-	-	-	-	-	-	3	-	-	-	-		03	MARGBFD	*	C SS5 EDGE
58347B	-	-	-	-	-	-	-	3	-	-	-	-		03	METBFD	*	C SS5 CORE
58349	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	010	C SS4
58350	-	-	-	-	-	-	-	-	-	-	-	-		09	FLNPTR	000	C SS5
EMELEUS – CAMP 3, 1963 960M SUMMIT N OF MOTZFELDT SO																	
58357	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	055	C QZT
58358	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	*	C JHG
58359	-	-	-	-	-	-	-	-	-	-	-	-			ALNPTR	065	C QZT
58371	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	065	COMP DYKE C MZI
58372	1	-	-	-	-	-	2	3	-	-	-	-			DOL?	065	COMP DYKE C MZI
58376	-	-	-	-	-	-	-	3	-	-	-	-			ALPTR	060	C S 40M SHEET IN NM SY
58388	2	-	-	-	-	-	3	-	-	-	-	-		04	DOL	035	C MZI
58394	-	-	-	-	-	-	-	-	-	-	-	-		18	AMPHIBOL	055	C JHG, AMPHIBOLITE, NOT GARDAR
EMELEUS – CAMP 4, 1963 LEJRELV, N SHORES OF MOTZFELDT SO																	
63704	-	-	-	-	-	-	-	3	-	-	-	-		10	PTR	*	C SM1 & SM3
63706	-	-	-	-	-	-	-	-	-	-	-	-			GAB	*	LOOSE PIECE
63707	-	-	-	-	-	-	-	-	-	-	-	-	12		AGAB	*	LOOSE PIECE
63712	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	*	C SM3– SHEET
63714	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	C SM3– PORP TR SHEET
63716	-	-	-	-	-	-	-	-	-	-	-	-		05	ADOL	040	C SM2 LATE ALK GAB DYKE
63722	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	045	C S C MZI
63723	-	-	-	-	-	-	-	-	-	-	-	-			NPATR	040	C S C MZI
EMELEUS – CAMP 5, 1963 THE WALL, SW MOTZFELDT CENTRE.																	
63726	-	-	-	-	-	-	-	3	-	-	-	-		03	ALLAMP	060	C SM4
63727	-	-	-	-	-	-	-	-	-	-	-	-		07	MAFSY	090	C SM4
63741	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	055	C S C MZI
63751	2	-	-	-	-	-	-	3	-	-	-	-	44	09	PTR	040	C FOY C MZI
63752	2	-	-	-	-	-	-	3	-	-	-	-			PTR	045	C FOY C MZI
63755	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	*	C SM4
63756	1	-	2	-	-	-	-	3	-	-	-	-			PTR	040	C SM4 PLAG CORES TO ALK FSP
63765	-	-	-	-	-	-	-	3	-	-	-	-			PTR	055	C SM1
63766	-	-	-	-	-	-	-	-	-	-	-	-			BFD	055	COMP DYKE C SM1 & JG
63767	-	-	-	-	-	-	-	-	-	-	-	-			AN	*	COMP DYKE CORE C SM1 & JG
63768	-	-	2	-	-	-	-	3	-	-	-	-	29	07	PTR(EDGE)	*	COMP DYKE C SM1 & JG
63769	-	-	3	-	-	-	-	2	-	-	-	-			SPTR	050	C SM1
63777	-	-	-	-	-	-	-	-	-	-	-	-		04	GAB	*	C JG
63778	-	-	-	-	-	-	-	-	-	-	-	-		04	GAB	*	C JG
63779	-	-	-	-	-	-	-	-	-	-	-	-			GAB	*	C JG
63780	-	-	-	-	-	-	-	-	-	-	-	-		04	GAB	*	C JG
EMELEUS – CAMP 6, 1963 NARSSARSSUK PEGMATITE																	
63808	-	-	-	-	-	-	-	-	-	-	-	-	98	18	BFDMATRIX	*	BLOCKS IN SI.4 I.E. CUT BY SI.4
63809	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	CUT BY 63885 (BLOCKS IN SI.4) CUT BY SI.4
63810	-	-	2	-	-	-	-	3	-	-	-	-	109		PMSY	*	BLOCK IN SI.4 CUT BY SI.4
63815	-	-	-	-	-	-	-	-	-	-	-	-		09	MSY	020	C SI.4
63818	-	-	-	-	2	-	-	3	-	-	-	-			PTR	080	C QZT

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
63819	-	-	-	-	-	-	-	-	-	-	-	-		07	BFDMATRIX	*	XENOLITH IN SI.4 MARGIN
63820	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	XENOLITH IN SI.4 MARGIN
63821	-	-	-	-	-	-	3	-	-	-	-	-			AN	*	XENOLITH IN SI.4 MARGIN
63828	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	XENOLITH IN P M SY SHEET
63834	-	-	-	-	-	-	-	-	-	-	-	-			CBT	*	C SI.4 & LEUCO SHEET
63836	-	-	-	-	-	-	-	3	-	-	-	-		10	SPTR	055	C SI.4
63845A	-	-	2	-	-	-	-	3	-	-	-	-			PTR	*	
63845B	-	-	-	-	-	-	-	-	-	-	-	-	1	04	REX BAS	*	
EMELEUS - CAMP 1, 1969 5 KM SOUT WEST OF QAGSSIARSSUK																	
63881	-	-	-	-	-	-	-	2	-	-	-	3		15	QTZPORP	045	C BFD (2)
63882	-	-	-	-	-	-	-	3	-	-	-	-		10	PTR	030	C BFD
63884	-	-	-	-	-	-	3	-	-	-	-	-		04	PDOL	090	GIANT DYKE
63885	-	-	-	-	-	-	-	3	-	-	-	-			VARPTR	*	C DK 63884
EMELEUS - CAMP 2, 1969 RIVER N FRON QORORSSUAQ TO GIESECKES DAL																	
63889	-	-	-	-	-	-	3	-	-	-	-	-			BFD	075	C SI.2
63890	-	-	-	-	-	-	3	-	-	-	-	-		04	BFD	000	C SI.2
63891	-	-	-	-	-	-	-	-	-	-	-	-		06	NPTR	020	C SI.7
63893	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	050	
63894	-	-	-	-	-	-	-	2	-	-	-	3			QTZPORP	045	C RHOMB P TR & SST BREDEFJORD EDGE C DK
63895	-	-	-	-	-	-	-	2	-	-	-	3	50	15	QTZPORP	*	C RHOMB P TR & SST BREDEFJORD CORE C DK
63896	-	-	2	-	-	-	-	3	-	-	-	-	14		PTR	048	CUT BY 63894/5 TYPE DYKES BREDEFJORD
63898	-	-	-	-	-	-	-	-	-	-	-	3			QTZPORP	040	BREDEFJORD, SPHERULITIC
87118	-	-	-	-	-	-	-	-	-	-	-	-				*	C SI.4 & SI.6
87124	-	-	-	-	-	-	-	-	-	-	-	-				090	C GNEISS
87125	-	-	-	-	-	-	-	-	-	-	-	-				060	C JG
EMELEUS - TRAVERSE ACROSS PENINSULA SOUTH OF IGALIKO VILLAGE																	
126752	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	060	C GABBRO SET
126753	-	-	-	-	-	-	-	-	-	-	-	-		02	ALNPTR	060	
126754	-	-	-	-	-	-	-	2	3	-	-	-		09	NEPORP	050	C SST NEPHELINE PORPHYRY
126755	-	-	2	-	-	-	1	3	-	-	-	-			PTR	050	C SST PLAG CORES TO AF'S
126756	-	-	-	-	-	-	-	3	-	-	-	-		07	ALPTR	045	C SST
126757	-	-	-	-	-	-	-	3	2	-	-	-			PTR	045	C SST
126758	-	-	-	-	-	-	-	-	-	-	-	-		07	AEGTR	060	AEGIRINE RICH TRACHYTE
126759A	-	-	-	-	-	-	-	3	-	-	-	-		07	MICROPTR	060	C SST
126759B	-	-	-	-	-	-	-	3	2	-	-	-	45	07	PTR	*	C SST
126760	-	-	-	-	-	-	-	3	2	-	-	-		07	PTR	010	C DK 126761 & GNEISS
126761	-	-	-	-	-	-	-	-	-	-	-	-		09	SPHTR	090	C GNEISS CUT BY 126760
126762	-	-	-	-	-	-	-	-	-	-	-	-			ALNPTR	060	C GNEISS - ALTERED
126763	-	-	-	-	-	-	-	3	-	-	-	-		07	SPTR	025	C GNEISS
126764	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	055	C GNEISS
126765	-	-	2	-	-	-	-	3	-	-	-	-	36	09	PTR	060	C SST
126766A	-	-	-	-	-	-	2	3	-	-	-	-		06	BFD	060	CUT BY 126767
126766B	-	-	-	-	-	-	3	-	-	-	-	-		06	BFD	*	CUT BY 126767 EDGE
126766C	-	-	-	-	-	-	3	-	-	-	-	-		02	FINEGRTR	*	CUT BY 126767
126767	-	-	-	-	-	-	-	-	-	-	-	-		07	SPHTR	*	C DK 126766
126768	-	-	-	-	-	-	3	-	-	-	-	-		08	ALPTR	065	
126769	-	-	-	-	-	-	-	-	-	-	-	-		07	SPHTR	045	
126770	-	-	-	-	-	-	3	2	-	-	-	-		07	BFD?	055	
126771	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	055	
126772	2	-	-	-	-	-	-	3	-	-	-	-	26		PTR	055	
126773	-	-	1	-	-	-	2	3	-	-	-	-		07	PTR	075	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
126775	-	-	-	-	-	-	-	-	-	-	-	-		06	NPMSY	055	
HARRY - CAMP 1, 1962 AT 700M LAKE, UPPER FLINKS DAL																	
59601	-	-	-	-	-	-	-	-	-	-	-	-		04	OLDOL	*	C SM4 LATE ALK GABBRO DYKE
59602	-	-	-	-	-	-	-	-	-	-	-	-			OLDOL	*	C SM4 LATE ALK GABBRO DYKE
59605	-	-	-	-	-	-	-	-	-	-	-	-		07	TR	*	C MZI ALTERED
59608	-	-	-	-	-	-	-	-	-	-	-	-			ALBFD?	050	C SM4
59616	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	020	C MZI
59617	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	080	C MZI
59618	-	-	-	-	-	-	3	2	-	-	-	-			PTR	080	C MZI CORE
59619	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	*	C DK 59620 EDGE
59620	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	070	CUT BY 59619
59621	2	-	-	-	-	-	3	-	-	-	-	-		03	AOLDOL	090	C SM4 LATE ALK GABBRO DYKE
59622	-	-	-	-	-	-	3	-	-	-	-	-		04	OLDOL	250	C SM4 LATE ALK GABBRO DYKE
59623	-	-	-	-	-	-	-	-	-	-	-	-			?	*	ALTERED TRACHYTE
59624	-	-	-	-	-	-	-	-	-	-	-	-		05	AOLDOL	*	C SM4 LATE ALK GABBRO DYKE
59625	-	-	-	-	-	-	-	3	-	-	-	-			MSY	*	C SM4
59627	-	-	-	-	-	-	-	-	-	-	-	-			?	*	ALTERED TRACHYTE
59628	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	020	C MZI & BRECCIATED SY RED-FE3+ STAINED
59629	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	C MZI
59631	-	-	-	-	-	-	-	-	-	-	-	-	48		AOLDOL	*	SAME DYKE AS DK 59632 C SM4
59632	-	-	-	-	-	-	-	-	-	-	-	-	8	05	AOLDOL	*	NR CONTACT WITH SB (AS DK 59631) C SM4
59633	-	-	-	-	-	-	-	3	-	-	-	-			ALPTR	*	AT CONTACT WITH SB (AS DK 59631) C MZI
59634	-	-	-	-	-	-	-	-	-	-	-	-			ALSY	*	CONTACT WITH SB (AS DK 59631)
59636	-	-	-	-	3	-	-	-	3	-	-	-	18		NEPORP	*	C MZI A-A POIKILOBLASTIC
59637	-	-	-	-	-	-	3	-	-	-	-	-			AN	*	
HARRY - 1962, FROM NV USSING (SECOND CAMP)																	
59652	-	-	-	-	-	-	-	-	-	-	-	-		09	VARTR	*	
59656	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	*	C SS3
59660	1	-	2	-	-	-	-	3	-	-	-	-	52		PTR	*	C SS3
59677	-	-	-	-	-	-	-	-	-	-	-	-		08	SPHTR	*	C SQC
59692	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	310	C SI.1
59703	-	-	-	-	-	-	-	-	-	-	-	-		03	BFD	*	C SI.2 BFD SAME DYKE AS DK 59704/5/6/7/8 BFD MATRIX
59704	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	FSP FROM 59703 C SI.2 AS DK 59703-8
59705	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	ANORTH INCL FROM 59703 C SI.2 AS DK 59703-8
59706	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	ANORTH INCL FROM 59703 C SI.2 AS DK 59703-8
59707	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	ANORTH INCL FROM 59703 C SI.2 AS DK 59703-8
59708	-	-	-	-	-	-	3	-	-	-	-	-		03	BFD	*	MATRIX OF 59703 C SI.2 AS DK 59703-8
59718	-	-	-	-	-	-	-	-	-	-	-	-		10	NPTR	045	C SS3
59719	-	-	-	-	-	-	-	3	-	-	-	-		10	SPTR	*	C SS3
59720	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SI.1
59729	-	-	-	-	-	-	-	-	-	-	-	-			ALOLDOL	060	C SS2 ALTD
59731	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	045	C SS2 AS DK 127069
59734	-	-	-	-	-	-	3	-	-	-	-	-		04	ALOLDOL	*	C SS2 ALTD
HARRY - CAMP 3 1962, SOUTH END OF 2.5 KM LAKE IN FAULT, NORTH QOROQ																	
59741	-	-	2	-	-	-	-	3	-	-	-	-	40		PTR	050	C SN4 & SN5
59742	-	-	-	-	-	-	-	-	-	-	-	-			VARTR	*	C SN4
59745	-	-	-	-	-	-	-	-	-	-	-	-			AOLDOL	045	C SN4 ALKALI OL-DOL
59754	-	-	-	-	-	-	-	-	-	-	-	-			?	080	C SN1
59759	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	*	C SN4
59771	-	-	2	-	-	-	-	3	-	-	-	-	53	07	SPTR	045	SAME DYKE AS DK 58772 NQC
59772	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	AS DK 59771 SHOWING LL FSP NQC

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
59773	-	-	2	-	-	-	-	3	-	-	-	-			PTR	*	C SN4
59774	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	*	SAME DYKE AS DK 59771 NQC
59778	-	-	-	-	-	-	-	3	2	-	1	-			REX TR	*	CUT BY 59779 NQC
59779	2	-	-	-	-	-	-	3	-	-	-	-	37	07	SPTR	040	C DK 59778 NQC
59780	-	-	-	-	-	-	-	3	-	-	-	-			BFD	040	BFD CHILLED AGAINST PORP DYKE OF SIMILAR TREND NQC
59782	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	050	C SN5 CUT BY 59784 - REDDENED - FE3+ STAINED
59783	2	-	-	-	-	-	-	3	-	-	-	-	47		SPTR	*	C SN5
59784	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	*	C DK 59782
59789	2	-	-	-	-	-	-	3	-	-	-	-			PTR	*	C SN5
59790	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	*	C SN5
HARRY - CAMP 4 1962, NARSSARSSUK PEGMATITE (AT EMELEUS' CAMP 7)																	
59806	-	-	-	-	-	-	-	-	-	-	-	-		03	ALBAS	*	C QZT
59808	-	-	-	-	-	-	-	-	-	-	-	-			ALBAS	*	C QZT
HARRY - CAMP 1 1963, 570M LAKE, QORORSSUAQ VALLEY																	
59866	-	-	-	-	-	-	-	3	-	-	-	-		09	SPTR	068	C SS5
59875	-	-	-	-	-	-	-	-	-	-	-	-			VARTR	068	C SS2 VARIOLITIC
59880	-	-	3	-	-	-	-	-	-	-	-	-		09	SPTR	*	C SI.5
59883	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	020	C SS5
59884	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	000	C SS5
59885	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	030	C SS4 & SS5
59887	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	068	C SS4
59899	-	-	-	-	-	-	-	-	-	-	-	-			MAFNESY	*	(CONTS INCLUSION OF 59898)(C DK 59898)
HARRY - CAMP 2 1963, GIESECKES DAL																	
54114	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	*	C SS2?
HARRY - CAMP 3 1963, EAST MOTZFELDT?																	
54140	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	310	C SM3
54145	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	090	C MZI
54147	-	-	-	-	-	-	-	3	-	-	-	-			PTR	000	C SM1
54155	-	-	2	1	-	-	-	3	-	-	-	-			PTR	040	"HOT" C SM1
54156	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	045	C SM3
54158	-	-	-	-	-	2	-	3	-	-	-	-		09	PTR	045	C SM3
HARRY - CAMP 4 1963, 'HARRYS DAL', 4KM NW OF RIVER FROM MOTZFELDT SO																	
54164	-	-	3	-	-	-	-	2	-	-	-	-		01	LAMP	295	C GRANITE C SM2 OR SM3
54165	-	-	-	-	-	-	-	-	-	-	-	-			CBT	*	C GRANITE AS DK 54164 C SM2 OR SM3
54166	-	-	-	-	-	-	-	-	-	-	-	-			CBT	*	SAME DYKE AS DK 54165
54168	-	-	-	-	-	-	-	-	-	-	-	-	115		LAMP	*	C JG
54175	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	*	C SM1
54176	-	-	2	-	-	-	-	3	-	-	-	-			PTR	*	
HARRY - CAMP 5 1963, BETWEEN 2 SMALL LAKES, NORTH QOROQ CENTRE																	
54195	-	-	-	-	-	-	-	-	-	-	-	-			REXMSY	055	C SN4 - RECRYSTALLISED
54197	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	045	C SN5
54202	-	-	-	-	-	-	-	-	-	-	-	-			BFD	*	C SN4
54205	-	-	-	-	-	-	-	3	-	-	-	-			SPVARTR	020	C SN5 - VARIOLITIC
54216	-	-	-	-	-	-	-	-	-	-	3	-			CBT	*	
54219	-	-	-	-	-	-	-	-	-	-	-	-			?	075	C SN5
54225	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	SAME DYKE AS DK 59772 NQC
54228	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	070	LIES BETWEEN 59790 & 59792 NQC
HARRY - CAMP 6 1963, NARSSARSSUK PEGMATITE																	
54230	-	-	-	-	-	3	-	-	-	-	-	-		09	SPMSY	*	C QZT
54243	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	*	SAME DYKE AS DK 54244 C SUPRACRUSTAL SST & CONG NR. SI.4
54244	-	-	-	-	-	-	-	-	-	-	-	-	85	17	CBT	075	AS DK 59243 C SUPRACRUSTAL SST & CONG NR. SI.4

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
54252	-	-	-	-	-	-	2	3	-	-	-	-			ALBFD	*	SAME DYKE AS DK 54257/8 C QZT
54257	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	AS DK 54252 MATRIX AT CORE C QZT
54258	-	-	-	-	-	-	3	-	-	-	-	-	123	06	BFD	*	AS DK 54252 MATRIX AT EDGE C QZT - TRACHY-BASALT
54272	-	-	-	3	-	-	-	3	-	-	-	-		07	SPTR	*	C QZT & BRECCIA
54275	-	-	-	-	-	-	-	-	-	-	-	-	96	17	CBT	*	C SUPRACRUSTAL SST & CONG
54276	-	-	-	-	-	-	-	-	-	-	-	-			ALNPTR	*	C QZT
54286	-	-	-	-	-	-	-	3	-	-	-	-		12	PTR	*	C BRECCIA
54287	-	-	-	-	-	-	3	-	-	-	-	-			AN	*	SAME DYKE AS DK 54288
54288	-	-	-	-	-	-	3	-	-	-	-	-			ALBFD	*	AS DK 54287
54289	-	-	-	-	-	2	-	3	-	-	-	-		07	REXTR	*	C BRECCIA RECRYSTALLISED
54293	-	-	-	-	-	-	-	3	-	-	-	-		12	SPTR	*	C BRECCIA
54297	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	C BRECCIA
54314	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	SAME DYKE AS DK 54315/6/7/8/9 & 54321/3/4 C JHG SUPRA SST &CONG
54315	-	-	-	-	-	-	3	-	-	-	-	-			AN	*	AS DK 54314 ANORTH INCL C JHG SUPRA
54316	-	-	-	-	2	-	3	-	-	-	-	-		07	BFD	*	AS DK 54314 C JHG SUPRA
54317	-	-	-	-	-	-	3	-	-	-	-	-		06	ALBFD	045	AS DK 54314 ALTERED BFD
54318	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	*	AS DK 54314 C JHG SUPRA
54319	-	-	2	-	-	-	-	3	-	-	-	-			PTR	070	C JHG AND C SUPRA
54321	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	AS DK 54314 C JHG SUPRA
54323	-	-	-	-	-	-	3	-	-	-	-	-		05	BFD	*	AS DK 54314 ANORTH INCL C JHG SUPRA
54324	-	-	-	-	-	-	3	-	-	-	-	-		05	BFD	*	AS DK 54314 C JHG SUPRA
54325	-	-	-	-	-	-	-	3	-	-	-	-		09	PTR	070	C SI.4,SI.5,SI.6,JHG &SUPRACRUSTAL SAME DYKE AS DK 43808
BRADSHAW, 1982, LOCALITIES IN THE MOTZFELDT CENTRE																	
304006	-	-	-	-	-	-	-	3	2	-	-	-	20	09	PHON	*	C FSM1
304007	-	-	-	-	-	-	-	3	2	-	-	-			PHON	*	C FSM1
304008	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	*	C SM2
304011	-	-	-	1	-	-	-	3	2	-	-	-			PHON	*	C SM2
304012	-	-	-	-	-	-	-	-	-	-	-	-				*	C SM2
304013	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	*	C SM2
304017	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	C FSM1
304022	-	-	-	-	-	-	-	3	2	-	-	-			PHON	*	C ASM1
304023	-	-	-	-	-	-	-	3	2	-	-	-		09	PHON	*	C FSM1
304029	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	*	C JHG?
304034	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	*	C SM2
304038	-	-	1	-	-	-	-	3	2	-	-	-			PHON	*	C FSM1
304039	-	-	-	-	-	-	-	3	2	-	-	-			ALPTR	*	NOT A DYKE?
304041A	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	C ASM1
304041B	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	C ASM1
304045A	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	*	C ASM1 & JHG
304045B	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	*	C ASM1 & JHG
304050	1	-	-	-	-	-	3	2	-	-	-	-		07	BFD	*	C NM2
304096	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SM3
304108	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	C ASM1
304111	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C FSM1
304139	-	-	-	-	-	-	-	3	-	-	-	-			ALPTR	*	C ASM1
304199	-	-	-	-	-	-	-	-	-	-	-	-				*	C JHG
304761	-	-	-	-	-	-	-	-	-	-	-	-		09	SPHTR	*	C ASM1
304762	-	-	-	-	-	-	-	3	-	-	-	-			ALPTR	*	C ASM1
STEPHENSON, 1969. SHORE SECTIONS ALONG TUNUGDLIARFIK (NARSSARSSUAQ PENINSULA)																	
126806	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2 AS DK 126807 CHILL
126807	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2 AS DK 126806

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
127010	-	-	-	-	-	-	-	3	-	-	-	-		10	VARPTR	*	C SS3	CUT BY FAULT - VARIOLITIC
127012	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	*	C SS3	CUT BY FAULT
127013	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS3	
127023	-	-	-	-	-	-	-	-	-	-	-	-			BFD	*	C SQC	MATRIX
127031	-	-	-	-	-	-	-	-	-	-	-	-		09	SPHTR	*	C SQC	
127035	-	-	1	-	-	-	-	3	-	-	-	-		06	PTR	*	C SS4	CUT BY 58240 EDGE
127036	-	-	-	-	-	-	-	-	-	-	-	-			ALBFD	*	C SS4	CUT BY 58240 CORE
127037	-	-	-	-	-	-	-	-	-	-	-	-		09	NPATR	*	C SS3	
127039	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS3	
127040	-	-	2	-	-	-	-	3	-	-	-	-		07	SPTR	*	C SS3	
127041	-	-	-	-	-	-	-	-	-	-	-	-		04	ALDOL	*	C SS3	
127042	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	*	C SS3	
127043	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS3	
127044	-	-	-	-	-	-	-	-	-	-	-	-		10	NPTR	*	C SS2	& JHG AS DK 127045 CHILLED
127045	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2	& JHG AS DK 127044
127046	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	*	C SQC	EDGE
127047	-	-	-	-	-	-	-	3	-	-	-	-		09	SPTR	*	C SQC	CORE CHILLED
127048	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SQC	
127051X	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT	*	C SQC	EDGE
127052X	-	-	-	-	-	-	-	-	-	-	-	-	97	17	CBT	*	C SQC	CORE
127054	-	-	-	-	-	-	-	-	-	-	-	-		10	VARTR	*	C SQC	
127055	-	-	-	-	-	-	-	-	-	-	-	-		03	DOL	*	C SS2	AS DK 59729
127056	-	-	-	-	-	-	-	-	-	-	-	-		07	VARTR	*	C SS2	AS DK 127057
127057	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2	AS DK 127056 MUCH OL
127058	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2	AS DK 127059 EDGE CHILLED
127059	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2	AS DK 127058 CORE MUCH OL
127064X	-	-	-	-	-	-	-	-	-	-	-	-		08	CBT	*	C SS2	VEIN
127065	-	-	-	-	-	-	-	-	-	-	-	-		03	OLDOL	*	C SS2	
127066	-	-	-	-	-	-	-	-	-	-	-	-		03	OLDOL	*	C SS2	
127067	-	-	-	-	-	-	-	-	-	-	-	-		10	SPHTR	*	C SS2	
127068	-	-	-	-	-	-	-	-	-	-	-	-		12	NPTR	*	C SS2	EX SPHTR?
127069	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2	AS DK 59731
127072	-	-	-	-	-	-	-	-	-	-	-	-		07	TR	*	C SS2	AS DK 127073
127073	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2	AS DK 127072 ?AS DK 127074
127074	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2	?AS DK 127073
127077	-	-	-	-	-	-	-	-	-	-	-	-		07	SPHTR	*	C SS2	AS DK 127078
127078	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS2	AS DK 127077
127079	-	-	-	-	-	-	-	-	-	-	-	-		04	ALOLDOL	*	C SS2	ALTERED
127081	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	C SS2	AS DK 58216 QTZTR
127082	-	-	-	-	-	-	-	-	-	-	-	-			DOL	*	C SS2	AS DK 58217 SHEARED
127083	-	-	-	-	-	-	-	-	-	-	-	-		05	TRDOL	*	C SS2	
127084	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS5	HORNFELSED
127085	-	-	-	-	-	-	-	3	-	-	-	-		07	PMSY	*	C SS3	
127088	-	-	-	-	-	-	-	-	-	-	-	-		09	SPHTR	*	C SS5	EDGE
127089	-	-	-	-	-	-	-	3	-	-	-	-		07	PTR	*	C SS5	CORE
141223	-	-	-	-	-	-	3	-	-	-	-	-			BFD	*	C JHG	QAGSSIARSSUK
141224	-	-	-	-	-	-	-	-	-	-	-	Q		15	QTZPORP	*	C JHG	QAGSSIARSSUK
141229	-	-	2	-	-	-	-	3	-	-	-	-	3	10	SPTR	*	C SS3	
141231	-	-	-	-	-	-	-	-	-	-	-	-		10	NPTR	*	C SS3	
141232	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C SS3	
141233	-	-	2	-	-	-	-	3	-	-	-	-	28	09	PTR	*	C SS3	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
141238	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C JHG
141239	-	-	2	-	-	-	-	3	-	-	-	-	54	07	PTR	*	C JHG
141240	-	-	-	-	-	-	-	-	-	-	-	-		12	NPTR	*	C JHG
141241	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C JHG
141242	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C JHG
141243	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C JHG
141244	-	-	2	-	-	-	-	3	-	-	-	-	41	12	PTR	*	C JHG
PEARCE, CAMP 1 1984, STORELV, N SIDE OF GLACIER ENTERING MOTZFELDT SO																	
326201	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	080	C MZI
326202A	-	-	-	-	-	-	-	-	-	-	-	-		07	MSY	*	C MZI MARGIN
326202B	-	-	-	-	-	-	-	-	-	-	-	-		07	MSY	036	C MZI CORE
326203A	-	-	-	-	-	-	-	-	-	-	-	-		07	PTR	*	C MZI MARGIN
326203B	-	-	-	-	-	-	-	-	-	-	-	-		07	PTR	*	C MZI CORE
326204A	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	*	C MZI MARGIN
326204B	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	C MZI MARGIN
326204C	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	C MZI CORE
326205	-	-	-	-	-	-	-	2	3	-	-	-			SPPHON	*	C MZI AS DK 326206-10 MARGIN
326206	-	-	-	-	-	-	-	2	3	-	-	-		09	SPPHON	*	C MZI AS DK 326205-10
326207	-	-	-	-	-	-	-	2	3	-	-	-	90		SPPHON	*	C MZI AS DK 326205-10
326208	-	-	-	-	-	-	-	2	3	-	-	-			SPPHON	*	C MZI AS DK 326205-10 INCLUSION WITHIN DYKE DARK, CAF2 BEARING
326209	-	-	-	-	-	-	-	2	3	-	-	-			SPPHON	*	C MZI AS DK 326205-10
326210	-	-	-	-	-	-	-	2	3	-	-	-			SPPHON	*	C MZI AS DK 326205-09
326211	-	-	-	-	-	-	-	-	-	-	-	-	68	07	NPTR	040	C MZI C DK 326205-10 FLOW LAMINATED
326212	-	-	-	-	-	-	-	-	-	-	-	-			MSY	*	C MZ1 AS DK 326203-4
326213	-	-	-	-	-	-	-	-	-	-	-	-			FLTR	*	C MZI AS DK 326203-4 CYCLIC FLOW LAMINATION
326214	-	-	-	-	-	-	-	-	-	-	-	-			FLTR	*	C MZI AS DK 326213
326215	-	-	-	-	-	-	-	-	-	-	-	-			MSY	*	C MZI AS DK 326213-14 BANDED COARSER AND FINER
326216	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	*	C MZI AS DK 326213-15
326217	-	-	-	-	-	-	-	3	-	-	-	-			PTR	050	C MZI
326218	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	050	C MZI AS DK 326219 MARG
326219	-	-	-	-	-	-	-	-	-	-	-	-		07	MSY	050	C MZI AS DK 326218 CORE
326220	-	-	-	-	-	-	-	-	-	-	-	-			BFD	050	C MZI CONT BFD XENOS
326221	-	-	-	-	-	-	-	-	-	-	-	-			BFD	*	XENOLITH FROM 326220
PEARCE, CAMP 2 1984, LOWER FLINKS DAL																	
326222	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT/UML	*	ALTERAD ULTRA-BASIC CONTAINS HEMATITE AFTER OL
326223	-	-	2	-	-	-	-	3	-	-	1	-			PTR	*	APATITE PHENS
326224	-	-	-	-	-	-	-	3	-	-	-	-			RPTR	040	APATITE PHENS
326225	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	070	RED STAIN
326226	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	AS DK 326227 CORE
326227	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	AS DK 326226 MARGIN POCKETS OF PYROXENE CRYSTALS
326228	-	-	-	-	-	-	-	-	2	-	-	-			SPPHON	070	
326229	-	-	-	-	-	-	-	3	-	-	-	-	79		RPTR	*	CONTS XENOLITHS OF BFD & SY
326230	-	-	-	-	-	-	-	-	-	-	-	-			AN24	*	INCL FROM 326229
326231	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	*	
326232	-	-	-	-	-	-	-	-	-	-	-	-		09	TR	*	AS DK 326233 MARGIN
326233	-	-	2	-	-	-	-	3	-	-	-	-	60		RPTR	*	AS DK 326232 CORE
326234	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	FLOW LAM
326235	-	-	-	-	-	-	-	-	-	-	-	-			PHON	*	NON PORP 'TINGUAITE'
326236	-	-	-	-	-	-	-	-	-	-	-	-		09	FLTR	*	NP
326237	-	-	3	-	-	-	-	-	-	-	2	-		07	SPTR	050	VARIOLITIC,ROUNDED PYROXENES
326238	-	-	2	-	-	-	-	3	-	-	-	-			RPTR	060	LARGE AF & PX PHENS

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
326239	-	-	-	-	-	-	-	-	2	-	-	-		09	SPPHON	*	AS DK 326228? CUT BY 326240 SLIGHT ALTN OF NE PHENS
326240	-	-	-	-	-	-	-	-	-	-	-	-		07	NPMSY	040	C DK 326239
326241	2	-	-	-	-	-	3	-	-	-	-	-	63		BAS	055	AS DK 326226-27 V. LARGE PLAG PHENS WITH AF MANTLES
326242	-	-	-	-	-	-	-	-	-	-	-	-		09	RPTR	070	AS DK 326229-30,C DK 326243
326243	-	-	-	-	-	-	-	-	-	-	-	-		09	SPTR	070	CUT BY 326242, C DK 326245 CONTAINS XENOLITHS OF BFD TYPE MATL
326244	-	-	-	-	-	-	-	-	-	-	-	-	83		AN	*	XENOLITH FROM 326242(CUT BY 326242)
326245	-	-	-	-	-	-	-	-	-	-	-	-		09	SPPHON	*	CUT BY 326243
326246	-	-	-	-	-	-	-	-	-	-	-	-		09	SPMSY	*	STRONG FLOW LAM
326247	-	-	-	-	-	-	-	-	-	-	-	-	89	17	CBT	055	
326248	-	-	2	-	-	-	-	3	-	-	-	-			RPTR	065	
326249	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT	070	
326250	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	045	
326251	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	015	
326252	-	-	-	-	-	-	-	-	-	-	2	-			NPTR	090	ALTD PX & OX
326253	-	-	-	-	-	-	-	-	-	-	-	-		07	NPMSY	030	
326254	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	055	CORE
326255	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	MARGIN
326256	-	-	-	1	-	-	-	3	2	-	-	-	49	09	PPHON	030	NE ALT TO CANC
326257	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT	*	SILL DEPTH=0.00M
326258	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT	*	0.40M
326259	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT	*	0.70M
326260	-	-	-	-	-	-	-	-	-	-	-	-			CBT	*	1.10M
326261	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	095	CUT BY FEEDER TO 326257-60
326262	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	070	ALTD
326263	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	040	
326264	-	-	-	-	-	-	-	-	-	-	-	-		18	UML	175	ALTERED ULTRA BASIC
326265	-	-	1	-	-	-	-	1	-	-	-	-			TR	050	V SMALL PX & AF PHEN
326266	-	-	-	-	-	-	-	-	-	-	-	-	67	18	CBT/UML	015	ALTERED ULTRA BASIC
326267	-	-	-	-	-	-	-	-	-	-	-	-		07	SPTR	050	
326268	-	-	1	-	-	-	-	3	-	-	-	-			RPTR	050	CUT BY 326269 MICROCLINE FELDSPARS
326269	-	-	-	-	-	-	-	-	-	-	-	-		07	SPTR	055	C DK 326268
326270	-	-	-	-	-	-	-	-	-	-	-	-		10	SPTR	050	
PEARCE, CAMP 3 1984, OSTFJORDSDAL																	
326271	-	-	-	-	-	-	-	-	-	-	-	-	76	18	LAMP	*	BI,PX,OX
326272	-	-	-	-	-	-	-	-	-	-	-	-			REXTR	*	RECRYSTALLISED
326273	-	-	-	-	-	-	-	-	-	-	-	-	82	09	REXTR	*	AS DK 326274 RECRYSTALLISED
326274	-	-	-	-	-	-	-	-	-	-	-	-			REXTR	*	AS DK 326273 MARGIN WITH JHG, RECRYSTALLISED
326275	-	-	-	-	-	-	-	3	-	-	-	-			REXTR	045	RECRYSTALLISED
326276	-	-	-	-	-	-	-	-	-	-	-	-	06	07	PPHON	045	AS DK 326277 CORE BI,PX,NE
326277	-	-	1	-	-	-	-	2	3	-	-	-			PPHON	*	AS DK 326276 MARGIN
326278	-	-	-	-	-	-	-	-	-	-	-	-		05	BAS/LAMP	000	?ALTD BAS - LAMP
326279	-	-	-	-	-	-	-	-	-	-	-	-		09	REXTR	*	RECRYSTALLISED
326280	-	-	-	-	-	-	-	-	-	-	-	-			BAS	025	ALTD
326281	-	-	-	-	-	-	-	-	-	-	-	-	57	01	LAMP	055	AMPH,BI
326282	-	-	-	-	-	-	-	-	-	-	-	-	93	09	TR	*	
326283	-	-	2	-	-	1	1	-	-	-	-	-	122		BAS	050	C DK 326286 ALTD HB PL PX, CR-SPINEL - LAMP?
326284	-	-	-	-	-	-	-	-	-	-	-	-	74	09	REXTR	*	RECRYSTALLISED
326285	-	-	-	-	-	-	2	2	3	-	-	-		09	PSY	*	CUT BY OSTFJ SY,CUT BY 326307,CUT BY 326283,CUT BY 326314
326286	-	-	-	-	-	-	-	-	-	-	-	-	59		SY	050	CUT BY 326283 SOD,ALTD NE
326287	-	-	-	-	-	-	-	3	-	-	-	-			PTR	040	GM BI.METAM?
326288	-	-	-	-	-	-	-	-	-	-	-	-		09	REXTR	050	AS DK 326289 RECRYSTALLISED

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
326289	-	-	-	-	-	-	-	-	-	-	-	-	100		REXTR	*	AS DK 326288 GARNET (ANDRADITE)-BEARING, RECRYSTALLISED
326290	-	-	-	-	-	-	-	-	-	-	-	-			PSY	*	MARGINAL, PX IN LATHS
326291	-	-	-	-	-	-	-	-	-	-	-	-			REXTR	055	RECRYSTALLISED
326292	-	-	-	-	-	-	-	-	-	-	-	-		06	PTR	*	ALTD TO FSP,BI
326293	-	-	-	-	-	-	-	-	-	-	-	-		03	LAMP	*	OR ALT PTR SIMILAR TO 326292
326294	-	-	-	-	-	-	-	3	-	-	-	-		08	PTR	*	AF,SOD & AMPH CLUSTERS
326295	-	-	-	-	-	-	-	-	-	-	-	-			BAS?	020	ALTD BAS
326296	-	-	-	-	-	-	-	-	-	-	-	-		12	TR	050	
326297	-	-	-	-	-	-	-	-	-	-	-	-			BAS?	040	ALL FSP-PLAG/ALBITE
326298	-	-	-	-	-	-	-	-	-	-	-	-		01	BAS	060	AMPH & BI
326299	-	-	-	-	-	-	-	3	-	-	-	-			REXTR	060	RECRYSTALLISED
326300	-	-	-	-	-	-	-	-	-	-	-	-	72		REXTRLTR	050	LARGE AEG CLUSTERS, RECRYSTALLISED
326301	-	-	-	-	-	-	-	-	-	-	-	-	69	18	BAS	050	ALTD? PX,BI,OX
326302	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	020	
326303	-	-	-	-	-	-	-	-	-	-	-	-	75	18	LAMP	050	BI,PX,MT,CBT,SPHENE
326304	-	-	-	-	-	-	-	-	-	-	-	-		18	LAMP	050	SIMILAR TO 326301 ALTD BASALT?
326305	-	-	-	-	-	-	-	-	-	-	-	-		09	REXTR	*	LOTS OF SODALITE, RECRYSTALLISED
326306	-	-	-	-	-	-	-	-	-	-	-	-		18	LAMP	045	GREEN/BROWN BI
326307	-	-	-	-	-	-	-	-	-	-	-	-		09	TR	*	C DK 326285 (C PSY)
326308	-	-	-	-	-	-	-	-	-	-	-	-		03	LAMP	050	C OSTFJ SY
326309	-	-	-	-	-	-	-	-	-	-	-	-		09	FLTR	*	C OSTFJ SY
326310	-	-	-	-	-	-	-	-	-	-	-	-			TR	080	C OSTFJ SY ALT
326311	-	-	-	-	-	-	-	-	-	-	-	-			ALBAS	030	C OSTFJ SY ALT
326312	-	-	-	-	-	-	-	-	-	-	-	-			BAS	050	C OSTFJ SY ALT BAS WITH CBT VEINS- SLLR TO 326301/4
326313	-	-	-	-	-	-	-	3	2	-	-	-			PSY	*	SHEARED FSPS
326314	-	-	-	-	-	-	-	-	-	-	-	-		18	LAMP	050	C DK 326285 (C PSY)
326315	-	-	-	-	-	-	-	-	-	-	-	-			REXTR	040	RECRYSTALLISED
326316	-	-	-	-	-	-	-	-	-	-	-	-			REXTR	050	RECRYSTALLISED
326317	-	-	-	-	-	-	-	-	-	-	-	-		01	LAMP	020	
326318	-	-	-	-	-	-	-	-	-	-	-	-		03	LAMP	020	
326319	-	-	-	-	-	-	-	3	-	-	-	-			PTR/PTR	*	CONTACT 326287 & OTHER TRACHYTE
326320	-	-	-	-	-	-	-	-	-	-	-	-			BAS/LAMP	*	ALTD BAS, BI & PX
PEARCE, CAMP 4 1984, STREAM W OF 45M LAKE, CA. 6 KM N OF IGALIKO VILLAGE																	
326321	-	-	-	-	-	-	-	-	-	-	-	-		10	SPMSY	055	GM CAF2 AS DK 63837
326322	-	-	-	-	-	-	-	-	-	-	-	-		07	SPMSY	040	C SI.4 COMPOSITE DYKE AS 63836
326323	-	-	-	-	-	-	-	-	-	-	-	-	88	17	CBT	*	C SI.4
326324	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	055	OLDER THAN 54319/20(CUT BY 54319) SODALITE BEARING
326325	-	-	-	-	-	-	-	3	-	-	-	-			PTR	*	BFD MARGIN AS DK 54316
326326	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	080	NE ALTD TO CANC
326327	-	-	-	-	-	-	-	-	-	-	-	-			PTR	085	SLIGHT REXTALN
326328	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	000	V FINE GM
326329	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	070	AS DK 54243/44
326330	-	-	-	-	-	-	-	3	-	-	-	-			REXPHON	060	GM NE,SOD, RECRYSTALLISED
326331	-	-	-	-	-	-	-	3	-	-	-	-		09	REXPHON	060	BROWN AA,SOD,NE, RECRYSTALLISED
326332	-	-	-	-	-	-	-	-	-	-	-	-			REXPTR	050	RECRYSTALLISED
326333	-	-	-	-	-	-	-	-	-	-	-	-	11	17	CBT	065	
326334	-	-	-	-	-	-	-	-	-	-	-	-			LAMP	040	FINE GR. JHG XENOS?
326335	-	-	-	-	-	-	-	3	-	-	-	-			REXTALTR	045	
326336	-	-	-	-	-	-	-	-	-	-	-	-	84	17	CBT	070	
326337	-	-	-	-	-	-	-	-	-	-	-	-	119	17	CBT	*	
326338	-	-	-	-	-	-	-	3	-	-	-	-			REXTALTR	060	AA & RELICT NE?

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
326339	-	-	2	-	-	-	-	3	-	-	-	-			SPMSY	055	BI IN GM
326340	-	-	-	-	-	-	-	3	-	-	-	-		09	PTR	060	BI CLUSTERS
326341	-	-	-	-	-	-	-	-	-	-	-	-			BAS	155	ALTD TO CHL & ALT FSP
326342	-	-	-	-	-	-	-	3	-	-	2	-			SPTR	050	C DK 326344
326343	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	055	CONTS CAF2
326344	-	-	-	-	-	-	-	-	-	-	-	-			TR	040	RED TR, C DK 326345, CUT BY 326342
326345	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT	070	CUT BY 326344
326346	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	060	
326347	-	-	-	-	-	-	-	-	-	-	-	-	95	17	CBT	060	
326348	-	-	-	-	-	-	-	-	-	-	-	-		09	SPTR	*	
326349	-	-	2	-	-	-	-	3	-	-	-	-			REXTR	*	BLOCK FROM 326348(CUT BY 326348) RECRYSTALLISED
326350	-	-	-	-	-	-	-	-	-	-	-	-			BRECCIA	*	AS DK 41947
326351	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	090	AS DK 326352 CORE
326352	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	AS DK 326351 MARGIN
326353	-	-	-	-	-	-	-	-	-	-	-	-			REXPTR	050	BI,HB,AF,OX, RECRYSTALLISED
326354	-	-	-	-	-	-	-	-	-	-	-	-			REXTR	050	ALTD, RECRYSTALLISED
326355	-	-	-	-	-	-	-	-	-	-	-	-		09	REXTR	050	RECRYSTALLSIED
326356	-	-	-	-	-	-	-	-	-	-	-	-		03	REXBAS	055	RECRYSTALLISED
326357	-	-	-	-	-	-	-	-	-	-	-	-		06	BFD	*	
326358	-	-	-	-	-	-	-	-	-	-	-	-	81	17	LAMP	*	AS DK 326359 MICA RICH
326359	-	-	-	-	-	-	-	-	-	-	-	-	100	18	CBT	*	AS DK 326358 CBT RICH
326360	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	055	SOME SOD,CANC
326361	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	
326362	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	055	
326363	-	-	-	-	-	-	-	3	-	-	-	-			BFD	*	AS DK 54229, AS DK 326371
326364	-	-	-	-	-	-	-	-	-	-	-	-		09	SPTR	060	
326365	-	-	-	-	-	-	-	-	-	-	-	-			BAS?	060	ALTD
326366	-	-	-	-	-	-	-	-	-	-	-	-			BFD?	*	OR PTR FLOW LAM
326367	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	060	
326368	-	-	-	-	-	-	-	3	-	-	-	-			PTR	060	APATITE PHENS
326369	-	-	-	-	-	-	-	3	-	-	-	-			SPMSY	060	INTERSTITIAL NE
326370	-	-	-	-	-	-	3	-	-	-	-	-			BFD	050	EPIDOTE
326371	-	-	-	-	-	-	3	-	-	-	-	-		06	BFD	065	AS DK 326363
326372	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	070	VERY FINE GRAIN
326373	-	-	2	-	-	-	-	3	-	-	-	-			PMSY	060	
326374	-	-	-	-	-	-	-	3	2	-	-	-			PPHON	050	
326375	-	-	-	-	-	-	-	-	-	-	-	-		07	SPMSY	060	
326376	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	055	
326377	-	-	-	-	-	-	-	3	-	-	-	-			PTR	050	WITH "GEODES" FILLED WITH CHLORITE & ?CANC?
326378	-	-	-	-	-	-	-	2	-	-	-	-		09	SPTR	065	ALKALINE
326379	-	-	-	-	-	-	-	-	-	-	-	-		07	SPTR	*	
326380	-	-	-	-	-	-	-	3	2	-	-	-		09	PPHON	*	NE ALT TO CANC & SOD
326381	-	-	-	-	-	-	-	3	-	-	2	-			PTR	060	CUT BY 326382
326382	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	060	C DK 326381 VARIOLITIC
326383	-	-	-	-	-	-	-	3	-	-	-	-			REXTR	040	BI & AMP CLUSTERS, RECRYSTALLISED
326384	-	-	-	-	-	-	-	-	-	-	-	-		07	SPTR	035	
326385	-	-	-	-	-	-	-	-	-	-	-	-			PTR	050	AS DK 326386 MARGIN
326386	-	-	-	-	-	-	-	3	2	-	-	-			PPHON	*	AS DK 326385 CORE, NEPH?
326387	-	-	-	-	-	-	-	3	-	-	-	-			SPTR/MSY	050	
326388	-	-	-	-	-	-	-	-	-	-	-	-	91	17	CBT	050	
326389	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	120	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
326390	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	060	ALKALI RICH
326391	-	-	-	-	-	-	-	-	-	-	-	-				*	
326392	-	-	2	-	-	-	-	3	-	-	-	-			BFD	*	INCL FROM BFD SLIGHT ALT'N
326393	-	-	2	-	-	-	-	3	2	-	-	-			PPHON	075	
326394	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	050	
326395	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	*	CAF2 RICH
326396	-	-	-	-	-	-	-	-	-	-	-	-		07	SPTR	*	
326397	-	-	-	-	-	-	-	-	-	-	-	-		09	SPTR	045	
326398	-	-	2	-	-	-	-	3	-	-	-	-			RPTR	*	
326399	-	-	-	-	-	-	-	-	-	-	-	-			NPMSY	*	ALT'D G-MASS NEPH
EMELEUS, CAMP 6 1984, NORTH OF RIVER AT NARSSARSSUAQ																	
326400	-	-	-	-	-	-	-	-	-	-	-	-			MSY	055	QTZ BEARING, ALT'D
PEARCE, CAMP 4 1984, IGALIKO																	
325901	-	-	-	-	-	-	-	3	-	-	-	-		09	BFD	050	AS DK 325902,3 MARGIN
325902	-	-	-	-	-	-	3	-	-	-	-	-	77		BFD	*	AS DK 326901,3 1.5M IN
325903	-	-	-	-	-	-	3	-	-	-	-	-	104		BFD	*	AS DK 325901,2 CORE
325904	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	120	C DK 325901-3
325905A	-	-	-	-	-	-	-	-	-	-	-	3		09	PPHON	055	FELDSPARBLE TR- PSEUDO-LEUCITES
325905B	-	-	-	-	-	-	-	3	2	-	-	3		09	PPHON	055	FELDSPARBLE TR- PSEUDO-LEUCITES
325906	-	-	-	-	-	-	-	-	-	-	-	-		09	PTR	*	COMPOSITE OUTER C SI.4
325907	-	-	-	-	-	-	-	-	-	-	-	-		09	PTR	*	COMPOSITE INNER C SI.4
325908	-	-	-	-	-	-	-	-	-	-	-	-		17	CBT	055	C DK 325809, AS DK 325910
325909	-	-	-	-	-	-	-	-	-	-	-	-		09	SPTR	*	CUT BY 325908,10
325910	-	-	-	-	-	-	-	-	-	-	-	-	80	17	CBT	*	AS DK 325908
325911	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	*	CUT BY 325908,10
325912	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	065	
PEARCE, CAMP 5 1984, LEJRELV, NORTH SHORE OF MOTZFELDT SO																	
325913	-	-	-	-	-	-	-	-	-	-	-	-		10	NPTR	055	CUT BY MOTZ FOY SHEETS SLIGHT ALT'N
325914	-	-	-	-	-	-	-	-	-	-	-	-		10	NPTR	055	CUT BY MOTZ FOY SHEETS SLIGHT ALT'N
325915	-	-	-	-	-	-	-	3	-	-	-	-		10	SPTR	045	CUT BY MOTZ FOY SHEETS SLIGHT ALT'N
325916	-	-	-	-	-	-	-	-	-	-	-	-		07	TRBAS	*	AS DK 325917 MARGIN
325917	-	-	-	-	-	-	2	-	-	-	-	-			TRBAS	*	AS DK 325916 CORE , AFSPS WITH PLAG CORES
325918	-	-	-	-	-	-	-	2	-	-	-	-			PTR	040	ALT'D G-MASS
325919	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	040	
325920	-	-	-	-	-	-	-	3	-	-	-	-			PTR	090	ALSO BIOTITE CLASTS, REXTAL?
325921	-	-	-	-	-	-	-	-	-	-	-	-		06	SPTR	080	
325922	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	055	
325923	-	-	-	-	-	-	-	-	-	-	-	-	107	09	SPPHON	045	GLASSY ROCK, BENMOREITE COMP
325924	-	-	-	-	-	-	-	3	-	-	-	-			RPTR	055	
325925	-	-	-	-	-	-	-	3	-	-	-	-			ALPTR	060	CAF2 AND ZIRCON
325926	-	-	-	-	-	-	-	-	-	-	-	-		09	SPTR	050	
325927	-	-	2	-	-	-	-	3	-	-	1	-			SPTR	050	
325928	-	-	-	-	-	-	-	-	-	-	-	-		09	SPTR	055	
PEARCE - CAMP 7 1984, 'HARRYS DAL', 4KM NW OF RIVER FROM MOTZFELDT SO																	
325929	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	130	PATCHES OF CANCRINITE
325930	-	-	-	-	-	-	-	3	-	-	2	-			RPTR	050	AS DK 325931 MARGIN ALT'D, FINE GR
325931	-	-	2	-	-	-	-	3	-	-	-	-			RPTR	*	AS DK 325930 CORE, ANORTHOCLASE?
325932	-	-	-	-	-	-	-	-	-	-	-	-	118		MT/OL(UB)	*	*
325933	-	-	-	-	-	-	-	-	-	-	-	-		09	NPTR	040	
325934	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	*	LOOSE BLOCK ALT'D
325935	-	-	-	-	-	-	-	-	-	-	-	-			SPHTR	*	LOOSE BLOCK

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
325936	-	-	3	-	-	-	-	-	-	-	2	-		01	LAMP	060	CPX PHENOS WITH GREEN CORES - LAMPROPHYRE
325937	-	-	-	-	-	-	-	-	-	-	-	-	73		TR	055	ALT'D
325938	-	-	-	-	-	-	-	3	-	-	-	-			RPTR	*	ALT'D
325939	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT/LAMP	*	
325940	-	-	-	-	-	-	-	-	-	-	-	-		16	NPTR	055	
325941	-	-	-	-	-	-	-	-	-	-	-	-		18	CBT/LAMP	045	
325942	-	-	-	-	-	-	-	-	-	-	-	-		10	SPTR	*	MARGINAL
325943	-	-	3	-	-	1	-	-	-	-	2	-	108	03	LAMP	*	CPX WITH GREEN CORES, DIOPSIDIC
PEARCE, CAMP 8 1984, HOTEL MOTZFELDT, CARAVAN AT SW CORNER OF MOTZFELDT SO																	
325944	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	090	FLOW LAMINATED, ALT'D
325945	-	-	-	-	-	-	-	-	-	-	-	-			NPTR	090	
325946	-	-	-	-	-	-	-	3	-	-	-	-			PTR	060	
325947	-	-	-	-	-	-	-	3	-	-	-	-			PTR	100	ALT'D
325948	1	-	-	-	-	-	-	-	-	-	-	-	114	01	LAMP	045	BI, CHLORITE, RELICT OL, ALTD BASIC DYKE
325949	-	-	-	-	-	-	-	-	-	-	-	-			LAMP?	040	ALT'D
325950	1	-	-	-	-	-	-	-	-	-	-	-			LAMP	050	AS DK 325951,2 CF. 325940, ALTD BASIC DYKE
325951	-	-	-	-	-	-	-	-	-	-	-	-			LAMP	*	WITH XENOLITH OF JHG AS DK 325950,52
325952	-	-	-	-	-	-	-	-	-	-	-	-	65	01	LAMP	*	MORE CBT RICH AS DK 325950,1
325953	-	-	-	-	-	-	-	3	-	-	-	-			PTR	080	
325954	-	-	-	-	2	-	-	3	-	-	-	-			SPTR	050	SLIGHTLY ALT'D
325955	-	-	-	-	-	-	-	-	-	-	-	-		01	LAMP	*	CUT BY SM3
325956	-	-	-	-	-	-	-	-	-	-	-	-		01	CBT	050	
325957	-	-	-	-	-	-	-	3	-	-	-	-	56		REXTR	*	CUT BY SM3, RECRYSTALLISED
325958	-	-	-	-	-	-	-	-	-	-	-	-		18	LAMP	080	CUT BY SM3, CBT PATCHES
325959	-	-	-	-	-	-	-	-	-	-	-	-		18	LAMP	160	CUT BY SM3, ALT'D BASALT?, CF 325958
325960	-	-	-	-	-	-	-	-	-	-	-	-	78		BRECCIA	*	CONTS XENOS OF JHG, CUT BY SM3 AS DK 325961 ALL AEGERINE
325961	-	-	-	-	-	-	-	-	-	-	-	-		01	BRECCIA	*	AS DK 325960, MATRIX ALL AEGERINE
325962	-	-	-	-	-	-	-	-	-	-	-	-	117	18	LAMP	100	CUT BY SM3
325963	-	-	-	-	-	-	-	-	-	-	-	-		18	LAMP	065	CBT RICH
325964	-	-	-	-	-	-	-	2	3	-	-	-	113	09	PPHON	*	REXTAL, FAIRLY COARSE
325965	1	-	-	-	-	-	-	-	-	-	-	-			BAS	060	RELICT OL
325966	-	-	2	-	-	-	-	3	-	-	-	-		09	SPTR	050	
325967	-	-	-	-	-	-	-	3	-	-	-	-			PTR	050	
325968	-	-	-	-	-	-	-	-	-	-	-	-			PTR	100	ALT'D BADLY
325969	-	-	-	-	-	-	-	-	-	-	-	-		04	BAS/LAMP	090	ALT'D, CBT VESICLE(?) INFILLS
325970	-	-	-	-	-	-	-	-	-	-	-	-			MSY	070	AS DK 325601 CORE
EMELEUS, CAMP 6 1984, NORTH OF RIVER AT NARSSARSSUAQ																	
325971	-	-	-	-	-	-	3	-	-	-	-	-			DOL	035	VERY LARGE PLAG
325972	-	-	-	-	-	-	-	-	-	-	-	-	121	03	LAMP	*	
325973	-	-	-	-	-	-	-	-	-	-	-	-		07	SPMSY	050	QTZ BEARING
325974	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	050	QTZ BEARING
325975	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	050	ALT'D QTZ BEARING
325976	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	*	QTZ BEARING
325977	-	-	2	-	-	-	-	3	-	-	-	-			PMSY	065	AS DK 325978 MARGIN ALT'D, QTZ BEARING
325978	-	-	2	-	-	-	-	3	-	-	-	-			PMSY	*	AS DK 325977 CORE ALT'D, QTZ BEARING
325979	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	060	C DK 325980,1
325980	1	-	2	-	-	-	3	-	-	-	-	-	61		BFD	*	CUT BY 325979,AS DK 325981 CORE
325981	-	-	-	-	-	-	-	-	-	-	-	-		05	BFD	*	CUT BY 325979,AS DK 325980 MARGIN
325982	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	065	QTZ BEARING
325983	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	055	QTZ BEARING
325984	-	-	-	-	-	-	-	-	-	-	-	-		07	PMSY	050	QTZ BEARING

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
325985	-	-	2	-	-	-	-	3	-	-	-	-			SPVARTR	050	ALT'D PX, VARIOLITIC
325986	-	-	-	-	-	-	-	-	-	-	-	-	58	07	DOL/TR	040	MAFIC TR, FELSIC DOL
325987	-	-	2	-	-	-	-	3	-	-	-	-			PMSY	050	ALTD OLS?
325988	-	-	-	-	-	-	-	-	-	-	-	-			SPTR	050	C BRECCIATED GNEISS(FE STAINED) QTZ BEARING
325989	-	-	-	-	-	-	-	-	-	-	-	-			DOL	055	
325990	-	-	-	-	-	-	1	-	-	-	-	-		04	DOL	*	
325991	-	-	2	-	-	-	-	3	-	-	-	-			PMSY	*	C LAMP SHEETS CUTTING GNEISS
325992	-	-	-	-	-	-	-	-	-	-	-	-	64	04	DOL	060	
325993	-	-	-	-	-	-	3	-	-	-	-	-			DOL	050	
325994	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	
325995	-	-	-	-	-	-	-	3	-	-	-	-			SPMSY	*	
325996	-	-	-	-	-	-	-	3	-	-	-	-			SPMSY	*	QTZ BEARING
325997	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	055	CBT MATERIAL IN PATCHES
325998	-	-	-	-	-	-	-	3	-	-	-	-		07	SPTR	055	C DK 325999 AT ITS CORE
325999	-	-	2	-	-	-	-	3	-	-	-	-			PMSY	055	CUT BY 325998
326000	-	-	-	-	-	-	-	-	-	-	-	-		07	DOL	*	
PEARCE, CAMP 8 1984, HOTEL MOTZFELDT, CARAVAN AT SW CORNER OF MOTZFELDT SO																	
325601	-	-	-	-	-	-	-	3	-	-	-	-			SPMSY	070	AS 325970 ALT'D GLASSY G-MASS
325602	-	-	-	-	-	-	-	-	-	-	-	-			ALTBAS	120	AS DK 325603-5 MARGIN
325603	-	-	-	-	-	-	-	-	-	-	-	-		04	BAS	*	AS DK 325602-5 CORE
325604	-	-	-	-	-	-	-	-	-	-	-	-			BAS	*	AS DK 325602-5 1M IN
325605	-	-	-	-	-	-	-	-	-	-	-	-			BAS	*	AS DK 325602-4 PLAG XENOXT
325606	-	-	-	-	-	-	-	-	-	-	-	-			SPPHON	050	ALT'D NE PHENOXTS
325607	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	*	LOOSE BLOCK
PEARCE, CAMP 9 1984, N END OF 475M LAKE, MELLEMLANDET																	
325608	-	-	-	-	-	-	-	-	-	-	-	-		12	SPTR	060	AS DK 325609, CORE QTZ BEARING
325609	-	-	-	-	-	-	-	3	-	-	-	-			SPTR	*	AS DK 325609, MARGIN
325610	-	-	-	-	-	-	-	-	-	-	-	-		04	DOL(BDO)	115	CUT BY SM1,AS DK 325611, ALT'D PLAG, POSSIBLE BD0
325611	-	-	-	-	-	-	-	-	-	-	-	-	105	04	DOL(BDO)	*	CUT BY SM1,AS DK 325610, ALT'D PLAG, POSSIBLE BD0
325612	-	-	-	-	-	-	-	-	-	-	-	-		07	NPTR	*	C FAULT(MINOR)
325613	-	-	-	-	-	-	-	-	-	-	-	-			SPMSY	050	CUT BY FAULT THAT IS CUT BY 325612 QTZ BEARING
325614	-	-	-	-	-	-	-	-	-	-	-	-		12	SPMSY	050	CUT BY FAULT THAT IS CUT BY 325612 QTZ BEARING
325615	-	-	-	-	-	-	-	-	-	-	-	-		04	ALTDOL	090	LARGE NO. OF IRREGULAR 1-1.5M DYKES
325616	-	-	-	-	-	-	-	-	-	-	-	-		07	PTR	060	AS DK 325617, MARGIN
325617	-	-	-	-	-	-	-	3	-	-	-	-			PMSY	*	AS DK 325616, CORE
325618	-	-	-	-	-	-	-	-	-	-	-	-		16	BAS	080	CUT BY 325619(PROB.) ALT'D - PICRITIC
325619	-	-	-	-	-	-	-	3	-	-	-	-		07	SPMSY	050	C DK 325618(PROB.)-A BASALTIC DYKE
325620	-	-	-	-	-	-	-	-	-	-	-	-			BFD	*	LOOSE BLOCK

APPENDIX II

Microprobe analyses

All analyses were carried out using electron microprobes equipped with Energy Dispersive Spectrometers (EDS) at Manchester University. Operating conditions and machine specifications were:-

Modified Cambridge Instruments Geoscan

Only available with EDS analysis. This machine uses a 'Kervex' Li-doped Si-detector, maintained at liquid nitrogen temperatures to reduce electronic noise. It is fitted with a 'Harwell' 2010 pulse processor and 'Link System' 290 Electronics.

During analysis a 15kV electron beam accelerating voltage was used with a 3nA specimen current taken from cobalt metal.

Cameca Camebax Microprobe

Equipped with both wavelength (WD) and energy dispersive spectrometers. This microprobe uses a 'Link Systems' 860-500 EDS system connected to Link Systems electronics. As with the 'Geoscan', an accelerating voltage of 15kV was used at a specimen current of 3nA.

Both microscopes process the X-ray spectra using Link Systems ZAF-4/FLS software. This deconvolutes overlapping X-ray peaks and subtracts background radiation by reference to a previously obtained library of standard peak profiles. X-ray intensities are automatically ZAF corrected (ie. corrections are made for average atomic weight of sample (Z), X-ray absorbtion (A) and x-ray secondary fluorescence (F)), using a procedure based on the TIM1 program of Duncumb and Jones (1969). The atomic number correction described by Duncumb and Reed (1968) is used together with Reed's (1965) fluorescence correction. The absorbtion effects are calculated using Philibert's (1963) equation with Heinrich's (1967) absorbtion coefficients, the bulk mineral mass absorbtion coefficient being calculated by the method of Yakowitz *et al.* (1973).

EDS allows rapid production of analyses (up to about 15 per hour) for a maximum of 14 elements simultaneously. EDS is however, less sensitive than WDS with typical detection limits in the range 0.1 to 0.2 wt%, compared to 100's of ppm, but the speed of analysis compensates for this drawback. EDS is perhaps also slightly less precise than WDS as peak/background ratios are higher.

EDS also has a lower resolution than WDS which in some cases gives serious peak overlaps. Notable among these are the Si K peak overlapping the Sr L and Rb L peaks, the Ba L peak overlapping Ti K peak (which leads to about 5 wt% Ba being reported from ilmenites!) and serious overlaps within the REE. At the time of use, the Cameca Camebax WDS Microprobe unfortunately was not calibrated for REE and, due to its usual use for silicate minerals, the Geoscan was not calibrated for Sr, thus this element was not analysed in the calcites and strontianites of the carbonatites. F cannot be analysed by EDS.

The following table shows the elements commonly analysed and the standards used.

Element	Line	Standard
Si	K	Wollastonite or Forsterite
Ti	K	Rutile
Al	K	Corundum
Fe	K	Fayalite
Mn	K	Tephroite
Mg	K	Periclase or Forsterite
Ca	K	Wollastonite
Na	K	Jadeite or Albite
K	K	Orthoclase
Ba	L	Barytes
Zr	L	Zr metal
Cl	K	Halite
S	K	Pyrite
P	K	Apatite
Cu	L	Cu metal
Zn	L	Zn metal
Ni	K	Ni metal
Cr	K	Cr metal

Analyses of these standard spectra are held on hard disc in the on-line computer. These are compared to the unknown spectra and scaled against an analysis of Co metal (which acts as a 'monitor') in the calculation of the unknown element concentrations. This procedure removes the need to standardise the microprobe each time it is used, any long term drift being corrected for from the analysis of Co metal.

Pyroxene Recalculation

Pyroxene end members have been calculated using the program `PYROXENE.F4B` written by Dr. A. Peckett. This allows recalculation of Fe^{3+}/Fe^{2+} ratios from analyses where all Fe is reported as FeO. Initially enough Fe^{3+} is assigned to produce acmite and K-acmite, giving a minimum Fe^{3+} value.

In outline the procedure begins by converting the weight% oxide in the analysis to atomic proportions. From here, in a fixed order, pyroxene end-member molecules are extracted from the available atomic composition. The Fe^{3+}/Fe^{2+} ratio is adjusted at various stages to account for any excess K and Na by forming more K acmite and acmite. $CaFe^{3+}AlSi_2O_6$ (Ferri-Tschermaks molecule) is not allowed in this calculation, with all Fe^{3+} present in the acmite end members. Various other options are allowed which include fixing Fe^{3+}/Fe^{2+}, allowing Si to vary to use up all cations as end members, and allowing only a slight change in Fe^{3+}/Fe^{2+}, but permitting $CaFe^{3+}AlSi_2O_6$.

Pyroxene end members are calculated in the following order:-

1. $KFe^{3+}Si_2O_6$	2. $NaZrSiAlO_6$	3. $NaTiAlSiO_6$	4. $NaZr_{0.5}FM_{0.5}Si_2O_6$
5. $NaTi_{0.5}FM_{0.5}Si_2O_6$	6. $NaNb_{0.33}FM_{0.67}Si_2O_6$	7. $NaYSi_2O_6$	8. $NaVSi_2O_6$
9. $NaCrSi_2O_6$	10. $NaFe^{3+}Si_2O_6$	11. $NaAlSi_2O_6$	12. $LiAlSi_2O_6$
13. $CaZrSi_2O_6$	14. $CaTiSi_2O_6$	15. $CaYAlSiO_6$	16. $CaVAlSiO_6$
17. $CaCrSiAlO_6$	18. $CaFe^{3+}SiAlO_6$	19. $CaAlSiAlO_6$	20. $CaZnSi_2O_6$
21. $CaMnSi_2O_6$	22. $CaFMSi_2I_6$	23. $FMAlSiAlO_6$	24. $FM_2S_2O_6$
25. $Ca_2Si_2O_6$	26. $Zn_2Si_2O_6$	27. $Mn_2Si_2O_6$	28. $Ni_2Si_2O_6$

FM=(Fe^{2+}, Mg)

Computer programs used to calculate Fe^{2+}/Fe^{3+} ratios for amphiboles, opaque oxides and for minerals where stoichiometry could be assumed are listed in Appendix

VII. Also listed is a computer program used to classify amphiboles based on the Leake (1978) nomenclature.

PYROXENE ANAYLSES

	63845.08	63845.09	63845.10	63845.18	63845.23	58017.26	58017.28	58017.30	58017.36	58017.39	58017.40	43842.02
Weight % oxide												
SiO2	51.816	51.765	52.048	51.988	50.933	51.758	52.339	50.170	50.554	51.717	51.303	52.032
TiO2	0.317	0.674	0.702	0.681	0.871	0.709	0.563	0.702	0.0	0.400	0.549	1.146
Al2O3	1.113	1.018	1.226	1.489	1.421	1.228	0.675	0.593	0.504	0.681	0.754	0.916
FeO	17.477	16.872	15.942	16.554	14.826	12.157	14.417	17.015	24.630	17.221	17.607	27.296
MnO	0.675	0.571	0.738	0.768	0.381	0.576	0.812	1.162	1.367	0.639	0.693	0.0
MgO	7.078	7.767	8.314	7.423	8.637	10.826	8.865	4.926	0.676	7.059	5.908	0.0
CaO	22.170	22.221	22.463	22.666	22.570	22.472	21.796	14.372	10.418	19.447	17.199	2.188
Na2O	1.673	1.419	1.457	1.265	1.268	1.024	1.747	5.422	7.302	2.650	3.556	12.660
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.923	5.038	1.642	3.497	0.657
Total	102.319	102.307	102.890	102.834	100.907	100.750	101.214	101.285	100.489	101.456	101.066	96.895
Atoms per 6 oxygens												
Si	1.953	1.950	1.941	1.952	1.931	1.942	1.970	1.944	1.989	1.969	1.978	2.001
Ti	0.009	0.019	0.020	0.019	0.025	0.020	0.016	0.020	0.0	0.011	0.016	0.033
Al	0.049	0.045	0.054	0.066	0.064	0.054	0.030	0.027	0.023	0.031	0.034	0.042
Fe3	0.148	0.121	0.130	0.084	0.118	0.096	0.125	0.190	0.363	0.143	0.112	0.810
Fe2	0.403	0.411	0.367	0.435	0.352	0.286	0.329	0.361	0.447	0.405	0.455	0.068
Mn	0.022	0.018	0.023	0.024	0.012	0.018	0.026	0.038	0.046	0.021	0.023	0.0
Mg	0.398	0.436	0.462	0.415	0.488	0.605	0.497	0.284	0.040	0.401	0.339	0.0
Ca	0.896	0.897	0.898	0.912	0.917	0.904	0.879	0.597	0.439	0.793	0.711	0.090
Na	0.122	0.104	0.105	0.092	0.093	0.075	0.128	0.407	0.557	0.196	0.266	0.944
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.131	0.097	0.030	0.066	0.012
Sample	1.	1.	1.	1.	1.	2.	2.	2.	2.	2.	2.	4.
Rock Type	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Phon
Crystal	4.	4.	4.	1.	5.	4.	5.	1.	1.	1.	1.	4.
Position	1.	4.	7.	8.	1.	8.	8.	8.	8.	8.	8.	1.
Atomic percent												
Mg	42.1	45.0	48.3	43.0	51.6	61.5	50.7	26.1	3.7	39.2	31.3	0.0
Fe2+Mn	45.0	44.3	40.8	47.5	38.5	30.9	36.2	36.6	45.2	41.6	44.1	6.7
Na	12.9	10.7	11.0	9.5	9.8	7.6	13.1	37.3	51.1	19.2	24.6	93.3

PYROXENE ANAYLSES

	43842.03	43842.13	43842.15	43842.22	43842.26	41954.44	41954.45	41954.48	41954.52	41954.55	52293.06	52293.07
Weight % oxide												
SiO2	52.873	53.249	53.416	53.023	53.333	51.547	51.947	51.319	50.328	51.975	50.216	50.587
TiO2	0.576	0.928	0.556	1.058	0.884	0.871	1.129	0.558	1.704	0.754	1.393	1.461
Al2O3	0.882	0.793	0.957	1.455	0.688	1.894	1.936	1.549	3.317	1.076	2.217	2.172
FeO	28.319	28.839	28.853	27.528	27.864	12.702	13.074	16.273	10.557	11.846	11.633	11.145
MnO	0.0	0.0	0.0	0.0	0.425	0.465	0.410	0.438	0.284	0.250	0.372	0.384
MgO	0.0	0.0	0.0	0.0	0.0	11.478	11.254	9.097	11.639	11.546	11.311	11.687
CaO	1.127	2.335	1.770	1.953	1.469	21.340	21.763	21.916	21.651	22.098	21.670	21.379
Na2O	13.706	12.986	13.609	12.863	13.624	0.559	0.604	0.398	0.588	0.474	0.573	0.624
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.305	0.485	0.456	0.570	1.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	97.788	99.615	99.617	98.450	99.998	100.856	102.117	101.548	100.068	100.019	99.385	99.439
Atoms per 6 oxygens												
Si	1.996	1.992	1.986	2.003	1.988	1.936	1.931	1.948	1.894	1.966	1.911	1.919
Ti	0.016	0.026	0.016	0.030	0.025	0.025	0.032	0.016	0.048	0.021	0.040	0.042
Al	0.039	0.035	0.042	0.065	0.030	0.084	0.085	0.069	0.147	0.048	0.099	0.097
Fe3	0.928	0.853	0.920	0.790	0.866	0.036	0.034	0.031	0.011	0.011	0.041	0.027
Fe2	-0.034	0.049	-0.023	0.080	0.002	0.363	0.372	0.485	0.322	0.363	0.329	0.327
Mn	0.0	0.0	0.0	0.0	0.013	0.015	0.013	0.014	0.009	0.008	0.012	0.012
Mg	0.0	0.0	0.0	0.0	0.0	0.642	0.623	0.515	0.653	0.651	0.642	0.661
Ca	0.046	0.094	0.071	0.079	0.059	0.859	0.867	0.892	0.873	0.896	0.884	0.869
Na	1.003	0.942	0.981	0.942	0.985	0.041	0.044	0.029	0.043	0.035	0.042	0.046
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.006	0.009	0.008	0.011	0.031	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	4.	4.	4.	4.	4.	5.	5.	5.	5.	5.	6.	6.
Rock Type	Phon	Phon	Phon	Phon	Phon	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Ben	Ben
Crystal	4.	9.	9.	5.	1.	10.	10.	4.	1.	1.	4.	4.
Position	7.	8.	8.	7.	8.	1.	7.	8.	8.	8.	1.	7.
Atomic percent												
Mg	0.0	0.0	0.0	0.0	0.0	60.5	59.2	49.4	63.6	61.6	62.6	63.2
Fe2+Mn	-3.5	4.9	-2.4	7.8	1.5	35.6	36.6	47.8	32.2	35.1	33.3	32.4
Na	103.5	95.1	102.4	92.2	98.5	3.9	4.2	2.8	4.2	3.3	4.1	4.4

PYROXENE ANAYLSES

	52293.08	52293.13	59632.35	59632.39	59632.42	59632.43	59632.45	58294.61	58294.64	58298.74	326333.52	326333.53
Weight % oxide												
SiO2	50.817	48.583	51.401	49.604	48.904	51.298	52.090	49.843	50.135	50.999	48.731	51.256
TiO2	1.157	2.319	1.350	1.978	2.288	1.268	1.090	0.307	0.899	0.253	0.0	0.0
Al2O3	1.724	3.306	2.037	3.338	3.927	2.194	1.810	1.396	2.033	0.280	0.0	0.0
FeO	11.213	13.012	9.838	10.421	10.174	9.306	9.401	19.877	15.014	21.138	9.027	9.078
MnO	0.434	0.414	0.0	0.0	0.255	0.288	0.0	1.279	0.866	1.090	5.440	6.552
MgO	11.665	10.256	12.544	12.253	12.311	12.636	13.092	4.882	8.077	4.183	8.545	8.289
CaO	21.785	20.529	21.897	21.561	21.493	22.013	22.419	20.158	21.727	16.843	21.856	22.948
Na2O	0.644	0.913	0.644	0.548	0.566	0.497	0.696	2.194	1.697	3.974	0.983	0.868
K2O	0.0	0.0	0.0	0.0	0.113	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.432	0.0	0.0
Total	99.439	99.332	99.711	99.703	100.497	99.500	100.598	99.936	100.448	99.192	94.582	98.991
Atoms per 6 oxygens												
Si	1.928	1.859	1.931	1.869	1.832	1.931	1.933	1.944	1.908	1.994	1.970	1.990
Ti	0.033	0.067	0.038	0.056	0.064	0.036	0.030	0.009	0.026	0.007	0.0	0.0
Al	0.077	0.149	0.090	0.148	0.173	0.097	0.079	0.064	0.091	0.013	0.0	0.0
Fe3	0.049	0.066	0.018	0.042	0.080	0.005	0.044	0.196	0.167	0.269	0.137	0.085
Fe2	0.307	0.350	0.292	0.286	0.238	0.288	0.248	0.453	0.311	0.422	0.168	0.210
Mn	0.014	0.013	0.0	0.0	0.008	0.009	0.0	0.042	0.028	0.036	0.186	0.215
Mg	0.660	0.585	0.702	0.688	0.687	0.709	0.724	0.284	0.458	0.244	0.515	0.480
Ca	0.886	0.842	0.882	0.870	0.863	0.888	0.891	0.842	0.886	0.706	0.947	0.955
Na	0.047	0.068	0.047	0.040	0.041	0.036	0.050	0.166	0.125	0.301	0.077	0.065
K	0.0	0.0	0.0	0.0	0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.008	0.0	0.0
Sample	6.	6.	8.	8.	8.	8.	8.	9.	9.	10.	11.	11.
Rock Type	Ben	Ben	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Rex Tr	Rex Tr	Rex Tr	Cbt	Cbt
Crystal	5.	1.	1.	1.	1.	1.	1.	4.	4.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	1.	7.	8.	8.	8.
Atomic percent												
Mg	64.2	57.6	67.4	67.9	70.5	68.0	70.8	30.1	49.7	24.3	54.4	49.5
Fe2+Mn	31.2	35.7	28.0	28.2	25.3	28.5	24.3	52.4	36.8	45.7	37.4	43.8
Na	4.6	6.7	4.5	3.9	4.2	3.5	4.9	17.6	13.6	30.0	8.1	6.7

PYROXENE ANAYLSES

	326333.54	326333.55	326333.59	326333.60	326333.61	63707.27	63707.31	63707.32	63707.33	63707.34	63707.40	52267.14
Weight % oxide												
SiO2	51.527	51.629	51.888	51.240	51.115	52.305	51.805	51.759	52.799	52.684	51.426	50.788
TiO2	0.0	0.0	0.0	0.0	0.0	0.903	0.987	1.244	0.727	0.890	0.792	0.779
Al2O3	0.0	0.0	0.0	0.0	0.0	0.471	1.432	1.518	0.339	0.423	0.0	0.957
FeO	9.378	9.704	9.370	8.365	7.975	18.776	13.979	13.799	18.100	18.064	21.952	23.871
MnO	6.095	6.359	6.269	5.721	5.555	0.561	0.234	0.230	0.597	0.500	1.018	0.885
MgO	9.085	8.558	9.112	9.894	10.123	6.492	10.856	10.906	7.036	6.935	4.358	2.613
CaO	23.151	23.049	24.299	24.127	24.773	19.093	21.761	21.689	19.500	19.391	16.360	12.087
Na2O	0.804	0.802	0.630	0.622	0.0	3.063	0.382	0.591	2.799	2.751	4.447	6.829
K2O	0.0	0.0	0.162	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.040	100.101	101.730	99.969	99.541	101.664	101.436	101.736	101.897	101.638	100.353	98.809
Atoms per 6 oxygens												
Si	1.974	1.983	1.957	1.954	1.964	1.978	1.948	1.937	1.989	1.991	1.980	1.967
Ti	0.0	0.0	0.0	0.0	0.0	0.026	0.028	0.035	0.021	0.025	0.023	0.023
Al	0.0	0.0	0.0	0.0	0.0	0.021	0.063	0.067	0.015	0.019	0.0	0.044
Fe3	0.113	0.094	0.141	0.138	0.073	0.197	0.012	0.031	0.171	0.150	0.326	0.490
Fe2	0.188	0.218	0.155	0.129	0.184	0.397	0.428	0.401	0.399	0.421	0.381	0.283
Mn	0.198	0.207	0.200	0.185	0.181	0.018	0.007	0.007	0.019	0.016	0.033	0.029
Mg	0.519	0.490	0.512	0.562	0.580	0.366	0.608	0.608	0.395	0.391	0.250	0.151
Ca	0.950	0.949	0.982	0.986	1.020	0.774	0.877	0.870	0.787	0.785	0.675	0.501
Na	0.060	0.060	0.046	0.046	0.0	0.225	0.028	0.043	0.204	0.202	0.332	0.513
K	0.0	0.0	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	11.	11.	11.	11.	11.	12.	12.	12.	12.	12.	12.	13.
Rock Type	Cbt	Cbt	Cbt	Cbt	Cbt	Umaf	Umaf	Umaf	Umaf	Umaf	Umaf	Phon
Crystal	1.	1.	4.	4.	5.	4.	5.	5.	5.	5.	6.	1.
Position	8.	8.	1.	7.	8.	1.	1.	3.	5.	7.	7.	8.
Atomic percent												
Mg	53.8	50.3	56.1	61.0	61.4	36.4	56.8	57.4	38.8	38.0	25.1	15.5
Fe2+Mn	40.0	43.6	38.9	34.1	38.6	41.3	40.6	38.5	41.1	42.4	41.6	32.0
Na	6.2	6.2	5.0	5.0	0.0	22.4	2.6	4.1	20.1	19.6	33.3	52.6

PYROXENE ANAYLSES

	52267.03	52267.04	52267.05	52267.06	52267.09	52267.11	52267.21	52267.23	52267.24	58292.10	58292.12	58292.17
Weight % oxide												
SiO2	51.373	51.103	51.084	50.635	50.983	50.879	50.929	50.982	50.342	50.783	50.068	50.616
TiO2	0.500	0.731	0.444	0.585	0.483	0.424	0.545	0.522	0.594	0.649	0.579	0.604
Al2O3	0.994	0.926	0.929	1.049	0.856	0.993	1.211	0.918	0.948	0.738	0.688	0.746
FeO	24.431	26.488	26.015	25.596	24.913	26.120	24.059	24.829	24.015	23.544	23.435	23.603
MnO	0.876	0.883	0.647	0.924	1.118	0.881	1.105	1.181	1.071	0.907	0.962	0.815
MgO	2.217	1.526	1.549	1.692	1.962	1.455	2.588	2.218	2.298	2.489	2.515	2.603
CaO	11.908	10.374	9.790	9.094	10.931	10.125	12.075	11.242	11.748	16.060	16.337	16.638
Na2O	7.068	8.242	8.225	8.596	7.794	8.311	6.932	7.445	7.142	4.699	4.486	4.224
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.122	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.367	100.273	98.683	98.171	99.040	99.188	99.444	99.337	98.158	99.869	99.192	99.849
Atoms per 6 oxygens												
Si	1.978	1.946	1.973	1.958	1.963	1.955	1.958	1.961	1.960	1.979	1.967	1.980
Ti	0.014	0.021	0.013	0.017	0.014	0.012	0.016	0.015	0.017	0.019	0.017	0.018
Al	0.045	0.042	0.042	0.048	0.039	0.045	0.055	0.042	0.044	0.034	0.032	0.034
Fe3	0.497	0.632	0.602	0.646	0.589	0.639	0.515	0.562	0.542	0.325	0.348	0.291
Fe2	0.290	0.212	0.239	0.181	0.213	0.200	0.259	0.237	0.240	0.443	0.421	0.481
Mn	0.029	0.028	0.021	0.030	0.036	0.029	0.036	0.038	0.035	0.030	0.032	0.027
Mg	0.127	0.087	0.089	0.098	0.113	0.083	0.148	0.127	0.133	0.145	0.147	0.152
Ca	0.491	0.423	0.405	0.377	0.451	0.417	0.497	0.463	0.490	0.671	0.688	0.697
Na	0.528	0.609	0.616	0.645	0.582	0.619	0.517	0.555	0.539	0.355	0.342	0.320
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.006	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	13.	13.	13.	13.	13.	13.	13.	13.	13.	16.	16.	16.
Rock Type	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Rex Tr	Rex Tr	Rex Tr
Crystal	1.	1.	4.	4.	1.	5.	1.	6.	6.	1.	1.	1.
Position	1.	7.	1.	7.	8.	1.	8.	1.	7.	8.	8.	8.
Atomic percent												
Mg	13.0	9.3	9.2	10.3	12.0	8.9	15.4	13.3	14.0	14.9	15.6	15.5
Fe2+Mn	32.8	25.6	26.9	22.1	26.4	24.6	30.7	28.7	29.0	48.6	48.1	51.8
Na	54.2	65.1	63.8	67.6	61.7	66.5	53.9	58.0	56.9	36.5	36.3	32.7

PYROXENE ANAYLSES

	58292.19	58292.23	58292.25	59636.34	59636.35	59636.43	58206.52	58206.56	58206.57	58206.58	58206.62	304006.09
Weight % oxide												
SiO2	50.599	50.077	49.974	51.914	52.228	51.948	51.955	50.884	48.900	49.573	51.048	50.229
TiO2	0.294	0.717	0.630	0.281	0.304	0.0	0.863	2.144	0.869	0.380	0.429	0.604
Al2O3	0.797	0.890	1.024	0.764	0.685	0.632	1.106	0.621	1.195	0.681	0.259	0.775
FeO	24.435	24.333	24.935	30.069	29.751	29.679	27.777	26.020	22.512	27.467	27.453	26.475
MnO	0.680	0.639	0.879	0.249	0.322	0.0	0.308	0.418	0.767	0.823	0.299	1.088
MgO	2.028	2.168	2.174	0.0	0.0	0.0	0.0	0.0	4.840	0.217	0.0	1.208
CaO	15.138	15.712	15.729	1.647	1.937	1.711	4.732	3.309	21.106	14.503	4.458	11.905
Na2O	5.079	4.589	4.731	12.918	12.538	13.048	10.935	11.868	0.744	5.025	11.189	6.929
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.934	0.951	0.770	0.625	0.864	0.686	3.819	0.0	1.580	5.363	0.0
Total	99.050	100.059	101.027	98.612	98.390	97.882	98.362	99.083	100.933	100.249	100.498	99.213
Atoms per 6 oxygens												
Si	1.987	1.964	1.941	1.967	1.988	1.978	1.998	1.962	1.923	1.969	1.964	1.957
Ti	0.009	0.021	0.018	0.008	0.009	0.0	0.025	0.062	0.026	0.011	0.012	0.018
Al	0.037	0.041	0.047	0.034	0.031	0.028	0.050	0.028	0.055	0.032	0.012	0.036
Fe3	0.359	0.301	0.354	0.936	0.879	0.947	0.693	0.668	0.104	0.333	0.669	0.538
Fe2	0.444	0.497	0.456	0.016	0.068	-0.002	0.200	0.171	0.637	0.579	0.214	0.325
Mn	0.023	0.021	0.029	0.008	0.010	0.0	0.010	0.014	0.026	0.028	0.010	0.036
Mg	0.119	0.127	0.126	0.0	0.0	0.0	0.0	0.0	0.284	0.013	0.0	0.070
Ca	0.637	0.660	0.655	0.067	0.079	0.070	0.195	0.137	0.889	0.617	0.184	0.497
Na	0.387	0.349	0.356	0.949	0.925	0.963	0.815	0.887	0.057	0.387	0.835	0.524
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.018	0.018	0.014	0.012	0.016	0.013	0.072	0.0	0.031	0.101	0.0
Sample	16.	16.	16.	18.	18.	18.	19.	19.	19.	19.	19.	20.
Rock Type	Rex Tr	Rex Tr	Rex Tr	Phon	Phon	Phon	Ben	Ben	Ben	Ben	Ben	Phon
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic percent												
Mg	12.2	12.8	13.0	0.0	0.0	0.0	0.0	0.0	28.3	1.3	0.0	7.3
Fe2+Mn	48.0	52.1	50.2	2.5	7.8	-0.2	20.5	17.3	66.0	60.3	21.2	37.8
Na	39.8	35.1	36.8	97.5	92.2	100.2	79.5	82.7	5.7	38.4	78.8	54.9

PYROXENE ANAYLSES

	46237.25	46237.28	46237.32	46237.33	46237.34	46237.35	46237.36	46237.40	46240.46	58036.52	58036.53	58036.57
Weight % oxide												
SiO2	51.218	51.122	50.150	52.408	50.644	51.883	48.897	52.133	50.933	50.650	50.911	50.706
TiO2	1.313	1.399	1.516	1.848	1.489	1.945	1.569	2.026	1.278	1.243	1.038	1.120
Al2O3	2.014	1.866	2.649	1.147	2.573	0.961	2.320	0.818	1.123	1.796	2.129	1.842
FeO	11.020	11.249	12.825	25.364	13.045	25.604	13.417	25.494	24.943	11.148	10.604	11.278
MnO	0.309	0.403	0.367	0.416	0.267	0.524	0.428	0.266	0.937	0.569	0.372	0.413
MgO	12.067	11.969	10.835	0.725	10.418	0.574	10.368	0.402	0.249	11.850	11.496	12.011
CaO	21.779	22.223	21.408	1.900	21.494	1.969	22.025	2.727	8.115	22.153	22.648	21.831
Na2O	0.824	0.676	0.835	12.978	0.698	12.835	0.835	12.292	9.373	0.436	0.554	0.658
K2O	0.0	0.0	0.0	0.109	0.130	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	1.356	0.0	1.237	0.750	3.963	2.219	0.0	0.0	0.0
Total	100.544	100.907	100.585	98.251	100.758	97.532	100.609	100.121	99.170	99.845	99.752	99.859
Atoms per 6 oxygens												
Si	1.915	1.910	1.890	1.981	1.911	1.980	1.855	1.977	1.974	1.916	1.924	1.912
Ti	0.037	0.039	0.043	0.053	0.042	0.056	0.045	0.058	0.037	0.035	0.029	0.032
Al	0.089	0.082	0.118	0.051	0.114	0.043	0.104	0.037	0.051	0.080	0.095	0.082
Fe3	0.067	0.069	0.078	0.787	0.037	0.788	0.130	0.650	0.546	0.049	0.039	0.078
Fe2	0.278	0.282	0.326	0.015	0.375	0.029	0.296	0.158	0.262	0.303	0.296	0.277
Mn	0.010	0.013	0.012	0.013	0.009	0.017	0.014	0.009	0.031	0.018	0.012	0.013
Mg	0.672	0.666	0.608	0.041	0.586	0.033	0.586	0.023	0.014	0.668	0.647	0.675
Ca	0.873	0.889	0.864	0.077	0.869	0.081	0.895	0.111	0.337	0.898	0.917	0.882
Na	0.060	0.049	0.061	0.951	0.051	0.950	0.061	0.904	0.704	0.032	0.041	0.048
K	0.0	0.0	0.0	0.005	0.006	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.025	0.0	0.023	0.014	0.073	0.042	0.0	0.0	0.0
Sample	21.	21.	21.	21.	21.	21.	21.	21.	22.	23.	23.	23.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Phon	Sy-gab	Sy-gab	Sy-gab
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.	7.	8.
Atomic percent												
Mg	65.9	65.9	60.4	4.0	57.4	3.2	61.2	2.1	1.4	65.4	65.0	66.6
Fe2+Mn	28.2	29.2	33.6	2.7	37.6	4.5	32.4	15.3	29.0	31.4	30.9	28.6
Na	5.9	4.9	6.1	93.2	5.0	92.3	6.4	82.6	69.6	3.1	4.1	4.7

PYROXENE ANAYLSES

	58036.63	58036.67	46247.27	46247.26	46247.25	46247.24	46247.17	46247.16	46247.10	46247.04	46247.03	46247.06
Weight % oxide												
SiO2	50.793	50.698	50.271	49.688	50.188	50.186	51.264	50.237	49.991	50.051	50.447	49.816
TiO2	1.217	1.222	0.301	0.258	0.595	0.427	0.350	0.0	0.539	0.594	0.542	0.635
Al2O3	1.827	1.772	0.878	0.916	1.338	1.088	0.794	0.964	1.008	1.071	1.607	0.899
FeO	10.827	10.456	21.579	23.218	19.364	22.255	23.615	23.337	22.162	19.562	13.980	21.712
MnO	0.424	0.515	1.108	0.961	0.760	0.897	0.616	0.782	0.913	0.862	0.574	1.056
MgO	11.865	11.735	4.480	3.375	5.482	3.370	2.939	3.161	3.684	5.368	8.789	4.090
CaO	21.627	21.633	20.400	19.230	21.686	16.421	12.836	15.294	17.762	19.585	22.392	18.630
Na2O	0.633	0.629	1.903	2.465	1.467	4.356	6.637	4.906	3.897	2.740	1.365	3.460
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.356	0.0	0.525	0.740	0.795	0.0	0.0	0.0	0.0
Total	99.213	98.660	100.920	100.467	100.880	99.525	99.791	99.476	99.956	99.833	99.696	100.298
Atoms per 6 oxygens												
Si	1.928	1.935	1.957	1.953	1.943	1.959	1.970	1.959	1.942	1.941	1.928	1.931
Ti	0.035	0.035	0.009	0.008	0.017	0.013	0.010	0.0	0.016	0.017	0.016	0.019
Al	0.082	0.080	0.040	0.042	0.061	0.050	0.036	0.044	0.046	0.049	0.072	0.041
Fe3	0.039	0.026	0.171	0.211	0.128	0.317	0.471	0.378	0.332	0.241	0.142	0.319
Fe2	0.305	0.308	0.531	0.552	0.499	0.410	0.288	0.384	0.388	0.394	0.305	0.385
Mn	0.014	0.017	0.037	0.032	0.025	0.030	0.020	0.026	0.030	0.028	0.019	0.035
Mg	0.671	0.668	0.260	0.198	0.316	0.196	0.168	0.184	0.213	0.310	0.501	0.236
Ca	0.880	0.885	0.851	0.810	0.900	0.687	0.528	0.639	0.739	0.814	0.917	0.774
Na	0.047	0.047	0.144	0.188	0.110	0.330	0.494	0.371	0.294	0.206	0.101	0.260
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.007	0.0	0.010	0.014	0.015	0.0	0.0	0.0	0.0
Sample	23.	23.	24.	24.	24.	24.	24.	24.	24.	24.	24.	24.
Rock Type	Sy-gab	Sy-gab	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon
Crystal	1.	1.	4.	4.	4.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	7.	4.	1.	8.	8.	8.	8.	8.	8.	8.
Atomic percent												
Mg	64.7	64.2	26.7	20.4	33.3	20.3	17.3	19.1	23.0	33.0	54.1	25.8
Fe2+Mn	30.8	31.3	58.4	60.2	55.2	45.5	31.8	42.5	45.2	45.0	35.0	45.9
Na	4.5	4.5	14.8	19.4	11.6	34.2	50.9	38.4	31.8	22.0	10.9	28.4

PYROXENE ANAYLSES

	58224.43	58224.30	58224.29	58224.28	126772.62	126772.60	126772.53	126772.52	126772.51	126772.45	126772.49	126772.48
Weight % oxide												
SiO2	49.349	50.134	49.770	49.629	50.556	48.727	49.731	50.211	50.200	50.352	51.785	50.115
TiO2	0.762	0.553	0.608	0.635	1.199	1.660	1.360	1.158	1.274	1.167	1.426	0.981
Al2O3	2.135	1.855	2.103	1.899	2.395	2.954	2.655	2.300	2.697	2.181	2.566	1.633
FeO	16.997	17.671	17.056	16.837	12.858	12.411	11.532	11.663	11.860	12.170	12.622	12.230
MnO	0.887	0.813	0.709	0.777	0.359	0.498	0.418	0.301	0.326	0.374	0.404	0.376
MgO	7.158	7.231	7.421	7.334	10.908	10.653	11.696	11.314	11.635	11.166	11.606	10.987
CaO	21.976	22.075	21.718	22.125	21.284	21.520	21.055	20.669	21.071	21.392	21.901	21.452
Na2O	1.075	1.098	1.003	0.919	0.770	0.636	0.741	0.611	0.668	0.650	0.752	0.780
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.339	101.430	100.388	100.155	100.329	99.059	99.188	98.227	99.731	99.452	103.062	98.554
Atoms per 6 oxygens												
Si	1.903	1.914	1.917	1.918	1.910	1.866	1.889	1.931	1.899	1.916	1.900	1.924
Ti	0.022	0.016	0.018	0.018	0.034	0.048	0.039	0.033	0.036	0.033	0.039	0.028
Al	0.097	0.083	0.095	0.087	0.107	0.133	0.119	0.104	0.120	0.098	0.111	0.074
Fe3	0.132	0.138	0.110	0.110	0.062	0.085	0.080	0.012	0.058	0.051	0.063	0.080
Fe2	0.416	0.427	0.439	0.435	0.344	0.312	0.286	0.363	0.317	0.336	0.324	0.313
Mn	0.029	0.026	0.023	0.025	0.011	0.016	0.013	0.010	0.010	0.012	0.013	0.012
Mg	0.411	0.411	0.426	0.422	0.614	0.608	0.662	0.649	0.656	0.633	0.635	0.629
Ca	0.908	0.903	0.896	0.916	0.861	0.883	0.857	0.852	0.854	0.872	0.861	0.882
Na	0.080	0.081	0.075	0.069	0.056	0.047	0.055	0.046	0.049	0.048	0.054	0.058
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	25.	25.	25.	25.	26.	26.	26.	26.	26.	26.	26.	26.
Rock Type	Phon	Phon	Phon	Phon	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	6.	5.	4.	4.	6.	1.	5.	5.	5.	4.	4.	4.
Position	1.	1.	3.	3.	1.	8.	7.	4.	1.	7.	7.	1.
Atomic percent												
Mg	43.9	43.5	44.2	44.4	59.9	61.9	65.2	60.8	63.6	61.5	61.9	62.2
Fe2+Mn	47.5	47.9	48.0	48.4	34.6	33.4	29.4	34.9	31.7	33.8	32.8	32.1
Na	8.5	8.6	7.8	7.3	5.5	4.8	5.4	4.3	4.7	4.7	5.3	5.7

PYROXENE ANAYLSES

	58003.81	58003.80	58003.69	58003.68	58003.67	141233.19	141233.17	141233.16	141233.15	141233.14	141233.13	63768.21
Weight % oxide												
SiO2	50.014	49.576	49.484	49.524	48.734	51.183	50.544	51.444	51.567	51.084	50.829	50.831
TiO2	1.003	1.426	1.216	1.258	1.353	0.928	0.827	0.661	0.906	0.937	0.669	0.913
Al2O3	2.094	2.536	2.147	2.364	2.353	1.667	1.543	1.488	1.503	1.699	1.273	1.907
FeO	14.652	14.892	14.526	14.546	14.332	12.298	12.788	12.176	13.494	13.442	13.003	12.841
MnO	0.579	0.673	0.606	0.570	0.451	0.518	0.557	0.430	0.619	0.465	0.646	0.458
MgO	8.841	8.805	9.107	9.012	8.999	10.673	10.748	11.246	10.644	10.454	10.626	11.122
CaO	21.870	21.860	21.873	21.699	22.046	22.149	21.851	22.233	22.007	22.184	21.858	21.367
Na2O	0.732	0.843	0.859	0.956	0.693	0.613	0.603	0.706	0.639	0.727	0.730	0.697
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.785	100.611	99.818	99.929	98.961	100.029	99.461	100.384	101.379	100.992	99.634	100.136
Atoms per 6 oxygens												
Si	1.923	1.891	1.898	1.897	1.888	1.942	1.930	1.938	1.937	1.924	1.938	1.923
Ti	0.029	0.041	0.035	0.036	0.039	0.026	0.024	0.019	0.026	0.027	0.019	0.026
Al	0.095	0.114	0.097	0.107	0.107	0.075	0.069	0.066	0.067	0.075	0.057	0.085
Fe3	0.055	0.084	0.100	0.098	0.091	0.033	0.068	0.073	0.056	0.076	0.083	0.067
Fe2	0.416	0.392	0.366	0.368	0.374	0.358	0.341	0.311	0.368	0.348	0.332	0.339
Mn	0.019	0.022	0.020	0.018	0.015	0.017	0.018	0.014	0.020	0.015	0.021	0.015
Mg	0.507	0.501	0.521	0.514	0.519	0.604	0.612	0.631	0.596	0.587	0.604	0.627
Ca	0.901	0.894	0.899	0.890	0.915	0.901	0.894	0.897	0.886	0.895	0.893	0.866
Na	0.055	0.062	0.064	0.071	0.052	0.045	0.045	0.052	0.047	0.053	0.054	0.051
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	27.	27.	27.	27.	27.	28.	28.	28.	28.	28.	28.	29.
Rock Type	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Ben
Crystal	5.	5.	4.	4.	4.	7.	6.	6.	5.	4.	4.	4.
Position	7.	1.	7.	4.	1.	1.	7.	1.	1.	7.	1.	7.
Atomic percent												
Mg	50.9	51.3	53.7	52.9	54.1	59.0	60.2	62.6	57.8	58.5	59.7	60.8
Fe2+Mn	43.6	42.4	39.8	39.8	40.5	36.6	35.3	32.2	37.6	36.2	34.9	34.3
Na	5.5	6.3	6.6	7.3	5.4	4.4	4.4	5.2	4.6	5.3	5.3	4.9

PYROXENE ANAYLSES

	63768.20	58297.50	58297.48	58297.47	58297.46	58297.45	46237.03	46237.04	46237.05	46237.09	46237.10	46237.19
Weight % oxide												
SiO2	50.867	49.466	49.975	51.645	51.750	49.167	49.828	49.972	51.151	48.077	49.518	51.448
TiO2	0.982	0.413	0.510	2.511	1.991	0.483	1.407	1.202	1.151	2.200	1.585	1.177
Al2O3	1.683	1.503	1.471	0.0	0.0	1.269	1.884	1.978	1.618	3.069	2.866	1.974
FeO	13.489	19.048	19.786	28.377	28.296	20.052	10.463	11.124	11.574	12.173	12.252	11.379
MnO	0.574	0.818	0.839	0.0	0.357	0.770	0.430	0.275	0.300	0.420	0.279	0.367
MgO	10.881	5.308	5.091	0.474	0.398	4.673	11.826	11.690	11.915	10.641	11.253	12.296
CaO	21.190	19.935	19.789	0.966	1.253	19.152	21.777	21.311	21.683	21.611	21.331	22.091
Na2O	0.700	2.181	2.221	12.823	12.605	2.716	0.647	0.544	0.649	1.008	0.726	0.751
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.383	0.0	0.0
Total	100.366	98.672	99.682	96.796	96.650	98.282	98.262	98.096	100.041	99.582	99.810	101.483
Atoms per 6 oxygens												
Si	1.926	1.946	1.951	1.989	1.998	1.943	1.908	1.921	1.928	1.831	1.876	1.907
Ti	0.028	0.012	0.015	0.073	0.058	0.014	0.041	0.035	0.033	0.063	0.045	0.033
Al	0.075	0.070	0.068	0.0	0.0	0.059	0.085	0.090	0.072	0.138	0.128	0.086
Fe3	0.068	0.180	0.168	0.834	0.832	0.234	0.065	0.039	0.054	0.135	0.084	0.089
Fe2	0.359	0.447	0.478	0.080	0.082	0.429	0.270	0.318	0.311	0.253	0.304	0.264
Mn	0.018	0.027	0.028	0.0	0.012	0.026	0.014	0.009	0.010	0.014	0.009	0.012
Mg	0.614	0.311	0.296	0.027	0.023	0.275	0.675	0.670	0.669	0.604	0.635	0.679
Ca	0.860	0.840	0.828	0.040	0.052	0.811	0.894	0.878	0.876	0.882	0.866	0.877
Na	0.051	0.166	0.168	0.957	0.944	0.208	0.048	0.041	0.047	0.074	0.053	0.054
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.007	0.0	0.0
Sample	29.	30.	30.	30.	30.	30.	31.	31.	31.	31.	31.	31.
Rock Type	Ben	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	4.	1.	1.	1.	1.	1.	4.	4.	4.	1.	1.	5.
Position	1.	8.	8.	8.	8.	8.	1.	4.	7.	8.	8.	1.
Atomic percent												
Mg	58.9	32.7	30.5	2.5	2.2	29.3	67.0	64.5	64.5	63.9	63.4	67.3
Fe2+Mn	36.2	49.8	52.2	7.5	8.9	48.5	28.2	31.5	31.0	28.3	31.3	27.4
Na	4.9	17.5	17.3	89.9	89.0	22.2	4.8	3.9	4.5	7.8	5.3	5.4

PYROXENE ANAYLSES

	46237.20	52298.42	52298.41	52298.40	52298.39	52298.36	52298.34	52298.33	52298.32	52298.31	52298.30	52298.29
Weight % oxide												
SiO2	50.549	49.604	50.220	49.977	50.032	50.196	47.507	47.983	50.061	50.529	50.858	50.885
TiO2	1.014	1.373	1.290	0.984	1.047	0.855	1.550	2.446	0.271	1.165	0.850	1.457
Al2O3	1.914	2.440	2.419	1.440	1.805	1.584	2.577	3.809	1.212	2.337	2.122	2.127
FeO	11.444	11.940	12.221	21.723	19.939	20.284	14.198	13.719	20.774	12.379	13.022	12.385
MnO	0.398	0.525	0.469	0.616	0.624	0.456	0.536	0.462	0.563	0.246	0.251	0.516
MgO	11.417	11.237	11.233	4.461	5.297	5.155	8.650	9.132	5.212	11.047	10.258	11.147
CaO	22.011	20.870	20.661	20.021	20.466	20.795	21.658	20.806	20.863	21.234	21.500	21.279
Na2O	0.503	0.881	0.904	2.324	1.792	1.655	0.798	1.018	1.645	0.881	0.808	0.862
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.320	0.0	0.515	0.0	0.0	0.0	0.0	0.0
Total	99.250	98.870	99.417	101.546	101.322	100.980	97.989	99.375	100.601	99.818	99.669	100.658
Atoms per 6 oxygens												
Si	1.925	1.894	1.908	1.928	1.932	1.945	1.864	1.845	1.947	1.913	1.938	1.914
Ti	0.029	0.039	0.037	0.029	0.030	0.025	0.046	0.071	0.008	0.033	0.024	0.041
Al	0.086	0.110	0.108	0.065	0.082	0.072	0.119	0.173	0.056	0.104	0.095	0.094
Fe3	0.044	0.089	0.069	0.196	0.116	0.112	0.102	0.073	0.159	0.068	0.041	0.059
Fe2	0.321	0.293	0.319	0.505	0.528	0.545	0.364	0.368	0.517	0.324	0.374	0.330
Mn	0.013	0.017	0.015	0.020	0.020	0.015	0.018	0.015	0.019	0.008	0.008	0.016
Mg	0.648	0.639	0.636	0.256	0.305	0.298	0.506	0.523	0.302	0.623	0.582	0.625
Ca	0.898	0.854	0.841	0.827	0.847	0.863	0.911	0.857	0.869	0.861	0.878	0.857
Na	0.037	0.065	0.067	0.174	0.134	0.124	0.061	0.076	0.124	0.065	0.060	0.063
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.006	0.0	0.010	0.0	0.0	0.0	0.0	0.0
Sample	31.	32.	32.	32.	32.	32.	32.	32.	32.	32.	32.	32.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	5.	5.	5.	1.	1.	1.	1.	1.	1.	4.	4.	4.
Position	7.	7.	1.	8.	1.	8.	8.	8.	8.	7.	3.	1.
Atomic percent												
Mg	63.6	63.0	61.3	26.8	30.9	30.3	53.3	53.3	31.4	61.1	56.8	60.4
Fe2+Mn	32.8	30.6	32.2	55.0	55.5	57.0	40.3	39.0	55.7	32.5	37.3	33.5
Na	3.6	6.4	6.5	18.2	13.6	12.6	6.4	7.7	12.9	6.4	5.9	6.1

PYROXENE ANAYLSES

	58065.19	58065.18	58065.16	58065.15	58065.14	58100.39	58100.38	58100.36	58100.34	58100.34	58100.33	58100.31
Weight % oxide												
SiO2	50.380	50.241	49.736	49.239	49.089	49.488	52.388	50.659	49.524	50.583	50.206	51.543
TiO2	1.658	1.477	1.575	2.006	2.161	0.415	0.584	0.409	0.761	0.953	1.529	1.399
Al2O3	2.900	2.671	2.934	3.317	3.712	2.694	1.946	1.936	2.503	2.667	2.856	2.545
FeO	9.199	9.288	8.877	9.132	9.609	14.929	9.928	12.723	13.411	10.195	10.145	9.615
MnO	0.0	0.0	0.263	0.0	0.0	0.804	0.451	0.753	1.022	0.528	0.314	0.370
MgO	12.804	12.834	12.531	12.113	12.320	7.813	12.153	9.657	8.992	12.446	12.037	13.043
CaO	21.811	21.700	22.182	21.563	21.668	22.051	22.629	22.379	22.196	22.020	22.185	22.419
Na2O	0.847	0.703	0.779	0.767	0.765	1.443	1.100	1.437	1.329	0.896	0.993	0.877
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.569	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.599	98.914	98.877	98.137	99.324	100.206	101.179	99.953	99.738	100.288	100.265	101.811
Atoms per 6 oxygens												
Si	1.886	1.896	1.877	1.877	1.849	1.894	1.935	1.917	1.889	1.886	1.875	1.890
Ti	0.047	0.042	0.045	0.058	0.061	0.012	0.016	0.012	0.022	0.027	0.043	0.039
Al	0.128	0.119	0.131	0.149	0.165	0.122	0.085	0.086	0.113	0.117	0.126	0.110
Fe3	0.068	0.057	0.083	0.039	0.070	0.151	0.092	0.161	0.165	0.123	0.110	0.096
Fe2	0.221	0.236	0.198	0.252	0.232	0.327	0.215	0.242	0.263	0.195	0.206	0.199
Mn	0.0	0.0	0.008	0.0	0.0	0.026	0.014	0.024	0.033	0.017	0.010	0.011
Mg	0.714	0.722	0.705	0.688	0.692	0.446	0.669	0.545	0.511	0.691	0.670	0.713
Ca	0.875	0.877	0.897	0.881	0.875	0.905	0.896	0.908	0.907	0.880	0.888	0.881
Na	0.061	0.051	0.057	0.057	0.056	0.107	0.079	0.105	0.098	0.065	0.072	0.062
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.011	0.0	0.0	0.0	0.0	0.0	0.0
Sample	33.	33.	33.	33.	33.	34.	34.	34.	34.	34.	34.	34.
Rock Type	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	5.	5.	4.	1.
Position	7.	1.	7.	3.	1.	7.	1.	8.	7.	1.	1.	8.
Atomic percent												
Mg	71.7	71.6	72.8	69.0	70.6	49.2	68.5	59.5	56.5	71.4	69.9	72.4
Fe2+Mn	22.2	23.4	21.3	25.3	23.7	39.0	23.4	29.0	32.7	21.9	22.5	21.3
Na	6.1	5.1	5.9	5.7	5.7	11.8	8.1	11.5	10.8	6.7	7.5	6.3

PYROXENE ANAYLSES

	58264.49	58264.48	126765.75	126765.71	126765.70	126765.69	126765.66	126765.65	59779.99	59779.97	59779.93	59779.92
Weight % oxide												
SiO2	50.618	50.514	50.481	49.006	48.875	49.928	50.813	50.699	47.780	48.648	45.372	49.726
TiO2	1.021	0.927	0.895	0.948	1.284	0.906	0.829	0.726	0.745	0.788	0.607	0.824
Al2O3	1.527	1.572	1.919	2.435	3.001	2.497	2.312	1.740	0.728	1.344	1.381	1.169
FeO	14.436	14.239	14.845	13.838	13.696	13.577	13.727	15.291	26.252	21.747	22.888	20.931
MnO	0.367	0.473	0.580	0.536	0.574	0.561	0.354	0.653	0.671	0.717	0.445	0.583
MgO	10.681	11.030	8.582	8.558	8.667	9.050	9.160	8.163	1.105	4.330	2.173	5.447
CaO	20.418	20.487	22.198	21.852	21.831	22.153	22.377	22.238	19.929	20.896	19.009	21.429
Na2O	0.645	0.723	1.069	1.026	1.170	1.064	0.988	1.138	1.819	1.027	2.409	1.143
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.428	0.0	1.011	0.0
Total	99.713	99.965	100.569	98.199	99.098	99.736	100.560	100.648	99.457	99.497	95.295	101.252
Atoms per 6 oxygens												
Si	1.935	1.921	1.924	1.907	1.882	1.908	1.927	1.934	1.941	1.937	1.896	1.931
Ti	0.029	0.027	0.026	0.028	0.037	0.026	0.024	0.021	0.023	0.024	0.019	0.024
Al	0.069	0.070	0.086	0.112	0.136	0.112	0.103	0.078	0.035	0.063	0.068	0.054
Fe3	0.050	0.087	0.094	0.096	0.113	0.098	0.068	0.096	0.164	0.095	0.257	0.123
Fe2	0.412	0.366	0.379	0.355	0.328	0.336	0.367	0.392	0.728	0.629	0.543	0.557
Mn	0.012	0.015	0.019	0.018	0.019	0.018	0.011	0.021	0.023	0.024	0.016	0.019
Mg	0.609	0.625	0.487	0.496	0.497	0.515	0.518	0.464	0.067	0.257	0.135	0.315
Ca	0.837	0.835	0.906	0.911	0.901	0.907	0.909	0.909	0.868	0.892	0.851	0.892
Na	0.048	0.053	0.079	0.077	0.087	0.079	0.073	0.084	0.143	0.079	0.195	0.086
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.008	0.0	0.021	0.0
Sample	35.	35.	36.	36.	36.	36.	36.	36.	37.	37.	37.	37.
Rock Type	Tr/Sy	Tr/Sy	Phon	Phon	Phon	Phon	Phon	Phon	Ben	Ben	Ben	Ben
Crystal	4.	4.	7.	6.	6.	5.	4.	10.	1.	1.	1.	1.
Position	7.	1.	1.	7.	1.	1.	1.	8.	8.	8.	8.	8.
Atomic percent												
Mg	56.3	59.0	50.5	52.4	53.4	54.3	53.5	48.3	7.0	26.0	15.2	32.2
Fe2+Mn	39.2	36.0	41.3	39.4	37.3	37.3	39.0	43.0	78.1	66.0	62.9	59.0
Na	4.4	5.0	8.2	8.1	9.3	8.3	7.5	8.7	14.9	8.0	21.9	8.8

PYROXENE ANAYLSES

	58291.04	58291.02	58022.08	58022.07	58022.10	58022.11	58022.12	58022.16	58022.17	58022.27	58022.28	59741.31
Weight % oxide												
SiO2	48.490	49.194	49.305	49.527	47.754	46.804	48.441	50.539	50.537	50.210	49.951	50.733
TiO2	0.482	0.543	1.269	1.429	1.332	2.119	1.464	0.894	0.956	0.731	0.893	1.010
Al2O3	0.915	1.122	2.000	2.471	2.209	3.259	2.334	1.616	1.647	1.328	1.371	1.459
FeO	23.476	23.567	16.764	15.468	14.930	26.980	17.827	13.766	13.698	16.723	16.349	12.818
MnO	0.816	0.741	0.470	0.483	0.263	0.828	0.603	0.348	0.461	0.732	0.394	0.363
MgO	2.141	2.118	8.215	9.164	9.115	1.122	7.105	10.687	10.608	8.397	8.304	11.189
CaO	15.269	15.286	22.298	21.816	21.939	4.789	20.858	21.449	21.274	21.692	21.375	21.370
Na2O	4.663	4.476	0.594	0.493	0.312	8.188	0.503	0.570	0.554	0.563	0.537	0.488
K2O	0.0	0.0	0.0	0.153	0.0	0.170	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.720	0.794	0.503	0.0	0.934	1.252	0.0	0.0	0.0	0.0	0.0	0.0
Total	96.972	97.841	101.418	101.004	98.788	95.511	99.135	99.869	99.735	100.376	99.174	99.430
Atoms per 6 oxygens												
Si	1.955	1.970	1.886	1.886	1.869	1.891	1.907	1.926	1.930	1.935	1.948	1.937
Ti	0.015	0.016	0.037	0.041	0.039	0.064	0.043	0.026	0.027	0.021	0.026	0.029
Al	0.043	0.053	0.090	0.111	0.102	0.155	0.108	0.073	0.074	0.060	0.063	0.066
Fe3	0.353	0.290	0.090	0.079	0.070	0.535	0.030	0.065	0.051	0.069	0.029	0.038
Fe2	0.439	0.499	0.446	0.413	0.418	0.376	0.557	0.373	0.386	0.470	0.504	0.371
Mn	0.028	0.025	0.015	0.016	0.009	0.028	0.020	0.011	0.015	0.024	0.013	0.012
Mg	0.129	0.126	0.468	0.520	0.532	0.068	0.417	0.607	0.604	0.482	0.483	0.637
Ca	0.660	0.656	0.914	0.890	0.920	0.207	0.880	0.876	0.871	0.896	0.893	0.874
Na	0.365	0.348	0.044	0.036	0.024	0.641	0.038	0.042	0.041	0.042	0.041	0.036
K	0.0	0.0	0.0	0.007	0.0	0.009	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.014	0.016	0.009	0.0	0.018	0.025	0.0	0.0	0.0	0.0	0.0	0.0
Sample	38.	38.	39.	39.	39.	39.	39.	39.	39.	39.	39.	40.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	1.	1.	1.	1.	1.	1.	1.	4.	10.	5.	5.	4.
Position	8.	8.	8.	8.	8.	8.	8.	1.	8.	1.	7.	1.
Atomic percent												
Mg	13.4	12.6	48.1	52.8	54.1	6.1	40.4	58.8	57.7	47.3	46.4	60.3
Fe2+Mn	48.6	52.5	47.4	43.6	43.4	36.3	55.9	37.2	38.3	48.5	49.7	36.3
Na	38.0	34.9	4.5	3.7	2.4	57.6	3.7	4.1	3.9	4.1	3.9	3.4

PYROXENE ANAYLSES

	59741.32	59741.34	59741.35	59741.45	59741.46	59741.48	141244.54	141244.55	141244.56	141244.57	141244.60	141244.65
Weight % oxide												
SiO2	51.088	50.861	51.005	50.051	50.788	50.426	49.728	49.524	49.862	49.132	47.370	48.026
TiO2	1.013	0.866	1.062	0.966	0.819	0.995	0.840	0.708	0.787	0.961	0.786	0.614
Al2O3	1.810	1.835	2.017	1.877	1.546	1.983	1.061	0.797	0.969	1.585	0.365	0.445
FeO	12.528	12.379	12.423	12.421	15.771	12.804	18.917	20.037	19.347	19.944	25.457	26.029
MnO	0.430	0.452	0.382	0.411	0.553	0.342	0.652	0.598	0.665	0.556	0.650	0.773
MgO	11.159	11.345	11.314	10.948	8.150	10.718	7.595	6.843	7.460	6.826	2.919	2.444
CaO	21.162	20.913	21.052	20.998	21.181	21.610	20.389	20.861	20.505	20.137	19.712	19.747
Na2O	0.618	0.542	0.387	0.671	1.268	0.810	0.544	0.663	0.518	0.517	0.615	0.886
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.808	99.193	99.642	98.343	100.076	99.688	99.726	100.031	100.113	99.658	97.874	98.964
Atoms per 6 oxygens												
Si	1.940	1.942	1.942	1.928	1.950	1.917	1.946	1.940	1.947	1.934	1.955	1.961
Ti	0.029	0.025	0.030	0.028	0.024	0.028	0.025	0.021	0.023	0.028	0.024	0.019
Al	0.081	0.083	0.091	0.085	0.070	0.089	0.049	0.037	0.045	0.074	0.018	0.021
Fe3	0.026	0.024	0.0	0.053	0.077	0.080	0.050	0.091	0.054	0.041	0.072	0.089
Fe2	0.372	0.371	0.396	0.347	0.429	0.328	0.569	0.565	0.578	0.615	0.807	0.800
Mn	0.014	0.015	0.012	0.013	0.018	0.011	0.022	0.020	0.022	0.019	0.023	0.027
Mg	0.632	0.645	0.642	0.628	0.466	0.607	0.443	0.400	0.434	0.400	0.180	0.149
Ca	0.861	0.855	0.859	0.867	0.871	0.880	0.855	0.876	0.858	0.849	0.872	0.864
Na	0.046	0.040	0.029	0.050	0.094	0.060	0.041	0.050	0.039	0.039	0.049	0.070
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	40.	40.	40.	40.	40.	40.	41.	41.	41.	41.	41.	41.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Tr-and	Tr-and	Tr-and	Tr-and	Tr-and	Tr-and
Crystal	4.	5.	5.	1.	1.	1.	4.	4.	4.	4.	1.	1.
Position	7.	1.	7.	8.	8.	8.	1.	4.	6.	7.	8.	8.
Atomic percent												
Mg	59.4	60.2	59.5	60.5	46.3	60.3	41.2	38.6	40.4	37.3	17.0	14.2
Fe2+Mn	36.3	36.0	37.8	34.7	44.4	33.7	55.0	56.5	55.9	59.1	78.4	79.1
Na	4.3	3.7	2.7	4.8	9.3	6.0	3.8	4.8	3.6	3.6	4.6	6.7

PYROXENE ANAYLSES

	46253.10	46253.11	46253.14	46253.15	46253.23	46249.25	46249.28	46249.32	46249.42	63751.46	63751.47	63751.48
Weight % oxide												
SiO2	49.558	49.587	48.940	49.014	47.555	51.922	51.566	51.021	50.324	49.454	50.741	50.589
TiO2	0.771	0.812	0.618	0.712	1.406	0.0	0.302	0.0	0.0	1.050	0.732	0.990
Al2O3	1.282	1.680	0.951	1.055	1.589	0.881	2.544	2.435	3.574	1.901	1.559	1.799
FeO	15.914	15.879	22.111	21.441	23.653	11.495	10.287	10.484	10.500	12.848	13.179	12.941
MnO	0.499	0.476	0.477	0.571	0.555	0.446	0.0	0.278	0.239	0.291	0.478	0.294
MgO	8.695	8.868	4.542	5.034	3.345	10.200	11.377	11.457	11.034	9.922	10.263	10.239
CaO	21.686	21.450	21.453	21.412	20.733	24.083	23.338	23.072	22.806	21.367	21.558	21.700
Na2O	0.774	0.780	0.780	0.917	1.134	0.568	0.507	0.547	0.575	1.025	0.784	0.746
K2O	0.0	0.0	0.0	0.0	0.127	0.0	0.0	0.0	0.0	0.0	0.0	0.113
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.179	99.532	99.872	100.156	100.097	99.595	99.921	99.294	99.052	97.858	99.294	99.411
Atoms per 6 oxygens												
Si	1.923	1.915	1.944	1.933	1.897	1.977	1.940	1.930	1.908	1.918	1.943	1.934
Ti	0.023	0.024	0.018	0.021	0.042	0.0	0.009	0.0	0.0	0.031	0.021	0.028
Al	0.059	0.076	0.045	0.049	0.075	0.040	0.113	0.109	0.160	0.087	0.070	0.081
Fe3	0.108	0.105	0.090	0.113	0.142	0.049	0.028	0.072	0.067	0.093	0.060	0.055
Fe2	0.408	0.408	0.644	0.594	0.647	0.317	0.296	0.260	0.266	0.323	0.362	0.359
Mn	0.016	0.016	0.016	0.019	0.019	0.014	0.0	0.009	0.008	0.010	0.016	0.010
Mg	0.503	0.510	0.269	0.296	0.199	0.579	0.638	0.646	0.623	0.573	0.586	0.583
Ca	0.902	0.888	0.913	0.905	0.886	0.982	0.941	0.935	0.926	0.888	0.884	0.889
Na	0.058	0.058	0.060	0.070	0.088	0.042	0.037	0.040	0.042	0.077	0.058	0.055
K	0.0	0.0	0.0	0.0	0.006	0.0	0.0	0.0	0.0	0.0	0.0	0.006
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	42.	42.	42.	42.	42.	43.	43.	43.	43.	44.	44.	44.
Rock Type	Ben	Ben	Ben	Ben	Ben	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Phon	Phon	Phon
Crystal	4.	4.	5.	5.	1.	1.	1.	1.	1.	4.	4.	4.
Position	1.	7.	1.	7.	8.	8.	8.	8.	8.	1.	4.	7.
Atomic percent												
Mg	51.1	51.4	27.2	30.2	20.9	60.8	65.7	67.6	66.3	58.3	57.3	57.9
Fe2+Mn	43.0	42.7	66.7	62.6	69.9	34.8	30.5	28.2	29.2	33.9	37.0	36.6
Na	5.9	5.8	6.1	7.2	9.2	4.4	3.8	4.2	4.5	7.8	5.7	5.5

PYROXENE ANAYLSES

	63751.49	63751.53	63751.57	46233.06	46233.07	46233.08	46233.09	46233.06	46233.07	46233.20	46233.21	59783.32
Weight % oxide												
SiO2	48.492	49.046	52.759	51.015	50.524	51.469	50.268	50.042	50.406	50.145	50.981	49.440
TiO2	1.865	0.948	0.0	0.829	0.816	0.818	0.901	0.726	0.639	0.941	0.955	0.839
Al2O3	2.910	0.416	1.579	1.690	1.836	2.209	1.864	1.848	1.658	3.434	2.241	1.732
FeO	14.235	22.216	28.203	12.786	12.500	12.526	12.708	12.536	12.752	12.735	12.278	14.876
MnO	0.530	0.516	0.0	0.492	0.0	0.280	0.254	0.268	0.355	0.267	0.399	0.597
MgO	8.748	3.400	0.0	9.656	9.817	10.163	9.797	10.179	9.960	8.839	10.100	8.646
CaO	21.631	19.735	0.263	22.356	22.377	22.434	21.808	22.409	22.299	22.013	22.918	21.927
Na2O	0.951	2.066	13.439	0.735	1.035	1.160	1.048	0.819	0.924	1.245	0.936	0.713
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.136	0.0	0.0	0.0
ZrO2	0.443	0.0	0.928	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.805	98.343	97.171	99.559	98.905	101.059	98.648	98.827	99.129	99.619	100.808	98.770
Atoms per 6 oxygens												
Si	1.866	1.972	2.010	1.953	1.936	1.927	1.934	1.920	1.929	1.911	1.917	1.923
Ti	0.054	0.029	0.0	0.024	0.024	0.023	0.026	0.021	0.018	0.027	0.027	0.025
Al	0.132	0.020	0.071	0.076	0.083	0.098	0.085	0.084	0.075	0.154	0.099	0.079
Fe3	0.083	0.140	0.868	0.026	0.074	0.087	0.074	0.095	0.105	0.061	0.081	0.079
Fe2	0.376	0.607	0.031	0.384	0.326	0.306	0.335	0.307	0.303	0.344	0.305	0.405
Mn	0.017	0.018	0.0	0.016	0.0	0.009	0.008	0.009	0.012	0.009	0.013	0.020
Mg	0.502	0.204	0.0	0.551	0.561	0.567	0.562	0.582	0.568	0.502	0.566	0.501
Ca	0.892	0.850	0.011	0.917	0.919	0.900	0.899	0.921	0.915	0.899	0.923	0.914
Na	0.071	0.161	0.993	0.055	0.077	0.084	0.078	0.061	0.069	0.092	0.068	0.054
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.007	0.0	0.0	0.0
Zr	0.008	0.0	0.017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	44.	44.	44.	46.	46.	46.	46.	46.	46.	46.	46.	47.
Rock Type	Phon	Phon	Phon	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Phon
Crystal	1.	1.	1.	1.	1.	7.	1.	1.	1.	1.	1.	4.
Position	8.	8.	8.	1.	7.	8.	8.	1.	7.	8.	8.	1.
Atomic percent												
Mg	52.0	20.6	0.0	54.8	58.2	58.7	57.2	60.7	59.7	53.0	59.5	51.1
Fe2+Mn	40.7	63.1	3.0	39.8	33.8	32.6	34.9	33.0	33.1	37.3	33.4	43.4
Na	7.3	16.3	97.0	5.5	8.0	8.7	7.9	6.4	7.2	9.7	7.1	5.5

PYROXENE ANAYLSES

	59783.33	59783.35	59783.36	59631.08	59631.09	59631.10	59631.15	59631.16	326256.19	326256.20	326256.21	63895.34
Weight % oxide												
SiO2	50.315	50.395	50.409	49.374	49.387	49.541	49.120	49.818	49.494	49.296	49.397	52.375
TiO2	0.982	0.540	0.576	1.645	1.658	1.843	1.943	1.510	0.420	0.668	0.623	0.0
Al2O3	1.769	1.436	1.470	3.095	2.999	3.997	3.586	2.905	1.319	1.850	2.135	0.0
FeO	12.991	14.422	14.245	9.367	9.316	8.765	10.031	9.547	17.876	17.714	17.754	31.974
MnO	0.738	0.681	0.688	0.0	0.0	0.0	0.0	0.0	0.675	0.811	0.832	0.0
MgO	10.578	9.675	9.387	11.775	12.163	11.683	12.031	12.305	6.956	6.731	6.827	0.0
CaO	21.358	22.240	22.337	23.019	23.136	23.346	22.147	22.529	22.478	22.777	22.675	0.563
Na2O	0.841	0.543	0.737	0.680	0.631	0.813	0.632	0.723	0.601	0.776	0.903	13.292
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.113	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.572	99.932	99.849	98.955	99.290	99.988	99.490	99.860	99.932	100.623	101.146	98.204
Atoms per 6 oxygens												
Si	1.918	1.930	1.931	1.870	1.862	1.852	1.852	1.872	1.929	1.907	1.897	1.986
Ti	0.028	0.016	0.017	0.047	0.047	0.052	0.055	0.043	0.012	0.019	0.018	0.0
Al	0.080	0.065	0.066	0.138	0.133	0.176	0.159	0.129	0.061	0.084	0.097	0.0
Fe3	0.090	0.084	0.093	0.079	0.095	0.074	0.072	0.095	0.108	0.122	0.141	1.005
Fe2	0.325	0.378	0.363	0.218	0.199	0.200	0.244	0.205	0.474	0.451	0.430	0.009
Mn	0.024	0.022	0.022	0.0	0.0	0.0	0.0	0.0	0.022	0.027	0.027	0.0
Mg	0.601	0.552	0.536	0.665	0.683	0.651	0.676	0.689	0.404	0.388	0.391	0.0
Ca	0.873	0.913	0.917	0.934	0.935	0.935	0.895	0.907	0.939	0.944	0.933	0.023
Na	0.062	0.040	0.055	0.050	0.046	0.059	0.046	0.053	0.045	0.058	0.067	0.977
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.006	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	47.	47.	47.	48.	48.	48.	48.	48.	49.	49.	49.	50.
Rock Type	Phon	Phon	Phon	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Phon	Phon	Phon	Q Porp
Crystal	4.	5.	5.	4.	4.	4.	5.	5.	4.	4.	5.	10.
Position	4.	1.	3.	1.	3.	7.	1.	7.	1.	7.	1.	8.
Atomic percent												
Mg	59.4	55.6	54.9	71.3	73.6	71.5	70.0	72.8	42.8	42.0	42.7	0.0
Fe2+Mn	34.5	40.3	39.4	23.4	21.4	22.0	25.3	21.6	52.5	51.7	49.9	0.9
Na	6.1	4.0	5.6	5.4	5.0	6.5	4.8	5.6	4.8	6.3	7.3	99.1

PYROXENE ANAYLSES

	63895.35	63895.40	52276.43	52276.44	52276.46	52276.47	59660.12	59660.13	59660.16	59660.17	59771.23	59771.24
Weight % oxide												
SiO2	51.518	53.003	51.184	49.208	49.282	49.437	50.368	50.511	49.448	49.947	48.861	48.690
TiO2	0.320	0.0	0.384	0.410	0.334	0.483	1.053	1.023	1.503	1.088	0.734	1.051
Al2O3	0.0	0.0	0.868	0.996	1.170	0.971	2.636	2.307	3.609	2.876	0.925	1.163
FeO	32.145	31.893	26.745	25.092	25.270	24.879	12.922	12.233	12.892	12.236	19.450	18.930
MnO	0.0	0.0	0.816	0.968	0.876	0.762	0.459	0.377	0.551	0.624	0.645	0.823
MgO	0.0	0.0	1.855	2.168	2.009	1.945	10.650	11.207	10.382	10.772	7.441	7.427
CaO	2.424	0.191	12.650	13.661	12.923	11.818	22.226	22.379	22.288	21.644	21.194	20.543
Na2O	11.964	13.487	6.833	5.847	6.232	6.539	0.760	0.859	0.815	0.956	0.574	0.759
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.909	0.667	0.646	0.964	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.371	98.574	102.244	99.017	98.742	97.798	101.074	100.896	101.488	100.143	99.824	99.386
Atoms per 6 oxygens												
Si	1.973	2.000	1.939	1.929	1.932	1.956	1.890	1.890	1.848	1.884	1.912	1.911
Ti	0.009	0.0	0.011	0.012	0.010	0.014	0.030	0.029	0.042	0.031	0.022	0.031
Al	0.0	0.0	0.039	0.046	0.054	0.045	0.117	0.102	0.159	0.128	0.043	0.054
Fe3	0.924	0.987	0.529	0.490	0.511	0.479	0.100	0.123	0.119	0.111	0.134	0.121
Fe2	0.106	0.019	0.319	0.332	0.317	0.344	0.305	0.260	0.284	0.275	0.502	0.501
Mn	0.0	0.0	0.026	0.032	0.029	0.026	0.015	0.012	0.017	0.020	0.021	0.027
Mg	0.0	0.0	0.105	0.127	0.117	0.115	0.595	0.625	0.578	0.606	0.434	0.434
Ca	0.099	0.008	0.514	0.574	0.543	0.501	0.893	0.897	0.893	0.875	0.889	0.864
Na	0.888	0.987	0.502	0.444	0.474	0.502	0.055	0.062	0.059	0.070	0.044	0.058
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.017	0.013	0.012	0.019	0.0	0.0	0.0	0.0	0.0	0.0
Sample	50.	50.	51.	51.	51.	51.	52.	52.	52.	52.	53.	53.
Rock Type	Q Porp	Q Porp	Phon	Phon	Phon	Phon	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Ben	Ben
Crystal	4.	10.	1.	1.	1.	1.	4.	1.	5.	5.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	1.	7.	8.	8.
Atomic percent												
Mg	0.0	0.0	11.0	13.6	12.5	11.7	61.3	65.2	61.6	62.4	43.4	42.5
Fe2+Mn	10.7	1.9	36.2	38.9	36.9	37.5	33.0	28.4	32.1	30.4	52.2	51.8
Na	89.3	98.1	52.7	47.5	50.6	50.9	5.7	6.5	6.3	7.2	4.4	5.7

PYROXENE ANAYLSES

	59771.25	141239.46	141239.47	141239.48	141239.49	141239.50	141239.51	141239.52	141239.53	141239.54	52247.60	52247.61
Weight % oxide												
SiO2	49.227	49.866	49.590	49.728	45.857	50.008	50.206	49.783	49.641	50.108	49.672	50.091
TiO2	0.869	1.405	1.013	1.067	0.0	0.955	0.903	1.071	0.835	0.990	1.238	0.986
Al2O3	0.929	1.874	1.199	1.811	1.362	1.567	1.317	1.630	1.255	1.782	1.770	2.126
FeO	19.947	16.529	16.512	15.098	27.934	15.073	15.807	14.718	16.861	13.701	13.741	11.957
MnO	0.646	0.307	0.820	0.476	0.0	0.593	0.642	0.689	0.593	0.401	0.414	0.414
MgO	6.613	9.973	9.218	10.570	13.318	10.868	9.949	10.612	9.503	11.093	10.286	11.155
CaO	20.828	20.651	20.711	20.902	0.564	20.148	20.525	20.439	20.754	20.197	21.899	21.948
Na2O	0.636	0.689	0.809	0.478	0.343	0.755	0.741	0.713	0.716	0.747	0.877	0.793
K2O	0.0	0.0	0.0	0.0	0.193	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.695	101.294	99.872	100.500	89.571	99.967	100.090	99.655	100.158	99.019	99.897	99.470
Atoms per 6 oxygens												
Si	1.938	1.890	1.912	1.895	1.990	1.906	1.923	1.906	1.907	1.920	1.892	1.902
Ti	0.026	0.040	0.029	0.031	0.0	0.027	0.026	0.031	0.024	0.029	0.035	0.028
Al	0.043	0.084	0.054	0.081	0.070	0.070	0.059	0.074	0.057	0.081	0.079	0.095
Fe3	0.078	0.107	0.124	0.088	0.0	0.118	0.098	0.107	0.135	0.077	0.131	0.104
Fe2	0.578	0.417	0.408	0.393	1.014	0.363	0.408	0.365	0.407	0.362	0.307	0.276
Mn	0.022	0.010	0.027	0.015	0.0	0.019	0.021	0.022	0.019	0.013	0.013	0.013
Mg	0.388	0.563	0.530	0.600	0.861	0.617	0.568	0.605	0.544	0.634	0.584	0.631
Ca	0.879	0.839	0.855	0.854	0.026	0.823	0.842	0.838	0.854	0.829	0.894	0.893
Na	0.049	0.051	0.060	0.035	0.029	0.056	0.055	0.053	0.053	0.056	0.065	0.058
K	0.0	0.0	0.0	0.0	0.011	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	53.	54.	54.	54.	54.	54.	54.	54.	54.	54.	55.	55.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	1.	1.	1.	1.	4.	4.	4.	4.	5.	5.	4.	4.
Position	8.	8.	8.	8.	8.	1.	4.	7.	1.	7.	1.	7.
Atomic percent												
Mg	37.4	54.1	51.7	57.5	45.2	58.5	54.0	57.9	53.2	59.5	60.3	64.5
Fe2+Mn	57.9	41.0	42.4	39.1	53.3	36.2	40.8	37.0	41.6	35.2	33.0	29.6
Na	4.7	4.9	5.9	3.4	1.5	5.3	5.2	5.1	5.2	5.3	6.7	5.9

PYROXENE ANAYLSES

	52247.62	52247.63	52247.64	52247.65	325957.11	325957.12	326281.15	326281.17	326281.19	325986.38	325986.39	325986.40
Weight % oxide												
SiO2	49.646	49.612	49.629	48.206	48.019	47.742	47.530	48.240	48.534	49.327	49.473	48.708
TiO2	1.000	1.058	1.429	1.835	0.646	0.406	1.977	2.231	2.140	0.961	0.756	0.898
Al2O3	1.847	2.024	2.201	2.796	1.957	1.690	4.013	4.214	4.413	1.427	1.343	1.030
FeO	13.465	12.072	15.473	13.161	19.824	20.604	9.143	6.759	8.679	19.822	18.032	22.298
MnO	0.373	0.453	0.580	0.624	1.436	1.537	0.0	0.0	0.0	0.528	0.376	0.686
MgO	10.153	11.225	8.693	9.995	4.936	4.420	10.853	12.388	11.147	6.647	7.592	4.940
CaO	21.091	21.443	21.858	21.384	21.129	21.297	23.394	23.623	23.982	21.620	21.952	21.525
Na2O	1.161	0.577	0.925	0.969	1.772	1.774	1.088	1.229	1.231	0.783	0.718	0.728
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.394	0.327	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.736	98.464	100.788	98.970	100.113	99.797	97.998	98.684	100.126	101.115	100.242	100.813
Atoms per 6 oxygens												
Si	1.907	1.906	1.892	1.852	1.879	1.880	1.815	1.809	1.809	1.909	1.917	1.916
Ti	0.029	0.031	0.041	0.053	0.019	0.012	0.057	0.063	0.060	0.028	0.022	0.027
Al	0.084	0.092	0.099	0.127	0.090	0.078	0.181	0.186	0.194	0.065	0.061	0.048
Fe3	0.131	0.077	0.103	0.135	0.233	0.260	0.156	0.160	0.156	0.119	0.115	0.122
Fe2	0.302	0.311	0.391	0.288	0.415	0.418	0.136	0.052	0.114	0.522	0.469	0.612
Mn	0.012	0.015	0.019	0.020	0.048	0.051	0.0	0.0	0.0	0.017	0.012	0.023
Mg	0.581	0.643	0.494	0.572	0.288	0.259	0.618	0.692	0.619	0.383	0.438	0.290
Ca	0.868	0.883	0.893	0.880	0.886	0.899	0.957	0.949	0.958	0.897	0.911	0.907
Na	0.086	0.043	0.068	0.072	0.134	0.135	0.081	0.089	0.089	0.059	0.054	0.056
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.008	0.006	0.0	0.0	0.0	0.0	0.0	0.0
Sample	55.	55.	55.	55.	56.	56.	57.	57.	57.	58.	58.	58.
Rock Type	Ben	Ben	Ben	Ben	Rex Tr	Rex Tr	Oth Lp	Oth Lp	Oth Lp	Ben	Ben	Ben
Crystal	5.	5.	1.	1.	12.	12.	1.	1.	1.	1.	1.	1.
Position	1.	7.	8.	8.	8.	8.	8.	8.	8.	1.	7.	8.
Atomic percent												
Mg	59.2	63.5	50.8	60.1	32.5	30.0	74.0	83.1	75.3	39.0	45.0	29.6
Fe2+Mn	32.0	32.2	42.2	32.4	52.3	54.3	16.3	6.2	13.9	54.9	49.4	64.7
Na	8.8	4.2	7.0	7.6	15.1	15.6	9.7	10.7	10.8	6.0	5.5	5.7

PYROXENE ANAYLSES

	325986.41	325986.42	325986.47	325986.48	326286.55	326286.56	326286.57	326233.06	326233.07	326233.08	326233.09	326233.10
Weight % oxide												
SiO2	48.200	48.157	48.107	51.211	49.181	48.931	49.322	49.654	50.232	49.330	49.283	50.739
TiO2	0.741	0.821	1.143	1.002	0.0	0.0	0.0	0.651	0.737	0.900	1.229	0.942
Al2O3	0.904	0.863	1.441	2.306	1.551	1.582	1.553	1.429	1.642	1.907	2.278	1.730
FeO	23.135	22.389	20.615	26.563	19.686	19.377	19.848	17.066	15.602	15.933	14.493	13.704
MnO	0.550	0.545	0.558	0.0	1.315	1.362	1.417	0.398	0.440	0.526	0.642	0.292
MgO	4.197	4.490	5.807	0.0	4.943	5.287	5.343	8.059	8.976	8.405	9.492	10.622
CaO	21.588	21.522	21.422	1.902	18.350	18.069	18.022	21.767	21.881	21.710	21.744	21.760
Na2O	0.852	0.791	0.913	12.321	3.252	3.470	3.801	0.581	0.647	0.591	0.703	0.692
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.117
ZrO2	0.0	0.0	0.0	1.842	0.382	0.484	0.359	0.0	0.0	0.0	0.0	0.0
Total	100.167	99.578	100.006	97.147	98.660	98.562	99.665	99.605	100.157	99.804	99.864	100.598
Atoms per 6 oxygens												
Si	1.915	1.921	1.891	1.975	1.927	1.912	1.901	1.930	1.928	1.913	1.889	1.918
Ti	0.022	0.025	0.034	0.029	0.0	0.0	0.0	0.019	0.021	0.026	0.035	0.027
Al	0.042	0.041	0.067	0.105	0.072	0.073	0.071	0.065	0.074	0.087	0.103	0.077
Fe3	0.149	0.129	0.153	0.739	0.308	0.347	0.398	0.080	0.075	0.079	0.101	0.090
Fe2	0.620	0.618	0.525	0.117	0.337	0.286	0.242	0.475	0.425	0.438	0.364	0.343
Mn	0.019	0.018	0.019	0.0	0.044	0.045	0.046	0.013	0.014	0.017	0.021	0.009
Mg	0.249	0.267	0.340	0.0	0.289	0.308	0.307	0.467	0.513	0.486	0.542	0.598
Ca	0.919	0.920	0.902	0.079	0.770	0.757	0.744	0.907	0.900	0.902	0.893	0.881
Na	0.066	0.061	0.070	0.921	0.247	0.263	0.284	0.044	0.048	0.044	0.052	0.051
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.006
Zr	0.0	0.0	0.0	0.035	0.007	0.009	0.007	0.0	0.0	0.0	0.0	0.0
Sample	58.	58.	58.	58.	59.	59.	59.	60.	60.	60.	60.	60.
Rock Type	Ben	Ben	Ben	Ben	Rex Ph	Rex Ph	Rex Ph	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab
Crystal	1.	5.	1.	9.	1.	1.	1.	4.	4.	1.	1.	5.
Position	8.	1.	8.	8.	8.	8.	8.	1.	7.	8.	8.	1.
Atomic percent												
Mg	26.1	27.7	35.6	0.0	31.5	34.1	34.9	46.7	51.3	49.3	55.4	59.7
Fe2+Mn	67.0	66.0	57.0	11.3	41.5	36.7	32.8	48.8	43.9	46.2	39.3	35.2
Na	6.9	6.3	7.3	88.7	26.9	29.2	32.3	4.4	4.8	4.5	5.3	5.1

PYROXENE ANAYLSES

	326233.11	326233.12	325980.17	325980.18	325980.22	326241.39	326241.40	326241.41	326241.50	326241.51	326241.52	326241.58
Weight % oxide												
SiO2	50.419	48.409	49.915	50.423	49.825	50.007	50.077	49.629	50.635	48.826	49.418	50.829
TiO2	1.099	0.517	1.345	1.004	1.566	0.919	0.923	1.091	0.533	0.603	0.992	0.682
Al2O3	1.817	0.888	2.408	2.145	2.920	2.009	2.388	2.631	1.396	1.046	2.668	1.759
FeO	13.925	26.981	11.420	10.820	10.798	14.396	14.438	13.219	16.759	20.042	12.727	13.681
MnO	0.441	0.867	0.0	0.258	0.243	0.523	0.481	0.418	0.603	0.763	0.641	0.411
MgO	10.311	0.0	12.020	12.028	11.727	9.398	9.443	9.676	7.371	5.089	9.911	10.150
CaO	21.953	17.177	21.916	21.979	21.715	21.996	22.013	21.760	22.742	21.882	21.884	22.166
Na2O	0.459	3.618	0.566	0.601	0.595	0.756	0.603	0.694	1.005	0.756	0.801	0.669
K2O	0.118	0.0	0.0	0.145	0.0	0.0	0.0	0.124	0.0	0.0	0.147	0.0
ZrO2	0.0	1.131	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.542	99.588	99.590	99.403	99.959	100.004	100.366	99.242	101.044	99.007	99.189	100.347
Atoms per 6 oxygens												
Si	1.915	1.954	1.887	1.906	1.884	1.912	1.910	1.905	1.938	1.945	1.892	1.929
Ti	0.031	0.016	0.038	0.029	0.045	0.026	0.026	0.031	0.015	0.018	0.029	0.019
Al	0.081	0.042	0.107	0.096	0.130	0.091	0.107	0.119	0.063	0.049	0.120	0.079
Fe3	0.066	0.258	0.084	0.086	0.057	0.088	0.065	0.065	0.105	0.083	0.104	0.073
Fe2	0.376	0.653	0.277	0.256	0.284	0.373	0.395	0.359	0.432	0.584	0.303	0.361
Mn	0.014	0.030	0.0	0.008	0.008	0.017	0.016	0.014	0.020	0.026	0.021	0.013
Mg	0.584	0.0	0.677	0.678	0.661	0.536	0.537	0.554	0.420	0.302	0.566	0.574
Ca	0.893	0.743	0.888	0.890	0.880	0.901	0.899	0.895	0.933	0.934	0.898	0.902
Na	0.034	0.283	0.041	0.044	0.044	0.056	0.045	0.052	0.075	0.058	0.059	0.049
K	0.006	0.0	0.0	0.007	0.0	0.0	0.0	0.006	0.0	0.0	0.007	0.0
Zr	0.0	0.022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	60.	60.	61.	61.	61.	63.	63.	63.	63.	63.	63.	63.
Rock Type	Sy-gab	Sy-gab	BFD	BFD	BFD	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug
Crystal	5.	1.	1.	1.	1.	4.	4.	4.	1.	1.	1.	1.
Position	7.	8.	8.	8.	8.	1.	4.	7.	8.	8.	8.	8.
Atomic percent												
Mg	57.9	0.0	68.0	68.8	66.3	54.6	54.1	56.6	44.4	31.1	59.6	57.6
Fe2+Mn	38.7	70.7	27.8	26.8	29.3	39.7	41.4	38.1	47.7	62.9	34.1	37.5
Na	3.4	29.3	4.1	4.5	4.4	5.7	4.5	5.3	7.9	6.0	6.2	4.9

PYROXENE ANAYLSES

	325992.06	325992.07	325992.08	325992.09	325992.10	325992.12	325952.22	325952.23	325952.24	325952.26	325952.27	325952.28
Weight % oxide												
SiO2	49.637	48.738	48.847	49.287	49.006	50.129	52.368	51.803	49.956	51.598	52.242	53.544
TiO2	1.879	1.642	1.886	1.446	2.070	1.225	0.648	0.792	2.378	1.044	0.778	0.0
Al2O3	2.861	2.445	2.713	2.250	2.892	1.751	0.593	0.815	1.882	1.307	0.804	0.0
FeO	13.499	13.182	12.656	16.228	12.329	13.454	7.326	8.209	7.156	4.344	6.389	0.882
MnO	0.394	0.0	0.247	0.0	0.0	0.0	0.235	0.281	0.0	0.0	0.0	0.0
MgO	12.162	11.657	12.263	11.916	12.278	12.273	13.252	12.371	12.762	14.907	13.852	17.020
CaO	20.171	20.690	20.162	18.235	21.003	20.482	23.127	23.503	23.811	24.125	23.904	26.554
Na2O	0.663	0.548	0.670	0.599	0.617	0.698	1.471	1.140	1.034	0.726	0.648	0.0
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.233	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.951	0.0	0.0	0.0	0.392
Total	101.266	98.902	99.444	99.961	100.195	100.012	99.020	99.865	98.979	98.284	98.617	98.392
Atoms per 6 oxygens												
Si	1.854	1.866	1.853	1.877	1.844	1.892	1.953	1.941	1.877	1.923	1.960	1.978
Ti	0.053	0.047	0.054	0.041	0.059	0.035	0.018	0.022	0.067	0.029	0.022	0.0
Al	0.126	0.110	0.121	0.101	0.128	0.078	0.026	0.036	0.083	0.057	0.036	0.0
Fe3	0.108	0.104	0.114	0.107	0.111	0.119	0.138	0.086	0.105	0.102	0.048	0.030
Fe2	0.314	0.318	0.288	0.409	0.277	0.306	0.090	0.172	0.120	0.034	0.152	-0.003
Mn	0.012	0.0	0.008	0.0	0.0	0.0	0.007	0.009	0.0	0.0	0.0	0.0
Mg	0.677	0.665	0.693	0.676	0.689	0.690	0.736	0.691	0.714	0.828	0.774	0.937
Ca	0.807	0.849	0.820	0.744	0.847	0.829	0.924	0.944	0.958	0.963	0.961	1.051
Na	0.048	0.041	0.049	0.044	0.045	0.051	0.106	0.083	0.075	0.052	0.047	0.0
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.011	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.017	0.0	0.0	0.0	0.007
Sample	64.	64.	64.	64.	64.	64.	65.	65.	65.	65.	65.	65.
Rock Type	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Alt UBs	Alt UBs	Alt UBs	Alt UBs	Alt UBs	Alt UBs
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	2.	2.	2.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.	7.	1.
Atomic percent												
Mg	64.4	64.9	66.8	59.9	68.2	65.9	78.4	72.4	78.5	90.6	79.5	100.3
Fe2+Mn	31.0	31.1	28.5	36.2	27.4	29.2	10.3	19.0	13.2	3.7	15.6	-0.3
Na	4.6	4.0	4.7	3.9	4.5	4.9	11.3	8.7	8.3	5.7	4.8	0.0

PYROXENE ANAYLSES

	325958.29	326276.40	326276.41	326276.42	326276.43	326276.44	326276.45	326211.65	326211.66	326211.67	326211.68	326211.69
Weight % oxide												
SiO2	53.750	50.461	48.543	48.692	47.555	46.291	48.351	49.791	49.525	48.317	47.833	50.408
TiO2	0.0	0.870	0.301	1.042	0.0	0.848	0.709	0.934	1.123	0.767	0.621	0.903
Al2O3	0.0	1.935	1.296	2.722	1.021	1.816	1.844	1.528	0.935	0.885	0.851	0.496
FeO	0.487	15.088	26.613	14.528	24.256	26.149	17.224	20.622	27.407	21.701	24.216	27.211
MnO	0.0	0.438	0.804	0.462	0.822	1.193	0.599	0.816	0.765	0.836	0.849	0.473
MgO	17.080	9.398	0.788	9.226	2.983	0.850	7.076	6.216	0.660	4.455	2.624	0.0
CaO	26.436	22.429	13.796	22.085	21.566	20.322	21.936	21.925	10.184	21.765	20.042	3.284
Na2O	0.293	0.856	5.356	0.827	0.948	1.749	0.769	1.024	7.603	0.761	1.820	11.480
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	1.616	0.0	0.444	0.303	0.0	0.0	0.906	0.0	0.0	3.086
Total	98.046	101.475	99.113	99.584	99.595	99.521	98.508	102.856	99.108	99.487	98.856	97.341
Atoms per 6 oxygens												
Si	1.981	1.903	1.935	1.868	1.915	1.879	1.905	1.897	1.940	1.928	1.929	1.975
Ti	0.0	0.025	0.009	0.030	0.0	0.026	0.021	0.027	0.033	0.023	0.019	0.027
Al	0.0	0.086	0.061	0.123	0.048	0.087	0.086	0.069	0.043	0.042	0.040	0.023
Fe3	0.058	0.122	0.403	0.141	0.179	0.228	0.121	0.159	0.554	0.115	0.206	0.729
Fe2	-0.043	0.354	0.484	0.325	0.638	0.659	0.447	0.498	0.344	0.610	0.610	0.163
Mn	0.0	0.014	0.027	0.015	0.028	0.041	0.020	0.026	0.025	0.028	0.029	0.016
Mg	0.938	0.528	0.047	0.528	0.179	0.051	0.416	0.353	0.039	0.265	0.158	0.0
Ca	1.044	0.906	0.589	0.908	0.930	0.884	0.926	0.895	0.427	0.931	0.866	0.138
Na	0.021	0.063	0.414	0.062	0.074	0.138	0.059	0.076	0.577	0.059	0.142	0.872
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.031	0.0	0.009	0.006	0.0	0.0	0.017	0.0	0.0	0.059
Sample	65.	66.	66.	66.	66.	66.	66.	68.	68.	68.	68.	68.
Rock Type	Alt UBs	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	2.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	7.	1.	7.	8.	1.	7.	8.	1.	7.	1.	7.	8.
Atomic percent												
Mg	102.4	55.1	4.8	56.8	19.5	5.7	44.2	37.0	4.0	27.5	16.8	0.0
Fe2+Mn	-4.7	38.4	52.6	36.6	72.5	78.7	49.6	55.0	37.5	66.3	68.1	17.0
Na	2.3	6.6	42.6	6.7	8.1	15.5	6.3	8.0	58.6	6.1	15.1	83.0

PYROXENE ANAYLSES

	326211.74	326301.76	326301.80	326301.81	326301.82	326301.89	58015.07	58015.08	58015.11	58015.13	58015.15	58015.18
Weight % oxide												
SiO2	50.354	50.520	48.126	49.811	50.252	50.268	50.377	49.546	48.591	49.458	50.077	49.728
TiO2	1.065	0.527	0.968	0.809	1.000	0.973	0.374	0.534	0.895	0.667	0.535	0.617
Al2O3	0.594	2.079	2.475	2.096	2.635	2.722	1.324	1.147	1.711	2.162	1.031	1.067
FeO	28.619	7.978	8.186	8.392	8.487	8.419	20.511	21.489	15.922	14.658	23.425	23.763
MnO	0.0	0.0	0.243	0.0	0.0	0.0	1.885	1.731	1.088	0.833	1.546	1.545
MgO	0.245	12.651	11.860	12.280	12.174	12.287	4.561	4.076	7.573	8.577	2.781	2.346
CaO	4.442	24.642	23.619	24.696	24.124	24.409	16.241	15.784	21.685	22.240	12.312	11.591
Na2O	11.080	0.602	0.428	0.528	0.543	0.581	4.623	4.723	1.378	1.119	6.411	6.966
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	1.500	0.0	0.0	0.0	0.0	0.0	0.0	0.474	0.0	0.0	0.751	0.882
Total	97.899	98.999	95.905	98.612	99.215	99.659	99.896	99.504	98.843	99.714	98.869	98.505
Atoms per 6 oxygens												
Si	1.953	1.898	1.876	1.885	1.892	1.882	1.935	1.922	1.892	1.898	1.950	1.941
Ti	0.031	0.015	0.028	0.023	0.028	0.027	0.011	0.016	0.026	0.019	0.016	0.018
Al	0.027	0.092	0.114	0.094	0.117	0.120	0.060	0.052	0.079	0.098	0.047	0.049
Fe3	0.781	0.126	0.111	0.129	0.083	0.103	0.393	0.410	0.188	0.152	0.477	0.526
Fe2	0.147	0.125	0.156	0.137	0.185	0.160	0.266	0.287	0.330	0.319	0.286	0.249
Mn	0.0	0.0	0.008	0.0	0.0	0.0	0.061	0.057	0.036	0.027	0.051	0.051
Mg	0.014	0.708	0.689	0.693	0.683	0.686	0.261	0.236	0.440	0.490	0.161	0.136
Ca	0.185	0.992	0.986	1.001	0.973	0.979	0.668	0.656	0.905	0.914	0.514	0.485
Na	0.833	0.044	0.032	0.039	0.040	0.042	0.344	0.355	0.104	0.083	0.484	0.527
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.028	0.0	0.0	0.0	0.0	0.0	0.0	0.009	0.0	0.0	0.014	0.017
Sample	68.	69.	69.	69.	69.	69.	70.	70.	70.	70.	70.	70.
Rock Type	Ben	UML	UML	UML	UML	UML	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy
Crystal	1.	4.	1.	1.	1.	1.	4.	4.	5.	6.	1.	1.
Position	8.	8.	8.	8.	8.	8.	1.	7.	1.	1.	8.	8.
Atomic percent												
Mg	1.4	80.7	77.9	79.7	75.2	77.3	28.0	25.2	48.4	53.3	16.4	14.1
Fe2+Mn	14.8	14.3	18.5	15.8	20.4	18.0	35.1	36.8	40.2	37.6	34.3	31.2
Na	83.8	5.0	3.6	4.5	4.4	4.7	36.9	38.0	11.4	9.0	49.3	54.7

PYROXENE ANAYLSES

	58241.37	326300.39	326300.40	326300.43	326303.15	326303.19	326303.27	326303.28	326303.29	326271.39	326271.40	326271.41
Weight % oxide												
SiO2	50.429	49.577	49.058	49.144	45.682	44.578	45.048	46.424	48.179	50.900	49.645	49.256
TiO2	1.694	0.0	0.344	0.254	1.989	2.134	2.023	1.629	1.485	0.882	1.241	1.370
Al2O3	0.423	1.498	1.388	1.250	6.529	6.591	5.970	4.894	4.723	2.370	2.851	3.651
FeO	30.674	17.277	18.430	18.562	9.579	9.798	9.558	8.975	9.131	7.319	7.345	7.585
MnO	0.0	1.637	1.907	1.844	0.0	0.0	0.272	0.0	0.0	0.0	0.0	0.0
MgO	0.0	6.699	5.375	5.818	10.501	10.216	10.419	10.944	11.595	12.944	12.783	12.605
CaO	0.544	20.134	19.299	19.634	24.679	24.198	24.096	24.186	25.501	25.325	25.151	25.151
Na2O	12.569	2.074	2.477	2.288	0.380	0.709	0.774	0.699	0.693	0.435	0.414	0.531
K2O	0.213	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.546	0.718	0.701	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	96.546	99.442	98.996	99.495	99.339	98.224	98.160	97.751	101.307	100.175	99.430	100.149
Atoms per 6 oxygens												
Si	1.957	1.925	1.927	1.920	1.728	1.703	1.721	1.777	1.777	1.890	1.858	1.829
Ti	0.049	0.0	0.010	0.007	0.057	0.061	0.058	0.047	0.041	0.025	0.035	0.038
Al	0.019	0.069	0.064	0.058	0.291	0.297	0.269	0.221	0.205	0.104	0.126	0.160
Fe3	0.924	0.217	0.222	0.234	0.167	0.226	0.229	0.183	0.208	0.099	0.119	0.143
Fe2	0.071	0.344	0.383	0.372	0.137	0.087	0.076	0.104	0.074	0.128	0.111	0.093
Mn	0.0	0.054	0.063	0.061	0.0	0.0	0.009	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.388	0.315	0.339	0.592	0.582	0.593	0.624	0.637	0.716	0.713	0.698
Ca	0.023	0.838	0.812	0.822	1.001	0.991	0.987	0.992	1.008	1.007	1.009	1.001
Na	0.946	0.156	0.189	0.173	0.028	0.053	0.057	0.052	0.050	0.031	0.030	0.038
K	0.011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.010	0.014	0.013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	71.	72.	72.	72.	75.	75.	75.	75.	75.	76.	76.	76.
Rock Type	Ben	Rex Ph	Rex Ph	Rex Ph	UML	UML	UML	UML	UML	UML	UML	UML
Crystal	1.	3.	3.	3.	4.	5.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic percent												
Mg	0.0	41.2	33.2	35.9	78.2	80.6	80.7	80.0	83.7	81.8	83.5	84.2
Fe2+Mn	7.0	42.3	46.9	45.8	18.1	12.0	11.6	13.3	9.7	14.6	13.0	11.2
Na	93.0	16.6	19.9	18.3	3.7	7.3	7.8	6.7	6.6	3.5	3.5	4.6

PYROXENE ANAYLSES

	325960.55	325960.56	325960.57	326229.66	326229.67	326229.68	325910.73	325910.74	325910.75	326273.06	326273.07	326273.08
Weight % oxide												
SiO2	50.159	51.414	50.562	48.066	49.547	48.040	48.057	50.465	51.786	48.800	48.831	47.828
TiO2	0.335	0.479	0.0	1.886	1.372	2.361	0.0	0.0	0.0	0.291	0.0	0.0
Al2O3	0.799	1.068	0.938	2.999	2.634	3.353	0.0	0.0	0.0	1.052	1.280	1.098
FeO	13.029	13.508	12.993	12.336	12.486	12.257	6.669	6.298	7.123	25.996	27.014	25.968
MnO	1.192	1.116	1.416	0.394	0.405	0.485	8.122	8.799	8.728	2.328	2.218	2.323
MgO	8.855	9.197	8.877	10.298	10.569	10.519	8.847	9.661	9.656	0.628	0.819	0.733
CaO	22.638	23.397	23.073	21.614	22.421	22.024	24.084	23.040	23.499	13.509	14.583	14.963
Na2O	1.362	1.467	1.315	0.864	1.010	1.000	0.668	0.651	0.827	5.562	5.237	4.690
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.654	0.487	0.621
Total	98.369	101.646	99.174	98.457	100.444	100.039	96.447	98.914	101.619	98.820	100.469	98.224
Atoms per 6 oxygens												
Si	1.941	1.924	1.940	1.851	1.866	1.819	1.907	1.950	1.948	1.943	1.914	1.926
Ti	0.010	0.013	0.0	0.055	0.039	0.067	0.0	0.0	0.0	0.009	0.0	0.0
Al	0.036	0.047	0.042	0.136	0.117	0.150	0.0	0.0	0.0	0.049	0.059	0.052
Fe3	0.164	0.185	0.175	0.116	0.147	0.151	0.237	0.149	0.163	0.452	0.492	0.438
Fe2	0.258	0.238	0.242	0.281	0.246	0.237	-0.016	0.054	0.061	0.413	0.393	0.437
Mn	0.039	0.035	0.046	0.013	0.013	0.016	0.273	0.288	0.278	0.078	0.074	0.079
Mg	0.511	0.513	0.508	0.591	0.593	0.594	0.523	0.556	0.541	0.037	0.048	0.044
Ca	0.939	0.938	0.949	0.892	0.905	0.894	1.024	0.954	0.947	0.576	0.612	0.646
Na	0.102	0.106	0.098	0.065	0.074	0.073	0.051	0.049	0.060	0.429	0.398	0.366
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.013	0.009	0.012
Sample	78.	78.	78.	79.	79.	79.	80.	80.	80.	82.	82.	82.
Rock Type	Brecc	Brecc	Brecc	Ben	Ben	Ben	Cbt	Cbt	Cbt	Rex Ph	Rex Ph	Rex Ph
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	3.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic percent												
Mg	56.2	57.5	56.8	62.2	64.0	64.6	62.9	58.7	57.6	3.9	5.3	4.8
Fe2+Mn	32.6	30.6	32.2	30.9	28.0	27.5	30.9	36.1	36.1	51.3	51.2	55.7
Na	11.2	11.9	11.0	6.8	8.0	7.9	6.1	5.2	6.4	44.8	43.6	39.5

PYROXENE ANAYLSES

	326273.10	326244.28	326244.29	326244.30	326244.34	326244.39	326336.01	326336.02	326336.03	326336.05	54244.15	54244.17
Weight % oxide												
SiO2	48.489	46.912	49.301	48.920	45.730	47.157	51.991	50.942	50.187	50.751	53.445	52.716
TiO2	0.0	3.058	1.258	1.498	3.342	2.703	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	1.081	4.350	2.335	2.627	5.242	4.083	0.545	0.454	0.641	0.372	0.366	0.295
FeO	26.365	13.222	12.288	11.735	12.873	12.153	12.481	12.799	12.203	12.087	3.614	3.516
MnO	2.031	0.376	0.382	0.419	0.285	0.373	5.953	5.875	6.414	6.786	3.998	4.004
MgO	0.576	9.683	10.535	10.868	10.078	10.036	7.601	7.384	7.032	7.279	14.140	13.984
CaO	13.712	22.194	21.790	21.985	21.817	22.054	21.111	20.114	21.522	21.514	24.830	24.731
Na2O	5.325	1.062	0.830	0.960	0.830	0.794	2.308	2.165	1.572	1.831	0.481	0.271
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.718	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.297	100.857	98.719	99.012	100.197	99.353	101.990	99.733	99.571	100.620	100.874	99.517
Atoms per 6 oxygens												
Si	1.944	1.770	1.891	1.865	1.735	1.803	1.952	1.961	1.946	1.943	1.963	1.966
Ti	0.0	0.087	0.036	0.043	0.095	0.078	0.0	0.0	0.0	0.0	0.0	0.0
Al	0.051	0.194	0.106	0.118	0.234	0.184	0.024	0.021	0.029	0.017	0.016	0.013
Fe3	0.446	0.170	0.101	0.137	0.166	0.113	0.240	0.219	0.197	0.234	0.092	0.075
Fe2	0.438	0.248	0.294	0.237	0.242	0.276	0.152	0.193	0.198	0.153	0.019	0.035
Mn	0.069	0.012	0.012	0.014	0.009	0.012	0.189	0.192	0.211	0.220	0.124	0.126
Mg	0.034	0.545	0.602	0.617	0.570	0.572	0.425	0.424	0.406	0.415	0.774	0.777
Ca	0.589	0.898	0.896	0.898	0.887	0.904	0.849	0.830	0.894	0.882	0.977	0.988
Na	0.414	0.078	0.062	0.071	0.061	0.059	0.168	0.162	0.118	0.136	0.034	0.020
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	82.	83.	83.	83.	83.	83.	84.	84.	84.	84.	85.	85.
Rock Type	Rex Ph	BFD	BFD	BFD	BFD	BFD	Cbt	Cbt	Cbt	Cbt	Cbt	Cbt
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic percent												
Mg	3.6	61.7	62.1	65.7	64.6	62.2	45.5	43.7	43.5	44.9	81.4	81.1
Fe2+Mn	53.1	29.4	31.5	26.7	28.5	31.3	36.5	39.6	43.8	40.4	15.0	16.8
Na	43.4	8.8	6.4	7.6	6.9	6.4	18.0	16.7	12.6	14.7	3.6	2.1

PYROXENE ANAYLSES

	54244.18	326207.07	326207.08	326207.09	326207.10	326207.12	326207.13	326207.14	326207.16	326207.17	326207.18	326388.24
Weight % oxide												
SiO2	52.824	51.452	51.497	51.510	48.216	48.562	47.420	50.535	50.437	50.315	49.994	54.380
TiO2	0.0	1.305	1.398	0.622	0.727	0.452	0.876	1.192	1.089	0.968	0.597	0.0
Al2O3	0.332	1.152	1.533	1.407	1.240	0.965	1.772	1.357	0.770	1.144	1.200	0.432
FeO	3.437	27.730	27.971	28.143	25.108	26.530	22.762	26.931	28.054	28.294	27.829	3.602
MnO	4.066	0.610	0.446	0.314	0.828	0.985	0.904	0.474	0.431	0.0	0.0	2.987
MgO	14.194	0.0	0.235	0.0	2.149	1.871	3.298	0.258	0.0	0.295	0.0	19.312
CaO	25.033	4.709	3.583	2.735	19.960	20.800	20.290	3.375	3.791	4.551	6.139	11.037
Na2O	0.423	10.491	11.186	11.920	1.856	1.606	1.562	11.097	10.856	10.823	9.470	1.210
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.616
ZrO2	0.0	1.653	1.094	1.249	0.630	0.318	0.431	1.799	1.742	1.465	1.608	0.0
Total	100.309	99.102	98.943	97.900	100.714	102.089	99.315	97.018	97.170	97.855	96.837	93.576
Atoms per 6 oxygens												
Si	1.950	1.985	1.970	1.979	1.921	1.916	1.899	1.975	1.979	1.953	1.983	2.088
Ti	0.0	0.038	0.040	0.018	0.022	0.013	0.026	0.035	0.032	0.028	0.018	0.0
Al	0.014	0.052	0.069	0.064	0.058	0.045	0.084	0.063	0.036	0.052	0.056	0.020
Fe3	0.115	0.625	0.699	0.783	0.176	0.208	0.169	0.690	0.702	0.745	0.609	0.0
Fe2	-0.009	0.270	0.197	0.122	0.660	0.667	0.593	0.190	0.219	0.174	0.314	0.116
Mn	0.127	0.020	0.014	0.010	0.028	0.033	0.031	0.016	0.014	0.0	0.0	0.097
Mg	0.781	0.0	0.013	0.0	0.128	0.110	0.197	0.015	0.0	0.017	0.0	1.105
Ca	0.990	0.195	0.147	0.113	0.852	0.879	0.871	0.141	0.159	0.189	0.261	0.454
Na	0.030	0.785	0.830	0.888	0.143	0.123	0.121	0.841	0.826	0.814	0.728	0.090
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.030
Zr	0.0	0.031	0.020	0.023	0.012	0.006	0.008	0.034	0.033	0.028	0.031	0.0
Sample	85.	90.	90.	90.	90.	90.	90.	90.	90.	90.	90.	91.
Rock Type	Cbt	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Cbt
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic percent												
Mg	84.1	0.0	1.2	0.0	13.3	11.8	20.9	1.4	0.0	1.7	0.0	78.5
Fe2+Mn	12.7	27.0	20.0	12.9	71.7	75.0	66.2	19.4	22.0	17.3	30.1	15.1
Na	3.2	73.0	78.7	87.1	14.9	13.2	12.8	79.2	78.0	81.0	69.9	6.4

PYROXENE ANAYLSES

	326282.04	326282.05	326282.06	326282.07	54275.40	54275.44	127052.52	127052.53	127052.54	127052.55	63808.26	63808.27
Weight % oxide												
SiO2	50.295	49.673	48.482	48.067	54.715	52.697	55.424	53.226	54.141	53.900	49.880	49.305
TiO2	0.0	0.0	0.0	0.286	0.0	0.0	0.0	0.0	0.0	0.0	0.477	0.0
Al2O3	1.318	1.447	1.523	1.669	0.321	0.378	0.592	0.0	0.259	0.271	1.098	0.926
FeO	22.724	22.639	21.077	21.430	5.634	3.954	2.240	1.929	2.276	2.767	20.106	17.828
MnO	2.057	1.997	1.704	1.825	4.276	4.382	0.952	0.857	1.101	1.115	0.720	0.677
MgO	3.154	3.313	3.375	3.474	13.068	13.279	16.557	16.004	15.877	15.875	6.538	6.907
CaO	16.585	16.159	17.418	17.336	24.975	24.952	26.881	25.757	26.336	26.269	21.852	21.766
Na2O	4.431	4.109	3.649	3.581	0.518	0.356	0.279	0.0	0.0	0.0	0.704	0.767
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.874	0.447	0.463	0.429	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	101.438	99.784	97.691	98.097	103.507	99.998	102.925	97.773	99.990	100.197	101.375	98.176
Atoms per 6 oxygens												
Si	1.933	1.940	1.933	1.911	1.978	1.963	1.965	1.989	1.984	1.973	1.928	1.953
Ti	0.0	0.0	0.0	0.009	0.0	0.0	0.0	0.0	0.0	0.0	0.014	0.0
Al	0.060	0.067	0.072	0.078	0.014	0.017	0.025	0.0	0.011	0.012	0.050	0.043
Fe3	0.372	0.348	0.327	0.343	0.067	0.083	0.064	0.021	0.021	0.043	0.119	0.110
Fe2	0.358	0.391	0.376	0.370	0.103	0.040	0.002	0.039	0.049	0.042	0.531	0.481
Mn	0.067	0.066	0.058	0.061	0.131	0.138	0.029	0.027	0.034	0.035	0.024	0.023
Mg	0.181	0.193	0.201	0.206	0.704	0.737	0.875	0.892	0.867	0.866	0.377	0.408
Ca	0.683	0.676	0.744	0.738	0.967	0.996	1.021	1.032	1.034	1.030	0.905	0.924
Na	0.330	0.311	0.282	0.276	0.036	0.026	0.019	0.0	0.0	0.0	0.053	0.059
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.016	0.009	0.009	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	93.	93.	93.	93.	96.	96.	97.	97.	97.	97.	98.	98.
Rock Type	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Cbt	Cbt	Cbt	Cbt	Cbt	Cbt	BFD	BFD
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	4.	4.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.	7.
Atomic percent												
Mg	19.3	20.1	21.9	22.6	72.3	78.3	94.6	93.1	91.3	91.8	38.3	42.0
Fe2+Mn	45.4	47.6	47.3	47.2	24.0	18.9	3.4	6.9	8.7	8.2	56.3	51.9
Na	35.3	32.4	30.8	30.2	3.7	2.8	2.1	0.0	0.0	0.0	5.4	6.1

PYROXENE ANAYLSES

	63808.34	52285.44	52285.45	52285.46	52285.55	326289.07	326289.08	58296.11	58296.12	58296.14	58290.20	58290.21
Weight % oxide												
SiO2	49.027	45.490	43.859	48.957	44.405	49.677	49.258	49.331	49.256	47.841	50.169	50.261
TiO2	0.604	3.146	4.385	2.390	3.551	0.0	0.0	0.305	0.352	0.0	1.199	1.034
Al2O3	1.196	9.300	10.370	6.352	8.764	2.167	1.962	1.532	1.532	1.516	2.790	2.435
FeO	19.926	8.319	8.309	7.412	8.965	21.974	23.386	20.675	20.774	19.559	9.716	9.985
MnO	0.621	0.283	0.0	0.325	0.0	2.500	2.669	1.139	1.254	1.161	0.0	0.232
MgO	6.296	11.269	10.528	13.056	11.465	3.652	2.943	4.716	4.778	4.743	10.795	11.254
CaO	21.806	22.338	22.537	23.016	21.043	18.175	17.616	19.858	20.599	20.251	23.191	23.191
Na2O	0.811	0.968	0.798	0.699	0.863	3.672	3.739	2.332	2.102	2.102	0.647	0.795
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.133	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.314	0.417	0.0	0.0
Total	100.287	101.113	100.786	102.207	99.056	101.817	101.573	100.021	100.961	97.590	98.507	99.187
Atoms per 6 oxygens												
Si	1.915	1.675	1.629	1.777	1.672	1.897	1.896	1.923	1.909	1.913	1.917	1.903
Ti	0.018	0.087	0.122	0.065	0.101	0.0	0.0	0.009	0.010	0.0	0.034	0.029
Al	0.055	0.404	0.454	0.272	0.389	0.098	0.089	0.070	0.070	0.071	0.126	0.109
Fe3	0.141	0.141	0.101	0.093	0.128	0.381	0.397	0.249	0.237	0.249	0.019	0.084
Fe2	0.510	0.115	0.157	0.132	0.154	0.321	0.356	0.425	0.437	0.406	0.291	0.232
Mn	0.021	0.009	0.0	0.010	0.0	0.081	0.087	0.038	0.041	0.039	0.0	0.007
Mg	0.367	0.618	0.583	0.706	0.643	0.208	0.169	0.274	0.276	0.283	0.615	0.635
Ca	0.913	0.881	0.897	0.895	0.849	0.744	0.727	0.829	0.856	0.868	0.950	0.941
Na	0.061	0.069	0.057	0.049	0.063	0.272	0.279	0.176	0.158	0.163	0.048	0.058
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.007	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.006	0.008	0.0	0.0
Sample	98.	99.	99.	99.	99.	100.	100.	101.	101.	101.	102.	102.
Rock Type	BFD	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Rex Ph	Rex Ph	Rex Tr	Rex Tr	Rex Tr	BFD	BFD
Crystal	5.	1.	1.	4.	1.	1.	1.	1.	1.	1.	1.	1.
Position	1.	8.	8.	1.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic percent												
Mg	38.3	76.2	73.1	78.7	74.8	23.6	19.0	30.0	30.3	31.8	64.5	68.1
Fe2+Mn	55.4	15.3	19.7	15.8	17.9	45.6	49.7	50.7	52.4	49.9	30.5	25.6
Na	6.4	8.5	7.2	5.5	7.3	30.8	31.3	19.3	17.3	18.3	5.0	6.2

PYROXENE ANAYLSES

	58290.23	58290.25	58290.27	58290.31	41906.41	41906.42	41906.43	325611.73	325611.74	325611.75	325611.76	325611.77
Weight % oxide												
SiO2	50.621	50.519	48.540	49.220	47.312	48.483	47.621	50.171	49.335	49.956	50.809	49.359
TiO2	0.0	0.558	0.644	1.108	1.642	1.669	1.853	1.284	1.407	1.093	0.795	1.121
Al2O3	1.113	2.113	1.440	2.770	3.775	4.199	4.696	1.433	2.088	1.700	1.611	1.624
FeO	11.977	9.472	18.084	12.146	9.065	9.319	9.446	12.956	13.723	15.621	14.826	17.423
MnO	0.254	0.0	0.0	0.261	0.0	0.0	0.289	0.0	0.241	0.248	0.433	0.0
MgO	10.655	11.663	6.361	9.721	11.117	11.188	11.171	13.300	12.505	11.409	13.106	10.441
CaO	23.112	23.248	22.684	22.513	24.364	24.623	24.343	19.867	19.744	19.891	18.568	19.431
Na2O	0.410	0.798	0.925	0.765	0.583	0.337	0.712	0.0	0.0	0.364	0.0	0.330
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.128
ZrO2	0.0	0.0	0.0	0.305	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.142	98.371	98.678	98.809	97.858	99.818	100.131	99.011	99.043	100.282	100.148	99.857
Atoms per 6 oxygens												
Si	1.954	1.921	1.914	1.894	1.813	1.826	1.783	1.915	1.892	1.902	1.926	1.901
Ti	0.0	0.016	0.019	0.032	0.047	0.047	0.052	0.037	0.041	0.031	0.023	0.032
Al	0.051	0.095	0.067	0.126	0.171	0.186	0.207	0.064	0.094	0.076	0.072	0.074
Fe3	0.071	0.090	0.137	0.067	0.152	0.091	0.173	0.031	0.041	0.085	0.030	0.091
Fe2	0.316	0.211	0.460	0.323	0.138	0.202	0.123	0.383	0.399	0.413	0.440	0.470
Mn	0.008	0.0	0.0	0.009	0.0	0.0	0.009	0.0	0.008	0.008	0.014	0.0
Mg	0.613	0.661	0.374	0.558	0.635	0.628	0.623	0.757	0.715	0.647	0.741	0.599
Ca	0.956	0.947	0.959	0.928	1.000	0.994	0.977	0.813	0.811	0.811	0.754	0.802
Na	0.031	0.059	0.071	0.057	0.043	0.025	0.052	0.0	0.0	0.027	0.0	0.025
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.006
Zr	0.0	0.0	0.0	0.006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	102.	102.	102.	102.	103.	103.	103.	105.	105.	105.	105.	105.
Rock Type	BFD	BFD	BFD	BFD	UML	UML	UML	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab
Crystal	10.	10.	1.	1.	1.	1.	1.	4.	4.	4.	5.	5.
Position	8.	8.	8.	8.	8.	8.	8.	1.	4.	7.	1.	7.
Atomic percent												
Mg	63.3	71.0	41.3	58.9	77.8	73.5	77.2	66.4	63.7	59.1	62.0	54.8
Fe2+Mn	33.5	22.7	50.8	35.1	16.9	23.6	16.4	33.6	36.3	38.4	38.0	43.0
Na	3.2	6.3	7.8	6.0	5.3	2.9	6.4	0.0	0.0	2.5	0.0	2.3

PYROXENE ANAYLSES

	41947.78	41947.79	41947.80	325943.18	325943.19	325943.20	325943.21	325943.22	325943.28	325943.30	325943.31	325943.32
Weight % oxide												
SiO2	49.137	48.840	49.272	45.291	46.233	46.315	46.071	41.611	46.342	45.520	49.573	44.369
TiO2	0.0	0.0	0.0	3.198	3.164	3.005	3.138	5.189	3.173	3.832	1.888	2.915
Al2O3	0.247	0.0	0.0	8.696	8.914	8.953	8.737	9.974	6.684	7.656	3.786	8.947
FeO	21.433	20.506	21.439	7.545	7.334	7.957	7.751	9.128	8.297	8.247	7.613	10.480
MnO	2.824	2.688	2.968	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.402
MgO	3.431	3.854	3.346	11.558	11.892	11.663	11.835	9.684	11.520	11.189	13.284	9.468
CaO	22.616	22.611	22.706	21.194	21.140	21.174	21.037	21.901	22.103	21.917	22.019	21.138
Na2O	0.351	0.340	0.329	0.779	0.818	0.954	0.588	0.844	0.0	0.583	0.0	0.917
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.124	98.839	100.060	98.261	99.595	100.021	99.157	98.331	98.119	98.944	98.163	98.636
Atoms per 6 oxygens												
Si	1.970	1.975	1.977	1.714	1.725	1.720	1.730	1.594	1.776	1.724	1.885	1.694
Ti	0.0	0.0	0.0	0.091	0.089	0.084	0.089	0.149	0.091	0.109	0.054	0.084
Al	0.012	0.0	0.0	0.388	0.392	0.392	0.387	0.450	0.302	0.342	0.170	0.403
Fe3	0.076	0.076	0.071	0.059	0.040	0.069	0.019	0.126	0.0	0.035	0.0	0.109
Fe2	0.643	0.618	0.649	0.179	0.189	0.178	0.224	0.166	0.266	0.227	0.242	0.225
Mn	0.096	0.092	0.101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.013
Mg	0.205	0.232	0.200	0.652	0.661	0.646	0.662	0.553	0.658	0.632	0.753	0.539
Ca	0.972	0.980	0.976	0.859	0.845	0.843	0.846	0.899	0.907	0.889	0.897	0.865
Na	0.027	0.027	0.026	0.057	0.059	0.069	0.043	0.063	0.0	0.043	0.0	0.068
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	106.	106.	106.	108.	108.	108.	108.	108.	108.	108.	108.	108.
Rock Type	Brecc	Brecc	Brecc	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp
Crystal	1.	1.	1.	4.	4.	4.	4.	4.	1.	1.	1.	5.
Position	8.	8.	8.	1.	3.	5.	6.	7.	8.	8.	8.	1.
Atomic percent												
Mg	21.1	23.9	20.5	73.4	72.7	72.3	71.3	70.7	71.2	70.1	75.7	63.8
Fe2+Mn	76.1	73.3	76.8	20.2	20.8	19.9	24.1	21.2	28.8	25.2	24.3	28.2
Na	2.8	2.8	2.7	6.4	6.5	7.7	4.6	8.1	0.0	4.8	0.0	8.0

PYROXENE ANAYLSES

	325943.33	325943.34	325943.47	325943.48	325943.49	63810.12	63810.13	63810.14	63810.15	63810.16	63810.19	63810.20
Weight % oxide												
SiO2	44.326	44.562	46.409	47.004	45.713	51.588	51.392	51.638	51.543	51.185	52.014	51.443
TiO2	2.904	3.383	0.584	0.424	2.966	0.968	0.840	0.799	0.858	0.901	0.860	0.799
Al2O3	9.471	8.832	3.653	4.009	7.532	2.152	1.957	1.588	2.067	2.409	1.923	1.847
FeO	9.907	8.641	21.386	22.598	8.264	11.719	11.797	11.700	12.868	11.508	11.503	11.380
MnO	0.0	0.0	0.606	0.707	0.0	0.550	0.536	0.533	0.382	0.389	0.468	0.494
MgO	9.106	10.674	4.043	3.842	11.430	10.331	10.271	10.531	9.868	9.930	11.219	10.511
CaO	21.119	21.387	19.900	19.880	21.982	22.128	22.291	21.659	22.200	21.942	21.871	21.882
Na2O	1.287	0.904	1.044	1.248	0.753	0.989	0.538	0.971	1.069	1.052	0.701	1.038
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.120	98.383	97.625	99.712	98.640	100.425	99.622	99.419	100.855	99.316	100.559	99.394
Atoms per 6 oxygens												
Si	1.694	1.692	1.877	1.862	1.729	1.944	1.960	1.965	1.940	1.950	1.954	1.954
Ti	0.083	0.097	0.018	0.013	0.084	0.027	0.024	0.023	0.024	0.026	0.024	0.023
Al	0.427	0.395	0.174	0.187	0.336	0.096	0.088	0.071	0.092	0.108	0.085	0.083
Fe3	0.113	0.093	0.119	0.160	0.094	0.034	0.0	0.025	0.058	0.018	0.009	0.039
Fe2	0.203	0.181	0.604	0.588	0.168	0.336	0.376	0.347	0.347	0.348	0.353	0.323
Mn	0.0	0.0	0.021	0.024	0.0	0.018	0.017	0.017	0.012	0.013	0.015	0.016
Mg	0.519	0.604	0.244	0.227	0.644	0.580	0.584	0.597	0.554	0.564	0.628	0.595
Ca	0.865	0.870	0.862	0.844	0.891	0.894	0.911	0.883	0.895	0.896	0.881	0.891
Na	0.095	0.067	0.082	0.096	0.055	0.072	0.040	0.072	0.078	0.078	0.051	0.076
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	108.	108.	108.	108.	108.	109.	109.	109.	109.	109.	109.	109.
Rock Type	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	BFD	BFD	BFD	BFD	BFD	BFD	BFD
Crystal	5.	5.	6.	6.	6.	1.	1.	1.	4.	4.	5.	5.
Position	6.	7.	1.	4.	9.	8.	8.	8.	1.	7.	1.	7.
Atomic percent												
Mg	63.5	70.9	25.7	24.3	74.3	57.7	57.4	57.8	55.9	56.2	60.0	58.9
Fe2+Mn	24.8	21.2	65.7	65.5	19.4	35.2	38.6	35.2	36.2	36.0	35.1	33.6
Na	11.6	7.9	8.6	10.3	6.3	7.2	3.9	7.0	7.9	7.8	4.9	7.5

PYROXENE ANAYLSES

	58019.41	58019.42	58019.43	58019.47	58019.58	58019.59	58019.60	325964.33	325964.34	325964.35	325964.36	325964.37
Weight % oxide												
SiO2	50.458	50.211	50.026	51.979	51.081	50.673	51.276	50.267	51.653	51.256	51.471	52.123
TiO2	0.391	0.351	0.583	0.0	0.494	0.489	0.479	0.640	0.0	0.384	0.0	1.195
Al2O3	0.543	0.381	1.261	1.023	1.040	0.503	1.297	1.251	0.901	0.919	1.046	1.246
FeO	20.889	16.216	15.583	20.020	13.831	16.751	13.228	19.340	18.902	24.543	16.932	26.036
MnO	1.199	1.187	1.207	1.518	1.105	1.341	0.899	1.130	1.279	0.987	1.194	0.716
MgO	3.884	7.423	7.738	3.921	9.032	6.458	9.153	5.495	5.563	1.217	7.251	0.0
CaO	17.306	20.626	20.592	12.731	20.727	19.429	21.405	20.314	18.694	9.924	21.022	6.370
Na2O	2.998	1.158	0.985	6.599	1.357	2.161	0.853	1.340	3.364	8.035	1.619	10.829
K2O	0.0	0.0	0.0	0.0	0.054	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.796	0.0	0.948
Total	97.668	97.553	97.975	97.791	98.721	97.805	98.590	99.777	100.356	98.061	100.535	99.463
Atoms per 6 oxygens												
Si	2.018	1.991	1.971	2.009	1.973	1.999	1.987	1.973	1.978	2.002	1.973	1.983
Ti	0.012	0.010	0.017	0.0	0.014	0.015	0.014	0.019	0.0	0.011	0.0	0.034
Al	0.026	0.018	0.059	0.047	0.047	0.023	0.059	0.058	0.041	0.042	0.047	0.056
Fe3	0.148	0.069	0.040	0.430	0.082	0.115	0.003	0.060	0.253	0.509	0.127	0.674
Fe2	0.551	0.468	0.474	0.217	0.365	0.437	0.426	0.575	0.352	0.293	0.416	0.154
Mn	0.041	0.040	0.040	0.050	0.036	0.045	0.030	0.038	0.041	0.033	0.039	0.023
Mg	0.231	0.439	0.454	0.226	0.520	0.380	0.529	0.321	0.317	0.071	0.414	0.0
Ca	0.742	0.876	0.869	0.527	0.858	0.821	0.889	0.854	0.767	0.415	0.863	0.260
Na	0.232	0.089	0.075	0.495	0.102	0.165	0.064	0.102	0.250	0.609	0.120	0.799
K	0.0	0.0	0.0	0.0	0.003	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.015	0.0	0.018
Sample	111.	111.	111.	111.	111.	111.	111.	113.	113.	113.	113.	113.
Rock Type	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon
Crystal	4.	4.	4.	5.	6.	6.	1.	4.	4.	4.	5.	5.
Position	1.	4.	7.	8.	1.	7.	8.	1.	4.	7.	1.	7.
Atomic percent												
Mg	21.9	42.4	43.5	22.9	50.8	37.0	50.4	31.0	33.0	7.1	41.9	0.0
Fe2+Mn	56.1	49.0	49.3	27.0	39.2	46.9	43.5	59.2	40.9	32.4	46.0	18.1
Na	22.0	8.6	7.2	50.1	10.0	16.1	6.1	9.8	26.0	60.5	12.1	81.9

PYROXENE ANAYLSES

	325964.42	325964.43	325948.55	325948.56	325948.59	325948.67	54168.03	54168.02	54168.01	46279.16	46279.15	46279.11
Weight % oxide												
SiO2	53.484	52.021	52.689	51.220	50.939	55.143	47.958	46.434	48.144	51.447	50.990	52.533
TiO2	0.680	0.483	1.359	2.402	2.753	0.0	0.483	0.599	0.345	0.0	0.0	0.584
Al2O3	1.579	1.016	0.0	1.379	1.069	0.0	2.384	2.755	1.823	3.817	3.595	3.742
FeO	23.379	22.814	5.711	6.776	6.319	5.438	15.709	15.073	14.724	10.450	10.273	10.003
MnO	1.194	1.393	0.0	0.0	0.331	0.0	0.379	0.356	0.315	0.362	0.369	0.284
MgO	2.516	2.838	14.283	13.721	13.541	16.016	8.214	7.925	9.147	11.314	11.425	11.781
CaO	9.878	12.067	23.319	22.694	22.444	22.243	23.685	23.003	23.622	22.766	22.369	23.184
Na2O	9.623	7.872	1.034	1.077	1.137	0.640	0.874	0.749	0.635	0.532	0.816	0.755
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	102.333	100.504	98.395	99.269	98.533	99.480	99.686	96.894	98.755	100.688	99.837	102.866
Atoms per 6 oxygens												
Si	1.955	1.958	1.974	1.912	1.917	2.030	1.846	1.840	1.864	1.918	1.911	1.913
Ti	0.019	0.014	0.038	0.067	0.078	0.0	0.014	0.018	0.010	0.0	0.0	0.016
Al	0.068	0.045	0.0	0.061	0.047	0.0	0.108	0.129	0.083	0.168	0.159	0.161
Fe3	0.666	0.586	0.050	0.059	0.045	0.0	0.237	0.213	0.216	0.034	0.078	0.035
Fe2	0.049	0.132	0.128	0.152	0.154	0.167	0.269	0.286	0.261	0.292	0.244	0.270
Mn	0.037	0.044	0.0	0.0	0.011	0.0	0.012	0.012	0.010	0.011	0.012	0.009
Mg	0.137	0.159	0.798	0.763	0.760	0.879	0.471	0.468	0.528	0.629	0.638	0.639
Ca	0.387	0.487	0.936	0.908	0.905	0.878	0.977	0.977	0.980	0.910	0.898	0.905
Na	0.682	0.575	0.075	0.078	0.083	0.046	0.065	0.058	0.048	0.038	0.059	0.053
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	113.	113.	114.	114.	114.	114.	115.	115.	115.	116.	116.	116.
Rock Type	Phon	Phon	UML	UML	UML	UML	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic percent												
Mg	15.1	17.5	79.7	76.8	75.4	80.5	57.6	56.8	62.3	64.8	66.9	65.8
Fe2+Mn	9.5	19.3	12.8	15.3	16.4	15.3	34.4	36.2	32.0	31.2	26.9	28.7
Na	75.4	63.2	7.5	7.9	8.2	4.2	8.0	7.0	5.7	3.9	6.2	5.5

PYROXENE ANAYLSES

	325962.34	325962.33	325962.32	325972.34	325972.33	325972.31	325972.30	326283.53	326283.45	326283.40	54254.65
Weight % oxide											
SiO2	53.172	53.580	54.580	56.186	56.610	56.694	57.024	48.414	51.097	49.216	52.914
TiO2	1.438	0.786	0.440	0.0	0.0	0.0	0.0	3.314	1.723	1.931	0.721
Al2O3	1.989	1.205	0.0	0.410	0.0	0.0	0.0	6.935	3.738	3.307	1.733
FeO	3.983	5.270	3.024	12.631	2.535	1.325	1.372	8.746	7.991	8.916	11.133
MnO	0.0	0.332	0.0	0.469	0.0	0.0	0.0	0.0	0.0	0.0	0.474
MgO	15.676	15.790	16.198	16.067	17.183	18.270	17.915	12.702	14.277	14.053	11.367
CaO	24.568	23.669	25.736	11.491	26.117	26.284	25.969	22.317	21.969	21.482	22.362
Na2O	0.0	0.604	0.0	1.401	0.0	0.0	0.0	0.609	0.973	0.878	1.219
K2O	0.0	0.419	0.0	0.245	0.0	0.0	0.0	0.0	0.0	0.0	0.322
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.561	0.0
Total	100.826	101.655	99.978	98.900	102.445	102.573	102.280	103.037	101.768	100.344	102.274
Atoms per 6 oxygens											
Si	1.940	1.933	2.000	2.102	2.016	2.003	2.024	1.754	1.855	1.823	1.944
Ti	0.039	0.021	0.012	0.0	0.0	0.0	0.0	0.090	0.047	0.054	0.020
Al	0.086	0.051	0.0	0.018	0.0	0.0	0.0	0.296	0.160	0.144	0.075
Fe3	0.0	0.102	0.0	0.0	0.0	0.0	0.0	0.058	0.105	0.144	0.099
Fe2	0.122	0.057	0.093	0.395	0.075	0.039	0.041	0.207	0.138	0.132	0.243
Mn	0.0	0.010	0.0	0.015	0.0	0.0	0.0	0.0	0.0	0.0	0.015
Mg	0.853	0.849	0.885	0.896	0.912	0.962	0.948	0.686	0.772	0.776	0.622
Ca	0.961	0.915	1.011	0.461	0.997	0.995	0.988	0.866	0.855	0.853	0.880
Na	0.0	0.042	0.0	0.102	0.0	0.0	0.0	0.043	0.068	0.063	0.087
K	0.0	0.019	0.0	0.012	0.0	0.0	0.0	0.0	0.0	0.0	0.015
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.010	0.0
Sample	117.	117.	117.	121.	121.	121.	121.	122.	122.	122.	123.
Rock Type	UML	UML	UML	UML	UML	UML	UML	Oth Lp	Oth Lp	Oth Lp	Haw/Mug
Crystal	1.	1.	1.	1.	1.	1.	1.	2.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic percent											
Mg	87.5	88.6	90.5	63.6	92.4	96.1	95.9	73.3	78.9	79.9	64.3
Fe2+Mn	12.5	7.0	9.5	29.1	7.6	3.9	4.1	22.1	14.1	13.6	26.7
Na	0.0	4.4	0.0	7.2	0.0	0.0	0.0	4.6	7.0	6.5	9.0

AMPHIBOLE ANAYLSES

	63845.03	63845.04	63845.06	63845.11	63845.12	63845.13	63845.15	63845.17	141229.45	141229.46	141229.48	43842.05
Weight % oxide												
SiO2	41.745	41.721	40.238	42.715	42.102	41.663	43.441	42.652	48.424	49.859	49.681	50.285
TiO2	3.520	3.372	3.829	2.366	2.509	3.278	2.030	2.572	2.198	1.919	0.674	1.004
Al2O3	9.690	9.497	10.322	9.563	9.350	9.602	8.390	9.525	1.003	0.837	0.281	2.592
FeO	21.165	22.205	23.706	22.203	23.184	24.464	23.534	24.264	35.612	33.192	35.755	27.768
MnO	0.650	0.420	0.598	0.486	0.689	0.412	0.719	0.602	0.778	0.626	1.945	1.257
MgO	6.945	6.558	4.899	7.249	6.332	5.004	6.770	5.742	0.330	0.760	0.0	3.379
CaO	11.124	11.167	11.131	11.343	11.124	11.181	10.812	10.961	3.745	2.988	5.735	0.423
Na2O	2.950	3.116	2.987	3.226	3.263	3.186	3.106	3.267	6.398	6.284	3.785	9.022
K2O	1.452	1.397	1.488	1.439	1.434	1.539	1.401	1.462	1.163	1.055	0.904	2.092
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.241	99.453	99.198	100.590	99.987	100.329	100.203	101.047	99.651	97.520	98.760	97.822
Atoms per 23 oxygens - T+C cations=13.00												
Si	6.429	6.445	6.308	6.491	6.483	6.470	6.625	6.510	7.659	7.932	7.870	7.836
Ti	0.408	0.392	0.451	0.270	0.291	0.383	0.233	0.295	0.261	0.230	0.080	0.118
Al	1.759	1.730	1.908	1.713	1.697	1.758	1.509	1.714	0.187	0.157	0.052	0.476
Fe3	0.0	0.0	0.0	0.0	0.0	0.0	0.051	0.0	0.506	0.348	0.756	0.332
Fe2	2.726	2.869	3.108	2.822	2.986	3.177	2.951	3.097	4.204	4.069	3.981	3.287
Mn	0.085	0.055	0.079	0.063	0.090	0.054	0.093	0.078	0.104	0.084	0.261	0.166
Mg	1.594	1.510	1.145	1.642	1.453	1.158	1.539	1.306	0.078	0.180	0.0	0.785
Ca	1.836	1.848	1.870	1.847	1.835	1.860	1.767	1.793	0.635	0.509	0.973	0.071
Na	0.881	0.933	0.908	0.950	0.974	0.959	0.918	0.967	1.962	1.938	1.163	2.726
K	0.285	0.275	0.298	0.279	0.282	0.305	0.273	0.285	0.235	0.214	0.183	0.416
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	1.	1.	1.	1.	1.	1.	1.	1.	3.	3.	3.	4.
Rock Type	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Phon
Crystal	4.	4.	1.	9.	1.	1.	9.	1.	1.	1.	1.	3.
Position	1.	7.	8.	8.	8.	8.	8.	8.	8.	8.	8.	7.
Leake (1978) Classification												
	Fn-Pa-Hb	Fn-Pa-Hb	Fo-Pa-Hb	Fn-Pa-Hb	Fn-Pa-Hb	Fo-Pa-Hb	Fo-Ed-Hb	Fo-Ed-Hb	Arf	Arf	Fo-Win	Arf

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	43842.06	43842.12	43842.16	43842.19	58294.48	58294.49	58294.50	58294.52	58294.53	58294.57	58294.58	58294.59
Weight % oxide												
SiO2	46.291	47.232	48.334	48.023	38.608	38.874	39.126	39.604	39.530	38.866	38.748	39.606
TiO2	1.319	1.317	1.295	1.476	1.532	1.646	1.675	1.567	1.652	1.537	1.613	1.696
Al2O3	4.313	4.065	3.307	3.427	10.553	10.817	10.959	9.652	10.157	10.387	9.929	9.739
FeO	30.114	30.166	30.722	31.115	27.037	27.158	26.615	25.948	26.125	26.550	25.795	25.918
MnO	1.144	1.079	1.459	1.333	1.397	1.240	1.345	1.333	1.263	1.187	1.388	1.501
MgO	2.026	1.999	1.587	1.406	3.540	3.565	3.751	4.154	3.806	3.903	3.754	4.217
CaO	2.596	1.729	1.202	0.860	9.786	9.967	9.782	9.802	9.596	9.869	9.781	9.847
Na2O	7.798	8.456	8.818	9.188	3.444	3.258	3.310	3.454	3.481	3.362	3.082	3.449
K2O	1.742	1.795	1.703	1.724	1.886	1.801	1.778	1.690	1.785	1.776	1.674	1.735
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.524	0.485	0.396	0.516	0.0	0.0	0.0	0.420	0.368	0.0	0.442	0.385
Total	97.867	98.323	98.823	99.068	97.783	98.326	98.341	97.624	97.763	97.437	96.206	98.093
Atoms per 23 oxygens - T+C cations=13.00												
Si	7.357	7.454	7.598	7.552	6.176	6.167	6.181	6.326	6.304	6.215	6.279	6.296
Ti	0.158	0.156	0.153	0.175	0.184	0.196	0.199	0.188	0.198	0.185	0.197	0.203
Al	0.808	0.756	0.613	0.635	1.990	2.023	2.041	1.818	1.910	1.958	1.897	1.825
Fe3	0.441	0.415	0.389	0.396	0.483	0.494	0.516	0.319	0.310	0.455	0.372	0.349
Fe2	3.562	3.567	3.650	3.696	3.134	3.110	3.000	3.147	3.175	3.096	3.124	3.096
Mn	0.154	0.144	0.194	0.178	0.189	0.167	0.180	0.180	0.171	0.161	0.191	0.202
Mg	0.480	0.470	0.372	0.329	0.844	0.843	0.883	0.989	0.905	0.930	0.907	0.999
Ca	0.442	0.292	0.202	0.145	1.677	1.694	1.656	1.678	1.640	1.691	1.698	1.677
Na	2.403	2.588	2.688	2.801	1.068	1.002	1.014	1.070	1.076	1.042	0.968	1.063
K	0.353	0.361	0.342	0.346	0.385	0.365	0.358	0.344	0.363	0.362	0.346	0.352
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.041	0.037	0.030	0.040	0.0	0.0	0.0	0.033	0.029	0.0	0.035	0.030
Sample	4.	4.	4.	4.	9.	9.	9.	9.	9.	9.	9.	9.
Rock Type	Phon	Phon	Phon	Phon	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr
Crystal	3.	3.	3.	3.	1.	1.	1.	3.	3.	1.	3.	3.
Position	1.	7.	8.	8.	8.	8.	8.	1.	7.	8.	8.	7.
Leake (1978) Classification												
	Arf	Arf	Arf	Arf	Has	Has	Has	Has-Hb	Has-Hb	Has	Has-Hb	Has-Hb

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	58294.60	58294.62	58294.63	58298.65	58298.66	58298.67	58298.68	58298.70	58298.73	63896.25	63896.26	63896.26
Weight % oxide												
SiO2	38.587	39.630	38.468	41.409	41.234	40.925	40.941	40.906	40.866	47.422	47.666	48.858
TiO2	1.483	1.347	1.422	2.535	2.701	2.842	2.801	2.770	2.912	0.0	0.0	0.0
Al2O3	10.585	9.461	10.896	8.320	8.508	8.189	8.379	8.412	8.388	2.628	2.563	1.654
FeO	26.667	26.553	26.017	25.378	25.594	24.919	25.811	26.011	25.420	30.863	31.889	30.709
MnO	1.358	1.301	1.348	0.812	0.789	0.990	1.025	0.828	0.687	1.130	0.997	0.895
MgO	3.434	4.239	3.746	4.442	4.573	4.529	4.160	4.298	4.412	3.155	3.143	3.550
CaO	9.727	9.769	9.972	9.658	9.620	9.506	9.583	9.669	9.870	10.815	10.751	10.757
Na2O	3.357	3.540	3.296	3.635	3.878	3.743	3.689	3.548	3.862	0.912	1.116	1.039
K2O	1.745	1.724	1.876	1.602	1.536	1.603	1.440	1.601	1.619	0.367	0.466	0.250
BaO	0.0	0.0	0.0	0.0	0.0	0.441	0.0	0.0	0.432	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.466	0.353	0.289	0.304	0.494	0.304	0.0	0.0	0.0
Total	96.943	97.564	97.041	98.257	98.786	97.976	98.133	98.537	98.772	97.292	98.591	97.712
Atoms per 23 oxygens - T+C cations=13.00												
Si	6.212	6.327	6.184	6.574	6.509	6.545	6.512	6.484	6.518	7.519	7.476	7.695
Ti	0.180	0.162	0.172	0.303	0.321	0.342	0.335	0.330	0.349	0.0	0.0	0.0
Al	2.009	1.781	2.065	1.557	1.583	1.544	1.571	1.572	1.577	0.491	0.474	0.307
Fe3	0.446	0.452	0.375	0.0	0.0	0.0	0.0	0.023	0.0	0.442	0.528	0.304
Fe2	3.144	3.094	3.122	3.370	3.379	3.333	3.434	3.425	3.391	3.651	3.655	3.741
Mn	0.185	0.176	0.184	0.109	0.105	0.134	0.138	0.111	0.093	0.152	0.132	0.119
Mg	0.824	1.009	0.897	1.051	1.076	1.079	0.986	1.015	1.049	0.746	0.735	0.833
Ca	1.678	1.671	1.718	1.643	1.627	1.629	1.633	1.642	1.687	1.837	1.807	1.815
Na	1.048	1.096	1.027	1.119	1.187	1.161	1.138	1.091	1.194	0.280	0.339	0.317
K	0.358	0.351	0.385	0.324	0.309	0.327	0.292	0.324	0.329	0.074	0.093	0.050
Ba	0.0	0.0	0.0	0.0	0.0	0.028	0.0	0.0	0.027	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.036	0.027	0.023	0.024	0.038	0.024	0.0	0.0	0.0
Sample	9.	9.	9.	10.	10.	10.	10.	10.	10.	14.	14.	14.
Rock Type	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Ben	Ben	Ben
Crystal	3.	3.	3.	3.	3.	3.	3.	3.	3.	4.	4.	4.
Position	1.	8.	8.	8.	8.	8.	8.	8.	8.	7.	7.	1.
Leake (1978) Classification												
	Has	Has-Hb	Has	Fo-Ed-Hb	Fo-Ed-Hb	Fo-Ed-Hb	Fo-Ed-Hb	Fo-Pa-Hb	Fo-Ed-Hb	Fo-Ac	Fo-Ac-Hb	Fo-Ac

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	63896.33	63896.35	63896.43	63896.46	58293.03	58293.04	58293.05	58293.06	58293.09	58292.11	58292.15	58292.16
Weight % oxide												
SiO2	47.446	48.500	48.419	48.391	39.600	39.075	39.552	38.751	39.522	43.527	43.523	43.665
TiO2	0.456	0.268	0.0	1.019	1.801	1.921	1.936	1.575	1.695	2.639	2.536	2.418
Al2O3	2.688	2.855	2.354	1.152	10.015	9.906	10.272	10.602	9.704	6.040	5.862	6.027
FeO	30.517	28.220	29.850	32.403	27.361	27.222	26.563	28.031	27.113	27.591	27.268	27.225
MnO	0.945	0.869	0.967	1.327	1.097	1.076	1.326	1.324	1.222	0.963	1.102	1.084
MgO	3.674	5.392	3.883	4.196	3.627	3.192	3.775	3.154	3.532	3.675	3.734	3.729
CaO	10.308	10.821	10.269	7.362	9.668	9.583	10.444	9.753	9.724	7.893	7.638	7.962
Na2O	1.052	1.533	1.099	1.187	3.499	3.644	3.349	3.458	3.778	4.656	4.892	4.682
K2O	0.502	0.613	0.395	0.678	1.678	1.624	1.675	1.705	1.557	1.649	1.623	1.529
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.592	0.582
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	97.588	99.071	97.236	97.715	98.346	97.243	98.892	98.353	97.847	98.633	98.770	98.903
Atoms per 23 oxygens - T+C cations=13.00												
Si	7.453	7.467	7.605	7.402	6.280	6.300	6.264	6.166	6.327	6.901	6.930	6.937
Ti	0.054	0.031	0.0	0.117	0.215	0.233	0.231	0.188	0.204	0.315	0.304	0.289
Al	0.498	0.518	0.436	0.208	1.872	1.883	1.918	1.989	1.831	1.129	1.100	1.129
Fe3	0.597	0.338	0.483	1.857	0.438	0.268	0.181	0.563	0.281	0.0	0.0	0.0
Fe2	3.412	3.295	3.438	2.288	3.191	3.403	3.337	3.167	3.349	3.658	3.631	3.617
Mn	0.126	0.113	0.129	0.172	0.147	0.147	0.178	0.178	0.166	0.129	0.149	0.146
Mg	0.860	1.237	0.909	0.956	0.857	0.767	0.891	0.748	0.843	0.868	0.886	0.883
Ca	1.735	1.785	1.728	1.207	1.643	1.655	1.772	1.663	1.668	1.341	1.303	1.355
Na	0.320	0.458	0.335	0.352	1.076	1.139	1.028	1.067	1.173	1.431	1.510	1.442
K	0.101	0.120	0.079	0.132	0.339	0.334	0.338	0.346	0.318	0.334	0.330	0.310
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.037	0.036
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	14.	14.	14.	14.	15.	15.	15.	15.	15.	16.	16.	16.
Rock Type	Ben	Ben	Ben	Ben	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr
Crystal	1.	10.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Leake (1978) Classification												
	Fo-Ac-Hb	Fo-Ac-Hb	Fo-Ac	Fo-Ac-Hb	Has-Hb	Has-Hb	Fo-Pa-Hb	Has	Has-Hb	Fo-Ed	Kat	Fo-Ed

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	58292.24	58292.26	59636.36	59636.37	59636.44	59636.45	59636.46	59636.47	58206.51	58206.53	58206.54	58206.59
Weight % oxide												
SiO2	42.957	43.485	46.489	47.068	47.499	46.926	46.683	46.964	47.612	44.504	44.427	43.517
TiO2	2.840	2.796	0.926	0.928	0.680	0.928	0.766	0.739	0.0	1.156	1.929	1.924
Al2O3	5.856	5.984	3.029	2.903	2.655	3.072	3.301	2.984	1.335	3.460	3.184	3.422
FeO	27.910	27.853	32.558	31.211	29.884	32.350	32.894	31.509	33.146	34.292	34.228	33.499
MnO	0.846	0.885	1.854	2.021	1.540	1.803	1.648	1.893	1.154	0.942	1.019	0.960
MgO	3.724	3.883	0.878	1.481	2.878	1.130	0.656	1.328	0.0	0.475	0.481	0.647
CaO	7.904	7.639	0.849	1.173	1.407	1.023	0.926	1.194	0.947	4.690	4.444	4.986
Na2O	4.766	4.866	8.963	8.731	8.357	8.706	9.069	8.766	8.248	5.759	5.955	5.923
K2O	1.533	1.509	1.327	1.467	1.485	1.396	1.489	1.503	1.992	1.779	1.696	1.597
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.325	0.0	0.535	0.646	0.389	0.368	0.0	3.036	1.360	0.598	0.374
Total	98.336	99.225	96.873	97.518	97.031	97.723	97.800	96.880	97.470	98.417	97.961	96.849
Atoms per 23 oxygens - T+C cations=13.00												
Si	6.843	6.841	7.474	7.510	7.526	7.467	7.473	7.540	7.799	7.205	7.208	7.163
Ti	0.340	0.331	0.112	0.111	0.081	0.111	0.092	0.089	0.0	0.141	0.235	0.238
Al	1.100	1.110	0.574	0.546	0.496	0.576	0.623	0.565	0.258	0.660	0.609	0.664
Fe3	0.051	0.133	0.896	0.726	0.844	0.890	0.754	0.729	0.291	0.632	0.641	0.488
Fe2	3.667	3.531	3.481	3.439	3.117	3.415	3.650	3.502	4.249	4.011	4.003	4.124
Mn	0.114	0.118	0.252	0.273	0.207	0.243	0.223	0.257	0.160	0.129	0.140	0.134
Mg	0.884	0.910	0.210	0.352	0.680	0.268	0.156	0.318	0.0	0.115	0.116	0.159
Ca	1.349	1.288	0.146	0.201	0.239	0.174	0.159	0.205	0.166	0.814	0.773	0.879
Na	1.472	1.484	2.794	2.701	2.568	2.686	2.815	2.729	2.620	1.808	1.873	1.890
K	0.312	0.303	0.272	0.299	0.300	0.283	0.304	0.308	0.416	0.367	0.351	0.335
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.025	0.0	0.042	0.050	0.030	0.029	0.0	0.243	0.107	0.047	0.030
Sample	16.	16.	18.	18.	18.	18.	18.	18.	19.	19.	19.	19.
Rock Type	Rex Tr	Rex Tr	Phon	Phon	Phon	Phon	Phon	Phon	Ben	Ben	Ben	Ben
Crystal	1.	1.	3.	3.	3.	3.	3.	3.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Leake (1978) Classification												
	Fo-Ed	Kat	Arf	Arf	Arf	Arf	Arf	Arf	Arf	Kat	Kat	Kat

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	58206.60	46240.45	46247.05	46247.07	46247.15	126772.58	63768.32	58297.38	58297.39	58297.40	58297.42	58297.43
Weight % oxide												
SiO2	48.114	48.782	41.536	41.721	42.686	39.560	40.134	40.857	40.750	41.309	41.339	40.708
TiO2	1.921	1.196	3.152	3.115	2.856	2.868	3.170	3.110	3.022	3.100	3.183	2.755
Al2O3	2.195	1.854	7.433	7.293	6.770	9.199	9.641	8.949	9.004	9.088	9.118	9.187
FeO	34.121	30.241	25.279	25.669	25.577	27.469	25.253	23.695	23.912	23.493	23.667	23.511
MnO	0.416	1.141	0.992	0.804	1.032	0.451	0.522	0.622	0.763	0.697	0.760	0.796
MgO	0.516	2.913	4.640	4.545	5.017	3.373	4.241	5.952	6.149	6.285	6.204	5.956
CaO	1.085	3.527	8.165	8.288	8.640	10.395	10.593	10.392	10.153	10.192	10.427	10.287
Na2O	8.737	7.241	4.722	4.426	4.330	2.775	3.126	3.489	3.431	3.367	3.410	3.595
K2O	1.777	2.044	1.488	1.548	1.641	1.629	1.622	1.513	1.471	1.463	1.505	1.505
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.568	0.0	0.0	0.0	0.318	0.0	0.0
Total	98.882	98.939	97.407	97.409	98.549	98.287	98.302	98.579	98.655	99.312	99.613	98.300
Atoms per 23 oxygens - T+C cations=13.00												
Si	7.646	7.690	6.620	6.648	6.722	6.332	6.381	6.402	6.348	6.384	6.385	6.389
Ti	0.230	0.142	0.378	0.373	0.338	9.345	0.379	0.367	0.354	0.360	0.370	0.325
Al	0.411	0.345	1.397	1.370	1.257	1.736	1.807	1.653	1.654	1.656	1.660	1.700
Fe3	0.416	0.176	0.057	0.075	0.056	0.062	0.0	0.0	0.223	0.134	0.061	0.015
Fe2	4.119	3.811	3.312	3.346	3.312	3.615	3.358	3.105	2.892	2.903	2.996	3.071
Mn	0.056	0.152	0.134	0.109	0.138	0.061	0.070	0.083	0.101	0.091	0.099	0.106
Mg	0.122	0.684	1.102	1.079	1.177	0.805	1.005	1.390	1.428	1.448	1.428	1.393
Ca	0.185	0.596	1.394	1.415	1.458	1.783	1.805	1.745	1.695	1.688	1.726	1.730
Na	2.692	2.213	1.459	1.367	1.322	0.861	0.964	1.060	1.036	1.009	1.021	1.094
K	0.360	0.411	0.303	0.315	0.330	0.333	0.329	0.302	0.292	0.288	0.297	0.301
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.044	0.0	0.0	0.0	0.024	0.0	0.0
Sample	19.	22.	24.	24.	24.	26.	29.	30.	30.	30.	30.	30.
Rock Type	Ben	Phon	Phon	Phon	Phon	Ben	Ben	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr
Crystal	1.	1.	1.	1.	1.	1.	1.	3.	3.	3.	3.	3.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Leake (1978) Classification												
	Arf	Arf	Fo-Ed-Hb	Fo-Ed-Hb	Fo-Ed-Hb	Fo-Pa-Hb	Fo-Pa-Hb	Fn-Pa-Hb	Mg-Has-Hb	Mg-Has-Hb	Mg-Has-Hb	Fn-Pa-Hb

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	58297.44	58297.49	58264.60	58264.57	58264.52	58264.51	58264.50	59779.98	59779.96	59779.95	59779.94	58291.06
Weight % oxide												
SiO2	40.200	39.739	47.589	47.485	48.430	48.127	50.898	46.685	46.472	47.769	46.821	42.571
TiO2	3.160	2.881	1.899	1.641	1.306	2.093	0.984	0.0	0.363	0.0	0.403	2.283
Al2O3	8.961	8.854	1.063	0.754	1.025	0.835	0.239	2.276	2.660	1.586	2.165	5.828
FeO	23.432	23.125	33.360	33.003	33.063	34.998	35.570	33.116	31.350	32.703	33.771	25.937
MnO	0.696	0.768	0.716	0.834	0.868	0.644	0.272	0.660	0.702	0.739	0.740	0.760
MgO	5.969	5.883	1.198	1.649	1.788	0.862	1.039	0.926	2.207	0.927	0.949	4.085
CaO	10.169	10.053	4.776	4.311	4.914	4.205	2.087	3.127	4.086	3.819	3.646	7.829
Na2O	3.455	3.242	5.730	5.585	5.574	5.819	5.923	6.931	6.507	6.777	6.725	4.573
K2O	1.515	1.486	1.132	1.082	1.154	0.949	0.154	1.691	1.678	2.007	1.670	1.541
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.497	2.020	1.471	0.0	0.0
Total	97.557	96.031	97.463	96.344	98.122	98.532	97.166	96.909	98.045	97.798	96.890	95.407
Atoms per 23 oxygens - T+C cations=13.00												
Si	6.356	6.370	7.679	7.680	7.709	7.650	7.929	7.612	7.461	7.790	7.612	6.954
Ti	0.376	0.347	0.230	0.200	0.156	0.250	0.115	0.0	0.044	0.0	0.049	0.280
Al	1.670	1.673	0.202	0.144	0.192	0.156	0.044	0.437	0.503	0.305	0.415	1.122
Fe3	0.056	0.128	0.301	0.627	0.447	0.625	1.350	0.466	0.395	0.0	0.526	0.0
Fe2	3.042	2.972	4.201	3.837	3.955	4.027	3.284	4.050	3.815	4.460	4.066	3.543
Mn	0.093	0.104	0.098	0.114	0.117	0.087	0.036	0.091	0.095	0.102	0.102	0.105
Mg	1.406	1.405	0.288	0.397	0.424	0.204	0.241	0.225	0.528	0.225	0.230	0.994
Ca	1.723	1.727	0.826	0.747	0.838	0.716	0.348	0.546	0.703	0.667	0.635	1.370
Na	1.059	1.008	1.793	1.752	1.720	1.793	1.789	2.191	2.026	2.143	2.120	1.448
K	0.306	0.304	0.233	0.223	0.234	0.192	0.031	0.352	0.344	0.418	0.346	0.321
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.119	0.158	0.117	0.0	0.0
Sample	30.	30.	35.	35.	35.	35.	35.	37.	37.	37.	37.	38.
Rock Type	Rex Tr	Rex Tr	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Ben	Ben	Ben	Ben	Ben
Crystal	3.	3.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Leake (1978) Classification												
	Mg-Has-Hb	Mg-Has-Hb	Fo-Ric	Fo-Ric	Fo-Ric	Fo-Ric	Rieb	Arf	Kat	Fo-Ric	Arf	Fo-Ed

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	58291.01	141244.61	141244.63	46249.30	46249.31	59783.34	59783.37	59783.38	59783.42	59783.42	63895.36	63895.39
Weight % oxide												
SiO2	41.952	45.851	46.291	39.312	40.036	40.316	39.667	40.582	39.478	40.041	50.906	57.046
TiO2	2.497	1.779	1.703	2.211	1.962	2.080	2.745	1.932	2.296	2.490	0.266	0.388
Al2O3	6.385	1.814	1.747	13.966	13.518	8.055	8.452	7.594	8.645	8.644	1.608	0.459
FeO	27.133	31.953	31.045	16.826	15.667	27.814	28.325	28.519	28.181	28.118	35.165	30.780
MnO	0.931	0.542	0.605	0.311	0.0	1.231	1.229	1.168	1.150	1.150	0.566	0.557
MgO	3.794	2.206	2.545	8.265	9.058	3.184	2.583	2.612	2.586	2.594	0.522	0.530
CaO	7.914	5.924	6.132	11.777	12.037	9.634	9.522	9.182	9.432	9.742	0.397	0.393
Na2O	4.258	4.545	4.581	2.365	2.269	3.652	3.598	3.829	3.524	3.663	6.989	6.258
K2O	1.615	1.204	1.423	1.953	2.029	1.582	1.586	1.631	1.604	1.640	1.358	0.843
BaO	0.0	0.0	0.0	0.622	0.526	0.514	0.0	0.0	1.007	0.936	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.305	0.0	0.500	0.504	0.0	0.282
Total	96.479	95.818	96.072	97.608	97.102	98.062	98.012	97.049	98.403	99.522	97.777	97.536
Atoms per 23 oxygens - T+C cations=13.00												
Si	6.776	7.470	7.532	6.077	6.192	6.517	6.412	6.618	6.412	6.450	7.910	8.723
Ti	0.303	0.218	0.208	0.257	0.228	0.253	0.334	0.237	0.280	0.302	0.031	0.045
Al	1.216	0.348	0.335	2.545	2.465	1.535	1.611	1.460	1.655	1.641	0.295	0.083
Fe3	0.221	0.522	0.306	0.0	0.0	0.053	0.097	0.072	0.027	0.0	1.317	0.192
Fe2	3.443	3.831	3.918	2.175	2.027	3.707	3.732	3.817	3.801	3.788	3.252	3.744
Mn	0.127	0.075	0.083	0.041	0.0	0.169	0.168	0.161	0.158	0.157	0.074	0.072
Mg	0.913	0.536	0.617	1.904	2.088	0.767	0.622	0.635	0.626	0.623	0.121	0.121
Ca	1.370	1.034	1.069	1.951	1.995	1.669	1.649	1.604	1.642	1.681	0.066	0.064
Na	1.333	1.436	1.445	0.709	0.680	1.145	1.128	1.211	1.110	1.144	2.106	1.855
K	0.333	0.250	0.295	0.385	0.400	0.326	0.327	0.339	0.332	0.337	0.269	0.164
Ba	0.0	0.0	0.0	0.038	0.032	0.033	0.0	0.0	0.064	0.059	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.024	0.0	0.040	0.040	0.0	0.021
Sample	38.	41.	41.	43.	43.	47.	47.	47.	47.	47.	50.	50.
Rock Type	Ben	Tr-and	Tr-and	Rex Tr	Rex Tr	Phon	Phon	Phon	Phon	Phon	Q Porp	Q Porp
Crystal	1.	1.	1.	1.	1.	9.	5.	5.	9.	9.	1.	1.
Position	8.	8.	8.	8.	8.	8.	5.	7.	8.	8.	8.	8.
Leake (1978) Classification												
	Fo-Ed	Kat	Fo-Ric	Fn-Pa	Fn-Pa	Fo-Ed-Hb	Has-Hb	Fo-Ed-Hb	Fo-Pa-Hb	Fo-Pa-Hb	Rieb	Cross

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	63895.41	59771.21	59771.20	59771.22	59771.26	141239.55	325957.09	325957.10	325957.13	325957.14	326281.16	326281.18
Weight % oxide												
SiO2	50.358	46.273	47.805	47.081	47.801	45.772	39.557	41.491	41.590	40.577	38.134	38.969
TiO2	0.0	2.045	2.036	1.988	1.146	1.214	2.311	2.037	1.876	2.178	3.114	2.790
Al2O3	0.791	2.436	1.194	1.152	0.917	2.633	9.270	7.661	7.326	8.971	11.509	11.681
FeO	35.513	29.919	33.114	33.796	32.296	30.058	25.911	25.425	23.228	23.892	21.535	20.951
MnO	0.554	0.364	0.884	0.591	0.745	0.512	1.069	1.272	1.259	0.947	0.276	0.309
MgO	0.495	3.863	2.112	1.560	2.641	4.311	4.516	5.140	6.376	6.147	6.666	7.499
CaO	0.585	6.876	4.728	4.173	4.386	7.778	10.097	10.299	10.224	10.726	11.216	11.129
Na2O	7.104	4.516	5.674	5.682	5.431	3.854	3.182	3.431	3.346	3.223	2.895	3.192
K2O	0.885	1.312	1.115	1.082	1.114	1.104	1.537	1.578	1.605	1.611	1.563	1.513
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.682	0.0	0.339	0.0	0.374	0.0	0.0	0.0	0.0
Total	96.285	97.604	98.662	97.787	96.477	97.575	97.450	98.708	96.830	98.272	96.908	98.033
Atoms per 23 oxygens - T+C cations=13.00												
Si	7.964	7.357	7.548	7.523	7.641	7.261	6.307	6.559	6.623	6.376	6.029	6.045
Ti	0.0	0.245	0.242	0.239	0.138	0.145	0.277	0.242	0.225	0.257	0.370	0.326
Al	0.147	0.457	0.222	0.217	0.173	0.492	1.743	1.428	1.375	1.662	2.145	2.136
Fe3	1.368	0.340	0.637	0.743	0.856	0.591	0.342	0.054	0.080	0.156	0.053	0.162
Fe2	3.329	3.638	3.736	3.774	3.462	3.397	3.114	3.307	3.013	2.984	2.795	2.556
Mn	0.074	0.049	0.118	0.080	0.101	0.069	0.144	0.170	0.170	0.126	0.037	0.041
Mg	0.117	0.915	0.497	0.371	0.629	1.019	1.073	1.211	1.513	1.439	1.571	1.734
Ca	0.099	1.171	0.800	0.714	0.751	1.322	1.725	1.744	1.745	1.806	1.900	1.850
Na	2.178	1.392	1.737	1.760	1.683	1.185	0.984	1.052	1.033	0.982	0.887	0.960
K	0.179	0.266	0.225	0.221	0.227	0.223	0.313	0.318	0.326	0.323	0.315	0.299
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.053	0.0	0.026	0.0	0.029	0.0	0.0	0.0	0.0
Sample	50.	53.	53.	53.	53.	54.	56.	56.	56.	56.	57.	57.
Rock Type	Q Porp	Ben	Ben	Ben	Ben	Ben	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Oth Lp	Oth Lp
Crystal	1.	1.	1.	1.	1.	9.	1.	1.	1.	1.	9.	9.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Leake (1978) Classification												
	Rieb	Kat	Fo-Ric	Fo-Ric	Fo-Ric	Kat	Has-Hb	Fo-Ed-Hb	Fo-Ed-Hb	Mg-Has-Hb	Fn-Pa	Fn-Pa

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	326281.20	326281.21	325986.43	325986.44	325986.45	325986.46	326286.49	326286.50	326286.53	325952.25	325958.32	325958.33
Weight % oxide												
SiO2	38.579	37.953	51.589	45.929	46.238	45.603	43.094	41.813	42.720	54.360	55.890	56.665
TiO2	3.168	3.367	0.0	0.308	0.0	0.629	1.378	1.673	1.186	0.605	0.0	0.0
Al2O3	11.461	12.230	4.798	2.307	1.882	2.498	6.859	7.956	7.467	0.952	0.595	0.0
FeO	21.394	21.148	23.549	33.255	31.607	31.408	20.406	21.795	19.734	9.268	3.669	5.664
MnO	0.252	0.434	0.603	0.976	1.028	0.708	1.521	1.502	1.434	0.450	0.0	0.215
MgO	7.133	7.024	0.222	0.565	1.020	1.280	8.895	7.649	8.548	17.002	20.916	20.354
CaO	11.070	11.208	2.774	1.399	1.844	1.662	9.215	9.486	9.424	5.213	8.878	2.802
Na2O	3.103	2.866	8.801	7.730	7.245	7.662	4.293	4.184	4.240	6.357	3.870	7.520
K2O	1.495	1.456	1.755	1.683	2.316	1.945	1.530	1.481	1.513	1.370	0.672	1.027
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	2.855	2.333	4.130	3.390	0.0	0.0	0.425	0.0	0.0	0.0
Total	97.655	97.686	96.946	96.485	97.310	96.785	97.191	97.539	96.691	95.577	94.490	94.247
Atoms per 23 oxygens - T+C cations=13.00												
Si	6.027	5.914	8.471	7.511	7.580	7.462	6.683	6.522	6.685	7.904	7.999	8.014
Ti	0.372	0.395	0.0	0.038	0.0	0.077	0.161	0.196	0.140	0.066	0.0	0.0
Al	2.111	2.247	0.929	0.445	0.364	0.482	1.254	1.463	1.377	0.163	0.100	0.0
Fe3	0.146	0.238	0.0	0.794	0.380	0.479	0.402	0.371	0.161	0.226	0.0	-0.0
Fe2	2.650	2.518	3.234	3.754	3.954	3.819	2.244	2.472	2.422	0.901	0.439	0.0
Mn	0.033	0.057	0.084	0.135	0.143	0.098	0.200	0.198	0.190	0.055	0.0	0.026
Mg	1.661	1.631	0.054	0.138	0.249	0.312	2.056	1.778	1.993	3.684	4.461	4.290
Ca	1.853	1.871	0.488	0.245	0.324	0.291	1.531	1.585	1.580	0.812	1.361	0.425
Na	0.940	0.866	2.802	2.451	2.303	2.431	1.291	1.265	1.286	1.792	1.074	2.062
K	0.298	0.289	0.368	0.351	0.484	0.406	0.303	0.295	0.302	0.254	0.123	0.185
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.229	0.186	0.330	0.271	0.0	0.0	0.032	0.0	0.0	0.0
Sample	57.	57.	58.	58.	58.	58.	59.	59.	59.	65.	65.	65.
Rock Type	Oth Lp	Oth Lp	Ben	Ben	Ben	Ben	Rex Ph	Rex Ph	Rex Ph	Alt UBs	Alt UBs	Alt UBs
Crystal	9.	9.	9.	1.	1.	1.	3.	3.	3.	1.	2.	2.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.	7.
Leake (1978) Classification												
	Mg-Has	Mg-Has	Fo-Eck	Arf	Arf	Arf	Fo-Ed-Hb	Fo-Ed-Hb	Fo-Ed-Hb	Rich	Si-Ed	Eck

AMPHIBOLE ANAYLSES

	325958.34	326266.54	326266.59	326266.60	326211.70	326211.71	326211.72	326211.75	326301.77	326301.78	326301.83	326301.84
Weight % oxide												
SiO2	56.526	52.350	55.471	55.204	46.475	47.064	47.112	43.913	39.777	39.231	39.127	39.639
TiO2	0.0	0.320	0.0	0.316	2.484	0.529	0.873	1.139	3.714	4.108	4.262	4.041
Al2O3	0.0	1.255	0.0	0.441	2.479	2.002	1.865	3.600	12.010	12.508	12.232	12.051
FeO	6.311	15.264	13.434	16.645	33.412	32.037	31.542	33.712	13.869	14.096	14.317	13.571
MnO	0.0	0.0	0.0	0.0	1.123	1.304	1.365	0.979	0.0	0.0	0.258	0.0
MgO	20.986	14.502	15.623	13.937	0.988	1.604	1.222	1.439	10.975	10.763	10.663	10.738
CaO	2.146	1.466	2.336	0.867	0.705	1.820	1.365	4.972	13.201	12.186	12.375	12.331
Na2O	7.834	6.962	7.290	7.775	8.355	7.575	8.144	5.701	2.277	2.427	2.322	2.098
K2O	0.672	0.525	0.411	0.385	1.673	2.034	1.937	1.519	1.401	1.602	1.651	1.652
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	2.099	2.377	0.527	0.0	0.0	0.0	0.0
Total	94.475	92.644	94.565	95.570	97.694	98.068	97.802	97.501	97.224	96.921	97.207	96.121
Atoms per 23 oxygens - T+C cations=13.00												
Si	7.895	7.694	8.013	7.916	7.401	7.541	7.610	7.097	6.106	6.007	5.996	6.117
Ti	0.0	0.035	0.0	0.034	0.297	0.064	0.106	0.138	0.429	0.473	0.491	0.469
Al	0.0	0.217	0.0	0.075	0.465	0.378	0.355	0.686	2.174	2.258	2.210	2.193
Fe3	-0.0	1.779	1.132	1.526	0.977	0.690	0.417	0.939	0.0	0.0	0.0	0.0
Fe2	0.0	0.097	0.491	0.471	3.473	3.603	3.844	3.618	1.781	1.805	1.835	1.752
Mn	0.0	0.0	0.0	0.0	0.151	0.177	0.187	0.134	0.0	0.0	0.033	0.0
Mg	4.368	3.177	3.364	2.979	0.234	0.383	0.294	0.347	2.511	2.456	2.435	2.470
Ca	0.321	0.231	0.362	0.133	0.120	0.312	0.236	0.861	2.171	1.999	2.032	2.039
Na	2.121	1.984	2.042	2.162	2.580	2.353	2.551	1.786	0.678	0.721	0.690	0.628
K	0.120	0.098	0.076	0.070	0.340	0.416	0.399	0.313	0.274	0.313	0.323	0.325
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.164	0.187	0.042	0.0	0.0	0.0	0.0
Sample	65.	67.	67.	67.	68.	68.	68.	68.	69.	69.	69.	69.
Rock Type	Alt UBs	Alt UBs	Alt UBs	Alt UBs	Ben	Ben	Ben	Ben	UML	UML	UML	UML
Crystal	2.	1.	8.	8.	1.	1.	1.	7.	1.	1.	1.	1.
Position	4.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Leake (1978) Classification												
	Eck	Mgo-Rieb	Mgo-Rieb	Mgo-Rieb	Arf	Arf	Arf	Kat	Fn-Pa	Fn-Pa	Fn-Pa	Fn-Pa

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	376301.90	58015.09	58015.10	58015.12	58015.14	58015.16	58015.17	58241.29	58241.30	58241.31	58241.32	58241.33
Weight % oxide												
SiO2	39.393	43.931	44.799	44.629	43.793	44.580	43.957	45.995	48.764	44.918	43.722	43.194
TiO2	4.307	1.691	1.600	1.549	1.382	1.459	1.626	0.647	1.078	0.333	3.063	2.903
Al2O3	12.560	5.093	4.260	4.631	5.083	5.016	5.378	2.297	1.090	2.123	3.295	2.975
FeO	14.128	25.445	24.675	23.920	23.749	24.836	24.503	36.091	35.565	34.479	34.364	34.392
MnO	0.238	2.334	2.193	2.337	2.261	2.287	2.390	0.795	0.723	0.832	0.548	0.481
MgO	10.785	5.411	5.453	5.831	5.898	5.427	5.306	0.368	0.0	0.256	0.701	0.636
CaO	12.419	5.055	5.036	5.273	6.770	5.771	6.377	5.112	1.329	4.766	6.080	5.459
Na2O	2.224	6.175	6.417	6.154	5.128	5.788	5.469	5.570	7.961	5.763	5.256	5.353
K2O	1.703	1.577	1.443	1.463	1.405	1.491	1.547	1.623	1.946	1.747	1.497	1.425
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.280	0.398	0.0	0.0	0.338	0.0	1.131	0.304	1.405	0.730	0.284
Total	97.757	96.992	96.274	95.787	95.469	96.993	96.553	99.629	98.760	96.622	99.256	97.102
Atoms per 23 oxygens - T+C cations=13.00												
Si	5.987	6.909	7.116	7.082	6.995	7.020	6.973	7.369	7.791	7.460	7.059	7.095
Ti	0.492	0.200	0.191	0.185	0.166	0.173	0.194	0.078	0.130	0.042	0.372	0.359
Al	2.251	0.944	0.798	0.866	0.957	0.931	1.006	0.434	0.205	0.416	0.627	0.576
Fe3	0.0	0.893	0.543	0.618	0.530	0.616	0.496	0.680	0.588	0.432	0.338	0.546
Fe2	1.796	2.454	2.735	2.556	2.642	2.655	2.755	4.156	4.165	4.357	4.303	4.179
Mn	0.031	0.311	0.295	0.314	0.306	0.305	0.321	0.108	0.098	0.117	0.075	0.067
Mg	2.443	1.268	1.291	1.379	1.404	1.274	1.255	0.088	0.0	0.063	0.169	0.156
Ca	2.023	0.852	0.857	0.897	1.159	0.974	1.084	0.878	0.228	0.848	1.052	0.961
Na	0.655	1.883	1.976	1.893	1.588	1.767	1.682	1.730	2.466	1.856	1.645	1.705
K	0.330	0.316	0.292	0.296	0.286	0.300	0.313	0.332	0.397	0.370	0.308	0.299
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.021	0.031	0.0	0.0	0.026	0.0	0.088	0.024	0.114	0.057	0.023
Sample	69.	70.	70.	70.	70.	70.	70.	71.	71.	71.	71.	71.
Rock Type	UML	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Ben	Ben	Ben	Ben	Ben
Crystal	1.	10.	10.	10.	10.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	1.	7.	8.	1.	8.
Leake (1978) Classification												
	Fn-Pa	Kat	Kat	Kat	Kat	Kat	Kat	Kat	Arf	Kat	Kat	Kat

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	58241.34	326300.41	326300.42	326300.44	325937.56	325937.57	325937.58	325937.59	325937.60	326284.09	326284.10	326284.14
Weight % oxide												
SiO2	44.973	43.236	43.496	44.027	46.266	48.165	44.663	46.066	43.088	40.988	40.424	40.233
TiO2	0.730	0.839	0.817	0.755	0.518	0.0	0.362	0.723	0.0	1.163	1.305	1.060
Al2O3	2.455	6.733	7.029	6.704	6.375	4.715	7.158	6.563	8.804	8.611	8.598	8.740
FeO	34.498	21.093	20.153	20.876	18.250	18.043	20.137	19.140	21.175	25.075	25.310	25.310
MnO	0.810	1.451	1.592	1.378	0.588	0.420	0.490	0.306	0.405	1.871	1.954	1.644
MgO	0.360	7.751	8.401	8.154	10.198	10.305	10.087	9.802	9.786	5.327	5.153	5.114
CaO	4.829	9.112	9.472	9.436	12.454	14.182	11.023	12.157	10.472	10.088	9.973	9.679
Na2O	6.036	4.034	4.085	4.122	3.066	2.809	3.191	3.113	2.908	3.981	3.828	3.706
K2O	1.676	1.394	1.374	1.435	0.572	0.235	0.547	0.619	1.141	1.709	1.696	1.652
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	1.017	0.401	0.538	0.399	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.300
Total	97.384	96.044	96.957	97.286	98.287	98.874	97.658	98.489	97.779	98.813	98.241	97.438
Atoms per 23 oxygens - T+C cations=13.00												
Si	7.402	6.819	6.781	6.857	7.065	7.408	6.778	7.027	6.505	6.458	6.405	6.405
Ti	0.090	0.100	0.096	0.088	0.059	0.0	0.041	0.083	0.0	0.138	0.156	0.127
Al	0.476	1.252	1.292	1.231	1.148	0.855	1.281	1.180	1.567	1.599	1.606	1.640
Fe3	0.395	0.254	0.199	0.139	0.0	0.0	0.451	0.0	0.963	0.243	0.367	0.468
Fe2	4.354	2.528	2.429	2.580	2.331	2.321	2.105	2.442	1.711	3.061	2.987	2.901
Mn	0.113	0.194	0.210	0.182	0.076	0.055	0.063	0.040	0.052	0.250	0.262	0.222
Mg	0.088	1.822	1.952	1.893	2.321	2.362	2.281	2.228	2.202	1.251	1.217	1.213
Ca	0.852	1.540	1.582	1.575	2.038	2.337	1.792	1.987	1.694	1.703	1.693	1.651
Na	1.926	1.234	1.235	1.245	0.908	0.838	0.939	0.921	0.851	1.216	1.176	1.144
K	0.352	0.281	0.273	0.285	0.111	0.046	0.106	0.120	0.220	0.344	0.343	0.336
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.082	0.031	0.041	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.023
Sample	71.	72.	72.	72.	73.	73.	73.	73.	73.	74.	74.	74.
Rock Type	Ben	Rex Ph	Rex Ph	Rex Ph	Ben	Ben	Ben	Ben	Ben	Rex Ph	Rex Ph	Rex Ph
Crystal	1.	3.	3.	3.	1.	1.	1.	1.	1.	3.	3.	3.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Leake (1978) Classification												
	Kat	Fo-Ed	Fo-Ed	Fo-Ed	Fo-Ed	Ed	Ed	Fo-Ed	Ed-Hb	Has-Hb	Has-Hb	Has-Hb

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	326273.03	326273.04	326273.05	326323.38	326323.39	326323.41	326207.15	52285.41	52285.43	52285.47	52285.48	52285.49
Weight % oxide												
SiO2	38.936	39.139	38.335	41.754	41.561	41.768	44.071	37.639	37.835	38.758	39.075	38.380
TiO2	0.613	0.693	0.676	0.0	0.0	0.0	0.564	8.438	8.006	7.594	7.083	5.660
Al2O3	8.673	8.534	8.680	5.732	5.862	6.020	3.872	14.217	13.782	13.768	13.671	13.874
FeO	32.289	32.650	32.065	28.239	27.180	27.472	33.245	11.349	10.600	11.516	14.136	17.909
MnO	2.773	2.594	2.710	8.753	9.009	8.880	1.047	0.0	0.0	0.0	0.0	0.0
MgO	1.081	1.036	1.088	1.417	1.376	1.210	0.901	11.095	11.135	10.877	9.567	8.073
CaO	7.615	7.640	7.620	1.126	1.136	1.161	4.270	12.970	13.181	12.662	12.262	12.203
Na2O	4.292	4.664	4.594	0.423	0.398	0.476	5.973	2.011	1.803	2.539	2.165	2.446
K2O	1.822	1.942	1.845	0.815	0.463	0.545	1.754	1.224	1.359	1.608	1.506	1.446
BaO	0.0	0.0	0.0	0.0	0.582	0.610	0.0	0.708	0.741	0.0	0.0	0.0
ZrO2	0.471	0.510	0.328	0.0	0.0	0.0	2.022	0.0	0.0	0.0	0.0	0.0
Total	98.565	99.402	97.941	88.259	87.567	88.142	97.719	99.651	98.442	99.322	99.465	99.991
Atoms per 23 oxygens - T+C cations=13.00												
Si	6.263	6.280	6.232	7.449	7.466	7.460	7.154	5.639	5.748	5.822	5.866	5.801
Ti	0.074	0.084	0.083	0.0	0.0	0.0	0.069	0.951	0.915	0.858	0.800	0.643
Al	1.645	1.614	1.663	1.691	1.242	1.268	0.741	2.511	2.469	2.438	2.419	2.472
Fe3	1.269	1.102	1.171	4.213	4.084	4.104	0.763	0.0	0.0	0.0	0.0	0.0
Fe2	3.075	3.279	3.189	–	–	–	3.750	1.422	1.347	1.447	1.775	2.264
Mn	0.378	0.353	0.373	1.323	1.371	1.343	0.144	0.0	0.0	0.0	0.0	0.0
Mg	0.259	0.248	0.264	0.377	0.368	0.322	0.218	2.477	2.521	2.435	2.140	1.819
Ca	1.313	1.314	1.327	0.215	0.219	0.222	0.743	2.082	2.146	2.038	1.972	1.976
Na	1.339	1.451	1.448	0.146	0.139	0.165	1.880	0.584	0.531	0.740	0.630	0.717
K	0.374	0.398	0.383	0.185	0.106	0.124	0.363	0.234	0.263	0.308	0.288	0.279
Ba	0.0	0.0	0.0	0.0	0.041	0.043	0.0	0.042	0.044	0.0	0.0	0.0
Zr	0.037	0.040	0.026	0.0	0.0	0.0	0.160	0.0	0.0	0.0	0.0	0.0
Sample	82.	82.	82.	88.	88.	88.	90.	99.	99.	99.	99.	99.
Rock Type	Rex Ph	Rex Ph	Rex Ph	Cbt	Cbt	Cbt	Ben	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp
Crystal	1.	1.	3.	1.	1.	1.	1.	1.	1.	4.	4.	5.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.	7.	1.
Leake (1978) Classification												
	Tar	Tar	Tar	Mgo-Ant	Mgo-Ant	Mgo-Ant	Kat	Kaer	Kaer	Kaer	Kaer	Kaer

All Fe recalculated to Fe^{3+}

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	52285.56	326289.10	58296.09	58296.10	58296.13	325923.08	325923.11	325943.40	325943.41	58019.48	58019.49	58019.54
Weight % oxide												
SiO2	38.570	49.623	40.629	39.606	39.448	39.380	39.787	38.901	38.902	53.022	49.204	47.965
TiO2	8.309	0.0	2.334	2.152	2.111	0.0	0.0	6.738	6.410	0.326	1.456	1.341
Al2O3	14.500	4.906	9.248	8.946	9.685	20.168	20.068	14.154	13.806	1.148	4.865	3.986
FeO	11.431	20.317	26.344	26.455	26.564	20.288	19.939	9.412	9.546	22.958	16.630	18.239
MnO	0.0	2.470	1.239	1.231	1.163	0.401	0.399	0.0	0.0	1.643	0.980	1.249
MgO	11.220	3.086	4.780	4.326	4.839	1.252	1.428	12.374	12.227	7.216	10.238	10.154
CaO	13.054	16.281	10.004	9.974	9.991	0.194	0.210	11.712	11.539	1.480	7.821	7.872
Na2O	2.077	4.583	3.431	3.124	3.209	6.500	6.609	2.208	1.977	9.174	5.112	5.190
K2O	1.265	0.763	1.740	1.623	1.617	0.143	0.161	1.709	1.688	2.103	1.723	1.436
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.338	0.380	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.426	102.029	99.749	97.775	99.007	88.456	88.601	97.208	96.095	99.070	98.029	97.432
Atoms per 23 oxygens - T+C cations=13.00												
Si	5.685	8.157	6.326	6.314	6.175	6.218	6.263	5.815	5.867	8.018	7.435	7.326
Ti	0.921	0.0	0.273	0.258	0.249	0.0	0.0	0.757	0.727	0.037	0.165	0.154
Al	2.520	0.951	1.698	1.681	1.787	3.754	3.724	2.494	2.455	0.205	0.867	0.718
Fe3	0.0	0.0	0.384	0.420	0.660	1.725	1.630	0.0	0.0	0.110	0.0	0.0
Fe2	1.409	2.793	3.046	3.107	2.817	0.954	0.995	1.177	1.204	2.794	2.102	2.330
Mn	0.0	0.344	0.163	0.166	0.154	0.054	0.053	0.0	0.0	0.210	0.125	0.162
Mg	2.465	0.756	1.109	1.028	1.129	0.295	0.335	2.757	2.748	1.626	2.306	2.311
Ca	2.062	2.867	1.669	1.704	1.676	0.033	0.035	1.876	1.865	0.240	1.266	1.288
Na	0.594	1.461	1.036	0.966	0.974	1.990	2.017	0.640	0.578	2.690	1.498	1.537
K	0.238	0.160	0.346	0.330	0.323	0.029	0.032	0.326	0.325	0.406	0.332	0.280
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.026	0.029	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	99.	100.	101.	101.	101.	107.	107.	108.	108.	111.	111.	111.
Rock Type	Oth Lp	Rex Ph	Rex Tr	Rex Tr	Rex Tr	Glass	Glass	Oth Lp	Oth Lp	Phon	Phon	Phon
Crystal	1.	1.	3.	3.	3.	1.	1.	2.	2.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	1.	7.	8.	8.	8.
Leake (1978) Classification												
	Kaer	Si-Fo-Ed	Has-Hb	Has-Hb	Has	Cross	Cross	Kaer	Kaer	Fo-Eck	Mgo-Kat	Kat

AMPHIBOLE ANAYLSES

	58019.62	58019.63	54168.06	54168.05	54168.04	54168.43	54168.42	54168.41	46279.19	46279.18	46279.13	46279.10
Weight % oxide												
SiO2	48.126	46.867	37.346	37.080	37.420	39.800	40.016	39.839	40.905	40.157	40.598	39.908
TiO2	1.346	1.547	4.692	4.763	4.163	4.004	4.215	3.936	0.673	0.702	2.664	2.361
Al2O3	3.612	3.734	12.669	12.941	13.230	13.173	13.793	12.807	14.296	13.456	14.274	14.191
FeO	18.416	20.501	20.457	21.080	21.206	20.103	19.897	19.447	18.180	18.111	15.738	15.783
MnO	1.049	1.366	0.0	0.274	0.500	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	9.524	8.456	6.721	6.391	5.681	7.310	6.982	6.413	9.021	8.294	9.185	9.390
CaO	7.823	7.823	11.824	11.986	12.029	11.637	11.931	11.678	11.746	11.625	11.864	11.829
Na2O	5.464	5.105	2.041	2.147	1.786	2.242	2.131	1.799	2.677	2.556	2.598	1.962
K2O	1.430	1.380	2.577	2.582	2.672	2.541	2.501	2.485	1.907	1.785	2.000	1.999
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	96.790	96.779	98.327	99.244	98.687	101.191a	101.629b	98.638c	99.640d	96.686	99.150e	97.423
Atoms per 23 oxygens - T+C cations=13.00												
Si	7.459	7.311	5.854	5.786	5.877	6.013	6.014	6.186	6.118	6.211	6.117	6.060
Ti	0.157	0.181	0.553	0.559	0.492	0.455	0.476	0.460	0.076	0.082	0.302	0.270
Al	0.660	0.687	2.341	2.381	2.450	2.346	2.444	2.345	2.521	2.453	2.536	2.541
Fe3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.186	0.0	0.0	0.0
Fe2	2.387	2.675	2.682	2.751	2.785	2.540	2.501	2.525	2.088	2.343	1.983	2.004
Mn	0.138	0.180	0.0	0.036	0.067	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	2.200	1.966	1.570	1.486	1.330	1.646	1.564	1.484	2.011	1.912	2.062	2.125
Ca	1.299	1.308	1.986	2.004	2.024	1.884	1.921	1.943	1.883	1.926	1.915	1.925
Na	1.642	1.544	0.620	0.650	0.544	0.657	0.621	0.542	0.776	0.766	0.759	0.578
K	0.283	0.275	0.515	0.514	0.535	0.490	0.480	0.492	0.364	0.352	0.384	0.387
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	111.	111.	115.	115.	115.	115.	115.	115.	116.	116.	116.	116.
Rock Type	Phon	Phon	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Leake (1978) Classification												
	Kat	Kat	Kaer	Kaer	Fn-Pa	Fn-Pa	Fn-Pa	Fn-Pa	Fn-Pa	Fn-Pa	Fn-Pa	Fn-Pa

a - Includes 0.381wt% Cl
b - Includes 0.163wt% Cl
c - Includes 0.234wt% Cl
d - Includes 0.235wt% Cl
e - Includes 0.229wt% Cl

AMPHIBOLE ANAYLSES

	46279.08	46279.07	325932.59	325932.51	325932.50	325932.47	52287.15	52287.14	52287.13	52287.05	325972.28	326283.38
Weight % oxide												
SiO2	41.057	40.768	55.878	56.619	54.723	56.052	39.317	38.766	39.231	38.561	56.578	41.536
TiO2	2.050	2.864	0.502	0.630	1.294	1.447	7.734	7.486	7.211	7.728	0.0	5.875
Al2O3	13.614	14.074	0.0	0.0	2.175	0.651	13.981	14.195	14.150	13.586	0.0	12.809
FeO	15.575	15.821	22.353	23.597	19.092	20.931	10.868	12.154	11.847	11.674	15.563	13.570
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.548	0.0
MgO	9.541	9.558	10.497	10.183	13.500	11.113	11.504	11.216	11.381	10.842	14.893	11.219
CaO	11.557	11.737	0.0	0.0	0.286	0.0	12.375	12.328	12.319	12.075	8.577	11.082
Na2O	2.261	2.781	8.208	7.523	6.334	6.794	2.208	2.206	2.458	2.053	2.985	3.513
K2O	2.118	1.928	0.159	0.0	0.922	0.485	1.750	1.861	1.817	1.833	0.414	1.200
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.751	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.135a	99.785b	97.597	98.552	98.326	97.473	99.737	100.963	100.414	98.352	99.558	100.804
Atoms per 23 oxygens - T+C cations=13.00												
Si	6.214	6.092	8.018	8.000	7.540	7.923	5.818	5.726	5.782	5.808	7.973	6.059
Ti	0.233	0.322	0.054	0.067	0.134	0.154	0.861	0.832	0.799	0.875	0.0	0.644
Al	2.429	2.480	0.0	0.0	0.353	0.108	2.439	2.472	2.459	2.412	0.0	2.203
Fe3	0.0	0.0	1.542	1.805	-0.0	1.789	0.0	0.0	0.0	0.0	0.574	0.0
Fe2	1.971	1.977	1.140	0.984	0.0	0.685	1.345	1.501	1.460	1.471	1.260	1.655
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.065	0.0
Mg	2.152	2.129	2.245	2.144	2.772	2.341	2.537	2.469	2.500	2.434	3.128	2.439
Ca	1.874	1.879	0.0	0.0	0.042	0.0	1.962	1.951	1.945	1.949	1.295	1.732
Na	0.664	0.806	2.284	2.061	1.692	1.862	0.634	0.632	0.702	0.600	0.816	0.994
K	0.409	0.368	0.029	0.0	0.162	0.087	0.330	0.351	0.342	0.352	0.074	0.223
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.043	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	116.	116.	118.	118.	118.	118.	120.	120.	120.	120.	121.	122.
Rock Type	Oth Lp	Oth Lp	UML	UML	UML	UML	Oth Lp	Oth Lp	Oth Lp	Oth Lp	UML	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	2.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	7.
Leake (1978) Classification	Fn-Pa	Fn-Pa	Mgo-Rieb	Mgo-Rieb	Glauc	Mgo-Rieb	Kaer	Kaer	Kaer	Kaer	Win	Kaer

a - Includes 0.254wt% Cl   b - Includes 0.362wt% Cl

AMPHIBOLE ANAYLSES

	326283.37	54258.68	54258.67	54258.66	54275.36	54275.35
Weight % oxide						
SiO2	40.658	41.636	41.226	41.299	53.078	55.048
TiO2	6.122	2.868	3.115	2.798	0.0	0.0
Al2O3	12.898	10.543	10.931	10.959	2.400	1.726
FeO	13.567	21.135	21.238	21.783	5.434	6.029
MnO	0.307	0.370	0.575	0.696	3.377	3.797
MgO	10.391	7.151	7.033	7.177	18.060	18.058
CaO	11.007	11.068	10.953	10.875	8.676	8.379
Na2O	3.083	2.744	2.461	3.300	4.857	5.286
K2O	1.195	1.378	1.505	1.470	0.783	0.813
BaO	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.228	98.893	99.037	100.357	96.665	99.146
Atoms per 23 oxygens - T+C cations=13.00						
Si	6.036	6.378	6.291	6.255	7.647	7.765
Ti	0.684	0.330	0.358	0.319	0.0	0.0
Al	2.258	1.904	1.967	1.957	0.408	0.287
Fe3	0.0	0.0	0.132	0.111	0.118	0.080
Fe2	1.685	2.708	2.578	2.648	0.537	0.632
Mn	0.039	0.048	0.074	0.089	0.412	0.453
Mg	2.299	1.632	1.600	1.620	3.878	3.792
Ca	1.751	1.817	1.791	1.765	1.339	1.265
Na	0.888	0.815	0.728	0.969	1.357	1.444
K	0.226	0.269	0.293	0.284	0.144	0.146
Ba	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.0	0.0	0.0	0.0
Sample	122.	123.	123.	123.	96.	96.
Rock Type	Oth Lp	Haw/Mug	Haw/Mug	Haw/Mug	Cbt	Cbt
Crystal	2.	1.	1.	1.	1.	1.
Position	1.	8.	8.	8.	8.	8.
Leake (1978) Classification						
	Kaer	Fn-Pa-Hb	Fn-Pa-Hb	Fn-Pa-Hb	Subc-Si-Ed	Subc-Si-Ed

OLIVINE ANAYLSES

	63845.14	58017.25	58017.34	58017.35	58017.38	41954.47	41954.54	43867.15	43867.16	43867.22	43867.23	59632.29
Weight % oxide												
SiO_2	31.893	32.747	32.163	32.148	32.008	33.338	33.276	35.138	34.847	35.370	35.424	34.645
Al_2O_3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FeO	63.347	53.591	56.234	56.449	55.995	53.136	52.559	42.717	42.091	42.371	42.159	43.806
MnO	3.542	3.398	3.811	3.899	3.653	1.805	1.827	0.953	0.954	0.874	0.894	0.990
MgO	3.989	11.490	8.746	8.862	9.311	13.051	13.104	22.594	22.978	22.502	22.948	21.627
CaO	0.628	0.339	0.275	0.385	0.484	0.551	0.638	0.316	0.193	0.378	0.339	0.338
Total	103.973	101.994	101.543	102.306	101.905	102.208	101.404	101.718	101.063	101.495	101.764	101.406
Atoms per 4 oxygens												
Si	1.005	0.999	1.003	0.997	0.994	1.003	1.006	0.998	0.995	1.004	1.002	0.994
Al	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fe	1.669	1.368	1.467	1.464	1.455	1.336	1.329	1.015	1.005	1.006	0.997	1.052
Mn	0.095	0.088	0.101	0.102	0.096	0.046	0.047	0.023	0.023	0.021	0.021	0.024
Mg	0.187	0.522	0.407	0.410	0.431	0.585	0.591	0.956	0.977	0.952	0.967	0.925
Ca	0.021	0.011	0.009	0.013	0.016	0.018	0.021	0.010	0.006	0.012	0.010	0.010
Sample	1.	2.	2.	2.	2.	5.	5.	7.	7.	7.	7.	8.
Rock Type	Tr/Sy	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Haw/Mug	Haw/Mug	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Sy-gab
Crystal	4.	10.	4.	4.	5.	4.	5.	1.	1.	1.	1.	1.
Position	1.	8.	1.	7.	1.	1.	1.	1.	7.	8.	8.	8.
Atomic Percent												
Mg	9.6	26.4	20.6	20.7	21.7	29.7	30.0	47.9	48.7	48.1	48.7	46.2
Fe	85.5	69.2	74.3	74.1	73.4	67.9	67.6	50.9	50.1	50.8	50.2	52.6
Mn	4.9	4.4	5.1	5.2	4.8	2.3	2.4	1.2	1.1	1.1	1.1	1.2

OLIVINE ANAYLSES

	59632.38	59632.44	46240.48	46240.49	58036.55	58036.56	58036.59	58036.60	58036.64	58224.45	58224.44	58224.32
Weight % oxide												
SiO2	35.212	34.554	32.367	32.286	32.921	32.849	33.515	32.942	33.024	31.290	31.331	31.735
Al2O3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.374	0.0
FeO	42.057	45.526	54.396	54.303	49.256	49.479	47.414	47.980	48.090	57.080	57.132	58.286
MnO	0.946	1.320	2.824	2.504	2.009	2.317	2.272	2.250	2.082	3.421	3.687	3.565
MgO	22.989	19.977	11.301	10.985	16.004	15.728	17.010	16.422	16.338	8.011	8.014	7.986
CaO	0.330	0.268	1.083	1.025	0.429	0.348	0.357	0.535	0.429	1.217	1.123	1.160
Total	101.534	101.645	102.513	101.459	101.001	101.155	100.568	100.129	100.067	101.346	101.661	103.221
Atoms per 4 oxygens												
Si	0.999	0.999	0.987	0.994	0.987	0.986	0.998	0.991	0.994	0.987	0.984	0.985
Al	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.014	0.0
Fe	0.998	1.101	1.388	1.398	1.235	1.242	1.181	1.207	1.210	1.506	1.500	1.513
Mn	0.023	0.032	0.073	0.065	0.051	0.059	0.057	0.057	0.053	0.091	0.098	0.094
Mg	0.972	0.861	0.514	0.504	0.715	0.704	0.755	0.736	0.733	0.377	0.375	0.369
Ca	0.010	0.008	0.035	0.034	0.014	0.011	0.011	0.017	0.014	0.041	0.038	0.039
Sample	8.	8.	22.	22.	23.	23.	23.	23.	23.	25.	25.	25.
Rock Type	Sy-gab	Sy-gab	Phon	Phon	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Phon	Phon	Phon
Crystal	1.	1.	4.	4.	4.	4.	5.	5.	6.	4.	5.	4.
Position	8.	8.	8.	8.	3.	7.	1.	7.	1.	1.	2.	1.
Atomic Percent												
Mg	48.8	43.2	26.0	25.6	35.7	35.1	37.9	36.8	36.7	19.1	19.0	18.7
Fe	50.1	55.2	70.3	71.1	61.7	61.9	59.3	60.3	60.6	76.3	76.0	76.6
Mn	1.2	1.6	3.7	3.3	2.5	2.9	2.9	2.8	2.7	4.6	5.0	4.8

OLIVINE ANAYLSES

	58224.31	126772.65	126772.64	126772.66	126772.67	58003.79	58003.78	141233.18	141233.12	46237.01	46237.02	52298.44
Weight % oxide												
SiO2	31.776	34.406	34.585	33.740	34.230	31.770	32.364	33.280	33.258	34.300	33.534	33.706
Al2O3	0.0	0.271	0.261	0.299	0.299	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FeO	57.764	44.004	40.353	45.896	45.001	52.336	53.077	50.016	50.168	42.232	42.335	44.567
MnO	3.297	1.065	0.980	1.472	1.262	2.196	2.255	2.043	1.965	1.210	1.116	1.220
MgO	7.998	21.188	23.992	19.782	20.625	12.426	12.775	15.508	15.315	21.473	21.253	19.530
CaO	1.153	0.390	0.381	0.491	0.457	0.805	0.809	0.544	0.536	0.432	0.424	0.429
Total	101.988	101.324	100.552	101.680	102.166	99.895	101.820	101.810	101.547	99.647	98.662	99.824
Atoms per 4 oxygens												
Si	0.994	0.990	0.986	0.980	0.984	0.986	0.985	0.992	0.994	0.998	0.990	0.994
Al	0.0	0.009	0.009	0.010	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fe	1.512	1.059	0.962	1.115	1.081	1.358	1.351	1.247	1.254	1.028	1.045	1.099
Mn	0.087	0.026	0.024	0.036	0.031	0.058	0.058	0.052	0.050	0.030	0.028	0.030
Mg	0.373	0.909	1.019	0.857	0.883	0.575	0.579	0.689	0.682	0.932	0.935	0.858
Ca	0.039	0.012	0.012	0.015	0.014	0.027	0.026	0.017	0.017	0.013	0.013	0.014
Sample	25.	26.	26.	26.	26.	27.	27.	28.	28.	31.	31.	32.
Rock Type	Phon	Ben	Ben	Ben	Ben	Phon	Phon	Phon	Phon	Ben	Ben	Ben
Crystal	5.	4.	4.	5.	5.	4.	4.	5.	4.	2.	2.	5.
Position	1.	7.	1.	1.	7.	1.	7.	1.	1.	1.	7.	1.
Atomic Percent												
Mg	18.9	45.6	50.8	42.7	44.3	28.9	29.1	34.7	34.3	46.8	46.6	43.2
Fe	76.7	53.1	48.0	55.5	54.2	68.2	68.0	62.7	63.1	51.7	52.0	55.3
Mn	4.4	1.3	1.2	1.8	1.6	2.9	2.9	2.6	2.5	1.5	1.4	1.5

OLIVINE ANAYLSES

	52298.43	58065.13	58065.12	58065.11	58065.10	58065.09	58065.07	59779.91	59779.90	59779.89	59779.88	59741.29
Weight % oxide												
SiO2	34.059	35.387	35.225	35.254	35.260	34.767	34.963	29.666	31.354	31.151	32.991	34.707
Al2O3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.378	0.0	0.0	0.0	0.0
FeO	45.430	37.690	36.420	37.115	36.413	38.473	37.342	55.880	59.881	60.048	51.714	45.054
MnO	1.102	0.563	0.386	0.561	0.487	0.476	0.712	1.974	2.336	2.183	1.811	1.242
MgO	19.795	26.331	26.829	26.708	27.079	26.706	26.046	5.491	6.071	6.237	13.727	20.321
CaO	0.484	0.273	0.300	0.159	0.350	0.247	0.483	2.948	1.044	1.071	0.483	0.495
Total	101.325	100.244	99.160	99.797	100.011	101.119	99.546	98.435	101.159	101.149	101.075	101.819
Atoms per 4 oxygens												
Si	0.991	0.995	0.995	0.993	0.990	0.975	0.991	0.975	1.000	0.995	0.999	0.999
Al	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.015	0.0	0.0	0.0	0.0
Fe	1.105	0.886	0.861	0.874	0.855	0.902	0.885	1.536	1.598	1.604	1.310	1.085
Mn	0.027	0.013	0.009	0.013	0.012	0.011	0.017	0.055	0.063	0.059	0.046	0.030
Mg	0.858	1.103	1.130	1.121	1.133	1.116	1.100	0.269	0.289	0.297	0.620	0.872
Ca	0.015	0.008	0.009	0.005	0.011	0.007	0.015	0.104	0.036	0.037	0.016	0.015
Sample	32.	33.	33.	33.	33.	33.	33.	37.	37.	37.	37.	40.
Rock Type	Ben	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Ben	Ben	Ben	Ben	Ben
Crystal	4.	5.	5.	4.	4.	10.	10.	1.	1.	1.	1.	4.
Position	1.	7.	1.	7.	1.	8.	8.	8.	8.	8.	8.	1.
Atomic Percent												
Mg	43.1	55.1	56.5	55.8	56.6	55.0	54.9	14.5	14.8	15.2	31.4	43.9
Fe	55.5	44.3	43.0	43.5	42.8	44.5	44.2	82.6	81.9	81.8	66.3	54.6
Mn	1.4	0.6	0.4	0.6	0.6	0.5	0.8	3.0	3.2	3.0	2.3	1.5

OLIVINE ANAYLSES

	59741.30	59741.33	59741.47	46253.12	46253.13	63751.44	63751.45	63751.54	63751.55	46233.10	46233.11	46233.13
Weight % oxide												
SiO2	34.779	34.853	35.333	30.356	30.232	33.642	33.078	32.794	33.143	32.791	32.142	31.415
Al2O3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FeO	37.258	41.205	36.124	61.061	60.579	49.096	48.147	47.186	48.111	53.144	52.321	52.249
MnO	0.963	1.012	0.893	2.636	2.605	1.635	1.651	1.657	1.626	1.888	2.013	1.994
MgO	24.567	23.242	26.725	5.034	5.246	16.838	16.321	15.880	15.906	12.990	12.489	12.504
CaO	0.309	0.360	0.344	1.065	0.991	0.663	0.670	0.696	0.685	0.333	0.219	0.243
Total	97.876	100.672	99.419	100.581	99.991	101.874	99.867	98.213	99.471	101.507	99.773	98.405
Atoms per 4 oxygens												
Si	1.005	0.995	0.996	0.987	0.987	0.993	0.996	1.002	1.002	0.996	0.995	0.989
Al	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fe	0.900	0.984	0.852	1.660	1.654	1.212	1.212	1.206	1.216	1.350	1.355	1.375
Mn	0.024	0.024	0.021	0.073	0.072	0.041	0.042	0.043	0.042	0.049	0.053	0.053
Mg	1.058	0.989	1.123	0.244	0.255	0.741	0.732	0.723	0.716	0.588	0.576	0.586
Ca	0.010	0.011	0.010	0.037	0.035	0.021	0.022	0.023	0.022	0.011	0.007	0.008
Sample	40.	40.	40.	42.	42.	44.	44.	44.	44.	46.	46.	46.
Rock Type	Ben	Ben	Ben	Ben	Ben	Phon	Phon	Phon	Phon	Sy-gab	Sy-gab	Sy-gab
Crystal	4.	2.	5.	2.	2.	4.	4.	5.	5.	1.	1.	1.
Position	7.	8.	1.	8.	8.	1.	7.	1.	7.	8.	8.	8.
Atomic Percent												
Mg	53.4	49.5	56.3	12.3	12.9	37.2	36.9	36.7	36.3	29.6	29.0	29.1
Fe	45.4	49.3	42.7	84.0	83.5	60.8	61.0	61.2	61.6	67.9	68.3	68.3
Mn	1.2	1.2	1.1	3.7	3.6	2.1	2.1	2.2	2.1	2.5	2.7	2.6

OLIVINE ANAYLSES

	46233.10	46233.18	46233.19	59631.11	59631.12	59631.13	59631.14	326256.22	59660.14	59660.15	59660.18	59660.19
Weight % oxide												
SiO2	31.947	32.039	32.350	35.160	35.285	34.845	35.047	30.961	33.951	33.785	33.626	33.328
Al2O3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.288	0.337	0.244	0.0
FeO	52.864	52.979	52.692	38.978	38.929	40.611	41.396	60.544	47.483	47.119	47.458	46.837
MnO	1.903	2.136	2.126	0.609	0.577	0.826	0.797	3.414	1.751	1.836	1.691	1.379
MgO	13.008	12.884	13.043	25.671	25.533	24.206	23.836	6.734	17.647	18.005	18.341	18.116
CaO	0.256	0.270	0.0	0.417	0.376	0.469	0.438	1.008	0.637	0.646	0.493	0.627
Total	99.978	100.308	100.530	100.835	100.700	100.957	101.795	103.034	101.757	101.728	102.310	100.800
Atoms per 4 oxygens												
Si	0.988	0.988	0.993	0.989	0.993	0.989	0.990	0.976	0.994	0.989	0.981	0.986
Al	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.010	0.012	0.008	0.0
Fe	1.367	1.367	1.353	0.917	0.917	0.964	0.978	1.596	1.163	1.153	1.158	1.159
Mn	0.050	0.056	0.055	0.015	0.014	0.020	0.019	0.091	0.043	0.046	0.042	0.035
Mg	0.599	0.592	0.597	1.077	1.071	1.024	1.003	0.316	0.770	0.785	0.797	0.799
Ca	0.008	0.009	0.0	0.013	0.011	0.014	0.013	0.034	0.020	0.020	0.015	0.020
Sample	46.	46.	46.	48.	48.	48.	48.	49.	52.	52.	52.	52.
Rock Type	Sy-gab	Sy-gab	Sy-gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Phon	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy
Crystal	1.	1.	1.	4.	4.	5.	5.	2.	4.	4.	5.	6.
Position	8.	1.	7.	1.	7.	1.	7.	8.	1.	7.	8.	8.
Atomic Percent												
Mg	29.7	29.4	29.8	53.6	53.5	51.0	50.1	15.8	39.0	39.6	39.9	40.1
Fe	67.8	67.8	67.5	45.6	45.8	48.0	48.9	79.7	58.9	58.1	58.0	58.2
Mn	2.5	2.8	2.7	0.7	0.7	1.0	0.9	4.5	2.2	2.3	2.1	1.8

OLIVINE ANAYLSES

	52247.56	52247.57	52247.58	325980.14	325980.15	58023.27	58023.28	58023.34	58023.35	326241.44	326241.45	41958.29
Weight % oxide												
SiO2	33.422	33.751	33.564	37.040	37.177	31.176	30.119	29.830	30.173	34.935	34.552	28.438
Al2O3	0.0	0.0	0.0	0.622	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.280
FeO	45.133	44.390	44.456	28.387	28.681	56.568	58.530	57.782	57.571	41.929	42.012	43.295
MnO	1.680	1.297	1.377	0.606	0.291	10.528	10.768	11.176	11.950	1.213	1.112	8.788
MgO	19.393	19.795	19.814	33.238	33.156	1.608	1.777	1.740	1.786	22.236	21.336	0.0
CaO	0.399	0.556	0.459	0.371	0.294	0.152	0.0	0.0	0.0	0.522	0.489	14.132
Total	100.418	100.146	99.670	100.264	99.599	100.768	101.597	101.015	101.975	100.835	99.501	95.312
Atoms per 4 oxygens												
Si	0.985	0.991	0.991	0.992	1.003	1.024	0.993	0.990	0.991	1.001	1.005	0.976
Al	0.0	0.0	0.0	0.020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.011
Fe	1.112	1.091	1.098	0.636	0.647	1.554	1.614	1.604	1.582	1.004	1.022	1.243
Mn	0.042	0.032	0.034	0.014	0.007	0.293	0.301	0.314	0.333	0.029	0.027	0.256
Mg	0.852	0.867	0.872	1.327	1.333	0.079	0.087	0.086	0.087	0.949	0.925	0.0
Ca	0.013	0.018	0.015	0.011	0.008	0.005	0.0	0.0	0.0	0.016	0.015	0.520
Sample	55.	55.	55.	61.	61.	62.	62.	62.	62.	63.	63.	92.
Rock Type	Ben	Ben	Ben	BFD	BFD	Phon	Phon	Phon	Phon	Haw/Mug	Haw/Mug	Cbt
Crystal	4.	4.	5.	10.	10.	1.	1.	4.	5.	10.	10.	1.
Position	1.	7.	8.	1.	7.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Mg	42.5	43.6	43.5	67.1	67.1	4.1	4.3	4.3	4.3	47.9	46.9	0.0
Fe	55.4	54.8	54.8	32.2	32.6	80.7	80.6	80.0	79.0	50.7	51.8	82.9
Mn	2.1	1.6	1.7	0.7	0.4	15.2	15.0	15.7	16.6	1.5	1.4	17.1

OLIVINE ANAYLSES

	41958.30	127052.50	63808.22	63808.23	62808.35	58290.19	58290.22	58290.24	63810.07	63810.09	63810.09	58130.03
Weight % oxide												
SiO2	28.441	35.612	31.351	30.505	31.035	32.829	31.087	32.550	32.265	31.879	31.738	33.660
Al2O3	0.311	0.0	0.0	0.0	0.229	0.0	0.0	0.313	0.0	0.0	0.0	0.0
FeO	41.816	5.771	62.437	60.080	61.138	53.834	59.627	52.837	58.189	58.105	57.425	50.220
MnO	11.246	4.499	3.488	3.387	3.203	1.129	1.299	1.018	2.492	2.625	2.659	1.453
MgO	0.0	47.933	6.925	6.785	7.204	13.722	8.169	13.742	8.587	8.266	8.246	16.330
CaO	13.477	0.943	0.254	0.203	0.257	0.311	0.475	0.399	0.322	0.266	0.223	0.231
Total	95.291	94.758	104.455	101.285	103.066	101.825	100.657	100.859	101.855	101.141	100.291	102.732
Atoms per 4 oxygens												
Si	0.978	0.935	0.976	0.978	0.975	0.992	0.988	0.989	1.005	1.003	1.005	0.990
Al	0.013	0.0	0.0	0.0	0.008	0.0	0.0	0.011	0.0	0.0	0.0	0.0
Fe	1.202	0.127	1.626	1.611	1.606	1.360	1.585	1.343	1.515	1.528	1.521	1.236
Mn	0.327	0.100	0.092	0.092	0.085	0.029	0.035	0.026	0.066	0.070	0.071	0.036
Mg	0.0	1.876	0.321	0.324	0.337	0.618	0.387	0.622	0.399	0.387	0.389	0.716
Ca	0.496	0.027	0.008	0.007	0.009	0.010	0.016	0.013	0.011	0.009	0.008	0.007
Sample	92.	97.	98.	98.	98.	102.	102.	102.	109.	109.	109.	112.
Rock Type	Cbt	Cbt	BFD	BFD	BFD	BFD	BFD	BFD	BFD	BFD	BFD	Sy-gab
Crystal	1.	1.	4.	4.	5.	4.	5.	1.	4.	4.	4.	1.
Position	8.	8.	1.	7.	1.	1.	8.	8.	1.	4.	7.	8.
Atomic Percent												
Mg	0.0	89.2	15.7	16.0	16.6	30.8	19.3	31.2	20.2	19.5	19.6	36.0
Fe	78.6	6.0	79.7	79.5	79.2	67.8	79.0	67.5	76.5	77.0	76.8	62.2
Mn	21.4	4.8	4.5	4.5	4.2	1.4	1.7	1.3	3.3	3.5	3.6	1.8

OLIVINE ANAYLSES

	58130.04	58130.06	58130.07	58130.08	325962.40	325962.22	325962.21	325962.20
Weight % oxide								
SiO2	32.704	33.753	33.398	33.397	40.227	39.398	39.054	40.195
Al2O3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FeO	52.965	49.488	50.567	52.116	19.103	19.878	23.961	22.079
MnO	1.616	1.545	1.439	1.417	0.880	1.21[illegible]	0.358	0.649
MgO	12.791	16.220	15.734	14.549	42.223	40.166	38.941	40.035
CaO	0.0	0.390	0.384	0.0	0.271	0.296	0.0	0.174
Total	100.076	101.764	101.522	101.479	102.704	100.949	102.314	103.132
Atoms per 4 oxygens								
Si	1.005	0.999	0.996	1.002	1.003	1.006	0.998	1.010
Al	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fe	1.362	1.225	1.261	1.308	0.398	0.425	0.512	0.464
Mn	0.042	0.039	0.036	0.036	0.019	0.026	0.008	0.014
Mg	0.586	0.715	0.699	0.651	1.569	1.529	1.483	1.499
Ca	0.0	0.012	0.012	0.0	0.007	0.008	0.0	0.005
Sample	112.	112.	112.	112.	117.	117.	117.	117.
Rock Type	Sy-gab	Sy-gab	Sy-gab	Sy-gab	UML	UML	UML	UML
Crystal	1.	4.	4.	4.	1.	1.	5.	1.
Position	8.	1.	4.	7.	8.	8.	8.	8.
Atomic Percent								
Mg	29.4	36.1	35.0	32.6	79.0	77.2	74.0	75.8
Fe	68.4	61.9	63.2	65.6	20.0	21.5	25.6	23.5
Mn	2.1	2.0	1.8	1.8	1.0	1.3	0.4	0.7

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	63845.16	58017.29	58017.41	43842.25	43867.20	43867.26	59632.40	52267.07	52267.10	52267.12	52267.20	41945.16
Weight % oxide												
SiO2	36.800	37.739	38.154	38.449	36.826	36.505	36.486	34.718	34.507	35.400	34.704	30.189
TiO2	4.613	5.844	6.200	1.346	8.637	8.444	6.339	3.987	3.205	4.010	4.136	2.754
Al2O3	12.281	10.995	11.122	10.248	13.487	13.604	13.643	10.399	10.876	10.800	10.459	12.603
FeO	24.948	21.648	22.003	28.686	15.894	17.096	18.763	33.629	33.258	32.662	33.080	42.565
MnO	0.448	0.359	0.410	2.433	0.0	0.0	0.0	1.495	1.742	1.629	1.467	0.321
MgO	7.722	10.414	10.439	5.352	11.922	11.349	11.435	3.374	3.350	3.251	3.129	0.0
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	0.397	0.766	0.794	0.401	0.544	0.656	0.482	0.508	0.459	1.236	0.545	0.283
K2O	9.030	8.799	8.970	9.237	8.647	8.951	9.079	8.541	8.622	8.256	8.490	5.583
BaO	0.821	0.0	0.0	0.0	1.002	1.189	0.860	0.0	0.0	0.0	0.0	0.0
Total	97.060	96.564	98.092	96.152	96.959	97.794	97.087	96.651	96.019	97.244	96.010	94.298
Atoms per 22 oxygens, anhydrous												
Si	5.723	5.766	5.745	6.158	5.475	5.434	5.499	5.692	5.695	5.729	5.713	5.250
Ti	0.539	0.671	0.702	0.162	0.966	0.945	0.719	0.492	0.398	0.488	0.512	0.360
Al	2.251	1.980	1.974	1.935	2.364	2.387	2.424	2.010	2.116	2.061	2.030	2.584
Fe	3.245	2.766	2.771	3.843	1.976	2.128	2.365	4.611	4.591	4.421	4.554	6.190
Mn	0.059	0.046	0.052	0.330	0.0	0.0	0.0	0.208	0.244	0.223	0.205	0.047
Mg	1.790	2.371	2.343	1.278	2.641	2.518	2.569	0.824	0.824	0.784	0.768	0.0
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.120	0.227	0.232	0.125	0.157	0.189	0.141	0.161	0.147	0.388	0.174	0.095
K	1.791	1.715	1.723	1.888	1.640	1.700	1.746	1.787	1.816	1.705	1.783	1.239
Ba	0.050	0.0	0.0	0.0	0.058	0.069	0.051	0.0	0.0	0.0	0.0	0.0
Sample	1.	2.	2.	4.	7.	7.	8.	13.	13.	13.	13.	17.
Rock Type	Tr/Sy	Sy-gab	Sy-gab	Phon	Bas/Gab	Bas/Gab	Sy-gab	Phon	Phon	Phon	Phon	Tr/Sy
Crystal	1.	1.	1.	1.	1.	1.	1.	11.	1.	4.	5.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.	1.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	46237.39	46237.41	58036.54	58036.61	58036.69	46247.18	46247.14	46247.08	52298.50	52298.49	58065.22	58100.37
Weight % oxide												
SiO2	37.076	35.611	35.993	35.303	36.030	36.400	35.435	36.010	35.622	36.079	36.526	35.817
TiO2	3.661	4.762	8.044	8.392	7.059	5.363	4.958	5.334	5.829	5.486	8.336	5.692
Al2O3	10.870	11.488	13.330	13.904	13.873	10.886	11.422	11.466	10.294	10.929	13.935	13.593
FeO	30.754	32.538	17.808	17.384	18.019	29.564	28.756	27.721	32.923	28.938	15.542	23.590
MnO	0.0	0.258	0.409	0.0	0.283	0.679	0.565	0.614	0.509	0.497	0.0	0.427
MgO	4.979	3.707	11.204	11.032	11.009	5.216	5.007	5.820	2.795	5.463	12.546	8.655
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.462	0.0	0.0
Na2O	0.374	0.471	0.473	0.501	0.483	0.770	0.561	0.464	0.735	0.783	0.679	0.786
K2O	8.345	8.670	8.880	9.037	8.849	8.969	8.945	9.146	8.329	8.187	9.048	8.963
BaO	0.0	0.0	1.135	1.108	1.026	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	96.059	97.505	97.276	96.661	96.631	97.847	95.649	96.575	97.036	96.824	96.612	97.523
Atoms per 22 oxygens, anhydrous												
Si	5.923	5.692	5.418	5.339	5.450	5.734	5.700	5.700	5.747	5.711	5.416	5.483
Ti	0.440	0.572	0.911	0.954	0.803	0.635	0.600	0.635	0.707	0.653	0.930	0.655
Al	2.047	2.165	2.365	2.479	2.474	2.022	2.166	2.140	1.958	2.040	2.436	2.453
Fe	4.109	4.349	2.242	2.199	2.279	3.895	3.869	3.670	4.442	3.831	1.927	3.020
Mn	0.0	0.035	0.052	0.0	0.036	0.091	0.077	0.082	0.070	0.067	0.0	0.055
Mg	1.185	0.883	2.513	2.486	2.482	1.225	1.200	1.373	0.672	1.289	2.773	1.975
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.078	0.0	0.0
Na	0.116	0.146	0.138	0.147	0.142	0.235	0.175	0.142	0.230	0.240	0.195	0.233
K	1.701	1.768	1.705	1.744	1.708	1.803	1.836	1.847	1.714	1.653	1.712	1.751
Ba	0.0	0.0	0.067	0.066	0.061	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	21.	21.	23.	23.	23.	24.	24.	24.	32.	32.	33.	34.
Rock Type	Ben	Ben	Sy-gab	Sy-gab	Sy-gab	Phon	Phon	Phon	Ben	Ben	Bas/Gab	Haw/Mug
Crystal	1.	1.	1.	1.	1.	10.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	58100.35	58100.27	58100.26	58022.13	58022.14	58022.15	46253.19	46253.20	46249.24	46249.38	46249.39	46249.43
Weight % oxide												
SiO2	36.377	36.284	36.427	33.643	34.117	33.947	36.334	33.853	35.815	35.400	35.090	35.750
TiO2	6.135	7.110	7.066	2.239	6.138	2.994	1.933	5.570	3.283	3.967	3.603	3.716
Al2O3	13.112	13.338	13.255	11.791	10.430	11.718	12.992	12.102	15.376	15.435	15.937	15.808
FeO	21.617	20.827	19.428	36.143	35.915	34.440	34.123	34.631	20.731	18.227	18.743	18.575
MnO	0.514	0.447	0.391	0.587	0.757	0.413	0.826	0.860	0.0	0.0	0.0	0.0
MgO	9.784	9.685	10.290	2.167	0.0	3.122	1.293	0.903	10.353	11.761	11.223	11.010
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	1.021	0.671	0.773	0.547	0.460	0.665	0.586	0.461	0.0	0.0	0.0	0.0
K2O	8.684	8.948	9.143	7.649	8.294	7.657	8.930	8.460	9.292	9.101	9.113	9.087
BaO	0.0	0.0	0.0	0.0	0.684	0.0	0.0	0.800	1.089	0.670	1.201	1.264
Total	97.244	97.310	96.773	94.766	96.795	94.956	97.017	97.640	95.939	94.561	94.910	95.210
Atoms per 22 oxygens, anhydrous												
Si	5.527	5.489	5.511	5.656	5.661	5.638	5.878	5.530	5.515	5.450	5.419	5.489
Ti	0.701	0.809	0.804	0.283	0.766	0.374	0.235	0.684	0.380	0.459	0.418	0.429
Al	2.349	2.379	2.364	2.337	2.040	2.295	2.478	2.331	2.791	2.801	2.901	2.862
Fe	2.747	2.635	2.458	5.081	4.984	4.784	4.617	4.731	2.670	2.347	2.421	2.385
Mn	0.066	0.057	0.050	0.084	0.106	0.058	0.113	0.119	0.0	0.0	0.0	0.0
Mg	2.215	2.183	2.320	0.543	0.0	0.773	0.312	0.220	2.376	2.698	2.583	2.519
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.301	0.197	0.227	0.178	0.148	0.214	0.184	0.146	0.0	0.0	0.0	0.0
K	1.683	1.727	1.765	1.640	1.756	1.623	1.843	1.763	1.825	1.788	1.795	1.780
Ba	0.0	0.0	0.0	0.0	0.044	0.0	0.0	0.051	0.066	0.040	0.073	0.076
Sample	34.	34.	34.	39.	39.	39.	42.	42.	43.	43.	43.	43.
Rock Type	Haw/Mug	Haw/Mug	Haw/Mug	Ben	Ben	Ben	Ben	Ben	Rex Tr	Rex Tr	Rex Tr	Rex Tr
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	59783.39	59783.40	59783.41	59631.18	52276.42	52276.45	326281.22	326281.26	326281.27	326286.51	326286.52	326286.58
Weight % oxide												
SiO2	34.551	34.885	34.874	35.952	35.211	34.723	34.942	34.198	33.692	36.960	37.512	34.030
TiO2	4.613	4.579	4.538	7.144	2.923	3.016	3.756	4.331	4.055	3.402	3.066	4.310
Al2O3	11.963	11.534	11.880	13.136	11.679	10.766	14.657	15.502	14.627	11.683	11.280	10.799
FeO	31.979	31.762	31.716	19.632	34.111	33.041	22.499	24.131	23.631	20.177	20.785	34.511
MnO	0.783	0.855	0.832	0.0	1.162	1.163	0.258	0.254	0.465	1.096	1.172	1.362
MgO	2.697	2.843	2.878	9.889	3.494	3.960	9.131	9.073	9.039	11.060	11.045	1.620
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	0.575	0.570	0.467	0.0	0.281	0.429	0.592	0.798	0.597	0.555	0.562	0.569
K2O	8.672	8.816	8.795	9.078	9.108	9.049	8.860	8.929	8.841	9.395	9.432	8.485
BaO	0.866	0.684	1.145	1.661	0.538	0.0	0.0	0.702	0.488	0.0	0.0	0.0
Total	96.699	96.528	97.125	96.492	98.507	96.147	94.695	97.918	95.435	94.328	94.854	95.686
Atoms per 22 oxygens, anhydrous												
Si	5.628	5.684	5.657	5.513	5.676	5.712	5.478	5.262	5.318	5.787	5.854	5.670
Ti	0.565	0.561	0.554	0.824	0.354	0.373	0.443	0.501	0.481	0.401	0.360	0.540
Al	2.297	2.216	2.272	2.375	2.219	2.088	2.709	2.812	2.722	2.156	2.075	2.121
Fe	4.357	4.328	4.303	2.518	4.598	4.546	2.950	3.105	3.119	2.642	2.713	4.809
Mn	0.108	0.118	0.114	0.0	0.159	0.162	0.034	0.033	0.062	0.145	0.155	0.192
Mg	0.655	0.690	0.696	2.260	0.839	0.971	2.134	2.080	2.126	2.581	2.569	0.402
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.182	0.180	0.147	0.0	0.088	0.137	0.180	0.238	0.183	0.168	0.170	0.184
K	1.802	1.833	1.820	1.776	1.873	1.899	1.772	1.753	1.780	1.877	1.878	1.804
Ba	0.055	0.044	0.073	0.100	0.034	0.0	0.0	0.042	0.030	0.0	0.0	0.0
Sample	47.	47.	47.	48.	51.	51.	57.	57.	57.	59.	59.	59.
Rock Type	Phon	Phon	Phon	Bas/Gab	Phon	Phon	Oth Lp	Oth Lp	Oth Lp	Rex Ph	Rex Ph	Rex Ph
Crystal	1.	1.	1.	1.	10.	1.	1.	1.	1.	10.	10.	11.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	326233.13	58023.29	58023.32	58023.33	326241.57	326241.59	326241.60	325952.14	325952.15	325952.16	325952.17	326276.46
Weight % oxide												
SiO2	33.811	35.327	35.605	35.423	35.007	35.375	34.590	37.387	38.983	40.577	39.448	33.225
TiO2	2.374	1.619	1.975	1.991	4.096	3.880	4.267	3.652	2.064	0.806	1.360	4.776
Al2O3	11.870	14.957	14.602	15.090	12.540	11.870	12.111	12.000	11.427	10.377	10.811	13.481
FeO	35.391	25.698	25.709	26.174	31.064	33.404	33.171	14.748	12.983	11.935	12.830	29.450
MnO	0.487	1.361	1.134	1.383	0.417	0.379	0.406	0.0	0.0	0.0	0.257	0.280
MgO	1.832	6.725	7.104	6.306	3.596	2.716	2.549	15.786	17.971	19.590	18.815	4.584
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	0.578	0.0	0.310	0.0	0.459	0.751	0.700	0.0	0.0	0.349	0.0	0.755
K2O	7.982	9.193	8.968	9.273	8.554	8.356	8.572	9.668	9.917	9.797	9.993	8.385
BaO	0.0	0.566	0.638	0.679	1.203	1.267	1.150	0.606	0.0	0.450	0.0	0.0
Total	94.325	95.446	96.045	96.319	96.936	97.998	97.516	93.847	93.345	93.881	93.514	94.936
Atoms per 22 oxygens, anhydrous												
Si	5.697	5.620	5.622	5.600	5.646	5.704	5.616	5.722	5.905	6.087	5.968	5.404
Ti	0.301	0.194	0.235	0.237	0.497	0.471	0.521	0.420	0.235	0.091	0.155	0.584
Al	2.358	2.805	2.718	2.812	2.384	2.256	2.318	2.165	2.041	1.835	1.928	2.585
Fe	4.987	3.419	3.395	3.460	4.190	4.505	4.504	1.888	1.645	1.497	1.623	4.006
Mn	0.070	0.183	0.152	0.185	0.057	0.052	0.056	0.0	0.0	0.0	0.033	0.039
Mg	0.460	1.594	1.672	1.486	0.864	0.653	0.617	3.600	4.057	4.380	4.242	1.111
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.189	0.0	0.095	0.0	0.144	0.235	0.220	0.0	0.0	0.102	0.0	0.238
K	1.716	1.866	1.807	1.870	1.760	1.719	1.776	1.888	1.916	1.875	1.929	1.740
Ba	0.0	0.035	0.039	0.042	0.076	0.080	0.073	0.036	0.0	0.026	0.0	0.0
Sample	60.	62.	62.	62.	63.	63.	63.	65.	65.	65.	65.	66.
Rock Type	Sy-gab	Phon	Phon	Phon	Haw/Mug	Haw/Mug	Haw/Mug	Alt UBs	Alt UBs	Alt UBs	Alt UBs	Ben
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	326276.47	326276.48	326276.50	326266.52	326266.53	326266.55	326266.57	326266.58	326211.73	326301.79	326301.86	326301.87
Weight % oxide												
SiO2	33.172	33.304	32.526	34.577	34.628	35.061	36.345	35.529	33.402	34.616	36.024	35.559
TiO2	4.425	5.043	5.182	5.160	5.012	5.383	0.694	0.839	5.057	4.758	4.184	4.814
Al2O3	13.612	13.891	13.323	14.980	15.227	15.034	15.066	15.155	10.240	14.563	15.156	15.158
FeO	33.030	29.982	33.663	9.141	9.980	9.326	17.052	18.658	35.764	13.863	13.741	13.953
MnO	0.629	0.296	0.482	0.0	0.0	0.0	0.0	0.0	0.713	0.0	0.0	0.0
MgO	2.782	4.760	2.288	17.746	16.861	17.119	15.167	14.147	1.478	14.059	15.052	14.606
CaO	0.0	0.0	0.0	0.333	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	0.948	0.997	0.859	0.408	0.432	0.572	0.302	0.369	0.739	0.439	0.536	0.655
K2O	8.090	8.421	8.235	8.498	8.854	8.519	9.607	9.505	7.833	8.757	9.257	8.914
BaO	0.0	0.0	0.0	2.840	2.402	2.468	0.0	0.0	0.0	0.0	0.737	0.0
Total	96.688	96.694	96.558	93.683	93.396	93.482	94.233	94.202	95.226	91.055	94.687	93.659
Atoms per 22 oxygens, anhydrous												
Si	5.388	5.328	5.322	5.254	5.283	5.317	5.566	5.496	5.612	5.413	5.436	5.398
Ti	0.541	0.607	0.638	0.590	0.575	0.614	0.080	0.098	0.639	0.560	0.475	0.550
Al	2.606	2.620	2.570	2.684	2.739	2.688	2.720	2.764	2.028	2.685	2.696	2.713
Fe	4.487	4.011	4.606	1.162	1.273	1.183	2.184	2.414	5.025	1.813	1.734	1.771
Mn	0.087	0.040	0.067	0.0	0.0	0.0	0.0	0.0	0.101	0.0	0.0	0.0
Mg	0.673	1.135	0.558	4.019	3.834	3.869	3.461	3.261	0.370	3.276	3.385	3.304
Ca	0.0	0.0	0.0	0.054	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.299	0.309	0.273	0.120	0.128	0.168	0.090	0.111	0.241	0.133	0.157	0.193
K	1.676	1.719	1.719	1.647	1.723	1.648	1.877	1.876	1.679	1.747	1.782	1.726
Ba	0.0	0.0	0.0	0.169	0.144	0.147	0.0	0.0	0.0	0.0	0.044	0.0
Sample	66.	66.	66.	67.	67.	67.	67.	67.	68.	69.	69.	69.
Rock Type	Ben	Ben	Ben	Alt UBs	Alt UBs	Alt UBs	Alt UBs	Alt UBs	Ben	UML	UML	UML
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	11.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	326284.11	326284.12	326284.13	326303.20	326303.21	326303.22	326303.23	326303.24	326303.25	326303.26	326271.36	326271.37
Weight % oxide												
SiO2	35.551	35.175	34.766	34.417	34.607	34.918	34.385	34.894	34.860	35.322	38.581	37.938
TiO2	1.451	1.432	3.556	3.356	3.198	3.352	3.252	3.703	3.491	3.671	2.621	3.051
Al2O3	11.162	11.219	11.602	15.345	15.448	15.482	15.643	15.034	15.180	15.527	13.275	14.101
FeO	30.211	29.912	32.926	13.811	15.084	14.107	16.267	12.840	12.524	12.771	8.865	9.574
MnO	1.864	1.599	1.259	0.227	0.240	0.0	0.0	0.0	0.0	0.348	0.0	0.0
MgO	5.725	5.667	3.328	15.651	14.803	15.531	14.334	15.587	15.991	16.076	19.625	19.266
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	0.362	0.361	0.315	0.563	0.353	0.329	0.714	0.534	0.416	0.465	0.379	0.597
K2O	8.960	8.779	9.121	9.643	9.280	9.748	9.263	9.664	9.500	9.608	9.903	9.922
BaO	0.0	0.0	0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	95.286	94.144	97.584	93.013	93.013	93.467	93.858	92.256	91.962	93.788	93.249	94.449
Atoms per 22 oxygens, anhydrous												
Si	5.816	5.814	5.650	5.303	5.343	5.344	5.294	5.384	5.379	5.354	5.738	5.601
Ti	0.179	0.178	0.435	0.389	0.371	0.386	0.377	0.430	0.405	0.418	0.293	0.339
Al	2.153	2.186	2.223	2.787	2.812	2.794	2.839	2.735	2.761	2.775	2.328	2.454
Fe	4.134	4.135	4.475	1.780	1.948	1.806	2.095	1.657	1.616	1.619	1.103	1.182
Mn	0.258	0.224	0.173	0.030	0.031	0.0	0.0	0.0	0.0	0.045	0.0	0.0
Mg	1.396	1.396	0.806	3.594	3.406	3.543	3.289	3.584	3.677	3.632	4.350	4.239
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.115	0.116	0.099	0.168	0.106	0.098	0.213	0.160	0.124	0.137	0.109	0.171
K	1.870	1.851	1.891	1.896	1.828	1.903	1.819	1.902	1.870	1.858	1.879	1.869
Ba	0.0	0.0	0.045	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	74.	74.	74.	75.	75.	75.	75.	75.	75.	75.	76.	76.
Rock Type	Rex Ph	Rex Ph	Rex Ph	UML	UML	UML	UML	UML	UML	UML	UML	UML
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	1.	7.	7.	7.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	326271.38	326271.43	326229.69	326229.70	326358.86	326358.87	326358.88	326244.31	326244.33	326244.35	54244.14	54244.16
Weight % oxide												
SiO2	37.725	37.448	36.672	35.193	40.765	40.259	40.134	34.578	35.010	34.890	40.463	37.568
TiO2	2.893	3.205	5.798	7.355	0.454	0.685	0.641	0.0	6.101	6.186	0.0	0.0
Al2O3	13.920	14.719	13.594	13.350	12.676	12.464	12.508	11.121	13.438	12.938	11.370	11.981
FeO	9.588	9.867	18.293	22.159	7.438	6.952	7.358	27.981	23.745	24.328	5.073	4.311
MnO	0.0	0.270	0.0	0.0	0.648	0.583	0.572	0.0	0.250	0.311	1.465	1.418
MgO	18.947	18.701	12.571	8.739	22.273	21.996	22.064	10.504	8.909	8.275	23.428	23.080
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.604	0.0	0.0	0.261	0.177
Na2O	0.461	0.542	0.961	1.072	0.407	0.626	0.531	0.0	0.723	0.745	1.028	1.260
K2O	9.862	9.668	9.024	8.661	10.232	9.792	9.899	5.001	8.760	8.382	8.158	6.562
BaO	0.0	0.0	0.0	0.0	1.177	0.644	0.837	0.0	0.0	0.0	2.373	6.660
Total	93.396	94.420	96.913	96.529	96.070	94.001	94.544	89.789	96.936	96.055	93.619	93.017
Atoms per 22 oxygens, anhydrous												
Si	5.630	5.537	5.495	5.408	5.901	5.913	5.885	5.775	5.401	5.445	5.981	5.750
Ti	0.325	0.356	0.653	0.850	0.049	0.076	0.071	0.0	0.708	0.726	0.0	0.0
Al	2.449	2.566	2.401	2.418	2.163	2.158	2.162	2.190	2.444	2.380	1.981	2.162
Fe	1.197	1.220	2.292	2.848	0.900	0.854	0.902	3.909	3.064	3.175	0.627	0.552
Mn	0.0	0.034	0.0	0.0	0.079	0.073	0.071	0.0	0.033	0.041	0.183	0.184
Mg	4.214	4.121	2.807	2.001	4.805	4.815	4.822	2.615	2.048	1.925	5.161	5.265
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.108	0.0	0.0	0.041	0.029
Na	0.133	0.155	0.279	0.319	0.114	0.178	0.151	0.0	0.216	0.225	0.295	0.374
K	1.878	1.824	1.725	1.698	1.890	1.835	1.852	1.066	1.724	1.669	1.538	1.281
Ba	0.0	0.0	0.0	0.0	0.067	0.037	0.048	0.0	0.0	0.0	0.137	0.399
Sample	76.	76.	79.	79.	81.	81.	81.	83.	83.	83.	85.	85.
Rock Type	UML	UML	Ben	Ben	Cbt	Cbt	Cbt	BFD	BFD	BFD	Cbt	Cbt
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	54244.19	46257.22	46257.23	46257.25	46257.27	46256.32	46256.33	46256.34	46256.35	326207.11	54275.41	54275.42
Weight % oxide												
SiO2	40.210	39.095	39.962	43.215	44.034	39.787	40.831	40.963	40.980	34.862	39.692	39.151
TiO2	0.0	0.0	0.0	0.0	0.0	1.672	1.569	1.090	1.313	4.548	0.0	0.316
Al2O3	11.696	12.321	11.363	10.661	10.246	13.033	11.751	12.084	11.823	9.488	10.950	11.284
FeO	4.056	16.631	13.934	4.239	4.498	5.115	4.346	3.901	4.122	36.985	7.807	6.937
MnO	1.144	0.926	0.782	0.416	0.278	0.0	0.0	0.0	0.0	0.723	1.865	1.889
MgO	23.848	16.032	17.525	23.224	23.559	23.514	23.685	24.288	23.632	1.303	21.066	21.919
CaO	0.310	0.0	0.0	0.0	0.0	0.0	0.0	0.147	0.0	0.0	0.396	0.306
Na2O	0.856	0.443	0.0	0.0	0.0	0.766	0.552	0.509	0.508	0.778	0.588	0.832
K2O	7.395	10.218	10.391	10.821	10.530	9.479	9.038	9.195	9.273	8.396	8.935	8.273
BaO	4.899	0.0	0.0	0.0	0.0	0.582	0.664	0.540	0.598	0.0	2.236	2.577
Total	94.414	95.666	93.957	92.576	93.145	93.948	92.436	92.717	92.249	97.083	93.535	93.484
Atoms per 22 oxygens, anhydrous												
Si	5.945	5.911	6.060	6.309	6.373	5.779	5.977	5.963	6.004	5.769	5.988	5.891
Ti	0.0	0.0	0.0	0.0	0.0	0.183	0.173	0.119	0.145	0.566	0.0	0.036
Al	2.039	2.196	2.031	1.835	1.748	2.232	2.028	2.074	2.042	1.851	1.948	2.002
Fe	0.502	2.103	1.767	0.518	0.544	0.621	0.532	0.475	0.505	5.119	0.985	0.873
Mn	0.143	0.119	0.100	0.051	0.034	0.0	0.0	0.0	0.0	0.101	0.238	0.241
Mg	5.255	3.612	3.961	5.053	5.081	5.090	5.167	5.269	5.160	0.321	4.737	4.915
Ca	0.049	0.0	0.0	0.0	0.0	0.0	0.0	0.023	0.0	0.0	0.064	0.049
Na	0.245	0.130	0.0	0.0	0.0	0.216	0.157	0.144	0.144	0.250	0.172	0.243
K	1.395	1.971	2.010	2.015	1.944	1.756	1.688	1.708	1.733	1.773	1.720	1.588
Ba	0.284	0.0	0.0	0.0	0.0	0.033	0.038	0.031	0.034	0.0	0.132	0.152
Sample	85.	86.	86.	86.	86.	87.	87.	87.	87.	90.	96.	96.
Rock Type	Cbt	Cbt	Cbt	Cbt	Cbt	UML	UML	UML	UML	Ben	Cbt	Cbt
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	11.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	54275.45	127052.49	127052.51	127052.56	127052.58	127052.59	63808.33	63808.36	52285.52	52285.53	58290.26	41906.35
Weight % oxide												
SiO2	39.719	39.017	42.364	37.225	40.360	36.699	34.353	36.301	39.902	39.529	34.795	35.032
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	4.976	6.468	0.0	0.0	6.673	4.091
Al2O3	11.506	12.216	10.680	12.683	11.450	12.653	12.504	11.844	10.835	10.641	13.398	14.961
FeO	6.996	2.784	2.954	2.618	2.875	2.939	29.088	25.973	20.651	20.388	18.906	15.309
MnO	2.095	0.232	0.352	0.303	0.0	0.0	0.350	0.0	0.0	0.0	0.0	0.0
MgO	22.190	25.230	25.840	24.986	26.227	25.510	5.651	8.059	13.652	13.504	9.500	13.987
CaO	0.256	0.732	0.479	0.411	0.655	0.708	0.195	0.0	0.545	0.456	0.262	0.0
Na2O	0.967	0.526	0.666	0.507	0.491	0.731	0.316	0.404	0.0	0.0	0.376	0.0
K2O	8.419	7.528	9.306	7.269	8.633	6.932	8.916	9.314	8.306	8.241	8.382	9.337
BaO	2.798	6.937	1.342	8.097	3.620	9.263	0.0	0.0	0.0	0.0	1.985	1.490
Total	94.946	95.202	93.983	94.099	94.311	95.435	96.349	98.363	93.891	92.759	94.277	94.207
Atoms per 22 oxygens, anhydrous												
Si	5.898	5.777	6.111	5.636	5.897	5.539	5.494	5.571	6.162	6.177	5.465	5.395
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.599	0.747	0.0	0.0	0.788	0.474
Al	2.014	2.132	1.816	2.264	1.972	2.251	2.358	2.143	1.973	1.960	2.481	2.716
Fe	0.869	0.345	0.356	0.332	0.351	0.371	3.891	3.334	2.667	2.664	2.484	1.972
Mn	0.264	0.029	0.043	0.039	0.0	0.0	0.047	0.0	0.0	0.0	0.0	0.0
Mg	4.911	5.568	5.555	5.638	5.711	5.738	1.347	1.843	3.142	3.145	2.224	3.210
Ca	0.041	0.116	0.074	0.067	0.103	0.114	0.033	0.0	0.090	0.076	0.044	0.0
Na	0.278	0.151	0.186	0.149	0.139	0.214	0.098	0.120	0.0	0.0	0.115	0.0
K	1.595	1.422	1.713	1.404	1.609	1.335	1.819	1.824	1.636	1.643	1.680	1.834
Ba	0.163	0.402	0.076	0.480	0.207	0.548	0.0	0.0	0.0	0.0	0.122	0.090
Sample	96.	97.	97.	97.	97.	97.	98.	98.	99.	99.	102.	103.
Rock Type	Cbt	Cbt	Cbt	Cbt	Cbt	Cbt	BFD	BFD	Oth Lp	Oth Lp	BFD	UML
Crystal	1.	1.	1.	1.	1.	1.	10.	5.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	1.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	41905.36	41906.40	63810.17	63810.18	326359.30	326359.31	326359.32	58130.15	58130.25	325964.38	325964.41	325964.44
Weight % oxide												
SiO2	35.856	36.552	34.904	36.241	40.348	39.728	40.796	37.234	37.148	34.553	36.949	36.710
TiO2	4.285	4.032	6.978	6.885	2.128	1.875	1.980	9.882	9.400	3.218	2.139	1.967
Al2O3	15.176	14.933	12.536	13.362	14.656	15.598	14.517	13.420	13.209	11.971	11.113	10.534
FeO	15.717	14.669	24.261	23.295	2.605	2.732	2.501	19.146	19.640	36.351	30.512	29.378
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.919	2.057	2.143
MgO	14.546	14.535	7.330	7.899	24.956	25.505	24.909	9.310	9.186	1.025	5.762	6.169
CaO	0.0	0.0	0.0	0.0	0.221	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	0.0	0.0	0.679	0.780	0.0	0.0	0.525	0.0	0.0	0.0	0.0	0.0
K2O	9.813	9.726	8.734	8.759	10.086	10.320	10.107	8.940	8.830	9.151	9.061	9.048
BaO	0.0	1.591	0.511	0.924	0.0	0.0	0.0	1.296	1.607	0.0	0.0	0.0
Total	95.393	96.038	95.933	98.145	95.000	95.758	95.335	99.228	99.020	98.188	97.593	95.949
Atoms per 22 oxygens, anhydrous												
Si	5.400	5.495	5.480	5.520	5.695	5.576	5.738	5.492	5.516	5.651	5.874	5.923
Ti	0.485	0.456	0.824	0.789	0.226	0.198	0.209	1.096	1.050	0.396	0.256	0.239
Al	2.695	2.647	2.320	2.400	2.439	2.581	2.407	2.333	2.312	2.308	2.083	2.004
Fe	1.980	1.844	3.186	2.968	0.308	0.321	0.294	2.362	2.439	4.972	4.056	3.964
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.266	0.277	0.293
Mg	3.265	3.257	1.715	1.793	5.250	5.335	5.221	2.046	2.033	0.250	1.365	1.483
Ca	0.0	0.0	0.0	0.0	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.0	0.0	0.207	0.230	0.0	0.0	0.143	0.0	0.0	0.0	0.0	0.0
K	1.885	1.865	1.750	1.702	1.816	1.848	1.814	1.682	1.673	1.910	1.838	1.862
Ba	0.0	0.094	0.031	0.055	0.0	0.0	0.0	0.075	0.093	0.0	0.0	0.0
Sample	103.	103.	109.	109.	110.	110.	110.	112.	112.	113.	113.	113.
Rock Type	UML	UML	BFD	BFD	Cbt	Cbt	Cbt	Sy-gab	Sy-gab	Phon	Phon	Phon
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	325948.51	325948.52	325948.53	325948.54	325948.57	325948.58	325948.62	325948.63	325948.64	325948.65	325948.66	54168.13
Weight % oxide												
SiO2	43.162	42.647	40.126	40.207	39.979	37.341	0.392	0.392	39.656	42.669	39.293	35.159
TiO2	0.0	0.0	1.662	1.806	2.802	0.855	10.414	20.944	0.836	0.507	2.986	2.987
Al2O3	10.290	10.056	10.377	10.448	11.444	15.899	0.0	0.0	12.460	10.685	11.039	16.560
FeO	9.496	9.780	13.077	9.822	13.793	14.919	81.472	70.237	12.871	11.092	9.650	25.319
MnO	0.0	0.0	0.0	0.0	0.359	0.327	1.540	2.684	0.0	0.0	0.0	0.636
MgO	21.636	21.048	19.370	20.983	18.166	16.767	0.0	0.0	19.457	19.807	20.706	9.486
CaO	0.0	0.0	0.0	0.0	0.0	0.244	0.0	0.0	0.291	1.633	0.0	0.0
Na2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K2O	9.217	9.611	9.687	9.845	9.646	9.157	0.0	0.0	9.579	9.529	9.767	9.887
BaO	0.0	0.0	0.785	0.620	0.992	0.0	0.0	0.0	0.0	0.0	0.639	1.493
Total	93.801	93.142	95.084	93.731	97.181	95.758	93.818	94.257	95.150	95.922	94.080	101.527
Atoms per 22 oxygens, anhydrous												
Si	6.306	6.307	5.989	5.992	5.869	5.553	0.100	0.092	5.864	6.191	5.841	5.268
Ti	0.0	0.0	0.187	0.202	0.309	0.096	2.006	3.714	0.093	0.055	0.334	0.337
Al	1.772	1.753	1.826	1.836	1.981	2.788	0.0	0.0	2.172	1.828	1.934	2.925
Fe	1.160	1.210	1.632	1.224	1.693	1.856	17.453	13.851	1.592	1.346	1.200	3.173
Mn	0.0	0.0	0.0	0.0	0.045	0.041	0.334	0.536	0.0	0.0	0.0	0.081
Mg	4.711	4.639	4.309	4.661	3.974	3.716	0.0	0.0	4.288	4.283	4.587	2.118
Ca	0.0	0.0	0.0	0.0	0.0	0.039	0.0	0.0	0.046	0.254	0.0	0.0
Na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K	1.718	1.813	1.845	1.872	1.807	1.737	0.0	0.0	1.807	1.764	1.852	1.890
Ba	0.0	0.0	0.046	0.036	0.057	0.0	0.0	0.0	0.0	0.0	0.037	0.088
Sample	114.	114.	114.	114.	114.	114.	114.	114.	114.	114.	114.	115.
Rock Type	UML	UML	UML	UML	UML	UML	UML	UML	UML	UML	UML	Oth Lp
Crystal	2.	2.	1.	1.	1.	1.	1.	1.	1.	1.	1.	2.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	54168.14	54168.08	54168.07	46279.09	46279.05	46279.03	325962.28	325962.27	325962.26	325962.25	325962.24	325962.23
Weight % oxide												
SiO2	33.559	32.604	33.603	36.196	36.073	33.322	39.847	37.998	38.084	39.939	39.854	36.566
TiO2	2.716	3.020	2.154	3.547	3.997	3.625	1.916	1.716	1.394	2.021	1.859	1.175
Al2O3	16.023	15.454	15.457	16.055	16.729	14.872	15.254	17.914	17.259	14.889	14.554	19.081
FeO	23.490	21.551	23.311	18.701	19.202	17.813	7.259	7.595	7.703	7.221	6.841	7.992
MnO	0.337	1.025	0.0	0.334	0.0	0.268	0.0	0.0	0.0	0.0	0.0	0.0
MgO	9.113	9.588	9.457	11.868	11.862	10.908	22.006	20.886	21.810	22.682	22.641	20.172
CaO	0.0	1.092	0.285	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	0.0	0.0	0.0	0.719	0.795	0.439	0.737	0.801	1.119	1.036	0.718	0.888
K2O	9.100	8.428	9.194	9.378	9.072	8.545	9.065	8.750	9.169	9.441	9.336	8.459
BaO	2.005	2.292	1.436	0.0	0.508	0.388	0.816	1.556	1.371	0.712	0.780	1.938
Total	96.343	95.054	94.897	96.798	98.238	90.230	96.900	97.216	97.909	97.941	96.583	96.271
Atoms per 22 oxygens, anhydrous												
Si	5.287	5.209	5.353	5.439	5.354	5.398	5.647	5.404	5.398	5.618	5.669	5.278
Ti	0.322	0.363	0.258	0.401	0.446	0.442	0.204	0.184	0.149	0.214	0.199	0.128
Al	2.976	2.911	2.903	2.844	2.927	2.840	2.549	3.003	2.884	2.469	2.441	3.247
Fe	3.095	2.880	3.106	2.350	2.383	2.413	0.860	0.903	0.913	0.850	0.814	0.965
Mn	0.045	0.139	0.0	0.043	0.0	0.037	0.0	0.0	0.0	0.0	0.0	0.0
Mg	2.140	2.283	2.245	2.658	2.624	2.633	4.648	4.427	4.607	4.755	4.800	4.340
Ca	0.0	0.187	0.049	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.0	0.0	0.0	0.209	0.229	0.138	0.203	0.221	0.308	0.283	0.198	0.249
K	1.829	1.718	1.869	1.798	1.718	1.766	1.639	1.588	1.658	1.694	1.694	1.558
Ba	0.124	0.143	0.090	0.0	0.030	0.025	0.045	0.087	0.076	0.039	0.043	0.110
Sample	115.	115.	115.	116.	116.	116.	117.	117.	117.	117.	117.	117.
Rock Type	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	UML	UML	UML	UML	UML	UML
Crystal	2.	1.	1.	1.	1.	1.	1.	6.	5.	1.	1.	4.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	325932.58	325932.57	325932.53	325932.52	325932.49	325932.48	325932.46	326337.66	326337.63	326337.62	326337.61	52287.19
Weight % oxide												
SiO2	44.358	39.749	39.607	37.770	40.379	40.517	39.730	42.679	43.349	42.243	43.807	36.195
TiO2	0.0	0.578	3.932	4.239	0.950	3.856	3.579	0.0	0.0	0.0	0.0	4.152
Al2O3	10.081	11.548	12.505	13.870	11.475	12.472	12.244	10.287	10.550	9.774	10.067	15.510
FeO	11.295	15.167	8.402	8.480	11.942	9.484	9.149	5.046	5.860	6.195	5.291	24.591
MnO	0.0	0.0	0.0	0.0	0.315	0.0	0.0	0.782	0.496	0.539	0.493	0.0
MgO	20.950	18.060	21.105	21.298	20.692	21.444	21.200	23.934	25.242	24.485	25.103	7.119
CaO	0.202	0.0	0.0	0.0	0.266	0.0	0.0	0.440	0.223	0.253	0.236	0.244
Na2O	0.0	0.0	0.0	0.0	0.0	0.275	0.0	0.0	0.879	0.644	0.0	0.0
K2O	9.710	10.154	9.696	9.084	9.333	9.766	9.739	9.884	9.813	10.041	10.011	9.355
BaO	0.0	0.0	0.916	2.107	0.0	1.010	0.919	0.835	0.573	0.880	0.591	0.0
Total	96.596	95.256	96.163	96.848	95.352	98.824	96.560	93.887	96.985	95.054	95.599	97.166
Atoms per 22 oxygens, anhydrous												
Si	6.352	5.954	5.723	5.470	5.930	5.726	5.739	6.210	6.118	6.133	6.236	5.550
Ti	0.0	0.065	0.427	0.462	0.105	0.410	0.389	0.0	0.0	0.0	0.0	0.479
Al	1.702	2.039	2.130	2.368	1.987	2.078	2.085	1.765	1.756	1.673	1.690	2.804
Fe	1.353	1.900	1.015	1.027	1.467	1.121	1.105	0.614	0.692	0.752	0.630	3.154
Mn	0.0	0.0	0.0	0.0	0.039	0.0	0.0	0.096	0.059	0.066	0.059	0.0
Mg	4.471	4.032	4.545	4.597	4.529	4.516	4.564	5.190	5.310	5.297	5.326	1.627
Ca	0.031	0.0	0.0	0.0	0.042	0.0	0.0	0.069	0.034	0.039	0.036	0.040
Na	0.0	0.0	0.0	0.0	0.0	0.075	0.0	0.0	0.241	0.181	0.0	0.0
K	1.774	1.941	1.787	1.679	1.749	1.761	1.795	1.835	1.767	1.860	1.818	1.830
Ba	0.0	0.0	0.052	0.120	0.0	0.056	0.052	0.048	0.032	0.050	0.033	0.0
Sample	118.	118.	118.	118.	118.	118.	118.	119.	119.	119.	119.	120.
Rock Type	UML	UML	UML	UML	UML	UML	UML	Cbt	Cbt	Cbt	Cbt	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	11.	11.	8.	8.	7.	1.	8.	8.	8.	8.	11.	8.

BIOTITE/PHLOGOPITE ANAYLSES - Total Iron as FeO

	52287.18	325972.36	325972.32	325972.24	325972.23	326283.52	326283.51	54258.71	54258.70	54258.69
Weight % oxide										
SiO2	35.259	43.658	42.746	39.946	39.947	35.773	36.280	36.167	36.774	36.528
TiO2	8.121	0.408	0.385	2.248	2.509	7.662	7.375	4.708	4.793	4.905
Al2O3	15.387	9.782	11.340	11.617	12.535	15.255	15.526	13.512	13.247	13.543
FeO	15.985	11.245	9.991	8.212	8.550	21.089	21.272	23.720	23.191	23.433
MnO	0.0	0.0	0.340	0.0	0.273	0.0	0.0	0.330	0.354	0.0
MgO	11.157	19.752	21.351	21.455	21.817	9.750	9.555	9.033	9.777	9.254
CaO	0.0	0.419	0.0	0.0	0.0	0.0	0.0	0.199	0.0	0.0
Na2O	0.0	0.0	0.0	0.0	0.976	0.782	1.116	0.0	0.0	0.0
K2O	8.407	8.851	9.361	8.472	9.219	8.353	8.062	9.279	9.178	9.423
BaO	2.150	0.0	0.0	0.559	1.835	1.204	1.242	0.0	0.676	0.579
Total	96.466	94.115	95.514	92.509	97.661	99.868	100.428	97.093	97.990	97.665
Atoms per 22 oxygens, anhydrous										
Si	5.308	6.396	6.164	5.927	5.734	5.290	5.326	5.563	5.596	5.580
Ti	0.919	0.045	0.042	0.251	0.271	0.852	0.814	0.545	0.549	0.564
Al	2.731	1.690	1.928	2.032	2.121	2.659	2.687	2.450	2.377	2.439
Fe	2.012	1.378	1.205	1.019	1.026	2.608	2.612	3.051	2.952	2.994
Mn	0.0	0.0	0.042	0.0	0.033	0.0	0.0	0.043	0.046	0.0
Mg	2.503	4.313	4.589	4.744	4.667	2.149	2.091	2.071	2.217	2.107
Ca	0.0	0.066	0.0	0.0	0.0	0.0	0.0	0.033	0.0	0.0
Na	0.0	0.0	0.0	0.0	0.272	0.224	0.318	0.0	0.0	0.0
K	1.615	1.654	1.722	1.604	1.688	1.576	1.510	1.821	1.782	1.837
Ba	0.127	0.0	0.0	0.032	0.103	0.070	0.071	0.0	0.040	0.035
Sample	120.	121.	121.	121.	121.	122.	122.	123.	123.	123.
Rock Type	Oth Lp	UML	UML	UML	UML	Oth Lp	Oth Lp	Haw/Mug	Haw/Mug	Haw/Mug
Crystal	1.	1.	1.	1.	1.	2.	2.	1.	1.	1.
Position	8.	11.	8.	8.	8.	7.	1.	8.	8.	8.

MAGNETITE ANAYLSES

	326333.64	46240.44	58100.42	58100.28	126765.72	59741.38	141244.59	126759.69	126759.70	46233.17	59783.43	59631.17
Weight % oxide												
SiO2	0.0	0.257	0.236	0.521	0.496	0.442	0.417	0.479	0.242	0.627	0.263	0.276
TiO2	0.0	28.422	19.834	17.288	25.618	25.722	18.412	24.815	24.764	26.770	22.604	24.825
Al2O3	0.0	1.937	0.755	1.301	1.991	2.310	0.834	0.209	0.0	1.373	0.0	2.743
FeO	87.478	64.802	70.885	75.181	65.001	64.528	73.508	61.075	61.235	66.037	69.052	70.002
MnO	5.307	1.632	2.794	1.763	2.376	1.881	1.082	11.045	11.082	1.327	2.474	0.571
MgO	0.494	0.526	0.0	0.0	0.0	0.761	0.0	0.0	0.0	0.780	0.0	1.780
CaO	0.208	0.0	0.254	0.0	0.0	0.0	0.0	0.0	0.0	0.191	0.0	0.0
Total	93.487	97.576	94.758	96.054	95.482	95.644	94.253	97.623	97.323	97.105	94.393	100.197
Atoms per 4 oxygens												
Si	0.0	0.010	0.009	0.020	0.019	0.017	0.016	0.018	0.009	0.023	0.010	0.010
Ti	0.0	0.799	0.574	0.491	0.736	0.733	0.535	0.701	0.703	0.754	0.661	0.668
Al	0.0	0.085	0.034	0.058	0.090	0.103	0.038	0.009	0.0	0.061	0.0	0.116
Fe3	2.000	0.298	0.800	0.921	0.399	0.398	0.860	0.552	0.576	0.384	0.657	0.529
Fe2	0.792	1.727	1.482	1.454	1.678	1.646	1.516	1.368	1.358	1.684	1.590	1.566
Mn	0.172	0.052	0.091	0.056	0.077	0.060	0.035	0.352	0.354	0.042	0.082	0.017
Mg	0.028	0.029	0.0	0.0	0.0	0.043	0.0	0.0	0.0	0.044	0.0	0.095
Ca	0.009	0.0	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.008	0.0	0.0
Sample	11.	22.	34.	34.	36.	40.	41.	45.	45.	46.	47.	48.
Rock Type	Cbt	Phon	Haw/Mug	Haw/Mug	Phon	Ben	Tr-and	Phon	Phon	Sy-gab	Phon	Bas/Gab
Crystal	1.	4.	1.	1.	1.	4.	4.	1.	1.	10.	10.	1.
Position	8.	1.	8.	8.	8.	1.	8.	8.	8.	8.	8.	8.
End member molecules												
Mgt	100.0	19.2	41.7	48.9	24.5	25.1	44.9	28.1	28.8	22.2	32.8	32.2
Usp	0.0	80.8	58.3	51.1	75.5	74.9	55.1	71.9	71.2	77.8	67.2	67.8

MAGNETITE ANAYLSES

	63895.37	326286.59	325980.20	325952.21	326266.56	326301.88	326300.65	326300.66	325937.63	326303.31	325910.90	326358.89
Weight % oxide												
SiO2	0.969	0.230	0.371	3.293	0.963	0.308	0.399	0.315	1.037	0.410	0.653	0.202
TiO2	0.0	8.629	24.398	4.603	13.884	25.902	5.495	18.059	32.585	1.836	0.0	1.320
Al2O3	0.0	0.334	1.035	0.184	1.083	1.600	0.474	0.247	0.259	0.844	0.0	0.0
FeO	94.750	84.755	64.909	85.252	75.651	69.225	86.283	72.373	60.081	92.553	95.731	94.847
MnO	0.0	2.433	1.691	0.0	3.105	0.958	1.452	3.980	2.532	0.733	1.379	1.685
MgO	0.0	0.0	0.0	0.0	0.280	0.520	0.0	0.0	0.0	0.330	0.250	0.0
CaO	0.0	0.0	0.0	2.820	0.160	0.200	0.0	0.0	0.942	0.326	0.245	0.355
Total	95.719	96.381	92.404	96.152	95.126	98.713	94.103	94.974	97.436	97.032	98.258	98.409
Atoms per 4 oxygens												
Si	0.036	0.009	0.015	0.122	0.036	0.011	0.015	0.012	0.039	0.015	0.024	0.007
Ti	0.0	0.243	0.728	0.128	0.396	0.718	0.158	0.522	0.928	0.051	0.0	0.036
Al	0.0	0.015	0.048	0.008	0.048	0.070	0.021	0.011	0.012	0.037	0.0	0.0
Fe3	1.928	1.482	0.467	1.493	1.087	0.471	1.632	0.921	0.055	1.832	1.953	1.913
Fe2	1.036	1.175	1.685	1.138	1.310	1.663	1.126	1.404	1.848	1.012	0.958	0.978
Mn	0.0	0.077	0.057	0.0	0.100	0.030	0.047	0.130	0.081	0.023	0.042	0.052
Mg	0.0	0.0	0.0	0.0	0.016	0.029	0.0	0.0	0.0	0.018	0.014	0.0
Ca	0.0	0.0	0.0	0.112	0.006	0.008	0.0	0.0	0.038	0.013	0.010	0.014
Sample	50.	59.	61.	65.	67.	69.	72.	72.	73.	75.	80.	81.
Rock Type	Q Porp	Rex Ph	BFD	Alt UBs	Alt UBs	UML	Rex Ph	Rex Ph	Ben	UML	Cbt	Cbt
Crystal	1.	3.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
End member molecules												
Mgt	96.4	74.8	25.8	75.1	56.8	27.0	82.7	46.6	3.3	93.4	97.6	95.6
Usp	3.6	25.2	74.2	24.9	43.2	73.0	17.3	53.4	96.7	6.6	2.4	4.4

MAGNETITE ANAYLSES

	326273.09	326336.04	54244.20	46257.26	46256.37	326247.54	326388.19	326282.12	58254.23	326347.31	54275.43	127052.57
Weight % oxide												
SiO2	0.310	0.181	0.0	0.383	0.290	1.069	0.839	0.606	0.514	0.344	0.274	0.215
TiO2	3.275	0.513	0.278	0.0	7.223	0.0	0.333	3.040	0.376	0.0	0.0	0.0
Al2O3	0.0	0.0	0.0	0.0	0.0	0.220	0.0	0.412	0.0	0.0	0.0	0.0
FeO	87.703	88.624	87.246	92.153	86.897	93.157	91.798	91.517	93.954	90.135	88.795	85.966
MnO	2.787	6.312	6.744	0.0	0.855	0.0	0.0	1.121	0.0	0.414	6.025	5.297
MgO	0.0	0.0	0.704	0.0	0.0	0.0	0.454	0.0	0.0	0.287	0.429	1.448
CaO	0.0	0.0	0.203	1.787	0.140	0.150	1.037	0.0	0.256	0.575	0.164	2.237
Total	94.075	95.630	95.175	94.323	95.405	94.596	94.766	96.696	95.100	91.755	95.687	95.163
Atoms per 4 oxygens												
Si	0.012	0.007	0.0	0.014	0.011	0.040	0.032	0.022	0.019	0.013	0.010	0.008
Ti	0.094	0.014	0.008	0.0	0.206	0.0	0.009	0.085	0.011	0.0	0.0	0.0
Al	0.0	0.0	0.0	0.0	0.0	0.010	0.0	0.018	0.0	0.0	0.0	0.0
Fe3	1.788	1.958	1.984	1.971	1.567	1.909	1.907	1.767	1.940	1.973	1.980	1.984
Fe2	1.016	0.821	0.747	0.942	1.183	1.034	0.979	1.072	1.020	0.959	0.790	0.674
Mn	0.090	0.200	0.214	0.0	0.027	0.0	0.0	0.035	0.0	0.014	0.190	0.166
Mg	0.0	0.0	0.039	0.0	0.0	0.0	0.025	0.0	0.0	0.017	0.024	0.080
Ca	0.0	0.0	0.008	0.072	0.006	0.006	0.042	0.0	0.010	0.024	0.007	0.089
Sample	82.	84.	85.	86.	87.	89.	91.	93.	94.	95.	96.	97.
Rock Type	Rex Ph	Cbt	Cbt	Cbt	UML	Cbt	Cbt	Rex Ph	Cbt	Cbt	Cbt	Cbt
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
End member molecules												
Mgt	89.4	97.9	99.2	98.6	78.3	96.0	95.9	89.3	97.0	98.7	99.0	99.2
Usp	10.6	2.1	0.8	1.4	21.7	4.0	4.1	10.7	3.0	1.3	1.0	0.8

MAGNETITE ANAYLSES

	63808.28	63808.29	52285.54	326289.04	58296.08	41906.44	325943.42	325943.44	325943.46	63810.26	326359.33	326359.34
Weight % oxide												
SiO2	0.701	0.385	1.951	0.690	0.482	0.428	0.376	0.720	0.891	0.344	0.476	0.497
TiO2	12.266	14.148	21.095	0.865	7.441	7.499	20.485	0.0	17.441	19.464	6.832	7.409
Al2O3	0.576	0.501	2.056	0.276	0.619	1.645	7.580	0.0	11.897	1.283	3.142	2.885
FeO	85.300	83.312	69.125	93.844	89.322	85.502	66.221	90.694	62.354	72.075	75.878	75.445
MnO	0.550	0.847	1.236	2.426	1.962	0.832	1.049	0.0	0.0	1.157	2.677	2.884
MgO	0.264	0.0	0.330	0.0	0.0	0.714	0.0	0.0	0.0	0.0	4.630	4.090
CaO	0.0	0.0	0.416	0.0	0.0	0.141	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.657	99.193	96.209	98.101	99.826	96.761	95.711	91.414	92.583	94.323	93.635	93.210
Atoms per 4 oxygens												
Si	0.025	0.014	0.073	0.025	0.017	0.016	0.014	0.028	0.033	0.013	0.017	0.018
Ti	0.334	0.389	0.595	0.024	0.202	0.208	0.571	0.0	0.491	0.565	0.188	0.206
Al	0.025	0.022	0.091	0.012	0.026	0.071	0.331	0.0	0.525	0.058	0.136	0.126
Fe3	1.256	1.172	0.574	1.890	1.535	1.481	0.500	1.944	0.427	0.786	1.453	1.425
Fe2	1.328	1.377	1.593	0.974	1.159	1.153	1.552	1.028	1.524	1.540	0.870	0.909
Mn	0.017	0.026	0.039	0.075	0.060	0.026	0.033	0.0	0.0	0.038	0.083	0.090
Mg	0.014	0.0	0.018	0.0	0.0	0.039	0.0	0.0	0.0	0.0	0.253	0.225
Ca	0.0	0.0	0.017	0.0	0.0	0.006	0.0	0.0	0.0	0.0	0.0	0.0
Sample	98.	98.	99.	100.	101.	103.	108.	108.	108.	109.	110.	110.
Rock Type	BFD	BFD	Oth Lp	Rex Ph	Rex Tr	UML	Oth Lp	Oth Lp	Oth Lp	BFD	Cbt	Cbt
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
End member molecules												
Mgt	64.0	59.7	33.2	95.1	78.1	77.6	41.5	97.2	47.6	42.2	79.4	77.6
Usp	36.0	40.3	66.8	4.9	21.9	22.4	58.5	2.8	52.4	57.8	20.6	22.4

MAGNETITE ANAYLSES

	58130.22	58130.23	325962.29	325932.56	325932.55	325932.54	326337.64	325972.27	326283.39	54258.79	54258.78
Weight % oxide											
SiO2	0.500	0.373	0.606	0.574	0.957	0.905	0.0	0.563	0.453	0.527	2.712
TiO2	15.224	26.609	12.927	13.966	52.616	63.306	0.0	0.510	22.164	0.964	0.0
Al2O3	2.732	1.709	0.0	2.095	0.0	0.282	0.0	0.0	3.916	4.148	0.0
FeO	75.299	65.940	80.303	77.146	35.407	29.230	92.412	92.055	68.048	88.378	75.589
MnO	1.203	0.934	1.337	0.0	8.483	6.897	1.069	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.467	0.317	0.0	0.0	0.0	0.472	1.408
CaO	0.0	0.0	0.0	0.394	0.173	0.238	0.0	0.183	0.0	0.0	0.424
Total	94.958	95.565	95.173	94.175	98.103	101.433	93.481	93.311	94.581	94.489	80.412
Atoms per 4 oxygens											
Si	0.019	0.014	0.023	0.022	0.037	0.034	0.0	0.022	0.017	0.020	0.119
Ti	0.434	0.766	0.371	0.401	1.518	1.788	0.0	0.015	0.636	0.027	0.0
Al	0.122	0.077	0.0	0.094	0.0	0.012	0.0	0.0	0.176	0.182	0.0
Fe3	0.972	0.362	1.212	1.059	0.0	0.0	2.000	1.927	0.518	1.725	1.762
Fe2	1.414	1.750	1.351	1.407	1.136	0.918	0.965	1.029	1.653	1.020	1.007
Mn	0.039	0.030	0.043	0.0	0.276	0.219	0.035	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.027	0.018	0.0	0.0	0.0	0.026	0.092
Ca	0.0	0.0	0.0	0.016	0.007	0.010	0.0	0.008	0.0	0.0	0.020
Sample	112.	112.	117.	118.	118.	118.	119.	121.	122.	123.	123.
Rock Type	Sy-gab	Sy-gab	UML	UML	UML	UML	Cbt	UML	Oth Lp	Haw/Mug	Haw/Mug
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	4.	1.	1.
Position	8.	8.	8.	8.	8.	99.	8.	8.	1.	8.	8.
End member molecules											
Mgt	54.7	21.9	60.6	57.7	0.0	0.3	100.0	96.4	34.7	95.3	88.1
Usp	45.3	78.1	39.4	42.3	100.0	99.7	0.0	3.6	65.3	4.7	11.9

ILMENITE ANAYLSES

	43867.25	58065.23	141244.58	46233.12	325992.11	326301.85	58130.09	58130.11	325964.48	325964.49	52287.17
Weight % oxide											
SiO2	0.297	0.0	0.322	0.0	0.247	0.228	0.267	0.431	0.715	0.507	0.416
TiO2	51.462	53.066	53.417	50.182	51.695	54.292	52.054	53.288	52.582	51.753	50.937
Al2O3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.427
FeO	44.237	43.303	47.051	44.554	47.857	45.569	45.317	46.294	32.822	33.947	41.983
MnO	0.898	0.446	2.506	0.992	2.605	1.544	1.131	1.164	13.677	12.266	0.677
MgO	1.585	3.299	0.0	1.311	0.222	0.947	0.638	0.606	0.0	0.0	5.504
CaO	0.0	0.0	0.0	0.0	0.0	0.186	0.0	0.0	0.0	0.436	0.0
Total	98.741	100.114	103.296	97.039	103.049	102.766	99.407	101.783	99.796	98.909	99.944
Atoms per 3 oxygens											
Si	0.007	0.0	0.008	0.0	0.006	0.006	0.007	0.011	0.018	0.013	0.010
Ti	0.977	0.980	0.980	0.970	0.949	0.995	0.988	0.988	0.997	0.989	0.922
Al	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.012
Fe3	0.025	0.039	0.024	0.060	0.079	0.0	0.010	0.002	0.0	0.0	0.124
Fe2	0.909	0.850	0.936	0.898	0.899	0.929	0.947	0.952	0.692	0.722	0.721
Mn	0.019	0.009	0.052	0.022	0.054	0.032	0.024	0.024	0.292	0.264	0.014
Mg	0.060	0.121	0.0	0.050	0.008	0.034	0.024	0.022	0.0	0.0	0.197
Ca	0.0	0.0	0.0	0.0	0.0	0.005	0.0	0.0	0.0	0.012	0.0
Sample	7.	33.	41.	46.	64.	69.	112.	112.	113.	113.	120.
Rock Type	Bas/Gab	Bas/Gab	Tr-and	Sy-gab	Bas/Gab	UML	Sy-gab	Sy-gab	Phon	Phon	Oth Lp
Crystal	1.	1.	4.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
End member molecules											
Ilm	98.7	98.0	98.8	97.0	96.0	100.0	99.5	99.9	100.0	100.0	93.2
Hem	1.3	2.0	1.2	3.0	4.0	0.0	0.5	0.1	0.0	0.0	6.8

NEPHELINE ANAYLSES

	58017.27	58017.37	43842.07	43842.11	43842.14	43842.18	63707.35	63707.36	63707.38	63707.39	52267.16	52267.18
Weight % oxide												
SiO2	47.188	47.826	45.451	46.419	46.238	45.875	44.945	44.516	45.627	45.080	43.988	44.051
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	31.487	31.691	32.013	31.852	32.245	31.846	33.026	33.017	32.021	32.333	31.782	31.961
FeO	0.585	0.226	0.985	0.860	0.875	1.022	1.181	1.203	0.964	1.068	0.612	0.771
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	16.528	16.303	16.559	16.380	16.574	16.388	16.325	16.091	16.474	16.497	15.944	15.851
K2O	4.554	4.369	5.461	5.492	5.638	5.591	6.309	6.508	5.601	6.061	5.775	5.874
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.342	100.415	100.469	101.317	101.570	100.722	101.786	101.335	100.687	101.039	98.101	98.508
Atoms per 8 oxygens												
Si	2.227	2.244	2.166	2.190	2.177	2.180	2.126	2.118	2.170	2.146	2.148	2.144
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.752	1.753	1.799	1.772	1.790	1.784	1.842	1.852	1.795	1.814	1.830	1.834
Fe	0.023	0.009	0.039	0.034	0.034	0.041	0.047	0.048	0.038	0.043	0.025	0.031
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	1.513	1.483	1.530	1.498	1.513	1.510	1.497	1.484	1.519	1.522	1.510	1.496
K	0.274	0.262	0.332	0.331	0.339	0.339	0.381	0.395	0.340	0.368	0.360	0.365
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	2.	2.	4.	4.	4.	4.	12.	12.	12.	12.	13.	13.
Rock Type	Sy-gab	Sy-gab	Phon	Phon	Phon	Phon	Umaf	Umaf	Umaf	Umaf	Phon	Phon
Crystal	1.	1.	10.	10.	10.	10.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

NEPHELINE ANAYLSES

	59636.28	59636.29	59636.30	59636.31	304006.06	304006.07	304006.11	304006.12	46247.01	46247.02	46247.11	46247.12
Weight % oxide												
SiO2	46.879	46.512	45.857	46.042	45.118	45.431	45.425	47.547	45.378	45.219	47.151	45.373
TiO2	0.248	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	31.969	31.623	31.568	31.824	31.054	31.659	31.960	30.673	32.179	32.423	31.062	32.039
FeO	0.735	0.645	0.700	0.765	0.806	0.972	0.561	1.212	0.407	0.319	0.851	0.754
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.303	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	16.229	15.967	16.000	16.285	16.063	15.961	16.119	16.180	16.059	15.999	16.284	16.040
K2O	4.838	4.788	4.941	5.103	5.209	5.256	5.515	4.414	5.486	5.743	4.513	5.353
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.898	99.535	99.066	100.322	98.250	99.279	99.580	100.026	99.509	99.703	99.861	99.559
Atoms per 8 oxygens												
Si	2.205	2.215	2.200	2.186	2.191	2.183	2.176	2.253	2.173	2.163	2.237	2.174
Ti	0.009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.773	1.775	1.785	1.781	1.778	1.793	1.805	1.713	1.817	1.829	1.738	1.809
Fe	0.029	0.026	0.028	0.030	0.033	0.039	0.022	0.048	0.016	0.013	0.034	0.030
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	1.480	1.474	1.488	1.499	1.513	1.487	1.497	1.486	1.491	1.484	1.498	1.490
K	0.290	0.291	0.302	0.309	0.323	0.322	0.337	0.267	0.335	0.351	0.273	0.327
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	18.	18.	18.	18.	20.	20.	20.	20.	24.	24.	24.	24.
Rock Type	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon
Crystal	4.	4.	5.	5.	1.	1.	1.	1.	4.	4.	1.	1.
Position	1.	7.	1.	7.	8.	8.	8.	8.	1.	7.	8.	8.

NEPHELINE ANAYLSES

	58224.33	58224.34	58224.35	58224.41	58224.42	46233.23	46233.24	46233.26	46233.27	59783.49	59783.50	59783.51
Weight % oxide												
SiO2	44.734	44.914	44.689	45.832	45.069	46.280	46.322	46.788	46.561	46.464	46.482	47.232
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	32.084	32.889	32.120	32.392	31.317	32.562	32.476	32.574	32.633	32.136	30.979	31.317
FeO	0.338	0.466	0.397	0.288	0.573	0.0	0.0	0.0	0.0	0.433	0.488	0.334
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.324	0.0	0.324	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.829	0.430	0.728	0.788	0.933	0.623	0.657	0.694	0.774	0.0	0.0	0.0
Na2O	15.828	15.833	15.537	15.573	15.581	15.246	15.228	15.509	15.325	15.978	16.176	16.075
K2O	5.674	5.629	5.151	4.742	4.893	4.870	4.895	4.938	4.867	5.273	4.806	4.734
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.487	100.485	98.622	99.939	98.366	99.581	99.578	100.503	100.160	100.284	98.931	99.692
Atoms per 8 oxygens												
Si	2.151	2.135	2.158	2.174	2.182	2.195	2.197	2.200	2.196	2.200	2.228	2.239
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.819	1.843	1.829	1.812	1.788	1.820	1.816	1.806	1.814	1.794	1.751	1.751
Fe	0.014	0.019	0.016	0.011	0.023	0.0	0.0	0.0	0.0	0.017	0.020	0.013
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.023	0.0	0.023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.043	0.022	0.038	0.040	0.048	0.032	0.033	0.035	0.039	0.0	0.0	0.0
Na	1.476	1.460	1.455	1.432	1.463	1.402	1.400	1.414	1.401	1.467	1.503	1.478
K	0.348	0.341	0.317	0.287	0.302	0.295	0.296	0.296	0.293	0.319	0.294	0.286
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	25.	25.	25.	25.	25.	46.	46.	46.	46.	47.	47.	47.
Rock Type	Phon	Phon	Phon	Phon	Phon	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Phon	Phon	Phon
Crystal	4.	4.	4.	5.	5.	4.	44.	4.	4.	10.	10.	10.
Position	8.	8.	8.	1.	7.	3.	1.	7.	7.	8.	8.	8.

NEPHELINE ANAYLSES

	52276.51	52276.53	52276.54	52276.55	58015.24	58015.26	326300.47	326300.50	326300.51	326284.05	326284.07	326284.08
Weight % oxide												
SiO2	45.799	45.551	46.005	45.450	45.447	45.417	44.903	45.680	45.139	46.262	46.519	46.084
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	31.793	31.959	32.089	31.831	32.016	32.182	32.221	32.093	32.450	32.514	32.755	32.208
FeO	0.741	0.378	0.527	0.477	1.168	1.323	0.637	0.532	0.660	0.424	0.604	0.652
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.428	0.544	0.0	0.0	0.268	0.0	0.0	0.0
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	15.431	15.606	15.514	15.419	15.567	15.827	15.423	15.505	15.530	15.595	15.864	15.587
K2O	5.869	5.812	5.791	5.769	5.448	5.381	5.622	5.614	5.599	5.749	5.748	5.683
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.633	99.306	99.926	98.946	100.074	100.674	98.806	99.424	99.646	100.544	101.490	100.214
Atoms per 8 oxygens												
Si	2.192	2.185	2.192	2.188	2.168	2.157	2.166	2.186	2.159	2.188	2.183	2.189
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.794	1.807	1.802	1.806	1.801	1.802	1.832	1.811	1.830	1.813	1.812	1.804
Fe	0.030	0.015	0.021	0.019	0.047	0.053	0.026	0.021	0.026	0.017	0.024	0.026
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.030	0.039	0.0	0.0	0.019	0.0	0.0	0.0
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	1.432	1.452	1.433	1.439	1.440	1.458	1.442	1.439	1.440	1.430	1.443	1.436
K	0.358	0.356	0.352	0.354	0.332	0.326	0.346	0.343	0.342	0.347	0.344	0.344
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	51.	51.	51.	51.	70.	70.	72.	72.	72.	74.	74.	74.
Rock Type	Phon	Phon	Phon	Phon	Tr/Sy	Tr/Sy	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph
Crystal	4.	5.	5.	5.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	1.	4.	7.	8.	8.	8.	8.	8.	8.	8.	8.

NEPHELINE ANAYLSES

	326273.11	326273.12	326273.17	326207.01	326207.02	326207.04	326282.16	326282.17	326282.18	326289.03	326289.05	326289.09
Weight % oxide												
SiO2	44.938	45.375	45.295	47.529	47.042	47.328	45.931	46.606	45.169	44.366	45.242	45.237
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.241
Al2O3	32.057	32.811	32.551	31.688	31.089	31.218	32.546	31.997	32.411	31.346	32.250	32.175
FeO	0.569	0.274	0.418	0.681	0.842	0.688	0.855	0.996	0.879	0.662	1.032	1.084
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.462	0.330	0.251	0.0	0.0	0.0	0.0	0.327	0.0
CaO	0.0	0.0	0.0	0.0	0.243	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	15.296	15.355	15.247	15.506	14.692	14.563	15.495	15.484	14.992	14.797	15.141	14.622
K2O	5.806	5.929	6.055	4.492	4.613	4.444	5.848	5.501	6.151	5.823	5.802	5.711
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.666	99.744	99.566	100.358	98.851	98.492	100.675	100.584	99.602	96.994	99.794	99.070
Atoms per 8 oxygens												
Si	2.171	2.165	2.168	2.233	2.244	2.257	2.176	2.204	2.166	2.180	2.164	2.174
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.009
Al	1.826	1.846	1.837	1.755	1.748	1.755	1.818	1.784	1.832	1.816	1.819	1.823
Fe	0.023	0.011	0.017	0.027	0.034	0.027	0.034	0.039	0.035	0.027	0.041	0.044
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.032	0.023	0.018	0.0	0.0	0.0	0.0	0.023	0.0
Ca	0.0	0.0	0.0	0.0	0.012	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	1.433	1.421	1.415	1.413	1.359	1.347	1.423	1.420	1.394	1.410	1.404	1.363
K	0.358	0.361	0.370	0.269	0.281	0.270	0.353	0.332	0.376	0.365	0.354	0.350
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	82.	82.	82.	90.	90.	90.	93.	93.	93.	100.	100.	100.
Rock Type	Rex Ph	Rex Ph	Rex Ph	Ben	Ben	Ben	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

NEPHELINE ANAYLSES

	326289.12	326289.13	58290.28	58290.29	58290.30	58019.52	58019.55	58019.56	58019.57	325964.28	325964.29	325964.30
Weight % oxide												
SiO2	44.580	45.376	45.335	45.867	45.059	46.386	46.349	45.711	45.907	46.217	46.493	46.629
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	32.263	32.229	31.841	33.079	33.031	32.254	31.819	31.944	32.351	33.086	33.386	34.194
FeO	0.747	1.165	0.0	0.0	0.0	0.711	0.460	0.520	0.379	0.545	0.431	0.324
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.232	0.563	0.187	0.0	0.191	0.0	0.0	0.095	0.0	0.0	0.0	0.0
Na2O	14.773	15.198	15.304	15.994	15.618	15.949	16.359	15.273	15.789	15.975	16.419	16.783
K2O	5.756	5.686	4.956	5.327	5.617	5.435	4.776	5.005	5.227	5.318	5.361	5.675
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.351	100.217	97.623	100.267	99.516	100.735	99.763	98.548	99.653	101.141	102.090	103.605
Atoms per 8 oxygens												
Si	2.160	2.165	2.196	2.169	2.153	2.191	2.204	2.197	2.186	2.171	2.166	2.145
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.843	1.813	1.818	1.845	1.860	1.796	1.784	1.810	1.816	1.833	1.834	1.855
Fe	0.030	0.046	0.0	0.0	0.0	0.028	0.018	0.021	0.015	0.021	0.017	0.012
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.012	0.029	0.010	0.0	0.010	0.0	0.0	0.005	0.0	0.0	0.0	0.0
Na	1.388	1.406	1.437	1.467	1.447	1.461	1.508	1.423	1.458	1.455	1.483	1.497
K	0.356	0.346	0.306	0.321	0.342	0.328	0.290	0.307	0.318	0.319	0.319	0.333
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	100.	100.	102.	102.	102.	111.	111.	111.	111.	113.	113.	113.
Rock Type	Rex Ph	Rex Ph	BFD	BFD	BFD	Phon	Phon	Phon	Phon	Phon	Phon	Phon
Crystal	10.	10.	1.	1.	1.	1.	4.	5.	6.	4.	4.	4.
Position	8.	8.	8.	8.	8.	8.	1.	1.	1.	1.	4.	7.

NEPHELINE ANAYLSES

	325964.31	325964.32	46279.14	46279.12	46279.06
Weight % oxide					
SiO2	46.081	45.829	44.975	44.453	45.008
TiO2	0.0	0.0	0.0	0.0	0.0
Al2O3	33.884	32.918	34.471	34.884	35.354
FeO	0.461	0.312	0.382	0.375	0.0
MnO	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.080	1.435	1.328	1.171
Na2O	17.028	16.617	15.611	15.613	16.706
K2O	5.852	5.408	5.364	5.560	5.784
BaO	0.0	0.0	0.0	0.0	0.0
Total	103.306	101.164	102.238	102.213	104.023
Atoms per 8 oxygens					
Si	2.135	2.160	2.100	2.079	2.073
Ti	0.0	0.0	0.0	0.0	0.0
Al	1.850	1.829	1.898	1.924	1.920
Fe	0.018	0.012	0.015	0.015	0.0
Mn	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.004	0.072	0.067	0.058
Na	1.529	1.518	1.413	1.416	1.492
K	0.346	0.325	0.320	0.332	0.340
Ba	0.0	0.0	0.0	0.0	0.0
Sample	113.	113.	116.	116.	116.
Rock Type	Phon	Phon	Oth Lp	Oth Lp	Oth Lp
Crystal	5.	5.	1.	1.	1.
Position	1.	7.	8.	8.	8.

FELDSPAR ANAYLSES

	63845.99	63845.98	63845.01	63845.02	63845.05	63845.07
Weight % oxide						
SiO2	60.563	67.620	66.944	66.826	66.526	67.767
TiO2	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	17.171	19.319	18.810	19.437	18.998	19.174
FeO	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.169	0.593	0.336	0.720	0.520	0.420
Na2O	5.245	6.294	6.064	7.805	5.004	7.562
K2O	7.415	7.658	7.823	5.060	8.984	5.583
BaO	0.341	0.364	0.0	0.0	0.0	0.0
Total	90.904	101.848	99.977	99.848	100.032	100.506
Atoms per 8 oxygens						
Si	2.998	2.986	3.002	2.977	2.994	2.999
Ti	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.002	1.006	0.995	1.021	1.008	1.000
Fe	0.0	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.009	0.028	0.016	0.034	0.025	0.020
Na	0.503	0.539	0.527	0.674	0.437	0.649
K	0.468	0.431	0.448	0.288	0.516	0.315
Ba	0.007	0.006	0.0	0.0	0.0	0.0
Sample	1.	1.	1.	1.	1.	1.
Rock Type	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy
Crystal	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.
Atomic Percent						
Ca	0.9	2.8	1.6	3.4	2.6	2.0
Na	51.0	53.7	53.2	67.7	44.7	66.0
K	47.4	42.9	45.2	28.9	52.8	32.0
Ba	0.7	0.6	0.0	0.0	0.0	0.0

	63845.19	63845.20	63845.21	63845.22	63845.24	58017.31
Weight % oxide						
SiO2	65.749	65.957	66.825	65.609	65.187	65.627
TiO2	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.911	20.129	20.759	21.592	21.833	19.546
FeO	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.236	1.613	1.687	2.552	3.031	0.399
Na2O	5.137	5.733	10.268	9.488	9.845	6.743
K2O	8.509	7.373	0.412	0.702	0.429	5.922
BaO	0.519	0.0	0.0	0.436	0.0	1.664
Total	101.061	100.805	99.951	100.379	100.325	99.901
Atoms per 8 oxygens						
Si	2.944	2.940	2.931	2.885	2.865	2.963
Ti	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.051	1.058	1.073	1.119	1.131	1.040
Fe	0.0	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.059	0.077	0.079	0.120	0.143	0.019
Na	0.446	0.495	0.873	0.809	0.839	0.590
K	0.486	0.419	0.023	0.039	0.024	0.341
Ba	0.009	0.0	0.0	0.008	0.0	0.029
Sample	1.	1.	1.	1.	1.	2.
Rock Type	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Sy-gab
Crystal	4.	4.	4.	4.	1.	4.
Position	1.	3.	5.	7.	8.	1.
Atomic Percent						
Ca	5.9	7.8	8.1	12.3	14.2	1.9
Na	44.6	49.9	89.5	82.9	83.4	60.3
K	48.6	42.3	2.4	4.0	2.4	34.8
Ba	0.9	0.0	0.0	0.8	0.0	3.0

FELDSPAR ANAYLSES

	58017.32	58017.33	141229.42	141229.43	141229.44	141229.47	43842.01	43842.04	43842.08	43842.10	43842.17	43842.23
Weight % oxide												
SiO2	67.206	68.293	71.764	69.947	68.525	69.826	65.322	66.917	65.571	69.450	69.649	66.340
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	18.683	19.950	19.802	19.216	18.808	19.634	17.617	19.279	17.877	18.819	18.932	18.257
FeO	0.0	0.0	0.611	0.654	0.647	0.536	0.0	1.174	0.507	0.477	0.295	0.223
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.192	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.427	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	6.569	11.384	11.854	11.522	11.311	11.797	0.906	12.138	0.939	11.728	11.794	0.829
K2O	6.957	0.199	0.0	0.0	0.0	0.0	15.606	0.0	15.601	0.0	0.0	15.299
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.415	100.253	104.031	101.339	99.291	101.793	99.451	99.700	100.495	100.474	100.670	100.948
Atoms per 8 oxygens												
Si	3.016	2.978	3.013	3.015	3.015	2.999	3.027	2.960	3.014	3.020	3.021	3.020
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	0.989	1.025	0.980	0.977	0.976	0.994	0.962	1.005	0.969	0.965	0.968	0.980
Fe	0.0	0.0	0.021	0.024	0.024	0.019	0.0	0.043	0.019	0.017	0.011	0.008
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.007	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.572	0.962	0.965	0.963	0.965	0.982	0.081	1.041	0.084	0.989	0.992	0.073
K	0.398	0.011	0.0	0.0	0.0	0.0	0.923	0.0	0.915	0.0	0.0	0.889
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	2.	2.	3.	3.	3.	3.	4.	4.	4.	4.	4.	4.
Rock Type	Sy-gab	Sy-gab	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Phon	Phon	Phon	Phon	Phon	Phon
Crystal	4.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	7.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	59.0	96.9	100.0	100.0	100.0	100.0	8.1	100.0	8.4	100.0	100.0	7.6
K	41.0	1.1	0.0	0.0	0.0	0.0	91.9	0.0	91.6	0.0	0.0	92.4
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	43842.24	41954.42	41954.43	41954.46	41954.49	41954.50	41954.51	41954.53	52293.01	52293.02	52293.03	52293.04
Weight % oxide												
SiO2	66.778	62.961	63.832	66.231	63.882	63.172	66.391	66.777	59.115	59.361	62.713	61.997
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.246	0.0	0.0
Al2O3	18.221	22.805	22.531	19.626	21.309	22.326	19.449	19.140	20.952	20.322	21.749	22.369
FeO	0.0	0.0	0.0	0.0	0.252	0.0	0.266	0.237	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	4.788	4.134	0.898	2.930	4.141	0.721	0.582	3.353	2.893	3.040	4.035
Na2O	1.330	6.683	6.497	4.984	5.869	6.552	5.992	5.920	6.338	6.170	6.287	6.594
K2O	15.074	3.190	4.141	8.707	5.419	4.044	7.807	8.210	3.848	4.215	4.517	3.583
BaO	0.0	0.356	0.473	0.765	1.043	0.766	0.487	0.0	1.137	1.421	1.715	1.183
Total	101.403	100.783	101.608	101.211	100.704	101.001	101.113	100.866	94.743	94.628	100.021	99.761
Atoms per 8 oxygens												
Si	3.024	2.798	2.820	2.963	2.865	2.816	2.965	2.981	2.816	2.838	2.838	2.802
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.009	0.0	0.0
Al	0.973	1.195	1.174	1.035	1.127	1.173	1.024	1.007	1.177	1.145	1.160	1.192
Fe	0.0	0.0	0.0	0.0	0.009	0.0	0.010	0.009	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.228	0.196	0.043	0.141	0.198	0.034	0.028	0.171	0.148	0.147	0.195
Na	0.117	0.576	0.557	0.432	0.510	0.566	0.519	0.512	0.585	0.572	0.552	0.578
K	0.871	0.181	0.233	0.497	0.310	0.230	0.445	0.468	0.234	0.257	0.261	0.207
Ba	0.0	0.006	0.008	0.013	0.018	0.013	0.009	0.0	0.021	0.027	0.030	0.021
Sample	4.	5.	5.	5.	5.	5.	5.	5.	6.	6.	6.	6.
Rock Type	Phon	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Ben	Ben	Ben	Ben
Crystal	1.	4.	4.	5.	6.	6.	1.	1.	4.	5.	5.	5.
Position	8.	1.	7.	8	1.	7.	8.	8.	8.	7.	1.	7.
Atomic Percent												
Ca	0.0	23.0	19.7	4.4	14.4	19.7	3.4	2.8	16.9	14.7	14.8	19.5
Na	11.8	58.1	56.0	43.9	52.1	56.2	51.5	50.8	57.9	57.0	55.8	57.7
K	88.2	18.3	23.4	50.5	31.7	22.8	44.2	46.4	23.1	25.6	26.4	20.7
Ba	0.0	0.6	0.8	1.3	1.8	1.3	0.9	0.0	2.1	2.7	3.0	2.1

FELDSPAR ANAYLSES

	52293.05	52293.10	52293.11	52293.12	43867.14	43867.17	43867.18	43867.19	43867.21	43867.24	43867.27	59632.28
Weight % oxide												
SiO2	65.663	61.505	66.187	65.829	56.923	57.220	57.119	56.441	62.781	57.951	57.311	59.256
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.041	22.371	18.945	18.775	26.746	26.784	26.917	26.772	23.125	26.281	27.028	25.374
FeO	0.227	0.238	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.686	4.351	0.530	0.538	9.455	9.192	9.313	9.527	4.593	8.774	9.279	7.392
Na2O	5.508	6.568	5.229	5.529	6.022	6.185	6.081	5.919	8.492	6.231	6.143	7.106
K2O	8.506	3.186	8.767	8.341	0.338	0.312	0.419	0.260	0.522	0.304	0.231	0.621
BaO	0.0	1.117	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.631	99.336	99.658	99.012	99.484	99.693	99.849	98.919	99.513	99.541	99.992	99.749
Atoms per 8 oxygens												
Si	2.973	2.791	2.990	2.990	2.568	2.574	2.567	2.561	2.791	2.604	2.569	2.654
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.016	1.197	1.009	1.005	1.423	1.420	1.426	1.432	1.212	1.392	1.428	1.340
Fe	0.009	0.009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.033	0.212	0.026	0.026	0.457	0.443	0.449	0.463	0.219	0.423	0.446	0.355
Na	0.484	0.578	0.458	0.487	0.527	0.539	0.530	0.521	0.732	0.543	0.534	0.617
K	0.491	0.184	0.505	0.483	0.019	0.018	0.024	0.015	0.030	0.017	0.013	0.035
Ba	0.0	0.020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	6.	6.	6.	6.	7.	7.	7.	7.	7.	7.	7.	8.
Rock Type	Ben	Ben	Ben	Ben	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Sy-gab
Crystal	6.	7.	7.	1.	4.	4.	4.	5.	1.	1.	1.	1.
Position	8.	1.	7.	8	4.	1.	7.	1.	8.	8.	8.	8.
Atomic Percent												
Ca	3.3	21.3	2.6	2.6	45.6	44.3	44.8	46.3	22.3	43.0	44.9	35.3
Na	48.0	58.1	46.3	48.9	52.5	53.9	52.8	52.2	74.6	55.2	53.8	61.3
K	48.7	18.5	51.1	48.5	1.9	1.8	2.4	1.5	3.1	1.7	1.3	3.5
Ba	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	59632.30	59632.31	59632.32	59632.33	59632.34	59632.36	59632.37	59632.41	58294.46	58294.47	58294.51	58294.54
Weight % oxide												
SiO2	63.263	56.417	56.050	64.515	64.051	54.888	53.911	60.544	67.671	66.705	67.808	66.899
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	21.064	27.164	27.755	21.856	21.134	28.121	28.326	24.469	18.925	18.480	19.840	18.555
FeO	0.0	0.0	0.0	0.266	0.0	0.369	0.259	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	2.273	9.632	10.090	3.410	2.580	11.183	11.561	6.417	0.0	0.0	1.212	0.0
Na2O	6.026	5.874	5.531	8.161	6.778	4.901	4.757	7.410	4.669	4.380	10.882	5.404
K2O	5.275	0.394	0.315	2.095	4.797	0.407	0.330	0.622	10.163	10.385	0.238	8.798
BaO	1.494	0.0	0.345	0.375	0.696	0.0	0.0	0.493	0.0	0.0	0.0	0.0
Total	99.395	99.481	100.086	100.678	100.036	99.869	99.144	99.955	101.428	99.950	99.980	99.656
Atoms per 8 oxygens												
Si	2.876	2.548	2.523	2.852	2.876	2.484	2.460	2.706	3.011	3.016	2.969	3.016
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.129	1.446	1.473	1.139	1.119	1.500	1.524	1.289	0.993	0.985	1.024	0.986
Fe	0.0	0.0	0.0	0.010	0.0	0.014	0.010	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.111	0.466	0.487	0.162	0.124	0.542	0.565	0.307	0.0	0.0	0.057	0.0
Na	0.531	0.514	0.483	0.700	0.590	0.430	0.421	0.642	0.403	0.384	0.924	0.472
K	0.306	0.023	0.018	0.118	0.275	0.023	0.019	0.035	0.577	0.599	0.013	0.506
Ba	0.027	0.0	0.006	0.006	0.012	0.0	0.0	0.009	0.0	0.0	0.0	0.0
Sample	8.	8.	8.	8.	8.	8.	8.	8.	9.	9.	9.	9.
Rock Type	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Rex Tr	Rex Tr	Rex Tr	Rex Tr
Crystal	1.	1.	1.	1.	1.	4.	4.	1.	1.	1.	1.	4.
Position	8.	8.	8.	8.	8.	7.	1.	8.	8.	8.	8.	1.
Atomic Percent												
Ca	11.4	46.5	49.0	16.4	12.4	54.5	56.2	30.9	0.0	0.0	5.7	0.0
Na	54.5	51.2	48.6	71.0	58.9	43.2	41.9	64.7	41.1	39.1	93.0	48.3
K	31.4	2.3	1.8	12.0	27.5	2.3	1.9	3.5	58.9	60.9	1.3	51.7
Ba	2.8	0.0	0.6	0.6	1.2	0.0	0.0	0.9	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	58294.55	58294.56	52267.01	52267.02	52267.08	52267.13	52267.19	52267.22	63896.28	63896.29	63896.30	63896.31
Weight % oxide												
SiO2	67.849	67.592	64.910	66.048	64.950	64.898	64.339	65.240	65.466	65.706	66.574	64.874
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	20.134	19.832	18.734	19.197	18.943	18.850	18.766	18.824	19.369	19.949	19.991	19.390
FeO	0.0	0.0	0.0	0.0	0.326	0.0	0.466	0.0	0.0	0.0	0.0	0.294
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.140	1.078	0.0	0.0	0.0	0.0	0.0	0.0	0.770	1.076	0.852	0.684
Na2O	10.778	10.823	4.316	4.692	4.337	4.477	3.211	3.561	6.983	6.849	8.783	6.061
K2O	0.116	0.161	9.935	9.791	9.761	10.057	11.471	10.860	5.731	5.698	3.088	7.334
BaO	0.0	0.0	0.674	0.877	0.832	0.744	0.602	0.630	0.0	0.0	0.0	0.397
Total	100.017	99.486	98.569	100.605	99.149	99.026	98.855	99.115	98.319	99.278	99.288	99.034
Atoms per 8 oxygens												
Si	2.965	2.971	2.989	2.982	2.979	2.981	2.977	2.993	2.968	2.951	2.961	2.953
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.037	1.028	1.017	1.022	1.024	1.021	1.024	1.018	1.035	1.056	1.048	1.041
Fe	0.0	0.0	0.0	0.0	0.013	0.0	0.018	0.0	0.0	0.0	0.0	0.011
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.053	0.051	0.0	0.0	0.0	0.0	0.0	0.0	0.037	0.052	0.041	0.033
Na	0.913	0.922	0.385	0.411	0.386	0.399	0.288	0.317	0.614	0.596	0.757	0.535
K	0.006	0.009	0.584	0.564	0.571	0.589	0.677	0.636	0.332	0.327	0.175	0.426
Ba	0.0	0.0	0.012	0.016	0.015	0.013	0.011	0.011	0.0	0.0	0.0	0.007
Sample	9.	9.	13.	13.	13.	13.	13.	13.	14.	14.	14.	14.
Rock Type	Rex Tr	Rex Tr	Phon	Phon	Phon	Phon	Phon	Phon	Ben	Ben	Ben	Ben
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	4.	4.	4.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	7.	4.	1.	8.
Atomic Percent												
Ca	5.5	5.2	0.0	0.0	0.0	0.0	0.0	0.0	3.8	5.3	4.2	3.3
Na	93.9	93.9	39.2	41.5	39.7	39.9	29.5	32.9	62.5	61.1	77.8	53.4
K	0.6	0.9	59.5	56.9	58.7	58.8	69.4	66.0	33.8	33.5	18.0	42.6
Ba	0.0	0.0	1.2	1.6	1.5	1.3	1.1	1.1	0.0	0.0	0.0	0.7

FELDSPAR ANAYLSES

	63896.32	63896.34	63896.36	63896.37	63896.38	63896.39	63896.40	63896.41	63896.42	63896.44	63896.45	63896.47
Weight % oxide												
SiO2	64.249	64.579	63.044	64.001	64.583	64.609	64.486	64.204	68.579	64.943	65.197	63.960
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	18.407	18.491	21.395	21.406	20.141	20.604	20.551	20.914	19.048	18.452	18.275	18.509
FeO	0.436	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.368	0.229	0.438
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.0	2.707	2.752	1.617	1.790	1.713	2.390	0.0	0.0	0.0	0.0
Na2O	1.203	1.168	6.393	7.559	7.098	5.649	6.404	8.200	11.244	1.149	2.227	1.158
K2O	14.630	14.887	4.572	3.663	4.450	6.571	6.112	2.546	0.445	14.793	13.098	14.879
BaO	0.0	0.0	0.536	0.419	0.0	0.362	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.925	99.125	98.647	99.800	97.889	99.585	99.266	98.254	99.316	99.705	99.026	98.944
Atoms per 8 oxygens												
Si	2.990	2.995	2.863	2.866	2.932	2.914	2.910	2.893	3.014	2.997	3.008	2.981
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.010	1.011	1.146	1.130	1.078	1.096	1.093	1.111	0.987	1.004	0.994	1.017
Fe	0.017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.014	0.009	0.017
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.0	0.132	0.132	0.079	0.087	0.083	0.115	0.0	0.0	0.0	0.0
Na	0.109	0.105	0.563	0.656	0.625	0.494	0.560	0.716	0.958	0.103	0.199	0.105
K	0.869	0.881	0.265	0.209	0.258	0.378	0.352	0.146	0.025	0.871	0.771	0.885
Ba	0.0	0.0	0.010	0.007	0.0	0.006	0.0	0.0	0.0	0.0	0.0	0.0
Sample	14.	14.	14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	1.	1.	5.	5.	5.	6.	6.	6.	1.	1.	1.	1.
Position	8.	8.	1.	4.	7.	7.	4.	1.	8.	8.	8.	8.
Atomic Percent												
Ca	0.0	0.0	13.6	13.1	8.2	9.0	8.3	11.8	0.0	0.0	0.0	0.0
Na	11.1	10.6	58.0	65.3	65.0	51.2	56.3	73.3	97.5	10.6	20.5	10.6
K	88.9	89.4	27.3	20.8	26.8	39.2	35.4	14.9	2.5	89.4	79.5	89.4
Ba	0.0	0.0	1.0	0.7	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	58293.01	58293.02	58293.07	58293.08	58292.13	58292.14	58292.18	58292.20	58292.21	58292.22	58292.27	41945.14
Weight % oxide												
SiO_2	64.768	65.912	65.908	68.238	67.214	66.983	65.878	67.801	64.890	65.885	66.284	66.199
TiO_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al_2O_3	18.102	18.758	18.655	19.457	18.493	18.632	18.303	19.224	18.226	18.835	18.853	19.236
FeO	0.0	0.249	0.0	0.0	0.0	0.0	0.326	0.0	0.0	0.260	0.319	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.149	0.0	0.0	0.550	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.508
Na_2O	7.063	2.807	2.940	11.193	5.480	6.180	2.532	6.018	3.685	4.465	4.223	6.965
K_2O	6.124	13.272	12.370	0.206	8.817	7.905	13.174	8.569	11.195	10.222	10.426	6.053
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	96.206	100.998	99.873	99.644	100.004	99.700	100.213	101.612	97.996	99.667	100.105	98.961
Atoms per 8 oxygens												
Si	3.004	2.989	3.004	2.992	3.020	3.011	3.007	2.998	3.005	2.992	2.997	2.982
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	0.990	1.003	1.002	1.006	0.979	0.988	0.985	1.002	0.995	1.008	1.005	1.022
Fe	0.0	0.009	0.0	0.0	0.0	0.0	0.012	0.0	0.0	0.010	0.012	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.007	0.0	0.0	0.026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.025
Na	0.635	0.247	0.260	0.952	0.477	0.539	0.224	0.516	0.331	0.393	0.370	0.608
K	0.362	0.768	0.719	0.012	0.505	0.453	0.767	0.483	0.662	0.592	0.601	0.348
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	15.	15.	15.	15.	16.	16.	16.	16.	16.	16.	16.	17.
Rock Type	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Tr/Sy
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	4.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.
Atomic Percent												
Ca	0.7	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5
Na	63.2	24.3	26.6	96.2	48.6	54.3	22.6	51.7	33.3	39.9	38.1	62.0
K	36.1	75.7	73.4	1.2	51.4	45.7	77.4	48.3	66.7	60.1	61.9	35.5
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	41945.15	41945.18	41945.19	59636.39	59636.40	59636.41	59636.42	58206.49	58206.50	58206.57	304006.01	304006.02
Weight % oxide												
SiO2	67.226	67.036	69.088	64.994	64.896	68.566	67.977	69.111	69.414	68.797	64.595	64.494
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.553	19.353	18.844	18.152	18.118	19.163	18.906	19.274	19.443	19.117	17.839	17.865
FeO	0.0	0.0	0.0	0.559	0.301	0.240	0.0	0.0	0.0	0.0	0.245	0.238
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.456	0.334	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	7.244	6.537	11.562	1.792	1.312	9.496	11.041	11.571	11.754	11.394	4.527	5.665
K2O	6.303	7.227	0.0	13.996	14.638	3.544	0.587	0.0	0.0	0.177	10.280	8.139
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.782	100.487	99.494	99.493	99.265	101.009	98.511	99.956	100.611	99.485	97.486	96.401
Atoms per 8 oxygens												
Si	2.979	2.986	3.025	3.002	3.006	3.003	3.013	3.013	3.008	3.015	3.006	3.009
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.021	1.016	0.973	0.988	0.989	0.989	0.988	0.991	0.993	0.988	0.979	0.983
Fe	0.0	0.0	0.0	0.022	0.012	0.009	0.0	0.0	0.0	0.0	0.010	0.009
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.022	0.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.622	0.565	0.982	0.160	0.118	0.806	0.949	0.978	0.988	0.968	0.409	0.512
K	0.356	0.411	0.0	0.825	0.865	0.198	0.033	0.0	0.0	0.010	0.610	0.484
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	17.	17.	17.	18.	18.	18.	18.	19.	19.	19.	20.	20.
Rock Type	Tr/Sy	Tr/Sy	Tr/Sy	Phon	Phon	Phon	Phon	Ben	Ben	Ben	Phon	Phon
Crystal	5.	6.	1.	1.	1.	1.	1.	1.	1.	1.	4.	4.
Position	1.	1.	8.	8.	8.	8.	8.	8.	8.	8.	1.	1.
Atomic Percent												
Ca	2.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	62.2	57.0	100.0	16.2	12.0	80.3	96.6	100.0	100.0	99.0	40.1	51.4
K	35.6	41.4	0.0	83.8	88.0	19.7	3.4	0.0	0.0	1.0	59.9	48.6
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	304006.03	304006.04	304006.05	304006.08	304006.10	304006.13	46237.20	46237.21	46237.22	46237.23	46237.24	46237.28
Weight % oxide												
SiO2	66.901	65.257	65.011	66.429	65.279	66.551	61.867	61.472	62.300	64.662	64.779	64.577
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.282	0.0	0.0
Al2O3	18.552	18.028	17.948	18.634	18.351	18.322	22.322	22.600	21.637	19.649	19.582	19.904
FeO	0.0	0.0	0.350	0.287	0.345	0.455	0.0	0.0	0.277	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.0	0.0	0.0	0.0	0.0	3.982	4.239	3.372	1.012	0.834	0.784
Na2O	6.192	2.949	2.573	5.975	1.303	5.087	6.672	6.705	6.429	5.387	5.887	3.703
K2O	8.150	12.654	13.209	8.499	14.965	9.764	3.404	3.045	4.067	7.538	7.068	10.409
BaO	0.0	0.0	0.0	0.0	0.0	0.0	1.014	0.911	0.630	0.615	0.810	0.991
Total	99.795	98.888	99.091	99.824	100.243	100.179	99.261	98.972	98.712	99.145	98.960	100.368
Atoms per 8 oxygens												
Si	3.010	3.012	3.007	2.998	2.999	3.007	2.804	2.790	2.835	2.942	2.951	2.938
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.010	0.0	0.0
Al	0.984	0.981	0.979	0.991	0.994	0.976	1.193	1.209	1.161	1.054	1.052	1.068
Fe	0.0	0.0	0.014	0.011	0.013	0.017	0.0	0.0	0.011	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.193	0.206	0.164	0.049	0.041	0.038
Na	0.540	0.264	0.231	0.523	0.116	0.446	0.586	0.590	0.567	0.475	0.520	0.327
K	0.468	0.745	0.779	0.489	0.877	0.563	0.197	0.176	0.236	0.438	0.411	0.604
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.018	0.016	0.011	0.011	0.014	0.018
Sample	20.	20.	20.	20.	20.	20.	21.	21.	21.	21.	21.	21.
Rock Type	Phon	Phon	Phon	Phon	Phon	Phon	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	4.	4.	1.	5.	1.	1.	4.	4.	4.	1.	1.	1.
Position	7.	7.	8.	1.	8.	8.	4.	7.	1.	8.	8.	8.
Atomic Percent												
Ca	0.0	0.0	0.0	0.0	0.0	0.0	19.4	20.9	16.8	5.0	4.2	3.9
Na	53.6	26.2	22.9	51.7	11.7	44.2	59.0	59.7	58.0	48.8	52.7	33.1
K	46.4	73.8	77.1	48.3	88.3	55.8	19.8	17.8	24.1	45.0	41.7	61.2
Ba	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.6	1.1	1.1	1.4	1.8

FELDSPAR ANAYLSES

	46237.29	46237.30	46237.31	46237.37	46237.38	58036.50	58036.51	58036.58	58036.62	58036.65	58036.66	58036.68
Weight % oxide												
SiO2	61.464	59.588	60.870	66.620	66.499	64.932	63.516	63.467	63.587	61.495	63.963	61.188
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.424	0.0	0.0	0.0
Al2O3	22.853	24.483	23.893	19.690	19.243	20.309	20.417	20.625	20.874	22.569	19.385	22.910
FeO	0.0	0.317	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	4.349	6.071	5.652	0.587	0.442	1.132	1.393	1.581	1.411	4.073	1.166	4.406
Na2O	6.649	6.560	6.685	5.956	5.562	5.292	4.984	5.344	5.377	7.876	6.137	8.076
K2O	3.322	1.972	2.385	8.140	8.425	7.607	8.021	7.022	7.163	1.126	7.168	0.908
BaO	1.231	0.717	0.766	0.0	0.0	0.935	1.219	1.006	1.274	0.406	1.204	0.425
Total	99.868	99.708	100.251	100.993	100.171	100.207	99.550	99.045	100.110	97.545	99.023	97.913
Atoms per 8 oxygens												
Si	2.777	2.691	2.730	2.967	2.984	2.929	2.903	2.899	2.882	2.799	2.933	2.778
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.014	0.0	0.0	0.0
Al	1.217	1.304	1.263	1.034	1.018	1.080	1.100	1.111	1.115	1.211	1.048	1.226
Fe	0.0	0.012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.211	0.294	0.272	0.028	0.021	0.055	0.068	0.077	0.069	0.199	0.057	0.214
Na	0.583	0.574	0.581	0.514	0.484	0.463	0.442	0.473	0.473	0.695	0.546	0.711
K	0.192	0.114	0.136	0.462	0.482	0.438	0.468	0.409	0.414	0.065	0.419	0.053
Ba	0.022	0.013	0.013	0.0	0.0	0.017	0.022	0.018	0.023	0.007	0.022	0.008
Sample	21.	21.	21.	21.	21.	23.	23.	23.	23.	23.	23.	23.
Rock Type	Ben	Ben	Ben	Ben	Ben	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab
Crystal	5.	5.	5.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	7.	4	1.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	20.9	29.5	27.1	2.8	2.1	5.7	6.8	7.9	7.0	20.6	5.5	21.7
Na	57.8	57.7	58.0	51.2	49.0	47.6	44.2	48.4	48.3	71.9	52.3	72.1
K	19.0	11.5	13.6	46.0	48.8	45.0	46.8	41.9	42.3	6.7	40.1	5.4
Ba	2.2	1.3	1.3	0.0	0.0	1.7	2.2	1.8	2.3	0.7	2.1	0.8

FELDSPAR ANAYLSES

	58036.70	46247.09	46247.13	46247.19	46247.20	46247.21	58224.36	58224.37	58224.38	58224.39	58224.40	126772.46
Weight % oxide												
SiO2	63.132	65.266	64.300	65.997	66.000	66.087	65.720	65.702	65.486	65.329	65.212	63.684
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	20.641	18.524	18.454	19.002	18.806	18.981	19.272	18.974	19.497	19.623	19.058	22.771
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.252	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.770	0.0	0.0	0.0	0.0	0.0	0.681	0.395	0.649	0.885	0.395	3.497
Na2O	5.573	3.824	3.084	5.072	5.011	5.556	5.525	5.267	5.786	5.927	4.017	6.433
K2O	6.452	10.815	12.191	9.070	9.521	8.441	8.213	8.544	7.565	7.308	10.362	4.663
BaO	1.122	0.0	0.0	0.0	0.0	0.374	0.0	0.0	0.379	0.0	0.0	1.053
Total	98.690	98.429	98.029	99.141	99.338	99.439	99.411	99.134	99.362	99.072	99.044	102.101
Atoms per 8 oxygens												
Si	2.892	3.003	2.991	2.995	2.997	2.993	2.973	2.984	2.964	2.957	2.980	2.815
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.115	1.005	1.012	1.017	1.007	1.013	1.028	1.016	1.040	1.047	1.027	1.186
Fe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.010	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.087	0.0	0.0	0.0	0.0	0.0	0.033	0.019	0.031	0.043	0.019	0.166
Na	0.495	0.341	0.278	0.446	0.441	0.488	0.485	0.464	0.508	0.520	0.356	0.551
K	0.377	0.635	0.723	0.525	0.552	0.488	0.474	0.495	0.437	0.422	0.604	0.263
Ba	0.020	0.0	0.0	0.0	0.0	0.007	0.0	0.0	0.007	0.0	0.0	0.018
Sample	23.	24.	24.	24.	24.	24.	25.	25.	25.	25.	25.	26.
Rock Type	Sy-gab	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Ben
Crystal	1.	4.	4.	5.	5.	5.	4.	4.	4.	5.	5.	4.
Position	8.	4.	4.	1.	4.	7.	1.	4.	7.	1.	7.	7.
Atomic Percent												
Ca	8.9	0.0	0.0	0.0	0.0	0.0	3.3	1.9	3.2	4.4	1.9	16.6
Na	50.6	34.9	27.8	45.9	44.4	49.6	48.9	47.4	51.7	52.8	36.4	55.2
K	38.5	65.1	72.2	54.1	55.6	49.6	47.8	50.6	44.5	42.8	61.7	26.4
Ba	2.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.7	0.0	0.0	1.8

FELDSPAR ANAYLSES

	126772.47	126772.50	126772.54	126772.55	126772.56	126772.57	126772.59	126772.61	58003.70	58003.71	58003.72	58003.73
Weight % oxide												
SiO2	62.432	65.613	61.136	66.028	64.428	65.017	65.355	65.473	64.537	64.379	64.544	64.854
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	22.070	19.388	23.030	19.024	18.429	19.448	19.347	19.235	20.354	20.051	19.759	19.837
FeO	0.311	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	3.213	0.553	4.666	0.213	0.0	0.441	0.362	0.358	1.627	1.486	1.229	1.026
Na2O	5.756	5.803	6.826	5.111	3.337	5.495	5.803	5.485	6.072	5.870	5.640	5.660
K2O	5.174	7.533	2.664	8.957	11.296	8.011	7.648	7.894	6.310	6.669	7.169	7.236
BaO	0.974	0.0	0.593	0.393	0.0	0.529	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.930	98.890	98.915	99.726	97.490	98.941	98.515	98.445	98.900	98.455	98.341	98.613
Atoms per 8 oxygens												
Si	2.824	2.973	2.770	2.989	2.999	2.963	2.974	2.981	2.921	2.930	2.944	2.948
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.177	1.036	1.230	1.015	1.011	1.045	1.038	1.033	1.086	1.076	1.063	1.063
Fe	0.012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.156	0.027	0.227	0.010	0.0	0.022	0.018	0.017	0.079	0.072	0.060	0.050
Na	0.505	0.510	0.600	0.449	0.301	0.486	0.512	0.484	0.533	0.518	0.499	0.499
K	0.299	0.436	0.154	0.517	0.671	0.466	0.444	0.459	0.364	0.387	0.417	0.420
Ba	0.017	0.0	0.011	0.007	0.0	0.009	0.0	0.0	0.0	0.0	0.0	0.0
Sample	26.	26.	26.	26.	26.	26.	26.	26.	27.	27.	27.	27.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Phon	Phon	Phon	Phon
Crystal	4.	4.	5.	5.	1.	5.	1.	1.	4.	4.	4.	4.
Position	1.	7.	1.	7.	8.	4.	8.	8.	1.	3.	5.	7.
Atomic Percent												
Ca	16.0	2.8	22.9	1.0	0.0	2.2	1.8	1.8	8.1	7.4	6.1	5.2
Na	51.7	52.4	60.5	45.7	31.0	49.4	52.6	50.4	54.6	53.0	51.1	51.5
K	30.6	44.8	15.5	52.6	69.0	47.4	45.6	47.8	37.3	39.6	42.7	43.3
Ba	1.7	0.0	1.1	0.7	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	58003.74	58003.75	58003.76	58003.77	58003.82	141233.01	141233.02	141233.03	141233.04	141233.05	141233.06	141233.07
Weight % oxide												
SiO2	65.146	65.195	65.312	64.370	65.362	63.743	61.232	64.726	61.674	62.523	64.844	65.251
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.383	18.678	19.349	19.981	20.092	19.688	22.625	19.366	22.832	22.063	19.197	19.810
FeO	0.412	0.243	0.260	0.0	0.259	0.0	0.0	0.0	0.241	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.247	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.276	0.0	0.736	1.474	1.077	0.972	4.116	0.935	4.461	3.365	0.907	1.017
Na2O	5.666	3.741	5.146	6.426	5.800	5.495	6.571	5.231	6.990	6.568	5.308	5.430
K2O	8.163	10.950	8.444	6.162	7.371	7.382	3.350	8.120	2.754	3.972	7.947	8.044
BaO	0.0	0.0	0.0	0.0	0.538	0.867	1.047	0.0	0.0	0.848	0.0	0.0
Total	99.046	98.807	99.247	98.413	100.499	98.147	98.941	98.378	99.199	99.339	98.203	99.552
Atoms per 8 oxygens												
Si	2.963	2.993	2.965	2.929	2.935	2.935	2.786	2.960	2.780	2.827	2.967	2.949
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.039	1.011	1.036	1.072	1.064	1.069	1.214	1.044	1.214	1.176	1.036	1.055
Fe	0.016	0.009	0.010	0.0	0.010	0.0	0.0	0.0	0.009	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.009	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.013	0.0	0.036	0.072	0.052	0.048	0.201	0.046	0.215	0.163	0.044	0.049
Na	0.500	0.333	0.453	0.567	0.505	0.491	0.580	0.464	0.611	0.576	0.471	0.476
K	0.474	0.641	0.489	0.358	0.422	0.434	0.194	0.474	0.158	0.229	0.464	0.464
Ba	0.0	0.0	0.0	0.0	0.009	0.016	0.019	0.0	0.0	0.015	0.0	0.0
Sample	27.	27.	27.	27.	27.	28.	28.	28.	28.	28.	28.	28.
Rock Type	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon
Crystal	1.	1.	5.	5.	5.	4.	4.	4.	4.	4.	4.	4.
Position	8.	8.	1.	7.	7.	1.	3.	5.	2.	4.	6.	7.
Atomic Percent												
Ca	1.3	0.0	3.7	7.2	5.3	4.9	20.2	4.7	21.8	16.6	4.5	5.0
Na	50.7	34.2	46.3	56.9	51.1	49.6	58.4	47.2	62.1	58.6	48.1	48.1
K	48.0	65.8	50.0	35.9	42.7	43.9	19.5	48.2	16.1	23.3	47.4	46.9
Ba	0.0	0.0	0.0	0.0	0.9	1.6	1.9	0.0	0.0	1.5	0.0	0.0

FELDSPAR ANAYLSES

	141233.08	141233.09	141233.10	141233.11	63768.22	63768.23	63768.24	63768.25	63768.26	63768.27	63768.28	63768.29
Weight % oxide												
SiO2	64.723	65.604	60.616	65.055	62.801	62.777	64.044	64.551	66.028	64.874	64.275	66.154
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.888	19.841	22.677	19.887	22.140	22.349	19.817	20.522	20.046	20.053	20.109	18.653
FeO	0.237	0.0	0.0	0.0	0.0	0.0	0.0	0.309	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.142	0.922	4.180	1.309	3.490	3.601	0.629	2.288	0.934	1.240	1.421	0.214
Na2O	5.705	5.576	6.472	5.708	6.386	6.400	4.212	6.153	5.197	5.467	5.544	6.171
K2O	7.075	7.651	3.202	7.435	4.536	4.481	9.113	6.080	8.197	7.669	7.262	7.445
BaO	0.753	0.0	1.606	0.0	0.0	0.608	1.046	0.0	0.0	0.0	0.451	0.0
Total	99.523	99.594	98.753	99.394	99.353	100.216	98.861	99.903	100.402	99.303	99.062	98.637
Atoms per 8 oxygens												
Si	2.936	2.956	2.775	2.941	2.829	2.818	2.943	2.902	2.955	2.937	2.925	3.003
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.063	1.054	1.224	1.060	1.176	1.183	1.073	1.088	1.058	1.070	1.079	0.998
Fe	0.009	0.0	0.0	0.0	0.0	0.0	0.0	0.012	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.056	0.045	0.205	0.063	0.168	0.173	0.031	0.110	0.045	0.060	0.069	0.010
Na	0.502	0.487	0.574	0.500	0.558	0.557	0.375	0.536	0.451	0.480	0.489	0.543
K	0.409	0.440	0.187	0.429	0.261	0.257	0.534	0.349	0.468	0.443	0.422	0.431
Ba	0.013	0.0	0.029	0.0	0.0	0.011	0.019	0.0	0.0	0.0	0.008	0.0
Sample	28.	28.	28.	28.	29.	29.	29.	29.	29.	29.	29.	29.
Rock Type	Phon	Phon	Phon	Phon	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	4.	5.	5.	5.	4.	4.	4.	5.	5.	5.	5.	1.
Position	1.	1.	4.	7.	1.	4.	7.	1.	3.	5.	7.	8.
Atomic Percent												
Ca	5.7	4.6	20.6	6.4	17.0	17.3	3.2	11.1	4.7	6.1	7.0	1.0
Na	51.2	50.1	57.7	50.4	56.5	55.8	39.1	53.9	46.8	48.8	49.5	55.2
K	41.7	45.3	18.8	43.2	26.4	25.8	55.7	35.1	48.5	45.1	42.7	43.8
Ba	1.3	0.0	2.9	0.0	0.0	1.1	2.0	0.0	0.0	0.0	0.8	0.0

FELDSPAR ANAYLSES

	63768.30	63768.33	63768.34	58297.35	58297.36	58297.37	58297.41	58297.51	46237.06	46237.07	46237.08	46237.11
Weight % oxide												
SiO2	66.046	65.622	66.459	67.791	66.219	66.390	67.158	65.230	60.386	61.668	63.915	61.867
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	20.445	18.642	18.908	19.428	18.778	18.886	19.392	18.697	23.633	22.367	19.861	21.199
FeO	0.0	0.300	0.325	0.0	0.0	0.281	0.0	0.0	0.0	0.299	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.976	0.174	0.173	0.0	0.0	0.0	0.145	0.0	5.392	3.766	0.979	2.131
Na2O	8.399	4.136	6.073	6.549	6.281	5.340	7.283	5.635	6.465	6.426	4.538	5.418
K2O	3.274	10.440	7.665	6.790	7.214	8.642	5.729	8.044	2.184	3.666	9.239	6.327
BaO	1.180	0.0	0.0	0.347	0.0	0.0	0.0	0.0	0.828	1.241	1.332	1.977
Total	100.320	99.314	99.603	100.905	98.492	99.539	99.707	97.606	98.888	99.433	99.864	98.919
Atoms per 8 oxygens												
Si	2.936	2.994	2.994	3.000	3.004	2.999	2.993	2.997	2.740	2.799	2.925	2.852
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.071	1.003	1.004	1.014	1.004	1.006	1.019	1.013	1.264	1.197	1.072	1.152
Fe	0.0	0.011	0.012	0.0	0.0	0.011	0.0	0.0	0.0	0.011	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.046	0.009	0.008	0.0	0.0	0.0	0.007	0.0	0.262	0.183	0.048	0.105
Na	0.724	0.366	0.530	0.562	0.553	0.468	0.629	0.502	0.569	0.566	0.403	0.484
K	0.186	0.608	0.441	0.383	0.418	0.498	0.326	0.472	0.126	0.212	0.539	0.372
Ba	0.021	0.0	0.0	0.006	0.0	0.0	0.0	0.0	0.015	0.022	0.024	0.036
Sample	29.	29.	29.	30.	30.	30.	30.	30.	31.	31.	31.	31.
Rock Type	Ben	Ben	Ben	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Ben	Ben	Ben	Ben
Crystal	1.	1.	1.	1.	1.	1.	10.	1.	4.	4.	4.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	1.	4.	7.	8.
Atomic Percent												
Ca	4.7	0.9	0.8	0.0	0.0	0.0	0.7	0.0	27.0	18.6	4.7	10.5
Na	74.1	37.2	54.1	59.1	57.0	48.4	65.4	51.5	58.5	57.6	39.7	48.5
K	19.0	61.9	45.0	40.3	43.0	51.6	33.9	48.5	13.0	21.6	53.2	37.3
Ba	2.1	0.0	0.0	0.6	0.0	0.0	0.0	0.0	1.5	2.2	2.4	3.6

FELDSPAR ANAYLSES

	46237.12	46237.13	46237.21	46237.22	46237.23	46237.24	52298.53	52298.52	52298.51	52298.48	52298.47	52298.46
Weight % oxide												
SiO2	64.990	65.432	60.758	60.789	61.456	61.273	63.022	63.981	63.964	64.539	65.112	64.259
TiO2	0.272	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.098	19.120	23.689	22.896	22.529	23.027	21.708	21.261	21.572	19.357	19.455	19.572
FeO	0.254	0.0	0.339	0.313	0.256	0.0	0.328	0.259	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.678	0.520	5.201	4.776	3.985	4.218	3.355	2.444	2.539	0.960	0.881	1.234
Na2O	5.274	4.888	6.488	6.557	6.258	6.184	6.336	6.099	8.040	5.300	5.872	5.571
K2O	8.439	9.094	2.619	2.955	3.408	3.369	4.418	5.468	3.027	8.019	7.405	7.469
BaO	0.0	0.0	0.950	1.043	1.208	1.389	0.367	0.421	0.548	0.0	0.364	0.0
Total	99.005	99.054	100.044	99.329	99.100	99.460	99.534	99.933	99.690	98.175	99.089	98.105
Atoms per 8 oxygens												
Si	2.961	2.978	2.737	2.762	2.794	2.778	2.842	2.876	2.863	2.957	2.957	2.944
Ti	0.009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.026	1.026	1.258	1.226	1.208	1.231	1.154	1.127	1.138	1.046	1.042	1.057
Fe	0.010	0.0	0.013	0.012	0.010	0.0	0.012	0.010	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.033	0.025	0.251	0.232	0.194	0.205	0.162	0.118	0.122	0.047	0.043	0.061
Na	0.466	0.431	0.567	0.578	0.552	0.544	0.554	0.532	0.698	0.471	0.517	0.495
K	0.491	0.528	0.151	0.171	0.198	0.195	0.254	0.314	0.173	0.469	0.429	0.437
Ba	0.0	0.0	0.017	0.019	0.022	0.025	0.006	0.007	0.010	0.0	0.006	0.0
Sample	31.	31.	31.	31.	31.	31.	32.	32.	32.	32.	32.	32.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	1.	1.	5.	5.	5.	5.	6.	6.	6.	5.	5.	5.
Position	8.	8.	1.	3.	5.	7.	3.	7.	1.	7.	5.	3.
Atomic Percent												
Ca	3.3	2.5	25.5	23.2	20.1	21.2	16.6	12.2	12.2	4.8	4.3	6.1
Na	47.1	43.8	57.5	57.8	57.1	56.1	56.8	54.8	69.6	47.7	52.0	49.8
K	49.6	53.7	15.3	17.1	20.5	20.1	26.0	32.3	17.2	47.5	43.1	44.0
Ba	0.0	0.0	1.7	1.9	2.3	2.6	0.6	0.7	1.0	0.0	0.6	0.0

FELDSPAR ANAYLSES

	52298.45	52298.38	52298.37	52298.28	52298.27	52298.26	52298.25	58065.24	58065.21	58065.20	58065.17	58065.06
Weight % oxide												
SiO2	65.432	61.764	65.810	61.030	61.817	61.460	62.539	54.042	58.007	54.887	52.818	54.475
TiO2	0.0	0.0	0.0	0.257	0.0	0.0	0.288	0.298	0.0	0.0	0.235	0.0
Al2O3	19.565	20.452	18.970	22.511	22.157	22.802	21.338	28.674	25.492	28.124	28.953	27.417
FeO	0.0	1.154	0.246	0.0	0.0	0.0	0.0	0.318	0.451	0.329	0.307	0.245
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.888	0.343	0.0	4.347	3.921	4.055	2.782	11.263	7.522	10.687	11.589	10.193
Na2O	5.306	4.234	4.161	7.339	6.872	6.381	5.812	4.872	6.611	5.044	4.858	5.063
K2O	7.503	9.426	10.434	2.198	3.061	3.658	5.868	0.231	0.708	0.375	0.236	0.619
BaO	0.0	0.0	0.0	0.685	1.020	0.841	0.462	0.0	0.0	0.0	0.0	0.0
Total	98.694	97.373	99.621	98.367	98.848	99.197	99.089	99.698	98.791	99.446	98.996	98.012
Atoms per 8 oxygens												
Si	2.968	2.887	2.990	2.779	2.809	2.787	2.846	2.450	2.631	2.490	2.418	2.507
Ti	0.0	0.0	0.0	0.009	0.0	0.0	0.010	0.010	0.0	0.0	0.008	0.0
Al	1.046	1.127	1.016	1.208	1.187	1.219	1.145	1.533	1.363	1.504	1.563	1.487
Fe	0.0	0.045	0.009	0.0	0.0	0.0	0.0	0.012	0.017	0.012	0.012	0.009
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.043	0.017	0.0	0.212	0.191	0.197	0.136	0.547	0.366	0.519	0.569	0.503
Na	0.467	0.384	0.367	0.648	0.606	0.561	0.513	0.428	0.581	0.444	0.431	0.452
K	0.434	0.562	0.605	0.128	0.177	0.212	0.341	0.013	0.041	0.022	0.014	0.036
Ba	0.0	0.0	0.0	0.012	0.018	0.015	0.008	0.0	0.0	0.0	0.0	0.0
Sample	32.	32.	32.	32.	32.	32.	32.	33.	33.	33.	33.	33.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab
Crystal	5.	1.	1.	4.	4.	4.	4.	1.	1.	1.	1.	4.
Position	1.	8.	8.	3.	7.	5.	1.	8.	8.	8.	8.	2.
Atomic Percent												
Ca	4.6	1.8	0.0	21.2	19.3	20.0	13.6	55.4	37.0	52.7	56.1	50.8
Na	49.5	39.9	37.8	64.8	61.1	57.0	51.4	43.3	58.8	45.1	42.5	45.6
K	46.0	58.4	62.2	12.8	17.8	21.5	34.2	1.3	4.1	2.2	1.4	3.6
Ba	0.0	0.0	0.0	1.2	1.8	1.5	0.8	0.0	0.0	0.0	0.0	0.0

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	58065.05	58065.04	58065.03	58065.02	58100.40	58100.32	58100.30	58100.29	58100.25	58264.61	58264.59	58264.58
Weight % oxide												
SiO2	54.605	59.739	54.906	55.301	66.805	66.817	65.751	66.383	64.566	65.502	65.324	64.504
TiO2	0.0	0.285	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	29.113	25.031	27.692	27.610	19.919	19.209	19.921	19.896	20.123	18.578	19.500	19.387
FeO	0.0	0.336	0.0	0.271	0.276	0.0	0.0	0.344	0.0	0.0	0.0	0.322
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	11.764	7.079	10.377	10.476	0.826	0.445	1.298	0.886	1.071	0.315	1.019	1.253
Na2O	4.600	6.868	4.836	5.160	6.724	5.489	6.550	5.871	6.365	6.037	5.702	6.023
K2O	0.355	0.614	0.505	0.588	6.425	8.523	6.119	7.400	6.432	7.719	7.287	7.237
BaO	0.0	0.375	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.437	100.327	98.316	99.406	100.975	100.483	99.639	100.780	98.557	98.151	98.832	98.726
Atoms per 8 oxygens												
Si	2.454	2.666	2.511	2.510	2.960	2.989	2.949	2.957	2.933	2.995	2.963	2.943
Ti	0.0	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.543	1.317	1.493	1.477	1.040	1.013	1.053	1.045	1.077	1.001	1.043	1.043
Fe	0.0	0.013	0.0	0.010	0.010	0.0	0.0	0.013	0.0	0.0	0.0	0.012
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.567	0.339	0.509	0.509	0.039	0.021	0.062	0.042	0.052	0.015	0.050	0.061
Na	0.401	0.594	0.429	0.454	0.578	0.476	0.570	0.507	0.561	0.535	0.501	0.533
K	0.020	0.035	0.029	0.034	0.363	0.486	0.350	0.421	0.373	0.450	0.422	0.421
Ba	0.0	0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	33.	33.	33.	33.	34.	34.	34.	34.	34.	35.	35.	35.
Rock Type	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Tr/Sy	Tr/Sy	Tr/Sy
Crystal	4.	4.	4.	4.	1.	1.	1.	1.	1.	1.	6.	6.
Position	1.	7.	5.	3.	8.	8.	8.	8.	8.	8.	7.	1.
Atomic Percent												
Ca	57.4	34.8	52.6	51.1	4.0	2.1	6.3	4.3	5.3	1.5	5.1	6.0
Na	40.6	60.9	44.4	45.5	59.0	48.4	58.0	52.3	56.9	53.5	51.5	52.5
K	2.0	3.6	3.0	3.4	37.0	49.4	35.6	43.4	37.8	45.0	43.4	41.5
Ba	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	58264.56	58264.55	58264.53	58264.47	58264.46	58264.45	58264.44	58264.43	126765.74	126765.73	126765.68	126765.67
Weight % oxide												
SiO2	65.637	65.778	65.883	65.994	65.159	64.161	65.194	66.224	65.483	65.153	64.737	64.643
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	18.565	18.657	18.678	18.750	19.809	19.716	18.718	20.078	19.696	19.799	19.468	19.285
FeO	0.0	0.279	0.0	0.0	0.0	0.0	0.0	0.265	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.204	0.168	0.363	0.415	1.362	1.309	0.412	1.141	0.952	1.109	0.986	0.995
Na2O	6.016	6.020	6.099	6.126	5.945	6.385	6.298	5.961	4.504	5.708	3.091	3.562
K2O	7.660	7.868	7.520	7.436	6.852	6.203	7.413	7.352	9.282	7.467	11.705	10.799
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.082	98.770	98.543	98.721	99.127	97.774	98.035	101.021	99.917	99.236	99.987	99.284
Atoms per 8 oxygens												
Si	3.000	2.993	2.996	2.995	2.946	2.937	2.984	2.945	2.958	2.948	2.952	2.959
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.000	1.001	1.002	1.003	1.056	1.064	1.010	1.053	1.049	1.056	1.047	1.041
Fe	0.0	0.011	0.0	0.0	0.0	0.0	0.0	0.010	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.010	0.008	0.018	0.020	0.066	0.064	0.020	0.054	0.046	0.054	0.048	0.049
Na	0.533	0.531	0.538	0.539	0.521	0.567	0.559	0.514	0.394	0.501	0.273	0.316
K	0.447	0.457	0.436	0.431	0.395	0.362	0.433	0.417	0.535	0.431	0.681	0.631
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	35.	35.	35.	35.	35.	35.	35.	35.	36.	36.	36.	36.
Rock Type	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Phon	Phon	Phon	Phon
Crystal	1.	1.	1.	5.	5.	5.	4.	4.	6.	6.	5.	5.
Position	8.	8.	8.	7.	3.	1.	7.	1.	7.	1.	7.	1.
Atomic Percent												
Ca	1.0	0.8	1.8	2.0	6.7	6.4	2.0	5.5	4.7	5.5	4.8	4.9
Na	53.8	53.3	54.2	54.4	53.1	57.1	55.2	52.2	40.4	50.8	27.2	31.7
K	45.2	45.9	44.0	43.5	40.2	36.5	42.8	42.3	54.9	43.7	68.0	63.4
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	126765.64	126765.63	126765.62	59779.87	59779.86	59779.85	59779.84	59779.83	59779.82	59779.81	59779.80	59779.79
Weight % oxide												
SiO2	63.726	64.995	63.778	66.136	66.179	65.863	65.310	62.119	61.368	65.240	61.396	61.603
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.308	0.0
Al2O3	19.597	19.523	18.827	19.497	19.440	19.335	19.038	22.195	22.274	19.385	22.899	21.793
FeO	0.0	0.0	0.0	0.364	0.0	0.347	0.0	0.264	0.0	0.0	0.333	0.230
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.319	0.878	0.548	0.285	0.330	0.837	0.760	3.650	3.737	1.021	4.369	3.709
Na2O	3.285	3.657	1.770	6.106	6.382	6.822	6.892	6.598	6.020	6.603	6.251	6.071
K2O	11.112	10.756	13.459	7.513	7.517	5.801	6.042	3.711	4.097	6.266	3.748	4.251
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.933	1.291	0.0	1.131	0.829
Total	99.039	99.809	98.382	99.901	99.848	99.005	98.042	99.470	98.787	98.515	100.435	98.486
Atoms per 8 oxygens												
Si	2.933	2.957	2.971	2.971	2.973	2.970	2.975	2.812	2.804	2.961	2.766	2.819
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.010	0.0
Al	1.063	1.047	1.034	1.033	1.030	1.028	1.022	1.184	1.200	1.037	1.216	1.176
Fe	0.0	0.0	0.0	0.014	0.0	0.013	0.0	0.010	0.0	0.0	0.013	0.009
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.065	0.043	0.027	0.014	0.016	0.040	0.037	0.177	0.183	0.050	0.211	0.182
Na	0.293	0.323	0.160	0.532	0.556	0.596	0.609	0.579	0.533	0.581	0.546	0.539
K	0.653	0.624	0.800	0.431	0.431	0.334	0.351	0.214	0.239	0.363	0.215	0.248
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.017	0.023	0.0	0.020	0.015
Sample	36.	36.	36.	37.	37.	37.	37.	37.	37.	37.	37.	37.
Rock Type	Phon	Phon	Phon	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	4.	4.	4.	1.	1.	1.	1.	4.	4.	4.	4.	4.
Position	7.	3.	1.	8.	8.	8.	8.	1.	1.	7.	6.	5.
Atomic Percent												
Ca	6.4	4.3	2.7	1.4	1.6	4.1	3.7	17.9	18.7	5.0	21.3	18.5
Na	29.0	32.6	16.2	54.5	55.4	61.4	61.1	58.7	54.5	58.5	55.0	54.8
K	64.6	63.0	81.1	44.1	43.0	34.4	35.2	21.7	24.4	36.5	21.7	25.2
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	2.4	0.0	2.0	1.5

FELDSPAR ANAYLSES

	59779.78	59779.77	59779.76	58291.05	58291.03	58022.01	58022.02	58022.03	58022.04	58022.05	58022.06	58022.09
Weight % oxide												
SiO2	61.365	62.928	63.860	66.896	63.943	63.776	64.215	64.039	64.986	65.012	65.860	66.081
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	21.813	21.050	21.323	18.886	18.228	19.249	19.612	19.267	19.988	19.303	20.284	19.274
FeO	0.0	0.0	0.247	0.263	0.0	0.0	0.0	0.0	0.0	0.0	0.276	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.985	1.243	1.457	1.499	1.039	1.435	0.0
CaO	3.611	2.718	2.250	0.0	0.0	4.804	4.967	5.039	4.954	5.910	7.305	0.578
Na2O	5.968	5.995	5.923	7.241	2.809	8.631	8.064	8.029	7.768	7.161	5.027	4.368
K2O	4.390	5.582	6.073	6.281	12.278	0.484	0.410	0.0	0.0	0.0	0.0	9.703
BaO	0.893	0.525	0.570	0.0	0.0	0.684	0.666	0.617	0.629	0.542	0.604	0.0
Total	98.040	98.798	100.246	99.567	97.258	98.613	99.177	98.448	99.824	98.967	100.791	100.004
Atoms per 8 oxygens												
Si	2.820	2.867	2.872	2.999	2.997	2.880	2.876	2.882	2.878	2.902	2.881	2.982
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.182	1.131	1.131	0.998	1.007	1.025	1.036	1.022	1.044	1.016	1.046	1.025
Fe	0.0	0.0	0.009	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.010	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.066	0.083	0.098	0.099	0.069	0.094	0.0
Ca	0.178	0.133	0.108	0.0	0.0	0.232	0.238	0.243	0.235	0.283	0.342	0.028
Na	0.532	0.530	0.516	0.629	0.255	0.756	0.700	0.701	0.667	0.620	0.426	0.382
K	0.257	0.324	0.348	0.359	0.734	0.028	0.023	0.0	0.0	0.0	0.0	0.559
Ba	0.016	0.009	0.010	0.0	0.0	0.012	0.012	0.011	0.011	0.009	0.010	0.0
Sample	37.	37.	37.	38.	38.	39.	39.	39.	39.	39.	39.	39.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	4.	4.	4.	1	1.	4.	4.	4.	4.	4.	1.	1.
Position	4.	3.	2.	8.	8.	1.	3.	5.	6.	7.	8.	8.
Atomic Percent												
Ca	18.1	13.4	11.0	0.0	0.0	22.6	24.5	25.4	25.7	31.0	44.0	2.9
Na	54.1	53.2	52.5	63.7	25.8	73.5	71.9	73.4	73.1	68.0	54.8	39.4
K	26.1	32.5	35.4	36.3	74.2	2.7	2.4	0.0	0.0	0.0	0.0	57.7
Ba	1.6	0.9	1.0	0.0	0.0	1.2	1.2	1.2	1.2	1.0	1.3	0.0

FELDSPAR ANAYLSES

	58022.20	58022.21	58022.22	58022.23	58022.24	58022.25	58022.26	59741.36	59741.37	59741.39	59741.40	59741.41
Weight % oxide												
SiO2	69.365	61.741	62.657	62.405	62.656	62.683	65.614	64.148	64.722	64.738	63.043	64.220
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.142	22.175	22.416	22.164	22.104	22.391	19.265	21.424	20.283	20.367	22.362	20.385
FeO	0.0	0.0	0.0	0.0	0.316	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.355	4.506	4.169	4.070	3.698	3.919	0.486	2.748	1.650	1.444	3.961	1.700
Na2O	11.269	6.202	5.976	6.115	5.800	6.092	4.042	6.129	5.981	4.964	6.007	5.129
K2O	0.0	3.817	4.158	4.233	4.450	4.344	10.129	5.270	6.336	7.737	4.266	7.177
BaO	0.0	0.482	0.755	0.635	0.653	0.589	0.0	0.528	0.865	1.159	0.836	1.346
Total	100.131	98.923	100.131	99.622	99.677	100.018	99.536	100.247	99.837	100.409	100.475	99.957
Atoms per 8 oxygens												
Si	3.018	2.804	2.813	2.817	2.826	2.816	2.979	2.873	2.921	2.922	2.822	2.913
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	0.982	1.187	1.187	1.179	1.176	1.186	1.031	1.131	1.079	1.084	1.180	1.090
Fe	0.0	0.0	0.0	0.0	0.012	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.017	0.219	0.201	0.197	0.179	0.189	0.024	0.132	0.080	0.070	0.190	0.083
Na	0.951	0.546	0.520	0.535	0.507	0.531	0.356	0.532	0.523	0.434	0.521	0.451
K	0.0	0.221	0.238	0.244	0.256	0.249	0.587	0.301	0.365	0.446	0.244	0.415
Ba	0.0	0.009	0.013	0.011	0.012	0.010	0.0	0.009	0.015	0.020	0.015	0.024
Sample	39.	39.	39.	39.	39.	39.	39.	40.	40.	40.	40.	40.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	10.	5.	5.	5.	5.	5.	5.	4.	4.	5.	5.	5.
Position	8.	1.	2.	4.	5.	6.	7.	1.	7.	1.	3.	6.
Atomic Percent												
Ca	1.8	22.0	20.7	20.0	18.8	19.3	2.5	13.6	8.1	7.2	19.6	8.5
Na	98.2	54.9	53.5	54.2	53.1	54.2	36.8	54.6	53.2	44.7	53.7	46.4
K	0.0	22.2	24.5	24.7	26.8	25.4	60.7	30.9	37.1	46.0	25.2	42.7
Ba	0.0	0.9	1.3	1.1	1.3	1.0	0.0	0.9	1.5	2.1	1.5	2.5

FELDSPAR ANAYLSES

	59741.42	59741.43	59741.44	59741.49	141244.50	141244.51	141244.52	141244.53	141244.62	141244.64	46253.01	46253.02
Weight % oxide												
SiO2	66.065	66.829	66.653	67.418	65.840	65.486	65.702	66.307	65.508	64.911	61.839	61.582
TiO2	0.0	0.0	0.0	0.0	0.0	0.458	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	18.713	19.428	18.835	19.276	19.440	20.251	19.533	19.437	17.861	20.015	22.939	22.858
FeO	0.0	0.274	0.404	0.0	0.0	0.0	0.0	0.0	0.357	0.0	0.0	0.353
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.282	0.333	0.433	0.253	0.856	2.359	0.969	0.774	0.0	1.552	4.375	4.353
Na2O	5.211	6.014	5.856	5.964	5.542	8.074	6.072	6.091	6.292	6.811	6.521	6.657
K2O	8.552	7.416	7.661	7.858	7.959	3.375	6.858	7.335	7.327	5.190	3.161	3.392
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.504	0.481
Total	98.823	100.294	99.842	100.769	99.637	100.003	99.134	99.944	97.345	98.479	99.339	99.676
Atoms per 8 oxygens												
Si	3.002	2.984	2.996	2.997	2.969	2.911	2.965	2.973	3.018	2.937	2.788	2.778
Ti	0.0	0.0	0.0	0.0	0.0	0.015	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.003	1.023	0.998	1.010	1.033	1.061	1.039	1.028	0.970	1.068	1.219	1.216
Fe	0.0	0.010	0.015	0.0	0.0	0.0	0.0	0.0	0.014	0.0	0.0	0.013
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.014	0.016	0.021	0.012	0.041	0.112	0.047	0.037	0.0	0.075	0.211	0.210
Na	0.459	0.521	0.510	0.514	0.485	0.696	0.531	0.530	0.562	0.598	0.570	0.582
K	0.496	0.422	0.439	0.446	0.458	0.191	0.395	0.420	0.431	0.300	0.182	0.195
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.009	0.009
Sample	40.	40.	40.	40.	41.	41.	41.	41.	41.	41.	42.	42.
Rock Type	Ben	Ben	Ben	Ben	Tr-and	Tr-and	Tr-and	Tr-and	Tr-and	Tr-and	Ben	Ben
Crystal	5.	1.	1.	1.	4.	4.	4.	4.	1.	1.	4.	4.
Position	7.	8.	8.	8.	1.	3.	6.	7.	8.	8.	1.	3.
Atomic Percent												
Ca	1.4	1.7	2.2	1.2	4.2	11.2	4.8	3.7	0.0	7.7	21.7	21.1
Na	47.4	54.3	52.6	52.9	49.3	69.7	54.6	53.7	56.6	61.5	58.6	58.4
K	51.2	44.0	45.3	45.9	46.5	19.1	40.6	42.6	43.4	30.8	18.7	19.6
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9

FELDSPAR ANAYLSES

	46253.03	46253.04	46253.05	46253.06	46253.07	46253.08	46253.09	46253.16	46253.17	46253.18	46249.26	46249.27
Weight % oxide												
SiO2	64.969	64.578	65.108	65.178	65.916	66.178	65.731	65.797	64.867	64.865	55.345	48.333
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	20.248	19.460	19.354	19.432	19.203	19.249	19.251	20.179	19.777	19.667	28.060	31.746
FeO	0.0	0.0	0.0	0.0	0.0	0.283	0.0	0.0	0.0	0.0	0.0	0.276
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.260	1.348	1.038	1.114	0.868	0.589	0.886	1.452	1.250	1.584	10.854	15.623
Na2O	5.432	5.342	4.767	5.442	5.222	5.067	4.743	5.738	5.122	5.676	5.355	2.351
K2O	7.476	7.590	8.617	7.860	8.412	8.905	9.120	7.287	7.606	7.438	0.0	0.164
BaO	0.946	0.0	0.0	0.0	0.0	0.0	0.0	0.497	0.740	0.0	0.0	0.0
Total	100.331	98.318	98.884	99.026	99.621	100.271	99.731	100.950	99.362	99.230	99.614	98.493
Atoms per 8 oxygens												
Si	2.928	2.952	2.965	2.959	2.977	2.977	2.973	2.937	2.946	2.941	2.500	2.246
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.076	1.049	1.039	1.040	1.022	1.021	1.027	1.062	1.059	1.051	1.494	1.739
Fe	0.0	0.0	0.0	0.0	0.0	0.011	0.0	0.0	0.0	0.0	0.0	0.011
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.061	0.066	0.051	0.054	0.042	0.028	0.043	0.069	0.061	0.077	0.525	0.778
Na	0.475	0.473	0.421	0.479	0.457	0.442	0.416	0.497	0.451	0.499	0.469	0.212
K	0.430	0.443	0.501	0.455	0.485	0.511	0.526	0.415	0.441	0.430	0.0	0.010
Ba	0.017	0.0	0.0	0.0	0.0	0.0	0.0	0.009	0.013	0.0	0.0	0.0
Sample	42.	42.	42.	42.	42.	42.	42.	42.	42.	42.	43.	43.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Rex Tr	Rex Tr
Crystal	4.	4.	4.	5.	5.	5.	5.	5.	5.	5.	1.	1.
Position	5.	6.	7.	1.	3.	5.	7.	1.	4.	7.	8.	8.
Atomic Percent												
Ca	6.2	6.7	5.2	5.5	4.3	2.9	4.4	7.0	6.3	7.7	52.8	77.8
Na	48.3	48.2	43.3	48.5	46.4	45.1	42.2	50.2	46.7	49.6	47.2	21.2
K	43.7	45.1	51.5	46.1	49.3	52.1	53.4	41.9	45.7	42.7	0.0	1.0
Ba	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.3	0.0	0.0	0.0

FELDSPAR ANAYLSES

	46249.29	63751.50	63751.51	63751.52	63751.56	126759.62	126759.63	126759.64	126759.73	46233.01	46233.02	46233.03
Weight % oxide												
SiO2	51.232	63.915	65.937	65.141	65.525	65.075	65.287	66.441	65.392	61.970	64.924	65.199
TiO2	0.0	0.0	0.272	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	30.200	21.587	18.392	18.712	18.837	18.196	18.090	18.371	17.911	19.505	20.181	20.590
FeO	0.310	0.0	0.0	0.381	0.403	0.0	0.0	0.0	0.0	0.0	0.262	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	13.726	3.151	0.0	0.529	0.657	0.0	0.0	0.0	0.0	1.604	1.586	1.569
Na2O	3.577	7.350	3.792	5.029	5.246	2.257	1.088	4.546	0.963	8.046	7.348	8.089
K2O	0.228	3.635	10.793	8.950	8.895	13.353	15.221	9.854	15.446	2.698	3.937	2.910
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.489	0.529	0.0
Total	99.273	99.638	99.186	98.742	99.563	98.881	99.686	99.212	99.712	94.312	98.767	98.357
Atoms per 8 oxygens												
Si	2.349	2.859	3.008	2.981	2.976	3.009	3.013	3.019	3.020	2.919	2.930	2.927
Ti	0.0	0.0	0.009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.633	1.139	0.989	1.009	1.009	0.992	0.984	0.984	0.975	1.083	1.074	1.090
Fe	0.012	0.0	0.0	0.015	0.015	0.0	0.0	0.0	0.0	0.0	0.010	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.674	0.151	0.0	0.026	0.032	0.0	0.0	0.0	0.0	0.081	0.077	0.075
Na	0.318	0.638	0.335	0.446	0.462	0.202	0.097	0.401	0.086	0.735	0.643	0.704
K	0.013	0.207	0.628	0.522	0.515	0.788	0.896	0.571	0.910	0.162	0.227	0.167
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.009	0.009	0.0
Sample	43.	44.	44.	44.	44.	45.	45.	45.	45.	46.	46.	46.
Rock Type	Rex Tr	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Sy-gab	Sy-gab	Sy-gab
Crystal	1.	4.	1.	1	1.	4.	4.	4.	5.	1.	1.	1.
Position	8.	1.	8.	8.	8.	1.	1.	7.	8.	8.	8.	8.
Atomic Percent												
Ca	67.1	15.2	0.0	2.6	3.2	0.0	0.0	0.0	0.0	8.2	8.1	7.9
Na	31.6	64.1	34.8	44.9	45.8	20.4	9.8	41.3	8.6	74.5	67.3	74.4
K	1.3	20.8	65.2	52.5	51.0	79.6	90.2	58.7	91.4	16.4	23.7	17.7
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.0

FELDSPAR ANAYLSES

	46233.04	46233.05	46233.22	46233.22	46233.25	46233.28	59783.44	59783.45	59783.46	59783.47	59783.48	59783.52
Weight % oxide												
SiO2	65.355	64.528	63.656	67.184	55.116	65.290	67.943	68.014	67.259	68.179	67.535	67.723
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	21.432	21.223	24.130	20.425	26.938	21.455	18.437	18.748	19.062	19.398	18.689	18.562
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.281	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	2.188	2.680	1.267	1.466	0.903	2.641	0.0	0.132	0.0	0.137	0.0	0.0
Na2O	8.804	8.739	10.272	9.230	12.140	8.848	6.858	8.700	7.793	8.037	6.330	6.071
K2O	1.543	1.244	3.826	1.646	4.380	1.333	6.591	3.491	4.711	4.915	7.646	7.619
BaO	0.0	0.0	0.0	0.687	0.0	0.422	0.0	0.0	0.888	0.526	0.0	0.0
Total	99.322	98.414	103.151	100.638	99.477	99.989	99.829	99.085	99.994	101.192	100.200	99.975
Atoms per 8 oxygens												
Si	2.897	2.888	2.772	2.948	2.543	2.887	3.031	3.023	3.000	2.998	3.016	3.026
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.120	1.120	1.239	1.057	1.465	1.118	0.970	0.982	1.002	1.006	0.984	0.978
Fe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.010	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.104	0.129	0.059	0.069	0.045	0.125	0.0	0.006	0.0	0.006	0.0	0.0
Na	0.757	0.758	0.867	0.785	1.086	0.759	0.593	0.750	0.674	0.685	0.548	0.526
K	0.087	0.071	0.213	0.092	0.258	0.075	0.375	0.198	0.268	0.276	0.436	0.434
Ba	0.0	0.0	0.0	0.012	0.0	0.007	0.0	0.0	0.016	0.009	0.0	0.0
Sample	46.	46.	46.	46.	46.	46.	47.	47.	47.	47.	47.	47.
Rock Type	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Phon	Phon	Phon	Phon	Phon	Phon
Crystal	1.	1.	4.	4.	4.	1.	1.	1.	4.	4.	4.	1.
Position	8.	8.	1.	1.	4.	8.	8.	8.	1.	4.	7.	1.
Atomic Percent												
Ca	11.0	13.5	5.2	7.2	3.2	12.9	0.0	0.6	0.0	0.6	0.0	0.0
Na	79.9	79.1	76.1	81.9	78.2	78.6	61.3	78.6	70.4	70.2	55.7	54.8
K	9.2	7.4	18.7	9.6	18.6	7.8	38.7	20.8	28.0	28.3	44.3	45.2
Ba	0.0	0.0	0.0	1.3	0.0	0.7	0.0	0.0	1.7	0.9	0.0	0.0

FELDSPAR ANAYLSES

	59783.53	59631.01	59631.02	59631.03	59631.04	59631.05	59631.06	59631.07	326256.23	326256.24	326256.25	326256.26
Weight % oxide												
SiO2	67.693	49.288	57.302	55.416	62.964	53.282	54.753	54.381	63.558	65.008	64.085	65.612
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	18.298	26.969	26.049	28.288	21.430	28.701	28.099	28.665	21.618	21.491	21.267	18.829
FeO	0.0	0.259	0.311	0.336	0.0	0.409	0.307	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	11.566	9.296	11.518	3.332	12.284	11.592	11.772	3.359	3.285	2.670	0.706
Na2O	6.028	3.752	5.801	4.569	6.398	4.100	4.720	4.249	6.768	6.849	6.539	5.054
K2O	7.811	0.318	0.463	0.386	4.043	0.375	0.529	0.478	3.288	3.318	4.159	8.089
BaO	0.472	0.0	0.0	0.0	0.690	0.0	0.0	0.0	0.511	0.0	1.107	0.0
Total	100.302	92.152	99.222	100.513	98.857	99.151	100.000	99.545	99.102	99.951	99.827	98.290
Atoms per 8 oxygens												
Si	3.030	2.423	2.593	2.488	2.855	2.435	2.478	2.465	2.860	2.884	2.879	2.994
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	0.965	1.563	1.390	1.498	1.145	1.546	1.499	1.532	1.147	1.124	1.126	1.013
Fe	0.0	0.011	0.012	0.013	0.0	0.016	0.012	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.609	0.451	0.554	0.162	0.602	0.562	0.572	0.162	0.156	0.129	0.035
Na	0.523	0.358	0.509	0.398	0.562	0.363	0.414	0.373	0.590	0.589	0.570	0.447
K	0.446	0.020	0.027	0.022	0.234	0.022	0.031	0.028	0.189	0.188	0.238	0.471
Ba	0.008	0.0	0.0	0.0	0.012	0.0	0.0	0.0	0.009	0.0	0.019	0.0
Sample	47.	48.	48.	48.	48.	48.	48.	48.	49.	49.	49.	49.
Rock Type	Phon	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Phon	Phon	Phon	Phon
Crystal	1.	1.	1.	4.	4.	5.	5.	5.	4.	4.	4.	4.
Position	7.	1.	8.	1.	8.	1.	3.	7.	2.	1.	4.	5.
Atomic Percent												
Ca	0.0	61.7	45.7	56.9	16.7	61.0	55.8	58.8	17.1	16.7	13.5	3.7
Na	53.5	36.3	51.6	40.9	57.9	36.8	41.1	38.3	62.1	63.1	59.6	46.9
K	45.6	2.0	2.7	2.3	24.1	2.2	3.1	2.9	19.9	20.2	24.9	49.4
Ba	0.8	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.9	0.0	2.0	0.0

FELDSPAR ANAYLSES

	326256.27	326256.28	326256.29	326256.30	326256.31	326256.32	63895.33	63895.38	59660.01	59660.02	59660.03	59660.04
Weight % oxide												
SiO2	66.356	65.993	66.848	66.285	66.886	67.071	64.456	65.110	61.662	62.116	62.131	62.513
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.321
Al2O3	18.409	18.491	18.583	18.040	18.212	18.305	17.931	17.959	22.657	22.944	22.631	22.884
FeO	0.0	0.0	0.0	0.238	0.0	0.0	0.0	0.0	0.245	0.325	0.319	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.311	0.0	0.0	0.0	0.0	0.0	0.0	4.640	4.342	4.224	4.439
Na2O	4.597	4.834	4.301	4.258	4.411	4.686	0.360	2.945	6.272	6.090	6.521	6.284
K2O	9.266	9.098	10.023	9.886	10.075	10.181	16.469	12.702	3.423	3.486	3.591	3.524
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.374	0.0	0.489	0.380
Total	98.628	98.727	99.755	98.707	99.584	100.243	99.216	98.716	99.273	99.303	99.906	100.345
Atoms per 8 oxygens												
Si	3.022	3.008	3.019	3.028	3.029	3.022	3.007	3.012	2.787	2.794	2.794	2.790
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.011
Al	0.989	0.994	0.990	0.972	0.972	0.972	0.986	0.979	1.207	1.217	1.200	1.204
Fe	0.0	0.0	0.0	0.009	0.0	0.0	0.0	0.0	0.009	0.012	0.012	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.015	0.0	0.0	0.0	0.0	0.0	0.0	0.225	0.209	0.204	0.212
Na	0.406	0.427	0.377	0.377	0.387	0.409	0.033	0.264	0.550	0.531	0.569	0.544
K	0.538	0.529	0.578	0.576	0.582	0.585	0.980	0.750	0.197	0.200	0.206	0.201
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.007	0.0	0.009	0.007
Sample	49.	49.	49.	49.	49.	49.	50.	50.	52.	52.	52.	52.
Rock Type	Phon	Phon	Phon	Phon	Phon	Phon	Q Porp	Q Porp	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy
Crystal	4.	4.	5.	5.	6.	6.	10.	1.	4.	4.	4.	5.
Position	6.	7.	1.	7.	1.	7.	8.	8.	1.	4.	7.	1.
Atomic Percent												
Ca	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	23.0	22.2	20.6	22.0
Na	43.0	44.0	39.5	39.6	39.9	41.1	3.3	26.0	56.2	56.5	57.6	56.4
K	57.0	54.5	60.5	60.4	60.1	58.9	96.7	74.0	20.1	21.3	20.9	20.9
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.9	0.7

FELDSPAR ANAYLSES

	59660.05	59660.06	59660.07	59660.08	59660.09	59660.10	59660.11	59771.27	59771.28	59771.29	59771.30	59771.31
Weight % oxide												
SiO2	62.120	63.203	61.769	65.335	63.044	64.339	64.080	66.344	66.499	65.497	65.203	65.733
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	23.186	22.549	23.019	19.191	21.306	20.872	20.440	18.527	18.328	18.461	19.466	19.850
FeO	0.372	0.234	0.265	0.0	0.354	0.417	0.250	0.268	0.0	0.266	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	4.824	3.873	4.766	1.035	2.937	2.317	1.529	0.0	0.0	0.0	1.046	1.070
Na2O	6.205	6.197	6.456	3.589	6.754	5.786	4.953	5.156	5.216	5.404	4.792	4.934
K2O	3.393	4.054	3.155	10.813	4.545	6.031	7.839	8.939	8.682	8.425	8.340	8.247
BaO	0.769	0.495	0.471	0.376	0.419	0.426	1.031	0.0	0.0	0.0	0.0	0.0
Total	100.869	100.605	99.901	100.339	99.359	100.188	100.122	99.234	98.725	98.053	98.847	99.834
Atoms per 8 oxygens												
Si	2.773	2.818	2.776	2.966	2.852	2.891	2.907	3.009	3.023	3.003	2.965	2.958
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.220	1.185	1.219	1.027	1.136	1.106	1.093	0.991	0.982	0.998	1.044	1.053
Fe	0.014	0.009	0.010	0.0	0.013	0.016	0.009	0.010	0.0	0.010	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.231	0.185	0.229	0.050	0.142	0.112	0.074	0.0	0.0	0.0	0.051	0.052
Na	0.537	0.536	0.563	0.316	0.592	0.504	0.436	0.453	0.460	0.480	0.423	0.431
K	0.193	0.231	0.181	0.626	0.262	0.346	0.454	0.517	0.503	0.493	0.484	0.474
Ba	0.013	0.009	0.008	0.007	0.007	0.008	0.018	0.0	0.0	0.0	0.0	0.0
Sample	52.	52.	52.	52.	52.	52.	52.	53.	53.	53.	53.	53.
Rock Type	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Ben	Ben	Ben	Ben	Ben
Crystal	5.	5.	5.	1.	1.	1.	1.	1.	1.	1.	4.	4.
Position	3.	5.	7.	8.	8.	8.	8.	8.	8.	8.	1.	4.
Atomic Percent												
Ca	23.7	19.3	23.3	5.0	14.2	11.5	7.5	0.0	0.0	0.0	5.3	5.4
Na	55.1	55.8	57.4	31.6	59.0	52.0	44.4	46.7	47.8	49.3	44.2	45.0
K	19.8	24.0	18.5	62.7	26.1	35.7	46.2	53.3	52.2	50.7	50.5	49.5
Ba	1.3	0.9	0.8	0.7	0.7	0.8	1.8	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	59771.32	59771.33	59771.34	141239.35	141239.36	141239.37	141239.38	141239.39	141239.40	141239.41	141239.42	141239.43
Weight % oxide												
SiO2	64.912	64.282	64.308	66.041	65.204	66.009	66.713	66.394	64.991	64.909	66.198	66.017
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	20.122	19.839	20.438	20.085	19.431	19.776	18.837	19.481	20.238	20.612	18.878	18.748
FeO	0.289	0.0	0.298	0.0	0.284	0.0	0.261	0.0	0.0	0.0	0.0	0.382
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.669	1.470	1.887	1.408	1.192	1.379	0.258	1.044	1.772	1.969	0.559	0.288
Na2O	5.682	5.145	5.475	5.362	5.175	5.200	5.351	5.946	5.387	5.763	5.398	5.150
K2O	6.971	7.604	6.894	7.755	7.505	7.491	8.704	7.164	7.105	6.735	8.145	8.816
BaO	0.0	0.607	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.523	0.0	0.0
Total	99.645	98.947	99.300	100.651	98.791	99.855	100.124	100.029	99.493	100.511	99.178	99.401
Atoms per 8 oxygens												
Si	2.927	2.934	2.911	2.947	2.962	2.962	2.999	2.972	2.930	2.910	2.995	2.993
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.070	1.067	1.091	1.057	1.041	1.046	0.998	1.028	1.076	1.089	1.007	1.002
Fe	0.011	0.0	0.011	0.0	0.011	0.0	0.010	0.0	0.0	0.0	0.0	0.014
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.081	0.072	0.092	0.067	0.058	0.066	0.012	0.050	0.086	0.095	0.027	0.014
Na	0.497	0.455	0.481	0.464	0.456	0.452	0.466	0.516	0.471	0.501	0.474	0.453
K	0.401	0.443	0.398	0.442	0.435	0.429	0.499	0.409	0.409	0.385	0.470	0.510
Ba	0.0	0.011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.009	0.0	0.0
Sample	53.	53.	53.	54.	54.	54.	54.	54.	54.	54.	54.	54.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben
Crystal	4.	5.	5.	4.	4.	4.	4.	1.	5.	5.	5.	1.
Position	7.	1.	7.	1.	4.	7.	9.	8.	1.	4.	7.	8.
Atomic Percent												
Ca	8.3	7.3	9.5	6.9	6.1	7.0	1.2	5.1	8.9	9.6	2.8	1.4
Na	50.8	46.4	49.5	47.7	48.1	47.7	47.7	52.9	48.8	50.6	48.8	46.4
K	41.0	45.2	41.0	45.4	45.8	45.3	51.1	41.9	42.3	38.9	48.4	52.2
Ba	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0

FELDSPAR ANAYLSES

	141239.44	141239.45	52247.66	52247.67	52247.68	52247.69	52247.70	52247.71	52247.72	52247.73	325957.01	325957.02
Weight % oxide												
SiO2	66.590	65.014	63.373	65.264	64.905	63.916	65.166	65.985	66.214	65.893	65.647	67.002
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.335	19.640	18.967	19.664	19.769	20.672	20.117	19.499	19.037	19.158	18.531	19.099
FeO	0.0	0.252	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.570	1.179	0.974	1.011	1.233	1.995	1.523	0.711	0.298	0.380	0.207	0.174
Na2O	6.160	6.161	4.528	4.939	4.778	5.413	5.217	4.945	4.046	4.959	6.035	6.550
K2O	7.037	6.327	8.843	8.897	8.547	6.525	7.784	9.240	10.701	9.239	7.432	6.736
BaO	0.0	0.0	0.0	0.0	0.0	0.707	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.692	98.573	96.685	99.775	99.232	99.228	99.807	100.380	100.296	99.629	97.852	99.561
Atoms per 8 oxygens												
Si	2.985	2.951	2.959	2.952	2.947	2.902	2.936	2.967	2.990	2.982	3.003	3.001
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.022	1.051	1.044	1.049	1.058	1.106	1.069	1.034	1.013	1.022	0.999	1.009
Fe	0.0	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.027	0.057	0.049	0.049	0.060	0.097	0.074	0.034	0.014	0.018	0.010	0.008
Na	0.535	0.542	0.410	0.433	0.421	0.476	0.456	0.431	0.354	0.435	0.535	0.569
K	0.402	0.366	0.527	0.513	0.495	0.378	0.447	0.530	0.616	0.533	0.434	0.385
Ba	0.0	0.0	0.0	0.0	0.0	0.013	0.0	0.0	0.0	0.0	0.0	0.0
Sample	54.	54.	55.	55.	55.	55.	55.	55.	55.	55.	56.	56.
Rock Type	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Rex Tr	Rex Tr
Crystal	1.	1.	4.	4.	4.	4.	1.	1.	1.	1.	4.	4.
Position	8.	8.	1.	3.	5.	7.	8.	8.	8.	8.	1.	7.
Atomic Percent												
Ca	2.8	5.9	5.0	4.9	6.1	10.1	7.6	3.4	1.4	1.8	1.0	0.8
Na	55.5	56.2	41.6	43.5	43.1	49.4	46.7	43.3	36.0	44.1	54.6	59.1
K	41.7	37.9	53.4	51.6	50.7	39.2	45.8	53.3	62.6	54.1	44.3	40.0
Ba	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	325957.03	325957.04	325957.05	325957.06	326281.28	326281.29	326281.30	325986.31	325986.32	325986.33	325986.34	325986.35
Weight % oxide												
SiO2	66.741	65.726	65.898	66.101	63.725	64.196	64.845	65.079	65.300	64.877	65.578	66.672
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.057	18.574	19.641	19.248	21.868	22.007	22.123	19.301	19.953	19.673	19.753	19.483
FeO	0.261	0.0	0.314	0.434	0.0	0.261	0.0	0.0	0.0	0.0	0.292	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.176	0.0	0.169	0.216	3.470	3.239	3.318	0.859	1.603	2.086	1.202	0.574
Na2O	5.873	3.414	6.779	7.415	9.062	9.271	9.264	6.221	6.259	6.235	5.541	6.620
K2O	7.984	11.383	6.388	5.349	0.0	0.0	0.0	6.899	6.978	6.403	7.602	6.852
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.421	0.0	0.471	0.0	0.0
Total	100.092	99.097	99.189	98.763	98.125	98.974	99.550	98.780	100.093	99.745	99.968	100.201
Atoms per 8 oxygens												
Si	2.993	3.007	2.968	2.980	2.854	2.853	2.861	2.961	2.933	2.931	2.950	2.976
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.008	1.002	1.043	1.023	1.155	1.153	1.151	1.035	1.056	1.048	1.048	1.025
Fe	0.010	0.0	0.012	0.016	0.0	0.010	0.0	0.0	0.0	0.0	0.011	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.008	0.0	0.008	0.010	0.167	0.154	0.157	0.042	0.077	0.101	0.058	0.027
Na	0.511	0.303	0.592	0.648	0.787	0.799	0.792	0.549	0.545	0.546	0.483	0.573
K	0.457	0.664	0.367	0.308	0.0	0.0	0.0	0.401	0.400	0.369	0.436	0.390
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.008	0.0	0.008	0.0	0.0
Sample	56.	56.	56.	56.	57.	57.	57.	58.	58.	58.	58.	58.
Rock Type	Rex Tr	Rex Tr	Rex Tr	Rex Tr	Oth Lp	Oth Lp	Oth Lp	Ben	Ben	Ben	Ben	Ben
Crystal	1.	1.	1.	1.	1.	1.	1.	4.	4.	5.	5.	1.
Position	8.	8.	8.	8.	8.	8.	8.	1.	7.	1.	7.	8.
Atomic Percent												
Ca	0.8	0.0	0.8	1.0	17.5	16.2	16.5	4.2	7.5	9.9	5.9	2.7
Na	52.4	31.3	61.2	67.1	82.5	83.8	83.5	54.9	53.3	53.3	49.4	57.9
K	46.8	68.7	38.0	31.9	0.0	0.0	0.0	40.1	39.1	36.0	44.6	39.4
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.8	0.0	0.0

FELDSPAR ANAYLSES

	325986.36	325986.37	326286.60	326286.61	326286.62	326286.63	326286.64	326286.65	326286.69	326233.01	326233.02	326233.03
Weight % oxide												
SiO2	65.836	66.221	66.643	67.033	65.684	67.295	65.790	63.740	68.842	65.785	66.190	66.171
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.756	19.863	18.659	18.552	18.448	18.837	18.514	18.000	19.158	19.416	19.802	19.782
FeO	0.0	0.0	0.280	0.273	0.327	0.328	0.0	0.236	0.234	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.074	1.049	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.422	1.391	1.376
Na2O	6.387	6.190	5.906	5.251	5.092	6.156	5.859	0.0	10.800	5.189	4.994	5.116
K2O	6.631	6.682	8.109	8.971	9.110	7.311	8.120	16.079	0.0	8.284	8.356	8.386
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.684	100.005	99.597	100.080	98.661	99.927	98.283	98.055	99.034	100.096	100.733	100.831
Atoms per 8 oxygens												
Si	2.956	2.960	3.005	3.014	3.002	3.011	3.004	3.004	3.022	2.961	2.957	2.956
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.046	1.047	0.992	0.983	0.994	0.994	0.997	1.000	0.992	1.030	1.043	1.042
Fe	0.0	0.0	0.011	0.010	0.013	0.012	0.0	0.009	0.009	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.052	0.050	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.069	0.067	0.066
Na	0.556	0.537	0.516	0.458	0.451	0.534	0.519	0.0	0.919	0.453	0.433	0.443
K	0.380	0.381	0.466	0.515	0.531	0.417	0.473	0.967	0.0	0.476	0.476	0.478
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	58.	58.	59.	59.	59.	59.	59.	59.	59.	60.	60.	60.
Rock Type	Ben	Ben	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Sy-gab	Sy-gab	Sy-gab
Crystal	1.	1.	1.	4.	5.	1.	1.	1.	1.	4.	4.	4.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.	3.	5.
Atomic Percent												
Ca	5.3	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	6.9	6.7
Na	56.3	55.5	52.5	47.1	45.9	56.2	52.3	0.0	100.0	45.4	44.4	44.9
K	38.5	39.4	47.5	52.9	54.1	43.8	47.7	100.0	0.0	47.7	48.8	48.4
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	326233.04	325980.16	58023.24	58023.25	58023.26	58023.30	58023.31	58023.36	58023.37	58023.38	326241.42	326241.43
Weight % oxide												
SiO2	64.413	54.535	66.010	65.558	65.697	65.211	65.213	65.672	65.939	65.770	56.307	56.929
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.251	27.686	18.587	18.461	19.511	20.293	18.391	18.532	18.738	19.673	26.749	26.695
FeO	0.0	0.495	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.334	0.420
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.243	10.540	0.0	0.0	0.470	1.421	0.0	0.0	0.0	0.496	9.568	9.359
Na2O	4.701	5.121	2.934	1.618	3.225	7.304	2.767	3.219	3.931	4.613	5.504	5.532
K2O	8.106	0.767	12.724	14.809	11.428	4.908	13.271	12.005	10.988	9.527	0.963	1.366
BaO	1.011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.725	99.144	100.255	100.446	100.331	99.137	99.642	99.428	99.596	100.079	99.425	100.301
Atoms per 8 oxygens												
Si	2.956	2.490	3.003	3.001	2.972	2.930	2.997	3.004	3.000	2.966	2.554	2.563
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.042	1.490	0.997	0.996	1.041	1.075	0.996	0.999	1.005	1.046	1.430	1.417
Fe	0.0	0.019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.013	0.016
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.061	0.516	0.0	0.0	0.023	0.068	0.0	0.0	0.0	0.024	0.465	0.452
Na	0.418	0.453	0.259	0.144	0.283	0.636	0.247	0.285	0.347	0.403	0.484	0.483
K	0.475	0.045	0.739	0.865	0.660	0.281	0.778	0.701	0.638	0.548	0.056	0.078
Ba	0.018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	60.	61.	62.	62.	62.	62.	62.	62.	62.	62.	63.	63.
Rock Type	Sy-gab	BFD	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Haw/Mug	Haw/Mug
Crystal	4.	4.	4.	1.	1.	1.	4.	5.	5.	1.	4.	4.
Position	7.	8.	1.	8.	8.	8.	7.	1.	7.	8.	1.	3.
Atomic Percent												
Ca	6.3	50.9	0.0	0.0	2.4	6.9	0.0	0.0	0.0	2.5	46.3	44.6
Na	43.0	44.7	26.0	14.3	29.3	64.6	24.1	28.9	35.2	41.3	48.2	47.7
K	48.9	4.4	74.0	85.7	68.3	28.5	75.9	71.1	64.8	56.2	5.6	7.7
Ba	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	326241.46	326241.47	326241.48	326241.49	326241.53	326241.54	326241.55	326241.56	325992.01	325992.02	325992.03	325992.04
Weight % oxide												
SiO2	56.511	57.213	56.693	65.456	66.054	65.345	65.726	66.348	55.659	55.969	55.218	57.475
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	26.330	26.649	26.318	18.636	18.857	18.710	19.412	19.477	28.413	27.161	27.667	26.888
FeO	0.330	0.342	0.379	0.0	0.0	0.0	0.0	0.0	0.478	0.626	0.887	0.689
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	9.071	9.127	9.357	0.153	0.0	0.0	0.564	0.390	11.425	10.347	10.853	9.866
Na2O	5.535	5.608	5.638	5.345	6.093	4.990	6.183	6.100	5.241	5.433	5.026	5.861
K2O	1.381	1.356	0.734	8.678	8.023	9.129	7.392	7.630	0.260	0.415	0.418	0.312
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	99.158	100.295	99.119	98.268	99.027	98.174	99.277	99.945	101.476	99.951	100.069	101.091
Atoms per 8 oxygens												
Si	2.571	2.573	2.574	2.997	2.994	2.997	2.969	2.976	2.481	2.528	2.498	2.561
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.412	1.413	1.409	1.006	1.008	1.012	1.034	1.030	1.493	1.446	1.475	1.413
Fe	0.013	0.013	0.014	0.0	0.0	0.0	0.0	0.0	0.018	0.024	0.034	0.026
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.442	0.440	0.455	0.008	0.0	0.0	0.027	0.019	0.546	0.501	0.526	0.471
Na	0.488	0.489	0.496	0.474	0.536	0.444	0.542	0.531	0.453	0.476	0.441	0.506
K	0.080	0.078	0.043	0.507	0.464	0.534	0.426	0.437	0.015	0.024	0.024	0.018
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	63.	63.	63.	63.	63.	63.	63.	63.	64.	64.	64.	64.
Rock Type	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab
Crystal	4.	4.	4.	10.	1.	1.	1.	1.	1.	1.	1.	1.
Position	5.	6.	7.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	43.8	43.7	45.8	0.8	0.0	0.0	2.7	1.9	53.8	50.0	53.1	47.3
Na	48.3	48.6	49.9	47.9	53.6	45.4	54.5	53.8	44.7	47.6	44.5	50.9
K	7.9	7.7	4.3	51.3	46.4	54.6	42.8	44.3	1.5	2.4	2.4	1.8
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	325992.05	326276.35	326276.36	326276.37	326276.38	326276.39	326276.49	326211.61	326211.62	326211.63	326211.64	58015.01
Weight % oxide												
SiO2	55.773	65.296	67.026	66.421	60.982	63.141	59.915	65.324	65.740	65.948	65.861	64.372
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	28.221	19.472	19.911	19.645	23.748	21.086	20.659	19.140	19.144	19.374	19.328	18.638
FeO	0.641	0.0	0.0	0.268	0.0	0.0	0.0	0.0	0.0	0.342	0.310	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	10.911	0.711	0.487	0.214	3.798	0.850	1.068	0.565	0.264	0.352	0.381	0.0
Na2O	5.246	5.702	6.086	6.175	6.283	5.559	4.714	6.232	5.664	5.174	5.779	5.368
K2O	0.335	8.140	7.589	7.568	3.222	6.866	6.527	7.014	8.117	9.408	7.940	8.556
BaO	0.0	0.0	0.0	0.919	3.165	3.906	5.123	0.0	0.0	0.0	0.0	0.0
Total	101.127	99.321	101.099	101.210	101.198	101.408	98.006	98.275	98.929	100.598	99.599	96.934
Atoms per 8 oxygens												
Si	2.493	2.959	2.970	2.965	2.750	2.874	2.849	2.976	2.983	2.967	2.973	2.988
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.487	1.040	1.040	1.034	1.262	1.131	1.158	1.028	1.024	1.027	1.029	1.020
Fe	0.024	0.0	0.0	0.010	0.0	0.0	0.0	0.0	0.0	0.013	0.012	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.523	0.035	0.023	0.010	0.184	0.041	0.054	0.028	0.013	0.017	0.018	0.0
Na	0.455	0.501	0.523	0.534	0.549	0.491	0.435	0.550	0.498	0.451	0.506	0.483
K	0.019	0.471	0.429	0.431	0.185	0.399	0.396	0.408	0.470	0.540	0.457	0.507
Ba	0.0	0.0	0.0	0.016	0.056	0.070	0.095	0.0	0.0	0.0	0.0	0.0
Sample	64.	66.	66.	66	66.	66.	66.	68.	68.	68.	68.	70.
Rock Type	Bas/Gab	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Ben	Tr/Sy
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	4.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	1.
Atomic Percent												
Ca	52.5	3.5	2.4	1.0	18.9	4.1	5.5	2.8	1.3	1.7	1.8	0.0
Na	45.6	49.8	53.6	53.9	56.4	49.1	44.4	55.8	50.8	44.7	51.6	48.8
K	1.9	46.8	44.0	43.5	19.0	39.9	40.4	41.4	47.9	53.6	46.6	51.2
Ba	0.0	0.0	0.0	1.6	5.7	7.0	9.7	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	58015.02	58015.03	58015.04	58015.05	58015.06	58015.19	58015.21	58015.25	58241.27	58241.28	326300.45	326300.46
Weight % oxide												
SiO2	65.740	66.118	65.795	66.648	65.527	64.239	63.405	66.318	65.042	62.809	66.022	65.118
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.219	18.935	19.279	19.730	18.894	18.137	19.972	19.107	18.621	18.040	18.432	18.335
FeO	0.0	0.0	0.0	0.0	0.0	0.267	0.468	0.476	0.0	0.241	0.370	0.277
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na2O	6.020	6.443	4.914	7.625	4.776	3.938	5.002	5.057	2.635	0.947	5.906	4.356
K2O	7.781	7.162	9.538	5.197	9.891	10.885	9.942	9.518	13.081	15.198	7.556	10.067
BaO	0.0	0.0	0.369	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.760	98.658	99.895	99.200	99.088	97.466	98.789	100.476	99.379	97.235	98.286	98.153
Atoms per 8 oxygens												
Si	2.984	2.996	2.979	2.980	2.989	2.996	2.920	2.984	2.992	2.985	3.010	3.002
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.028	1.012	1.029	1.040	1.016	0.997	1.084	1.014	1.010	1.011	0.991	0.996
Fe	0.0	0.0	0.0	0.0	0.0	0.010	0.018	0.018	0.0	0.010	0.014	0.011
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	0.530	0.566	0.431	0.661	0.422	0.356	0.447	0.441	0.235	0.087	0.522	0.389
K	0.451	0.414	0.551	0.297	0.576	0.648	0.584	0.546	0.768	0.921	0.439	0.592
Ba	0.0	0.0	0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	70.	70.	70.	70.	70.	70.	70.	70.	71.	71.	72.	72.
Rock Type	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Tr/Sy	Ben	Ben	Rex Ph	Rex Ph
Crystal	4.	4.	5.	5.	5.	1.	1.	1.	4.	4.	1.	1.
Position	4.	7.	1.	4.	7.	8.	8.	8.	1.	8.	8.	8.
Atomic Percent												
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na	54.0	57.8	43.6	69.0	42.3	35.5	43.4	44.7	23.4	8.6	54.3	39.7
K	46.0	42.2	55.7	31.0	57.7	64.5	56.6	55.3	76.6	91.4	45.7	60.3
Ba	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	326300.48	326300.54	325937.55	326284.01	326284.02	325902.44	325902.45	325902.46	325902.47	325902.48	325902.49	325902.50
Weight % oxide												
SiO2	67.176	67.126	67.615	66.981	67.027	55.240	56.358	55.407	55.704	55.808	58.055	58.092
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	18.796	18.432	19.546	18.797	19.442	26.370	26.472	26.861	27.561	27.332	25.635	25.810
FeO	0.422	0.296	0.244	0.0	0.0	0.381	0.370	0.389	0.349	0.432	0.508	0.247
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.0	0.425	0.0	0.0	9.551	9.122	9.758	10.369	10.312	7.881	8.085
Na2O	5.915	5.977	11.013	10.652	4.433	5.327	5.378	5.184	5.154	5.065	5.874	5.825
K2O	7.888	8.341	0.0	0.110	11.203	1.154	1.210	1.085	0.962	0.957	1.648	1.723
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.425
Total	100.197	100.172	98.843	96.863	102.105	98.023	98.910	98.684	100.099	99.906	99.601	100.207
Atoms per 8 oxygens												
Si	3.007	3.013	2.986	3.012	2.981	2.546	2.568	2.536	2.515	2.524	2.623	2.617
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	0.992	0.975	1.018	0.996	1.019	1.433	1.422	1.449	1.467	1.457	1.366	1.371
Fe	0.016	0.011	0.009	0.0	0.0	0.015	0.014	0.015	0.013	0.016	0.019	0.009
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.0	0.020	0.0	0.0	0.472	0.445	0.478	0.502	0.500	0.382	0.390
Na	0.513	0.520	0.943	0.929	0.382	0.476	0.475	0.460	0.451	0.444	0.515	0.509
K	0.450	0.478	0.0	0.006	0.636	0.068	0.070	0.063	0.055	0.055	0.095	0.099
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.008
Sample	72.	72.	73.	74.	74.	77.	77.	77.	77.	77.	77.	77.
Rock Type	Rex Ph	Rex Ph	Ben	Rex Ph	Rex Ph	BFD	BFD	BFD	BFD	BFD	BFD	BFD
Crystal	1.	1.	1.	1.	1.	4.	4.	4.	5.	5.	6.	6.
Position	8.	8.	8.	8.	8.	1.	4.	7.	1.	7.	1.	7.
Atomic Percent												
Ca	0.0	0.0	2.1	0.0	0.0	46.5	44.9	47.8	49.8	50.1	38.5	38.8
Na	53.3	52.1	97.9	99.4	37.5	46.9	48.0	46.0	44.7	44.4	51.9	50.6
K	46.7	47.9	0.0	0.6	62.5	6.7	7.1	6.3	5.5	5.5	9.6	9.8
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8

FELDSPAR ANAYLSES

	325960.61	326229.63	326229.64	326229.65	326229.72	326273.01
Weight % oxide						
SiO2	63.780	62.161	63.675	63.360	67.255	63.353
TiO2	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	18.610	21.131	20.859	21.216	19.123	17.902
FeO	0.257	0.283	0.0	0.0	0.0	0.232
MnO	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	2.940	2.032	2.502	0.354	0.0
Na2O	1.771	5.935	5.441	5.654	11.063	1.118
K2O	13.702	5.385	7.005	6.357	0.0	14.760
BaO	0.827	0.0	0.373	0.0	0.0	0.0
Total	98.947	97.835	99.385	99.089	97.795	97.365
Atoms per 8 oxygens						
Si	2.976	2.854	2.889	2.873	2.999	2.998
Ti	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.024	1.144	1.116	1.134	1.005	0.999
Fe	0.010	0.011	0.0	0.0	0.0	0.009
Mn	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.145	0.099	0.122	0.017	0.0
Na	0.160	0.528	0.479	0.497	0.956	0.103
K	0.816	0.315	0.406	0.368	0.0	0.891
Ba	0.015	0.0	0.007	0.0	0.0	0.0
Sample	78.	79.	79.	79.	79.	82.
Rock Type	Brecc	Ben	Ben	Ben	Ben	Rex Ph
Crystal	2.	4.	4.	4.	1.	3.
Position	8.	1.	4.	7.	8.	8.
Atomic Percent						
Ca	0.0	14.7	10.0	12.4	1.7	0.0
Na	16.1	53.4	48.3	50.4	98.3	10.4
K	82.3	31.9	41.0	37.3	0.0	89.6
Ba	1.5	0.0	0.7	0.0	0.0	0.0

	326273.02	326273.20	326273.21	326244.22	326244.23	326244.24
Weight % oxide						
SiO2	68.301	63.708	67.954	55.095	55.273	55.995
TiO2	0.0	0.0	0.0	0.0	0.292	0.0
Al2O3	18.919	18.438	19.299	27.284	26.793	27.039
FeO	0.0	0.0	0.0	0.290	0.421	0.458
MnO	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.0	0.0	10.034	9.921	9.710
Na2O	10.786	1.020	11.237	5.044	4.773	5.130
K2O	0.141	15.125	0.0	0.980	1.025	1.153
BaO	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.147	98.291	98.490	98.727	98.498	99.485
Atoms per 8 oxygens						
Si	3.025	2.986	3.005	2.519	2.532	2.541
Ti	0.0	0.0	0.0	0.0	0.010	0.0
Al	0.988	1.019	1.006	1.471	1.447	1.446
Fe	0.0	0.0	0.0	0.011	0.016	0.017
Mn	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.0	0.0	0.492	0.487	0.472
Na	0.926	0.093	0.963	0.447	0.424	0.451
K	0.008	0.905	0.0	0.057	0.060	0.067
Ba	0.0	0.0	0.0	0.0	0.0	0.0
Sample	82.	82.	82.	83.	83.	83.
Rock Type	Rex Ph	Rex Ph	Rex Ph	BFD	BFD	BFD
Crystal	1.	1.	1.	4.	4.	4.
Position	8.	8.	8.	1.	4.	7.
Atomic Percent						
Ca	0.0	0.0	0.0	49.4	50.2	47.7
Na	99.1	9.3	100.0	44.9	43.7	45.6
K	0.9	90.7	0.0	5.7	6.2	6.8
Ba	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	326244.25	326244.26	326244.27	326207.05	326207.06	326282.01	326282.02	326282.03	326282.11	326282.19	63808.24	63808.25
Weight % oxide												
SiO2	55.308	56.005	55.941	64.123	63.113	66.700	67.233	67.737	65.100	68.425	65.671	66.360
TiO2	0.0	0.0	0.288	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	26.892	27.218	27.199	18.445	20.613	18.627	18.857	19.159	18.336	19.020	19.068	19.143
FeO	0.331	0.0	0.488	0.464	0.400	0.433	0.292	0.295	0.399	0.493	0.451	0.273
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	10.071	10.093	10.063	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.382	0.437
Na2O	4.951	5.366	5.051	0.400	10.105	6.791	6.769	7.128	5.903	6.829	6.503	7.345
K2O	1.136	1.076	1.025	16.494	1.479	6.434	6.378	6.403	7.698	6.612	6.249	4.904
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.689	99.758	100.055	99.926	95.710	98.985	99.529	100.722	97.436	101.379	98.324	98.462
Atoms per 8 oxygens												
Si	2.532	2.534	2.526	2.980	2.906	3.008	3.010	3.001	3.000	3.012	2.983	2.991
Ti	0.0	0.0	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.451	1.452	1.448	1.010	1.119	0.990	0.995	1.001	0.996	0.987	1.021	1.017
Fe	0.013	0.0	0.018	0.018	0.015	0.016	0.011	0.011	0.015	0.018	0.017	0.010
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.494	0.489	0.487	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.019	0.021
Na	0.439	0.471	0.442	0.036	0.902	0.594	0.588	0.612	0.527	0.583	0.573	0.642
K	0.066	0.062	0.059	0.978	0.087	0.370	0.364	0.362	0.453	0.371	0.362	0.282
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	83.	83.	83.	90.	90.	93.	93.	93.	93.	93.	98.	98.
Rock Type	BFD	BFD	BFD	Ben	Ben	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	BFD	BFD
Crystal	5.	5.	5.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	1.	4.	7.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	49.4	47.8	49.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.2
Na	43.9	46.1	44.7	3.6	91.2	61.6	61.8	62.8	53.8	61.1	60.1	67.9
K	6.6	6.1	6.0	96.4	8.8	38.4	38.2	37.2	46.2	38.9	37.9	29.8
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	63808.30	63808.31	63808.32	52285.39	52285.40	52285.42	52285.50	326289.01	326289.02	326289.06	58296.01	58296.02
Weight % oxide												
SiO2	66.050	65.598	65.850	51.007	52.291	54.546	56.784	61.663	66.785	65.276	60.583	65.113
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.582	19.376	19.276	28.201	28.139	27.998	26.507	17.476	18.827	18.384	17.062	18.565
FeO	0.0	0.255	0.0	0.512	0.634	0.530	0.350	0.418	0.433	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.608	0.730	0.684	11.648	11.555	9.698	8.770	0.0	0.171	0.0	0.0	0.0
Na2O	6.599	6.663	6.725	3.840	4.033	5.178	5.527	6.129	9.552	1.350	5.393	5.271
K2O	6.062	6.107	5.967	0.481	0.432	0.515	0.804	6.465	1.822	14.929	7.419	8.637
BaO	0.0	0.0	0.0	0.391	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.901	98.729	98.502	96.080	97.084	98.465	98.742	92.151	97.590	99.939	90.457	97.586
Atoms per 8 oxygens												
Si	2.974	2.968	2.979	2.415	2.440	2.497	2.581	2.996	3.004	3.003	3.005	2.999
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.040	1.034	1.028	1.574	1.548	1.511	1.420	1.001	0.999	0.997	0.998	1.008
Fe	0.0	0.010	0.0	0.020	0.025	0.020	0.013	0.017	0.016	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.029	0.035	0.033	0.591	0.578	0.476	0.427	0.0	0.008	0.0	0.0	0.0
Na	0.576	0.585	0.590	0.353	0.365	0.460	0.487	0.577	0.833	0.120	0.519	0.471
K	0.348	0.353	0.344	0.029	0.026	0.030	0.047	0.401	0.105	0.876	0.469	0.508
Ba	0.0	0.0	0.0	0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	98.	98.	98.	99.	99.	99.	99.	100.	100.	100.	101.	101.
Rock Type	BFD	BFD	BFD	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Rex Ph	Rex Ph	Rex Ph	Rex Tr	Rex Tr
Crystal	4.	4.	4.	1.	1.	1.	10.	1.	1.	1.	1.	1.
Position	1.	3.	7	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	3.0	3.6	3.4	60.3	59.6	49.3	44.4	0.0	0.8	0.0	0.0	0.0
Na	60.4	60.1	61.0	36.0	37.7	47.6	50.7	59.0	88.1	12.0	52.5	48.1
K	36.5	36.3	35.6	3.0	2.7	3.1	4.9	41.0	11.1	88.0	47.5	51.9
Ba	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	58296.03	58296.15	58290.16	58290.17	58290.18	325903.50	325903.51	325903.52	325903.53	325903.56	325903.57	325903.58
Weight % oxide												
SiO2	67.674	51.779	54.701	54.417	55.326	57.373	55.861	56.299	56.841	60.378	60.851	56.477
TiO2	0.0	0.0	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.029	26.053	29.219	28.625	27.891	28.036	26.937	27.310	26.753	23.549	23.617	26.880
FeO	0.253	0.694	0.254	0.366	0.0	0.0	0.320	0.522	0.464	0.334	0.0	0.370
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.192	0.138	12.403	11.665	10.541	10.802	10.210	10.348	9.430	5.718	5.539	9.851
Na2O	5.995	9.340	4.825	4.821	5.516	5.036	4.852	5.237	5.571	5.321	5.867	5.072
K2O	8.441	2.966	0.0	0.191	0.118	1.034	1.136	0.922	0.596	3.693	2.830	1.183
BaO	0.0	0.0	0.0	0.0	0.0	0.381	0.0	0.0	0.0	1.115	1.159	0.0
Total	101.584	90.970	101.702	100.085	99.392	102.662	99.316	100.638	99.655	100.108	99.863	99.833
Atoms per 8 oxygens												
Si	2.998	2.568	2.435	2.459	2.505	2.528	2.539	2.529	2.565	2.733	2.745	2.552
Ti	0.0	0.0	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	0.994	1.523	1.534	1.525	1.489	1.456	1.444	1.446	1.423	1.257	1.256	1.432
Fe	0.009	0.029	0.009	0.014	0.0	0.0	0.012	0.020	0.018	0.013	0.0	0.014
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.009	0.007	0.592	0.565	0.511	0.510	0.497	0.498	0.456	0.277	0.268	0.477
Na	0.515	0.898	0.416	0.422	0.484	0.430	0.428	0.456	0.487	0.467	0.513	0.444
K	0.477	0.188	0.0	0.011	0.007	0.058	0.066	0.053	0.034	0.213	0.163	0.068
Ba	0.0	0.0	0.0	0.0	0.0	0.007	0.0	0.0	0.0	0.020	0.020	0.0
Sample	101.	101.	102.	102.	102.	104.	104.	104.	104.	104.	104.	104.
Rock Type	Rex Tr	Rex Tr	BFD	BFD	BFD	BFD	BFD	BFD	BFD	BFD	BFD	BFD
Crystal	1.	1.	2.	2.	2.	4.	4.	4.	1.	5.	5.	6.
Position	8.	8.	1.	4.	7.	1.	4.	7.	8.	1.	7.	1.
Atomic Percent												
Ca	0.9	0.6	58.7	56.6	51.0	50.7	50.2	49.5	46.7	28.4	27.8	48.2
Na	51.4	82.2	41.3	42.3	48.3	42.8	43.2	45.3	49.8	47.8	53.2	44.9
K	47.7	17.2	0.0	1.1	0.7	5.8	6.7	5.3	3.5	21.8	16.9	6.9
Ba	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	2.0	2.1	0.0

FELDSPAR ANAYLSES

	325903.59	325903.60	325903.61	325903.62	325903.63	325611.64	325611.65	325611.66	325611.67	325611.68	325611.69	325611.70
Weight % oxide												
SiO2	56.603	60.837	60.762	60.352	55.542	55.019	62.172	56.317	57.350	56.179	57.081	63.577
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	27.044	23.157	23.450	23.348	26.586	26.368	25.206	27.286	27.051	27.444	26.763	19.844
FeO	0.415	0.294	0.551	0.275	0.484	0.382	0.331	0.260	0.453	0.531	0.956	2.751
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.456
CaO	9.744	5.318	5.515	5.514	9.672	9.957	7.029	10.550	9.703	10.417	8.085	2.261
Na2O	5.097	5.585	5.546	5.431	5.585	5.323	7.439	5.387	5.674	5.538	5.849	8.901
K2O	1.166	3.911	3.800	3.743	0.527	0.228	0.233	0.323	0.210	0.280	1.341	0.867
BaO	0.0	0.612	0.371	0.706	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.069	99.714	99.995	99.569	98.396	97.277	102.410	100.123	100.441	100.389	100.075	98.657
Atoms per 8 oxygens												
Si	2.551	2.754	2.742	2.742	2.545	2.545	2.702	2.533	2.564	2.524	2.573	2.876
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.437	1.236	1.247	1.251	1.436	1.438	1.291	1.447	1.426	1.454	1.422	1.058
Fe	0.016	0.011	0.021	0.010	0.019	0.015	0.012	0.010	0.017	0.020	0.036	0.104
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.031
Ca	0.471	0.258	0.267	0.268	0.475	0.493	0.327	0.509	0.465	0.502	0.390	0.110
Na	0.445	0.490	0.485	0.478	0.496	0.477	0.627	0.470	0.492	0.482	0.511	0.781
K	0.067	0.226	0.219	0.217	0.031	0.013	0.013	0.019	0.012	0.016	0.077	0.050
Ba	0.0	0.011	0.007	0.013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	104.	104.	104.	104.	104.	105.	105.	105.	105.	105.	105.	105.
Rock Type	BFD	BFD	BFD	BFD	BFD	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab	Bas/Gab
Crystal	6.	7.	7.	7.	1.	4.	4.	5.	5.	6.	7.	7.
Position	7.	1.	4.	7.	8.	1.	7.	1.	7.	1.	1.	7.
Atomic Percent												
Ca	47.9	26.2	27.3	27.5	47.4	50.2	33.8	51.0	48.0	50.2	39.9	11.7
Na	45.3	49.7	49.6	49.0	49.5	48.5	64.8	47.1	50.8	48.2	52.2	83.0
K	6.8	22.9	22.4	22.2	3.1	1.3	1.3	1.9	1.2	1.6	7.9	5.3
Ba	0.0	1.1	0.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	325611.71	325611.72	41947.83	41947.84	41947.87	325923.01	325923.02	325923.03	325923.12	325943.26	325943.27	325943.29
Weight % oxide												
SiO2	55.113	55.770	59.536	63.073	65.579	68.524	68.621	67.589	62.864	56.184	54.036	56.480
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	27.493	26.593	17.387	18.546	18.293	19.780	19.683	19.437	18.247	26.946	28.896	26.580
FeO	0.646	0.529	0.575	0.0	0.240	0.374	0.0	0.483	1.115	0.870	0.418	0.439
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	11.169	9.985	0.0	0.225	0.445	0.0	0.0	0.0	0.0	6.492	10.785	8.056
Na2O	4.880	5.779	0.0	0.267	9.753	11.648	11.885	11.298	0.494	6.072	4.624	5.884
K2O	0.237	0.229	15.010	15.656	0.543	0.291	0.0	0.152	16.100	1.501	0.542	0.811
BaO	0.0	0.0	1.491	2.048	0.0	0.0	0.0	0.0	0.0	0.604	0.0	0.674
Total	99.538	98.885	93.999	99.815	94.853	100.617	100.189	98.959	98.820	98.669	99.301	98.924
Atoms per 8 oxygens												
Si	2.502	2.543	2.968	2.964	3.015	2.982	2.990	2.987	2.964	2.572	2.457	2.575
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.471	1.429	1.022	1.028	0.992	1.015	1.011	1.013	1.014	1.454	1.549	1.429
Fe	0.025	0.020	0.024	0.0	0.009	0.014	0.0	0.018	0.044	0.033	0.016	0.017
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.543	0.488	0.0	0.011	0.022	0.0	0.0	0.0	0.0	0.318	0.526	0.394
Na	0.430	0.511	0.0	0.024	0.870	0.983	1.004	0.968	0.045	0.539	0.408	0.520
K	0.014	0.013	0.955	0.939	0.032	0.016	0.0	0.009	0.968	0.088	0.031	0.047
Ba	0.0	0.0	0.029	0.038	0.0	0.0	0.0	0.0	0.0	0.011	0.0	0.012
Sample	105.	105.	106.	106.	106.	107.	107.	107.	107.	108.	108.	108.
Rock Type	Bas/Gab	Bas/Gab	Brecc	Brecc	Brecc	Glass	Glass	Glass	Glass	Oth Lp	Oth Lp	Oth Lp
Crystal	13.	13.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	1.	7.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	55.0	48.2	0.0	1.1	2.4	0.0	0.0	0.0	0.0	33.3	54.5	40.5
Na	43.6	50.5	0.0	2.4	94.2	98.4	100.0	99.1	4.4	56.4	42.3	53.4
K	1.4	1.3	97.1	92.8	3.5	1.6	0.0	0.9	95.6	9.2	3.2	4.8
Ba	0.0	0.0	2.9	3.8	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.2

FELDSPAR ANAYLSES

	325943.31	325943.35	63810.01	63810.02	63810.03	63810.04	63810.05	63810.06	63810.10	63810.11	63810.21	63810.22
Weight % oxide												
SiO2	55.777	64.338	64.769	65.391	65.072	65.961	65.029	66.422	65.343	65.724	64.479	63.155
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	27.787	18.083	23.073	22.128	22.216	22.176	22.678	21.490	21.607	22.084	22.851	22.976
FeO	0.429	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	9.134	0.0	3.799	2.945	2.798	3.000	3.009	2.271	2.605	2.259	3.310	3.925
Na2O	5.547	0.658	9.229	8.809	9.328	9.126	9.365	8.506	8.279	8.036	8.413	8.078
K2O	0.523	14.983	0.408	0.526	0.394	0.404	0.373	1.089	0.821	0.633	1.247	0.717
BaO	0.0	0.456	0.633	0.886	0.586	0.537	0.307	0.0	0.545	0.690	0.837	0.0
Total	99.197	98.518	101.911	100.685	100.394	101.204	100.761	99.778	99.200	99.426	101.137	98.851
Atoms per 8 oxygens												
Si	2.527	3.009	2.818	2.870	2.861	2.873	2.846	2.916	2.897	2.899	2.831	2.816
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.484	0.997	1.184	1.145	1.152	1.139	1.170	1.112	1.129	1.148	1.183	1.208
Fe	0.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.443	0.0	0.177	0.138	0.132	0.140	0.141	0.107	0.124	0.107	0.156	0.188
Na	0.487	0.060	0.779	0.750	0.795	0.771	0.795	0.724	0.712	0.687	0.716	0.698
K	0.030	0.894	0.023	0.029	0.022	0.022	0.021	0.061	0.046	0.036	0.070	0.041
Ba	0.0	0.008	0.011	0.015	0.010	0.009	0.005	0.0	0.009	0.012	0.014	0.0
Sample	108.	108.	109.	109.	109.	109.	109.	109.	109.	109.	109.	109.
Rock Type	Oth Lp	Oth Lp	BFD	BFD	BFD	BFD	BFD	BFD	BFD	BFD	BFD	BFD
Crystal	1.	1.	4.	4.	4.	4.	4.	4.	1.	1.	5.	5.
Position	8.	8.	1.	2.	4.	5.	6.	7.	8.	8.	1.	3.
Atomic Percent												
Ca	46.1	0.0	17.9	14.8	13.8	14.9	14.7	12.0	13.9	12.7	16.3	20.3
Na	50.7	6.2	78.7	80.5	82.9	81.8	82.6	81.2	79.9	81.6	74.9	75.3
K	3.1	92.9	2.3	3.1	2.3	2.3	2.2	6.8	5.2	4.3	7.3	4.4
Ba	0.0	0.8	1.1	1.6	1.0	1.0	0.5	0.0	1.0	1.4	1.5	0.0

FELDSPAR ANAYLSES

	63810.23	63810.24	63810.25	58019.38	58019.39	58019.40	58019.44	58019.45	58019.46	58019.50	58019.51	58019.53
Weight % oxide												
SiO2	64.088	64.278	64.424	66.580	66.912	64.475	65.434	63.392	63.913	64.784	65.091	65.196
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	22.556	22.206	22.768	19.346	18.804	18.407	19.119	18.839	18.424	18.612	18.286	18.622
FeO	0.0	0.0	0.0	0.0	0.332	0.0	0.0	0.0	0.0	0.0	0.0	0.289
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	3.320	2.992	3.661	0.0	0.217	0.206	0.251	0.536	0.0	0.179	0.0	0.0
Na2O	8.542	8.087	8.327	6.504	5.027	2.786	1.854	1.834	1.483	2.621	1.619	1.746
K2O	0.710	0.704	0.484	7.725	8.727	11.753	13.643	12.786	13.800	12.845	13.843	13.919
BaO	0.433	0.0	0.0	0.0	0.0	0.557	0.0	0.590	0.755	0.0	0.475	0.0
Total	99.649	98.267	99.664	100.155	100.019	98.184	100.301	97.977	98.375	99.041	99.314	99.772
Atoms per 8 oxygens												
Si	2.840	2.868	2.841	2.982	3.007	2.996	2.984	2.969	2.991	2.989	3.008	2.995
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.178	1.168	1.184	1.022	0.996	1.009	1.028	1.040	1.017	1.012	0.996	1.009
Fe	0.0	0.0	0.0	0.0	0.012	0.0	0.0	0.0	0.0	0.0	0.0	0.011
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.158	0.143	0.173	0.0	0.010	0.010	0.012	0.027	0.0	0.009	0.0	0.0
Na	0.734	0.700	0.712	0.565	0.438	0.251	0.164	0.167	0.135	0.234	0.145	0.156
K	0.040	0.040	0.027	0.441	0.500	0.697	0.794	0.764	0.824	0.756	0.816	0.816
Ba	0.008	0.0	0.0	0.0	0.0	0.010	0.0	0.011	0.014	0.0	0.009	0.0
Sample	109.	109.	109.	111.	111.	111.	111.	111.	111.	111.	111.	111.
Rock Type	BFD	BFD	BFD	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon	Phon
Crystal	5.	5.	1.	4.	4.	4.	5.	5.	5.	1.	1.	1.
Position	5.	7.	8.	1.	4.	7.	1.	4.	7.	8.	8.	8.
Atomic Percent												
Ca	16.8	16.2	19.0	0.0	1.1	1.0	1.2	2.8	0.0	0.9	0.0	0.0
Na	78.1	79.3	78.1	56.2	46.2	25.9	16.9	17.2	13.9	23.4	14.9	16.0
K	4.3	4.5	3.0	43.8	52.7	72.0	81.9	78.8	84.7	75.7	84.1	84.0
Ba	0.9	0.0	0.0	0.0	0.0	1.0	0.0	1.1	1.4	0.0	0.9	0.0

FELDSPAR ANAYLSES

	58019.61	58130.01	58130.02	58130.05	58130.12	58130.13	58130.16	58130.19	58130.21	325964.26	325964.27	54168.15
Weight % oxide												
SiO2	67.199	62.804	63.860	64.345	61.538	64.566	63.900	64.457	64.889	65.761	65.750	58.661
TiO2	0.0	0.0	0.0	0.0	0.448	0.058	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	18.715	22.507	23.083	23.595	23.774	21.767	19.914	22.988	22.473	18.505	21.900	18.648
FeO	0.0	0.0	0.0	0.0	0.703	0.043	0.0	0.0	0.0	0.0	0.0	0.259
MnO	0.0	0.0	0.0	0.0	0.0	0.081	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	2.981	3.976	3.862	5.041	2.529	0.890	3.517	3.117	0.126	0.0	0.425
Na2O	9.065	6.638	8.789	9.111	8.354	8.470	5.379	9.548	9.137	3.119	12.629	2.236
K2O	3.067	4.659	0.0	0.335	0.358	1.071	7.391	0.383	0.435	13.111	1.026	12.093
BaO	0.0	1.491	0.0	0.0	0.0	0.858	0.772	0.0	0.507	0.0	0.0	1.268
Total	98.046	101.080	99.708	101.248	100.216	99.443	98.246	100.893	100.558	100.622	101.305	93.590
Atoms per 8 oxygens												
Si	3.016	2.813	2.818	2.804	2.733	2.873	2.935	2.820	2.849	2.993	2.872	2.909
Ti	0.0	0.0	0.0	0.0	0.015	0.002	0.0	0.0	0.0	0.0	0.0	0.0
Al	0.990	1.189	1.201	1.212	1.245	1.142	1.078	1.186	1.163	0.993	1.128	1.090
Fe	0.0	0.0	0.0	0.0	0.026	0.002	0.0	0.0	0.0	0.0	0.0	0.011
Mn	0.0	0.0	0.0	0.0	0.0	0.003	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.143	0.188	0.180	0.240	0.121	0.044	0.165	0.147	0.006	0.0	0.023
Na	0.789	0.577	0.752	0.770	0.719	0.731	0.479	0.810	0.778	0.275	1.070	0.215
K	0.176	0.266	0.0	0.019	0.020	0.061	0.433	0.021	0.024	0.761	0.057	0.765
Ba	0.0	0.026	0.0	0.0	0.0	0.015	0.014	0.0	0.009	0.0	0.0	0.025
Sample	111.	112.	112.	112.	112.	112.	112.	112.	112.	113.	113.	115.
Rock Type	Phon	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Sy-gab	Phon	Phon	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	0.0	14.1	20.0	18.6	24.5	13.0	4.5	16.6	15.3	0.6	0.0	2.2
Na	81.8	57.0	80.0	79.5	73.4	78.8	49.4	81.3	81.2	26.4	94.9	20.9
K	18.2	26.3	0.0	2.0	2.0	6.6	44.6	2.1	2.5	73.0	5.1	74.4
Ba	0.0	2.6	0.0	0.0	0.0	1.6	1.4	0.0	0.9	0.0	0.0	2.4

FELDSPAR ANAYLSES

	54168.11	54168.10	54168.09	52287.22	52287.12	52287.10	52287.09	52287.07	52287.06	326283.59	326283.58	326283.56
Weight % oxide												
SiO2	60.359	61.107	61.194	65.653	58.821	65.621	60.748	67.053	65.406	54.345	67.351	55.454
TiO2	0.624	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	19.344	19.594	19.383	19.778	27.264	19.631	24.718	20.032	18.622	29.580	20.277	30.026
FeO	3.055	0.366	0.365	0.0	0.354	0.0	0.301	0.0	0.0	0.715	0.346	0.436
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.579	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	1.626	0.224	0.291	1.085	7.781	0.545	4.407	0.677	0.301	9.470	0.817	10.912
Na2O	3.407	2.933	5.263	3.767	6.232	8.987	8.651	3.946	1.171	4.777	5.412	4.688
K2O	9.791	10.853	8.215	10.661	1.063	2.907	0.843	10.874	14.557	1.473	9.169	1.030
BaO	1.115	1.595	1.204	0.0	0.0	0.0	0.597	0.0	0.0	0.0	0.0	0.0
Total	99.900	96.672	95.915	100.944	101.515	97.691	100.265	102.582	100.057	100.360	103.372	102.546
Atoms per 8 oxygens												
Si	2.824	2.913	2.912	2.952	2.597	2.964	2.710	2.963	2.999	2.452	2.947	2.447
Ti	0.022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.067	1.101	1.088	1.049	1.419	1.045	1.300	1.044	1.007	1.573	1.046	1.562
Fe	0.120	0.015	0.015	0.0	0.013	0.0	0.011	0.0	0.0	0.027	0.013	0.016
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.040	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.082	0.011	0.015	0.052	0.368	0.026	0.211	0.032	0.015	0.458	0.038	0.516
Na	0.309	0.271	0.486	0.328	0.533	0.787	0.748	0.338	0.104	0.418	0.459	0.401
K	0.584	0.660	0.499	0.612	0.060	0.168	0.048	0.613	0.851	0.085	0.512	0.058
Ba	0.020	0.030	0.022	0.0	0.0	0.0	0.010	0.0	0.0	0.0	0.0	0.0
Sample	115.	115.	115.	120.	120.	120.	120.	120.	120.	122.	122.	122.
Rock Type	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	8.2	1.1	1.5	5.2	38.3	2.7	20.7	3.3	1.5	47.7	3.8	52.9
Na	31.1	27.9	47.6	33.1	55.5	80.2	73.5	34.4	10.7	43.5	45.5	41.1
K	58.7	67.9	48.8	61.7	6.2	17.1	4.7	62.4	87.7	8.8	50.7	5.9
Ba	2.0	3.1	2.2	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	326883.54	326283.50	326283.49	326283.48	326283.46	326283.44	326283.43	54258.77	54258.76	54258.75	54258.73	54258.63
Weight % oxide												
SiO2	63.099	62.279	61.869	62.053	67.859	58.118	55.858	67.493	66.581	66.307	68.481	65.372
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	21.904	25.502	25.733	25.547	19.866	26.777	29.873	22.295	22.586	22.256	22.489	23.706
FeO	0.877	0.0	0.0	0.0	0.0	0.501	0.452	0.0	0.333	0.0	0.0	0.479
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.307	6.264	6.353	6.587	0.499	7.464	11.188	2.209	2.782	3.007	2.309	1.746
Na2O	2.953	7.038	6.755	7.337	4.956	6.120	4.861	9.666	9.459	9.569	9.764	8.375
K2O	10.276	1.502	1.393	1.422	9.842	1.375	0.753	0.298	0.372	0.258	0.262	1.639
BaO	4.439	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	103.855	102.585	102.103	102.946	103.022	100.355	102.985	101.961	102.113	101.397	103.305	101.317
Atoms per 8 oxygens												
Si	2.849	2.706	2.697	2.693	2.975	2.600	2.454	2.898	2.867	2.873	2.901	2.841
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.166	1.306	1.323	1.307	1.027	1.412	1.547	1.128	1.147	1.137	1.123	1.214
Fe	0.033	0.0	0.0	0.0	0.0	0.019	0.017	0.0	0.012	0.0	0.0	0.017
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.015	0.292	0.297	0.306	0.023	0.358	0.527	0.102	0.128	0.140	0.105	0.081
Na	0.259	0.593	0.571	0.617	0.421	0.531	0.414	0.805	0.790	0.804	0.802	0.706
K	0.592	0.083	0.077	0.079	0.551	0.078	0.042	0.016	0.020	0.014	0.014	0.091
Ba	0.079	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	122.	122.	122.	122.	122.	122.	122.	123.	123.	123.	123.	123.
Rock Type	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug	Haw/Mug
Crystal	1.	2.	2.	1.	1.	1.	1.	1.	1.	1.	1.	4.
Position	8.	7.	4.	1.	8.	8.	8.	8.	8.	8.	8.	8.
Atomic Percent												
Ca	1.6	30.2	31.4	30.5	2.3	37.0	53.6	11.1	13.6	14.6	11.4	9.2
Na	27.4	61.3	60.4	61.6	42.3	54.9	42.1	87.2	84.2	83.9	87.1	80.4
K	62.6	8.6	8.1	7.9	55.4	8.1	4.3	1.7	2.1	1.5	1.5	10.4
Ba	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FELDSPAR ANAYLSES

	54258.62	54258.60
Weight % oxide		
SiO2	56.027	57.365
TiO2	0.647	0.0
Al2O3	28.476	28.346
FeO	4.094	0.0
MnO	0.0	0.0
MgO	0.0	0.0
CaO	9.103	9.937
Na2O	5.664	6.390
K2O	0.523	0.0
BaO	0.0	0.0
Total	104.534	102.038
Atoms per 8 oxygens		
Si	2.458	2.526
Ti	0.021	0.0
Al	1.473	1.471
Fe	0.150	0.0
Mn	0.0	0.0
Mg	0.0	0.0
Ca	0.428	0.469
Na	0.482	0.546
K	0.029	0.0
Ba	0.0	0.0
Sample	123.	123.
Rock Type	Haw/Mug	Haw/Mug
Crystal	1.	1.
Position	8.	1.
Atomic Percent		
Ca	45.6	46.2
Na	51.3	53.8
K	3.1	0.0
Ba	0.0	0.0

SODALITE ANAYLSES

	46249.33	46249.34	46249.37	59783.29	59783.30	59783.31	52276.57	52276.58	326300.49	326300.52	326300.53	326284.03
Weight % oxide												
SiO2	37.710	37.955	37.310	38.451	38.251	37.805	37.258	37.445	38.051	38.179	38.197	39.418
Al2O3	30.484	31.100	30.356	30.836	30.845	30.369	29.974	27.771	30.938	31.150	30.990	31.240
FeO	0.0	0.0	0.0	0.0	0.240	0.0	0.0	0.0	0.333	0.332	0.421	0.347
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.490	0.0	0.0	0.0	0.0	0.327	0.296	0.0	0.419	0.405	0.0
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.112	0.0	0.0	0.121	0.0	0.157
Na2O	23.776	24.281	24.251	23.895	24.350	23.891	23.036	22.083	22.410	22.916	23.139	22.226
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cl	7.087	7.048	7.084	7.166	7.080	6.922	6.944	6.601	7.015	7.042	6.989	7.095
S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.214
O eqiv Cl	-1.597	-1.588	-1.596	-1.615	-1.595	-1.560	-1.565	-1.488	-1.581	-1.587	-1.575	-1.599
Total	97.460	99.286	97.405	98.733	99.170	97.427	96.086	92.708	97.166	98.572	98.566	99.098
Atoms per 21 oxygens												
Si	5.714	5.653	5.674	5.744	5.707	5.730	5.719	5.934	5.752	5.703	5.711	5.822
Al	5.446	5.460	5.442	5.430	5.426	5.427	5.424	5.188	5.514	5.486	5.463	5.439
Fe2	0.0	0.0	0.0	0.0	0.030	0.0	0.0	0.0	0.042	0.041	0.053	0.043
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.109	0.0	0.0	0.0	0.0	0.075	0.070	0.0	0.093	0.090	0.0
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.018	0.0	0.0	0.019	0.0	0.025
Na	6.986	7.012	7.151	6.921	7.044	7.021	6.856	6.786	6.569	6.638	6.709	6.365
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cl	1.820	1.779	1.826	1.814	1.790	1.778	1.806	1.773	1.797	1.783	1.771	1.776
SO3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.059
Sample	43.	43.	43.	47.	47.	47.	51.	51.	72.	72.	72.	74.
Rock Type	Rex Tr	Rex Tr	Rex Tr	Phon	Phon	Phon	Phon	Phon	Rex Ph	Rex Ph	Rex Ph	Rex Ph
Crystal	1.	1.	1.	4.	5.	6.	4.	4.	1.	1.	1.	1.
Position	8.	8.	8.	1.	1.	1.	1.	1.	8.	8.	8.	8.

SODALITE ANAYLSES

	326284.04	326284.06	325960.58	325960.59	325960.60	325960.62	326273.16	326273.18	326282.13	326282.14	326282.15	46279.17
Weight % oxide												
SiO2	38.361	39.189	37.310	36.935	37.355	37.870	38.058	43.252	39.183	38.685	39.296	39.002
Al2O3	30.592	31.358	30.625	30.279	30.393	30.388	30.860	32.289	31.467	31.305	32.039	33.486
FeO	0.0	0.0	0.481	0.391	0.349	0.264	0.419	0.232	0.322	0.283	0.538	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.558	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.400	0.289	0.411	0.0	0.361	0.0	0.313	0.488	0.447	0.0
CaO	0.0	0.200	0.0	0.0	0.0	0.0	0.126	0.305	0.182	0.150	0.152	0.0
Na2O	22.464	22.793	23.562	23.318	23.433	23.024	23.426	16.315	21.495	22.672	21.715	26.053
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.130	0.0	0.0	0.0	0.0
Cl	6.781	7.010	7.016	6.952	6.993	6.922	7.022	2.085	6.991	7.005	7.038	7.395
S	0.0	0.225	0.0	0.197	0.0	0.0	0.0	0.0	0.205	0.209	0.0	0.0
O eqiv Cl	-1.528	-1.580	-1.581	-1.567	-1.576	-1.560	-1.582	-0.470	-1.575	-1.579	-1.586	-1.666
Total	96.670	99.195	97.813	96.794	97.358	97.466	98.690	98.138	98.582	99.218	99.639	104.270
Atoms per 21 oxygens												
Si	5.814	5.788	5.647	5.645	5.674	5.739	5.695	6.316	5.802	5.725	5.767	5.547
Al	5.466	5.460	5.465	5.455	5.443	5.430	5.445	5.559	5.493	5.462	5.543	5.615
Fe2	0.0	0.0	0.061	0.050	0.044	0.033	0.052	0.028	0.040	0.035	0.066	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.072	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.090	0.066	0.093	0.0	0.081	0.0	0.069	0.108	0.098	0.0
Ca	0.0	0.032	0.0	0.0	0.0	0.0	0.020	0.048	0.029	0.024	0.024	0.0
Na	6.602	6.527	6.915	6.910	6.901	6.766	6.797	4.620	6.171	6.506	6.179	7.185
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.769	0.0	0.0	0.0	0.0
Cl	1.742	1.755	1.800	1.801	1.800	1.778	1.781	0.516	1.754	1.757	1.750	1.782
SO3	0.0	0.062	0.0	0.056	0.0	0.0	0.0	0.0	0.057	0.058	0.0	0.0
Sample	74.	74.	78.	78.	78.	78.	82.	82.	93.	93.	93.	116.
Rock Type	Rex Ph	Rex Ph	Brecc	Brecc	Brecc	Brecc	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	7.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

SODALITE ANAYLSES

	46279.02	46279.01
Weight % oxide		
SiO2	38.666	37.627
Al2O3	32.211	32.112
FeO	0.0	0.0
MnO	0.0	0.0
MgO	0.0	0.0
CaO	1.300	0.0
Na2O	14.038	21.097
K2O	0.0	0.0
Cl	5.688	7.184
S	0.0	0.0
O eqiv Cl	-1.282	-1.619
Total	90.621	96.401
Atoms per 21 oxygens		
Si	6.021	5.695
Al	5.914	5.729
Fe2	0.0	0.0
Mn	0.0	0.0
Mg	0.0	0.0
Ca	0.217	0.0
Na	4.239	6.191
K	0.0	0.0
Cl	1.501	1.843
SO3	0.0	0.0
Sample	116.	116.
Rock Type	Oth Lp	Oth Lp
Crystal	1.	1.
Position	8.	8.

ANALCITE ANAYLSES

	326233.05	326207.03	52285.37	52285.38	52285.51	52287.16	52287.11	52287.04	326283.42	326283.41
Weight % oxide										
SiO2	55.602	53.288	50.357	50.575	50.870	54.906	56.110	55.386	55.453	57.202
Al2O3	21.680	23.822	23.698	23.334	23.932	24.104	24.198	24.562	24.233	23.251
FeO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.074	0.0
MnO	0.0	0.0	0.0	0.0	0.200	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.324	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.179	0.0
Na2O	12.993	12.930	13.821	13.047	13.360	12.729	11.589	13.439	12.455	11.056
K2O	0.0	0.180	0.369	0.270	0.447	0.0	0.144	0.0	0.204	0.077
Total	90.275	90.544	88.245	87.226	88.809	91.739	92.041	93.387	92.598	91.586
Atoms per 8 oxygens										
Si	2.743	2.634	2.578	2.606	2.584	2.666	2.699	2.649	2.669	2.752
Al	1.261	1.388	1.430	1.418	1.433	1.380	1.372	1.385	1.375	1.319
Fe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.003	0.0
Mn	0.0	0.0	0.0	0.0	0.009	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.024	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.009	0.0
Na	1.243	1.239	1.372	1.304	1.316	1.198	1.081	1.247	1.162	1.031
K	0.0	0.011	0.024	0.018	0.029	0.0	0.009	0.0	0.013	0.005
Sample	60.	90.	99.	99.	99.	120.	120.	120.	122.	122.
Rock Type	Sy-gab	Ben	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp	Oth Lp
Crystal	1.	1.	4.	5.	6.	1.	1.	1.	1.	1.
Position	8.	8.	1.	1.	1.	8.	8.	8.	8.	8.

CANCRINITE ANALYSES

	52276.49	52276.50	52276.52	52276.56	326273.13	326273.14	326273.15	326289.16	326289.17	326289.19	325964.39	325964.40
Weight % oxide												
SiO2	38.087	37.560	37.328	37.521	36.787	36.518	36.682	36.026	35.759	36.031	39.050	38.590
Al2O3	28.515	27.995	28.136	28.113	29.064	28.817	29.118	27.826	28.505	27.953	29.871	29.800
FeO	0.0	0.238	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.373	0.437	0.0	0.0	0.0
CaO	5.920	5.994	6.343	5.696	8.390	8.477	8.261	7.761	8.067	7.629	5.077	5.257
Na2O	13.984	15.722	15.547	16.454	13.824	13.467	13.473	15.199	15.341	15.030	13.421	13.466
K2O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.143	0.0	0.0
Total	86.506	87.509	87.354	87.784	88.065	87.279	87.534	87.185	88.109	86.786	87.419	87.113
Atoms per 24 oxygens, anhydrous												
Si	6.240	6.154	6.124	6.134	5.991	5.997	5.998	5.968	5.874	5.991	6.274	6.234
Al	5.507	5.407	5.442	5.418	5.580	5.579	5.613	5.435	5.521	5.480	5.658	5.675
Fe	0.0	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.092	0.107	0.0	0.0	0.0
Ca	1.039	1.052	1.115	0.998	1.464	1.492	1.447	1.378	1.420	1.359	0.874	0.910
Na	4.442	4.994	4.946	5.215	4.365	4.288	4.272	4.882	4.887	4.846	4.181	4.218
K	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.030	0.0	0.0
Sample	51.	51.	51.	51.	82.	82.	82.	100.	100.	100.	113.	113.
Rock Type	Phon	Phon	Phon	Phon	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Rex Ph	Phon	Phon
Crystal	10.	10.	10.	10.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

CANCRINITE ANALYSES

325964.46

Weight % oxide

SiO2	39.719
Al2O3	30.698
FeO	0.0
MgO	0.0
CaO	5.313
Na2O	11.298
K2O	0.0
Total	87.028

Atoms per 24 oxygens, anhydrous

Si	6.339
Al	5.776
Fe	0.0
Mg	0.0
Ca	0.909
Na	3.496
K	0.0
Sample	113.
Rock Type	Phon
Crystal	1.
Position	8.

'GLASS' ANAYLSES

	325923.04	325923.05	325923.06	329923.07	325923.13	325923.15	325923.16	325923.17
Weight % oxide								
SiO2	54.130	54.697	52.378	52.813	53.875	53.280	43.843	52.798
TiO2	0.0	0.305	0.403	0.515	0.351	0.288	0.0	0.297
Al2O3	22.686	20.583	20.843	22.471	22.790	22.695	21.375	22.738
FeO	0.860	2.255	4.368	2.691	1.574	1.631	14.814	2.525
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.532	0.0
CaO	0.0	0.111	0.327	0.0	0.0	0.0	0.206	0.0
Na2O	11.589	10.283	11.273	11.491	10.830	11.755	9.154	11.023
K2O	0.488	0.773	1.346	0.904	0.670	0.607	0.334	1.091
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	89.753	89.007	90.938	90.885	90.090	90.256	90.258	90.472
Sample	107.	107.	107.	107.	107.	107.	107.	107.
Rock Type	Glass	Glass	Glass	Glass	Glass	Glass	Glass	Glass
Crystal	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.
Classification by Total Alkalis - Silica method of Cox et al (1979)								
	Phon	Phon	Ph-Teph	Ph-Teph	Ph-Teph	Phon	Ph-Neph	Ph-Teph

ABBREVIATIONS:-

Phon - Phonolite
Ph - Phonolitic
Teph - Tephrite
Neph - Nephelinite

PREHNITE ANAYLSES

	58022.18	58022.19	326286.54	54258.61
Weight % oxide				
SiO2	43.165	44.419	36.467	46.835
Al2O3	22.658	22.996	24.409	25.308
FeO	2.098	1.987	4.373	0.439
CaO	27.373	28.017	24.354	24.234
Na2O	0.0	0.0	0.245	0.988
K2O	0.0	0.0	3.530	0.169
Total	95.294	97.419	93.378	97.973
Atoms per 10 oxygens				
Si	2.741	2.756	2.458	2.824
Al	1.696	1.682	1.940	1.799
Fe	0.111	0.103	0.247	0.022
Ca	1.862	1.862	1.759	1.566
Na	0.0	0.0	0.032	0.116
K	0.0	0.0	0.304	0.013
Sample	39.	39.	59.	123.
Rock Type	Ben	Ben	Rex Ph	Haw/Mug
Crystal	10.	10.	10.	4.
Position	8.	8.	8.	8.

NATROLITE ANAYLSIS

	43842.21
Weight % oxide	
SiO2	42.896
Al2O3	34.753
FeO	0.440
CaO	0.0
Na2O	15.551
K2O	0.0
Total	93.640
Atoms per 80 oxygens	
Si	21.093
Al	20.147
Fe	0.181
Ca	0.0
Na	14.827
K	0.0
Sample	4.
Rock Type	Phon
Crystal	4.
Position	8.

SCAPOLITE ANAYLSES

	46249.35	46249.36	52276.48
Weight % oxide			
SiO2	44.428	42.592	44.603
Al2O3	33.248	31.953	31.043
FeO	0.272	0.350	0.571
MgO	1.050	1.037	0.0
CaO	15.105	14.415	15.023
Na2O	5.498	5.070	5.578
K2O	0.0	0.0	0.0
Total	99.601	95.417	96.818
Atoms per 24 oxygens			
Si	6.237	6.237	6.445
Al	5.503	5.516	5.289
Fe	0.032	0.043	0.069
Mg	0.220	0.226	0.0
Ca	2.272	2.262	2.326
Na	1.497	1.440	1.563
K	0.0	0.0	0.0
Sample	43.	43.	51.
Rock Type	Rex Tr	Rex Tr	Phon
Crystal	1.	1.	4.
Position	8.	8.	8.

ALTERED NEPHELINE (GIESECKITE?) ANAYLSES

	43842.09	46249.41	325957.07	325957.08	326286.66	326286.67	326286.68	58296.04	58296.05	58130.17	58130.18	58130.20
Weight % oxide												
SiO2	46.634	43.736	47.326	46.730	45.679	45.803	46.222	47.441	49.237	46.631	48.229	46.210
TiO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	30.055	32.828	32.582	32.788	34.278	33.476	32.965	33.897	32.571	34.146	34.365	32.220
FeO	3.124	0.274	0.648	0.425	0.744	0.777	1.242	1.774	0.379	0.0	0.0	0.0
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	0.837	2.234	0.339	0.930	0.842	0.899	1.110	0.149	0.160	0.622	2.527	0.230
Na2O	4.494	9.048	4.105	3.720	2.052	2.987	2.833	3.160	5.666	2.025	3.257	3.129
K2O	6.184	4.074	7.076	7.494	8.561	7.947	7.570	8.849	6.744	7.227	6.492	6.377
BaO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.833	0.0
Total	91.328	92.194	92.076	92.087	92.156	91.889	91.942	95.270	94.757	90.651	95.703	88.166
Atoms per 8 oxygens												
Si	2.358	2.193	2.342	2.319	2.270	2.285	2.303	2.298	2.368	2.319	2.303	2.358
Ti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	1.791	1.941	1.901	1.919	2.009	1.969	1.937	1.935	1.847	2.002	1.934	1.939
Fe	0.132	0.011	0.027	0.018	0.031	0.032	0.052	0.072	0.015	0.0	0.0	0.0
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.045	0.120	0.018	0.049	0.045	0.048	0.059	0.008	0.008	0.033	0.129	0.013
Na	0.441	0.880	0.394	0.358	0.198	0.289	0.274	0.297	0.528	0.195	0.302	0.310
K	0.399	0.261	0.447	0.475	0.543	0.506	0.481	0.547	0.414	0.458	0.395	0.415
Ba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.016	0.0
Sample	4.	43.	56.	56.	59.	59.	59.	101.	101.	112.	112.	112.
Rock Type	Phon	Rex Tr	Rex Tr	Rex Tr	Rex Ph	Rex Ph	Rex Ph	Rex Tr	Rex Tr	Sy-gab	Sy-gab	Sy-gab
Crystal	10.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

GARNET ANAYLSES

	326333.50	326333.51	326333.62	326333.63	326333.65	326289.11	326289.14	326289.15	41906.37	41906.38	41906.39
Weight % oxide											
SiO2	35.149	35.180	33.860	34.501	34.506	34.762	35.364	35.149	27.074	27.249	28.123
TiO2	0.0	0.280	0.0	0.0	0.0	1.091	0.896	0.458	16.061	16.290	15.300
Al2O3	0.265	0.538	0.429	0.0	0.337	1.619	1.831	2.009	2.202	2.385	2.322
FeO	28.192	27.582	27.817	28.859	27.962	27.778	28.191	28.021	20.165	19.054	19.616
MnO	3.069	3.166	3.002	3.425	2.997	1.771	1.700	1.935	0.319	0.391	0.0
MgO	0.0	0.202	0.0	0.187	0.0	0.0	0.0	0.0	1.228	1.149	1.109
CaO	30.574	30.863	30.598	30.954	30.952	32.183	32.977	32.908	32.865	32.930	33.148
Na2O	0.0	0.0	0.0	0.355	0.0	0.333	0.267	0.0	0.266	0.0	0.287
K2O	0.0	0.0	0.133	0.195	0.141	0.0	0.0	0.0	0.0	0.0	0.167
ZrO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.378	0.0	0.514	0.0
Total	97.249	97.811	95.839	98.476	96.895	99.537	101.226	100.858	100.180	99.962	100.072
Atoms per 12 oxygens and 8 cations											
Si	2.979	2.958	2.909	2.877	2.931	2.857	2.856	2.858	2.246	2.275	2.326
Ti	0.0	0.018	0.0	0.0	0.0	0.067	0.054	0.028	1.002	1.023	0.952
Al	0.026	0.053	0.043	0.0	0.034	0.157	0.174	0.193	0.215	0.235	0.226
Fe3	1.998	1.939	1.999	2.010	1.987	1.919	1.904	1.906	1.332	1.128	1.281
Fe2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.067	0.202	0.076
Mn	0.220	0.225	0.218	0.242	0.216	0.123	0.116	0.133	0.022	0.028	0.0
Mg	0.0	0.025	0.0	0.023	0.0	0.0	0.0	0.0	0.152	0.143	0.137
Ca	2.776	2.781	2.816	2.766	2.817	2.834	2.853	2.867	2.921	2.946	2.938
Na	0.0	0.0	0.0	0.057	0.0	0.053	0.042	0.0	0.043	0.0	0.046
K	0.0	0.0	0.015	0.021	0.015	0.0	0.0	0.0	0.0	0.0	0.018
Zr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.015	0.0	0.021	0.0
Sample	11.	11.	11.	11.	11.	100.	100.	100.	103.	103.	103.
Rock Type	Cbt	Cbt	Cbt	Cbt	Cbt	Rex Ph	Rex Ph	Rex Ph	UML	UML	UML
Crystal	1.	1.	1.	1.	1.	3.	3.	3.	1.	1.	1.
Position	8.	8.	8.	8.	8.	1.	4.	7.	8.	8.	8.

PEROVSKITE ANAYLSES

	41906.32	41906.33	41906.34	326359.28	326359.29	326359.37	325948.60	325948.61
Weight % oxide								
SiO2	0.895	0.842	2.984	0.325	0.335	0.551	0.506	0.491
TiO2	51.066	55.345	52.883	57.048	56.565	55.722	55.164	57.129
Al2O3	0.374	0.342	0.536	0.0	0.0	0.0	0.0	0.0
FeO	2.093	2.166	1.545	0.586	0.916	1.277	1.879	8.991
MnO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.786
MgO	0.206	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaO	33.295	36.683	36.456	40.873	39.822	39.020	36.568	23.396
Na2O	0.945	1.253	0.581	0.0	0.564	0.0	0.710	0.0
K2O	0.0	0.175	0.0	0.0	0.0	0.0	0.0	0.0
Total	88.874	96.806	94.985	98.832	98.202	96.570	94.827	91.793
Atoms per 3 oxygens								
Si	0.023	0.020	0.070	0.007	0.008	0.013	0.012	0.012
Ti	0.977	0.976	0.937	0.984	0.984	0.984	0.992	1.065
Al	0.011	0.009	0.015	0.0	0.0	0.0	0.0	0.0
Fe	0.045	0.042	0.030	0.011	0.018	0.025	0.038	0.186
Mn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.038
Mg	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca	0.908	0.921	0.920	1.005	0.987	0.982	0.937	0.621
Na	0.047	0.057	0.027	0.0	0.025	0.0	0.033	0.0
K	0.0	0.005	0.0	0.0	0.0	0.0	0.0	0.0
Sample	103.	103.	103.	110.	110.	110.	114.	114.
Rock Type	UML	UML	UML	Cbt	Cbt	Cbt	Oth Lp	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.

SPHENE ANAYLSES

	326281.23	326281.24	326281.25	325980.19	325980.21	325980.23	325952.18	325952.19	58241.35	58241.36	58241.38	325937.61
Weight % oxide												
SiO2	29.342	29.639	29.146	19.345	23.740	17.961	11.775	5.852	29.573	26.399	32.652	27.737
TiO2	39.629	38.980	39.631	30.929	27.221	24.623	12.369	7.168	30.759	17.565	32.845	36.186
Al2O3	1.085	1.279	0.977	0.809	1.833	0.733	0.463	0.0	1.040	2.284	0.946	1.752
FeO	0.838	1.220	0.860	28.658	22.836	36.346	62.524	68.777	2.062	13.343	6.803	9.106
MnO	0.0	0.0	0.0	0.626	0.0	0.274	0.0	1.916	0.0	0.449	0.0	0.0
MgO	0.0	0.0	0.0	0.0	0.318	0.0	1.269	0.386	0.0	0.0	0.0	0.0
CaO	29.019	28.973	28.837	17.998	21.009	16.518	8.916	4.555	25.519	30.473	24.965	26.509
Na2O	0.0	0.0	0.0	0.0	0.0	0.294	0.649	0.931	0.581	0.399	1.188	0.0
K2O	0.0	0.0	0.0	0.128	0.0	0.163	0.184	0.0	0.0	0.486	0.408	0.0
ZrO2	0.0	0.484	0.499	0.0	0.0	0.0	0.0	0.0	5.968	0.0	0.0	0.589
Total	99.913	100.575	99.950	98.493	96.957	96.912	98.149	89.585	95.502	91.398	99.807	101.879
Atoms per 20 oxygens												
Si	3.861	3.882	3.842	2.965	3.550	2.921	2.192	1.330	4.145	4.120	4.347	3.708
Ti	3.921	3.839	3.929	3.565	3.061	3.012	1.731	1.225	3.242	2.062	3.288	3.638
Al	0.168	0.197	0.152	0.146	0.323	0.141	0.102	0.0	0.172	0.420	0.148	0.276
Fe	0.092	0.134	0.095	3.673	2.856	4.944	9.733	13.075	0.242	1.742	0.757	1.018
Mn	0.0	0.0	0.0	0.081	0.0	0.038	0.0	0.369	0.0	0.059	0.0	0.0
Mg	0.0	0.0	0.0	0.0	0.071	0.0	0.352	0.131	0.0	0.0	0.0	0.0
Ca	4.091	4.066	4.073	2.955	3.366	2.879	1.778	1.109	3.832	5.096	3.561	3.798
Na	0.0	0.0	0.0	0.0	0.0	0.093	0.234	0.410	0.158	0.121	0.307	0.0
K	0.0	0.0	0.0	0.025	0.0	0.034	0.044	0.0	0.0	0.097	0.069	0.0
Zr	0.0	0.031	0.032	0.0	0.0	0.0	0.0	0.0	0.408	0.0	0.0	0.038
Sample	57.	57.	57.	61.	61.	61.	65.	65.	71.	71.	71.	73.
Rock Type	Oth Lp	oth Lp	oth Lp	BFD	BFD	BFD	Alt UBs	Alt UBs	Ben	Ben	Ben	Ben
Crystal	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

SPHENE ANAYLSES

	325937.62	325937.64	326303.16	326303.17	326303.18	326303.30	326303.32	326271.42	325960.51	325960.52	325960.53	325960.54
Weight % oxide												
SiO2	10.840	15.780	29.708	30.108	29.476	27.449	27.274	24.068	29.939	29.643	29.615	28.854
TiO2	26.110	33.604	37.330	39.096	37.251	15.452	15.858	39.096	39.201	40.034	41.050	37.884
Al2O3	0.733	1.312	1.170	0.965	0.786	3.031	2.954	0.909	3.730	1.879	1.187	1.655
FeO	50.849	31.530	1.164	0.795	0.952	19.340	19.063	14.906	0.473	0.722	0.649	1.202
MnO	1.043	1.439	0.0	0.0	0.0	0.253	0.356	1.284	0.0	0.0	0.0	0.0
MgO	0.274	0.0	0.0	0.0	0.0	1.268	1.016	0.305	0.0	0.0	0.0	0.0
CaO	9.047	14.526	29.274	29.538	29.108	33.140	33.033	22.102	28.853	28.851	28.882	28.201
Na2O	0.277	0.0	0.0	0.0	0.0	0.270	0.281	0.0	0.412	0.590	0.303	0.215
K2O	0.0	0.0	0.0	0.166	0.144	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	0.0	0.0	1.705	0.752	2.491	0.0	0.668	0.0	0.0	0.0	0.0	0.0
Total	99.173	98.191	100.351	101.420	100.208	100.203	100.503	102.670	102.608	101.719	101.686	98.011
Atoms per 20 oxygens												
Si	1.868	2.474	3.918	3.913	3.907	3.991	3.961	3.292	3.810	3.827	3.825	3.872
Ti	3.385	3.962	3.703	3.821	3.714	1.690	1.732	4.021	3.752	3.887	3.987	3.823
Al	0.149	0.242	0.182	0.148	0.123	0.520	0.506	0.147	0.560	0.286	0.181	0.262
Fe	7.330	4.134	0.128	0.086	0.106	2.352	2.316	1.705	0.050	0.078	0.070	0.135
Mn	0.152	0.191	0.0	0.0	0.0	0.031	0.044	0.149	0.0	0.0	0.0	0.0
Mg	0.070	0.0	0.0	0.0	0.0	0.275	0.220	0.062	0.0	0.0	0.0	0.0
Ca	1.671	2.440	4.137	4.114	4.134	5.163	5.141	3.239	3.935	3.991	3.997	4.055
Na	0.093	0.0	0.0	0.0	0.0	0.076	0.079	0.0	0.102	0.148	0.076	0.056
K	0.0	0.0	0.0	0.028	0.024	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.0	0.0	0.110	0.048	0.161	0.0	0.047	0.0	0.0	0.0	0.0	0.0
Sample	73.	73.	75.	75.	75.	75.	75.	76.	78.	78.	78.	78.
Rock Type	Ben	Ben	UML	UML	UML	UML	UML	UML	Brecc	Brecc	Brecc	Brecc
Crystal	1.	1.	4.	5.	4.	1.	1.	1.	10.	1.	1.	1.
Position	8.	8.	7.	1.	1.	8.	8.	8.	8.	8.	8.	8.

SPHENE ANAYLSES

	326244.32	326244.37	326244.38	46256.36	326323.43	58296.07	41947.81	41947.82	325964.47	325964.50	54168.12	52287.21
Weight % oxide												
SiO2	29.589	27.059	19.861	10.155	28.433	30.488	29.816	28.556	30.076	30.864	30.157	21.085
TiO2	28.058	37.623	28.437	75.253	0.0	37.271	31.752	29.893	40.219	39.160	44.102	17.225
Al2O3	4.674	2.639	7.923	0.287	0.0	1.408	2.181	1.991	0.0	0.302	1.121	3.258
FeO	6.505	7.248	25.686	4.496	43.406	2.770	2.276	2.265	0.895	0.876	0.504	36.919
MnO	0.0	0.338	1.767	0.306	9.920	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MgO	1.967	0.369	2.360	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.724
CaO	23.020	25.229	10.702	10.258	13.129	29.529	27.634	26.141	26.690	27.150	29.883	12.212
Na2O	0.272	0.297	0.0	0.0	0.0	0.0	0.0	0.0	0.801	0.608	0.0	1.114
K2O	1.922	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ZrO2	1.284	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	97.291	100.802	96.736	100.755	94.888	101.466	93.659	88.846	98.681	98.960	107.146	92.537
Atoms per 20 oxygens												
Si	4.069	3.618	2.954	1.363	4.918	3.973	4.177	4.215	3.990	4.072	3.732	3.515
Ti	2.902	3.783	3.181	7.596	0.0	3.653	3.345	3.318	4.012	3.886	4.105	2.160
Al	0.758	0.416	1.389	0.045	0.0	0.216	0.360	0.346	0.0	0.047	0.164	0.640
Fe	0.748	0.810	3.195	0.505	6.278	0.302	0.267	0.280	0.099	0.097	0.052	5.148
Mn	0.0	0.038	0.223	0.035	1.453	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg	0.403	0.074	0.523	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.180
Ca	3.392	3.614	1.706	1.475	2.433	4.123	4.148	4.134	3.794	3.838	3.963	2.182
Na	0.073	0.077	0.0	0.0	0.0	0.0	0.0	0.0	0.206	0.156	0.0	0.360
K	0.337	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr	0.086	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	83.	83.	83.	87.	88.	101.	106.	106.	113.	113.	115.	120.
Rock Type	BFD	BFD	BFD	UML	Cbt	Rex Tr	Brecc	Brecc	Phon	Phon	OthLp	Oth Lp
Crystal	1.	1.	1.	1.	1.	10.	1.	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.	8.

SPHENE ANAYLSES

	52287.20	325972.26	325972.25	54258.74	54258.72
Weight % oxide					
SiO2	15.274	31.044	30.044	31.011	30.284
TiO2	15.942	39.059	38.447	38.626	37.715
Al2O3	2.491	0.919	0.794	1.196	0.657
FeO	47.594	1.122	1.387	1.473	0.984
MnO	0.0	0.0	0.0	0.0	0.0
MgO	1.754	0.0	0.0	0.0	0.0
CaO	9.435	28.318	27.260	28.548	27.689
Na2O	0.0	0.0	0.0	0.0	0.0
K2O	0.334	0.0	0.0	0.173	0.0
ZrO2	0.0	0.0	1.026	0.0	0.0
Total	92.824	100.462	98.958	101.027	97.329
Atoms per 20 oxygens					
Si	2.735	4.038	3.987	4.023	4.066
Ti	2.147	3.821	3.838	3.769	3.809
Al	0.526	0.141	0.124	0.183	0.104
Fe	7.129	0.122	0.154	0.160	0.110
Mn	0.0	0.0	0.0	0.0	0.0
Mg	0.468	0.0	0.0	0.0	0.0
Ca	1.811	3.947	3.877	3.968	3.984
Na	0.0	0.0	0.0	0.0	0.0
K	0.076	0.0	0.0	0.029	0.0
Zr	0.0	0.0	0.066	0.0	0.0
Sample	120.	121.	121.	123.	123.
Rock Type	Oth Lp	UML	UML	Haw/Mug	Haw/Mug
Crystal	1.	1.	1.	1.	1.
Position	8.	8.	8.	8.	8.

CHLORITE ANAYLSES

	52293.09	58298.71	41945.17	58206.61	126772.63	46237.14	46237.15	126759.66	126759.67	126759.71	126759.72	326303.33
Weight % oxide												
SiO2	28.318	31.029	25.167	26.951	26.121	27.458	27.973	25.993	26.309	21.216	26.462	27.443
TiO2	0.0	0.0	0.289	0.469	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al2O3	14.885	11.978	13.682	14.037	15.320	14.715	15.091	20.899	18.413	15.470	20.418	16.607
FeO	30.990	32.717	44.129	43.662	37.055	33.679	32.643	24.566	27.609	38.563	22.108	28.827
MnO	0.0	1.038	0.654	0.982	0.255	0.350	0.408	1.323	1.812	1.350	0.797	0.690
MgO	11.320	8.226	3.259	1.895	8.431	10.320	11.441	13.180	12.562	11.245	14.981	14.916
CaO	0.563	0.482	0.160	0.0	0.0	0.517	0.382	0.0	0.0	0.0	0.0	0.0
Na2O	0.358	0.367	0.471	0.460	0.0	0.0	0.375	0.0	0.0	0.0	0.0	0.287
K2O	0.106	0.421	0.118	1.546	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	86.540	86.258	87.929	90.002	87.182	87.039	88.313	85.961	86.705	87.844	84.766	88.770
Atoms per 28 oxygens												
Si	6.255	6.957	5.973	6.235	5.941	6.134	6.114	5.588	5.732	4.953	5.677	5.845
Ti	0.0	0.0	0.052	0.082	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Al	3.876	3.166	3.828	3.828	4.108	3.876	3.889	5.296	4.729	4.258	5.164	4.170
Fe	5.725	6.135	8.759	8.448	7.049	6.292	5.967	4.417	5.030	7.529	3.966	5.135
Mn	0.0	0.197	0.131	0.192	0.049	0.066	0.076	0.241	0.334	0.267	0.145	0.124
Mg	3.726	2.749	1.153	0.653	2.858	3.436	3.727	4.223	4.079	3.912	4.790	4.735
Ca	0.133	0.116	0.041	0.0	0.0	0.124	0.089	0.0	0.0	0.0	0.0	0.0
Na	0.153	0.160	0.217	0.206	0.0	0.0	0.159	0.0	0.0	0.0	0.0	0.119
K	0.030	0.120	0.036	0.456	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sample	6.	10.	17.	19	26.	31.	31.	45.	45.	45.	45.	75.
Rock Type	Ben	Rex Tr	Tr/Sy	Ben	Ben	Ben	Ben	Phon	Phon	Phon	Phon	UML
Crystal	10.	1.	1.	11.	1.	2.	2.	4.	5.	1.	6.	10.
Position	8.	8.	8.	8.	8.	1.	1.	8.	8.	8.	8.	8.

CHLORITE ANAYLSES

	326229.71	326244.36	326247.52	326247.53	326247.55*	326247.57	325903.54	325903.55	325923.09	325923.10	325923.14	52287.03
Weight % oxide												
SiO_2	36.817	33.027	28.716	27.199	20.301	29.058	28.676	28.581	28.092	32.354	23.381	31.321
TiO_2	0.0	0.0	0.0	0.0	0.0	0.265	0.0	0.0	0.0	0.0	0.0	0.0
Al_2O_3	22.895	12.097	15.373	15.884	11.166	15.276	16.013	16.243	18.470	19.374	18.089	15.960
FeO	13.167	29.953	22.127	25.290	15.721	20.724	30.997	31.029	35.237	33.458	41.278	26.660
MnO	0.0	0.0	2.963	2.375	2.252	3.437	0.549	0.326	0.642	0.352	0.606	0.0
MgO	0.212	10.495	16.353	15.224	12.249	17.560	12.987	13.701	2.286	2.046	2.675	14.111
CaO	24.134	0.543	0.235	0.315	15.240	0.446	0.0	0.0	0.0	0.0	0.0	0.659
Na_2O	0.0	0.0	0.0	0.361	0.271	0.426	0.0	0.0	1.694	3.086	0.0	0.0
K_2O	0.0	3.672	0.357	0.0	0.216	0.255	0.276	0.117	0.0	0.0	0.0	0.251
Total	97.225	89.787	86.124	86.648	77.416	87.447	89.498	89.997	87.779a	90.670	86.029	88.962
Atoms per 28 oxygens												
Si	6.813	7.056	6.162	5.902	5.149	6.118	6.102	6.035	6.281	6.797	5.559	6.493
Ti	0.0	0.0	0.0	0.0	0.0	0.042	0.0	0.0	0.0	0.0	0.0	0.0
Al	4.995	3.047	3.889	4.064	3.339	3.792	4.017	4.043	4.868	4.798	5.070	3.901
Fe	2.038	5.352	3.971	4.590	3.335	3.649	5.516	5.479	6.589	5.878	8.207	4.622
Mn	0.0	0.0	0.539	0.437	0.484	0.613	0.099	0.058	0.122	0.063	0.122	0.0
Mg	0.058	3.342	5.230	4.924	4.630	5.510	4.118	4.312	0.762	0.641	0.948	4.360
Ca	4.785	0.124	0.054	0.073	4.142	0.101	0.0	0.0	0.0	0.0	0.0	0.146
Na	0.0	0.0	0.0	0.152	0.133	0.174	0.0	0.0	0.734	1.257	0.0	0.0
K	0.0	1.001	0.098	0.0	0.070	0.068	0.075	0.032	0.0	0.0	0.0	0.066
Sample	79.	83.	89.	89.	89.	89.	104.	104.	107.	107.	107.	120.
Rock Type	Ben	BFD	Cbt	Cbt	Cbt	Cbt	BFD	BFD	Glass	Glass	Glass	Oth Lp
Crystal	1.	1.	1.	1.	1.	1.	4.	4.	1.	1.	1.	2.
Position	8.	8.	8.	8.	8.	8.	1.	1.	8.	8.	8.	8.

*overlap with $CaCO_3$?

a - Includes 1.358wt% ZrO_2

CHLORITE ANAYLSES

	52287.02	52287.01
Weight % oxide		
SiO2	30.860	32.012
TiO2	0.0	0.0
Al2O3	15.294	14.940
FeO	25.972	25.751
MnO	0.337	0.319
MgO	14.069	14.233
CaO	0.881	0.999
Na2O	0.0	0.0
K2O	0.363	0.599
Total	87.776	88.853
Atoms per 28 oxygens		
Si	6.501	6.644
Ti	0.0	0.0
Al	3.798	3.655
Fe	4.576	4.470
Mn	0.060	0.056
Mg	4.417	4.402
Ca	0.199	0.222
Na	0.0	0.0
K	0.098	0.159
Sample	120.	120.
Rock Type	Oth Lp	Oth Lp
Crystal	2.	2.
Position	8.	8.

MUSCOVITE ANALYSES

	41906.45	41906.46	41906.47	41906.49
Weight % oxide				
SiO2	45.586	46.914	47.159	45.965
TiO2	0.0	0.0	0.0	0.0
Al2O3	37.145	38.283	37.783	38.777
FeO	0.780	0.882	0.906	0.710
MnO	0.0	0.0	0.0	0.0
MgO	0.0	0.0	0.0	0.0
CaO	0.311	0.0	0.0	0.270
Na2O	0.443	0.764	0.822	0.363
K2O	11.048	11.548	11.276	11.579
BaO	0.0	0.0	0.0	0.0
Total	95.313	98.391	97.946	97.664
Atoms per 8 oxygens				
Si	2.206	2.203	2.221	2.174
Ti	0.0	0.0	0.0	0.0
Al	2.119	2.119	2.098	2.162
Fe	0.032	0.035	0.036	0.028
Mn	0.0	0.0	0.0	0.0
Mg	0.0	0.0	0.0	0.0
Ca	0.016	0.0	0.0	0.014
Na	0.042	0.070	0.075	0.033
K	0.682	0.692	0.677	0.699
Ba	0.0	0.0	0.0	0.0
Sample	103.	103.	103.	103.
Rock Type	UML	UML	UML	UML
Crystal	1.	1.	1.	1.
Position	8.	8.	8.	8.

APPENDIX III: XRF

Sample preparation and Major and Trace element analysis

III.1: Sample Preparation

The general fine grained nature of the dykes meant that relatively small sized samples could be analysed without introducing a 'sampling error'. Nicholls (1971) suggests sample sizes should be of the order of 10,000 times the volume of the largest component grain. If the typical grain sizes in the finer aphyric dykes are about 1mm, then a cube of side 21.5mm would provide a statistically valid analysis. In general, the coarser rocks will not exceed a grain size of 2mm, necessitating an analysed sample cube of about 4.3cm side, and so on. The size of sample crushed conformed to this general rule, except in the case of the very coarse samples with grain sizes up to 1cm or so, which would require the crushing of a 21.5cm cube of sample (or approximately 25kg of rock!).

In general, fresh material was chosen for analysis. Altered samples were however analysed if (i) they were only slightly altered, eg. a slight clouding of the feldspar, minor developement of chlorite etc. or (ii) they appeared to be of significance or particular interest, eg. lamprophyres which contain altered olivine. In general, aphyric or sparsely porphyritic sample (less than perhaps 5% modally of phenocrysts) were chosen for analysis so a not to produce results biased towards the compositions of the larger phenocrysts. In certain cases (eg. lamprophyres, porphyritic syenite dyke from Østfjordsdal) which are highly porphyritic, this general rule was ignored and the data regarded accordingly.

In the field fresh samples with as little weathered material as possible were collected, and as much as possible of any weathered surface was removed by hammering. In the laboratory, rocks were thin sectioned and the remaining lumps were split to produce, if possible, fresh samples using a hydraulic rock splitter. The fresh material was then crushed in a 'Sturtevant' jaw crusher to chips 0.5-1cm in size. These were hand picked to remove any weathered or contaminated material. This hand picked material was then crushed to a fine powder using a WC 'Tema' swing mill for about 2-3 minutes. A small aliquot of sample was removed after about 30 seconds for FeO determination in a number of cases.

Fused glass beads were prepared from 0.5g of powder and 2.5g of a La_2O_3-doped flux (Johnson Mattey Spectroflux 105), fused in Pt crucibles in a 'Leco' RF furnace for 6 minutes at approximately 1100°C. Pressed pellets were produced from about 5g of powder bonded by a few drops of a 2% solution of PVA ('Mowiol'), pressed at a pressure of about 7 tons p.s.i. These were dried in an oven at about 80°C for about 1 hour.

III.2: Analyses

All XRF analyses were run using a Philips PW1400 X-ray spectrometer with the operating conditions given in Table AIII.1 for major and trace elements. Mass absorbtion coefficients are taken from Heinrich (1967) and international standard compositions are from Abbey (1983).

III.2.A: Major Elements

Dykes from Igaliko cover a very wide range of composition unlike, for example, the intrusive rocks from South Qôroq or Motzfeldt (Stephenson 1973, Jones 1980) which are mostly augite syenites or nepheline syenites. It was initially decided to try to analyse all samples by fused bead methods (cf. Norrish and Hutton 1969). This technique had recently been installed at Durham and is described fully by Smith (1987), who played a large role in its setting up. Results from this method are generally excellent. Approximately 80 samples were run by fused bead methods with good results. By this stage it was decided to replace the furnace and platinum-ware as both were showing the signs of age. To avoid delay it was decided to run all analyses as pressed powder briquettes.

Calibration over such a wide range of major element compositions was achieved by using a mixture of international standards and dykes analysed by 'fused bead' methods. Data was processed using the computer program `XRF.QD` written by Colin Watson of Durham University. This is an iterative program which takes into account mass absorbtion coefficients within the sample matrix. In summary, a first approximation to the composition is calculated directly from the count data. The mass absorbtion coefficients (MAC's) are calculated from this and these are applied to the count data producing a second approximation to the composition. New MAC's are calculated and

Table AIII.1

Operating conditions for XRF analysis

Element	Line	Crystal	Angle°2θ	Time peak	+bkg	-bkg	Time bkg
Trace elements							
Ba	K_α	1	15.61	40	1.38	0.78	20
Nb	K_α	1	30.495	80	0.60	0.60	20
Zr	K_α	1	32.155	80	0.90	—	20
Y	K_α	1	33.960	80	1.00	0.90	20
Sr	K_α	1	35.925	80	0.90	—	20
Rb	K_α	1	38.045	80	0.70	1.0	20
Zn	K_α	1	60.665	80	1.00	—	20
Cu	K_α	1	65.645	80	1.10	—	20
Ni	K_α	1	71.355	80	2.00	—	20
Pb	K_α	1	40.460	80	1.20	1.60	20
U	L_α	1	37.380	80	1.40	—	20
Th	L_α	1	39.310	80	1.60	0.76	20
V	K_α	1	13.335	80	—	2.00	40
Cr	K_α	1	107.305	80	2.00	—	20
Nd	L_α	1	112.820	80	1.40	—	20
Ga	K_α	1	56.27	80	0.90	0.40	20
La	L_α	1	139.075	80	2.00	—	20
Ce	L_β	1	111.84	80	2.60	1.50	20
F	K_α	6	43.675	200	1.1	3.6	40
Cl	K_α	3	65.45	80	1.8	2.0	20
Major elements							
Si	K_α	3	109.235	20	3.80	—	10
Al	K_α	3	145.190	20	1.80	—	10
Fe	K_α	2	57.635	20	2.30	—	10
Mg	K_α	2	45.125	80	2.40	—	20
Ca	K_α	2	113.285	20	4.30	—	10
Na	K_α	4	55.00	80	2.40	—	20
K	K_α	2	136.885	20	3.00	—	10
Ti	K_α	2	86.28	20	5.00	—	10
Mn	K_α	1	95.415	20	4.60	—	10
P	K_α	5	141.025	40	4.00	—	10

1 - LIF220
2 - LIF200
3 - PE
4 - THAP
5 - GE
6 - XP1

All run at 80kv, 35mA

— indicates background not used in calculation of peak height

Counting times for peak and background in seconds a new composition produced. This proceeds until no change in MAC or major element composition is produced. Linear and quadratic calibrations are produced. If calibrated correctly these should be similar, which was observed to be the case. The 'quadratic' result was used for all analyses, although this was checked against the linear result if the sample was out of range of the standards.

Calibration lines were checked graphically to minimise any scatter of standard composition against MAC corrected count rate, and to produce a better 'fit'. As a check on the results, the analyses produced from fused beads were checked against the pressed powder results for about 40 samples not included in the standard set. These were generally in very good agreement and no correction factors were applied to the pressed powder results.

Table AIII.2 shows the correlation coefficients and ranges calculated from the final set of standards.

Table AIII.3 compares the fused bead results of a selection of unknowns with those of the pressed powder results. This table shows one of the best, one of the worst and two fairly typical comparisons to give an idea of the range and validity of the data.

III.2.B: Trace Element Analyses

Trace element analyses in this thesis have been performed using newly written computer programs. These were written specifically to replace the program TRATIO, written by R. C. O. Gill (1972b). Briefly, TRATIO compares the count rate of peak/background and uses back-scattered radiation as an internal standard to compensate for mass absorbtion and matrix effects. The program is however slow to standardise/calibrate and cannot be extrapolated above or below the maximum or minimum standard concentration.

The peak/background method is not an accurate method of accounting for mass absorbtion coefficients over a wide range of sample major element compositions and it was decided to write a new and complimentary set of programs to calculate trace element compositions which take account of mass absorbtion effects.

The programs follow the method employed at GGU as described by Bailey (1976)

Table AIII.2

Correlation coefficients and ranges for major element analysis

Element	Correlation	Range (wt%)
Si	0.987	0-69.22
Al	0.980	0-25.74
Fe	0.992	0-22.6
Mg	0.993	0-13.49
Ca	0.998	0-14.77
Na	0.980	0-13.1
K	0.998	0-15.35
Ti	0.998	0-9.6
Mn	0.995	0-0.80
P	0.999	0-4.26

Table AIII.3

Comparison between fused bead and pressed powder major element composition.

	43898[1]		46211[2]		41999[2]		43916[3]	
	Pressed	Fused	Pressed	Fused	Pressed	Fused	Pressed	Fused
SiO_2	53.85	54.23	43.69	44.33	60.78	59.77	45.36	46.17
Al_2O_3	19.31	19.54	14.39	15.69	12.84	12.50	14.35	15.94
Fe_2O_3	7.22	7.25	15.24	14.49	11.47	11.45	15.10	12.50
MgO	0.46	0.35	6.23	5.15	0.14	0.15	7.92	6.03
CaO	2.01	2.03	7.83	8.01	1.65	1.56	5.15	4.63
Na_2O	8.29	8.22	3.45	3.82	6.30	6.86	2.16	2.59
K_2O	5.62	5.63	2.03	1.81	4.31	4.48	3.60	3.72
TiO_2	0.50	0.51	3.25	3.23	0.56	0.59	3.32	3.33
MnO	0.18	0.17	0.20	0.21	0.26	0.26	0.30	0.27
P_2O_5	0.14	0.17	0.63	0.55	0.02	0.03	0.63	0.67

1 - one of the better agreements between fused and pressed powder analyses. 2 - typical agreements between fused and pressed powder analyses. 3 - worst agreement of 40 that were compared. (Note Fe, Al and MgO).

and make use of the general formula:-

ppm=net counts per second (c/s) $\times$ mass absorbtion coefficient (μ/ρ) $\times$ constant (K)

c/s is calculated as (peak - background) - blank; mass absorbtion effects are calculated using the coefficients of Heinrich (1967). For a standard, with known major and trace element compositions, the constant K can be calculated. An average K from a wide selection of samples is used in the final calculation of the unknown compositions. The new programs are described below and listed in the following pages.

TR.PEAK.STD and TR.PEAK.UNK

These programs calculate peak heights for standards and unknowns by interpolation of the background under the peak. The value of the 'blank' is also removed at this stage. Peak - peak interferences are calculated and subtracted within these programs. Interference factors were calculated by measuring boric acid beads spiked with spec. pure elements (eg. Sr for interference on Zr) and are reported as a fraction of the interfering element peak height. The only difference between these programs is their handling of characters for the unknown sample name and integers as a code for the standards (see TR.HELP).

TR.STDZE

This program is an interactive (and hopefully 'user friendly') standardising program used to produce the constant K. It allows the user to select the standards they would like to use to calibrate their analyses by responding to 'menu driven' prompts. The program contains large data arrays (2-dimensional) of major and trace element compositions of the satandards currently available at Durham. These have been laid out to be easily expanded if new standards become available. The layout and operation of the program is explained below:

(1) Reads in standard peak heights.
(2) Asks user to select the element they wish to calibrate.
(3) Asks user to select their 1^{st} standard.
(4) Selects concentration of element in chosen standard.
(5) Selects peak height for element in chosen standard.
(6) Calculates mass absorbtion coefficient for element in chosen standard.
(7) Calculates K and displays this on the screen.
(8) User selects the next standard and steps 4-6 are repeated.
(9) The new K and the previous K values are displayed on screen, along with an average K.
(10) This carries on until the user is content with the set of standards used. The user can then 'Take K' or 'Bias K'. 'Taking K' saves that K value, 'biasing K' allows the

user to remove erroneous K values, and the biased K value is saved.

(11) User selects next element and steps 3-10 are repeated.

(12) Options are available to check the elements already standardised, to stop or to repeat an element. 'Traps' are set to ensure incorrect menu responses are not given.

(13) User selects 'Stop' option.

(14) K values written into a separate data file for use in calculation of unknowns.

(15) A second large output file contains all standards used for each element, individual and running average K values, ppm, peak height and mass absorbtion coefficient, along with information on subsequent biasing etc. This can be used to check each calibration and to see if a change in the blank values would produce a better set of K values. Blank values can be 'calculated' if the K value from the sample with the highest concentration of an element is assumed to be correct (least affected by a blank correction). Back calculation on other samples can then give an 'ideal' blank for these. These will invariably be similar for a wide range of samples, and an average or median value can be chosen for the blank. This can be re-entered at the initial peak height calcualtion part of the process and the data can be re-standardised.

`TR.UNKNOWNS`

This calculates the MAC of the unknown samples from their major element compositions, reads in individual peak heights and K values, and calculates the ppm concentration of each element, which is written out into a separate file.

`TR.HELP`

This is a 'help file' written to describe exactly the use of each program and how to proceed with calculation of trace element analyses from raw count data. Reading this may help explain the method etc., although it is designed primarily as a manual for the user.

The method described here has several advantages over `TRATIO`.

(1) Standardisation is quick (40-60 minutes for 18 elements) and relatively easy.

(2) Correction factors for interference are included in the programs.

(3) Calibration lines approximate to straight lines and can be extended to compositions above the upper limit of standards with confidence.

(4) Computing time (and thus cost) is less than used by TRATIO.

(5) Accurate standardisation over a very wide range of compositions is possible.

(6) Possibly less important to other users, the method is compatible with the method used at GGU.

F and Cl have both been analysed by XRF using the same method as described above. They are included in the discussion as trace elements although are recorded in the data tables with the major elements. F in carbonatites was standardised independently using artificial standards made from spec. pure $CaCO_3$, $BaSO_4$ and CaF_2. At higher concentrations (>0.5 wt%) these gave very good results (±10% as a maximum variation).

Detection Limits

Theoretical detection limits (at the 3σ confidence level) can be calculated from the formula (from Bailey 1976)

$$\mathrm{LLD} = \frac{6}{m}\sqrt{\frac{C_b}{T}}$$

where	LLD	=	lower limit of detection
	m	=	counts per second per ppm
	C_b	=	background counts per second
	T	=	counting time for peak plus backgrounds

Longer counting times will thus increase the theoretical detection limit. Calculated detection limits are tabulated in Table AIII.4.

Tables AIII.5 and AIII.6 compare the results of running standards as unknowns against their published compositions. Correlation coefficients for these are all high (all but 2 above 0.99). Certain elements have better overall correlations than others, eg. Sr shows better agreement for most samples than Ba, ie. lower percentage differences.

Large errors become apparent at lower concentrations. Rounding to integers may enhance this effect at low ppm values. For example, if the actual concentration is 6ppm and the calculated concentration is is 6.5... ppm, it will be rounded up to 7ppm, giving a 16.6% error. Conversely if the calculated composition is 6.49... ppm, it will

Table AIII.4

Lower limits of detection (theoretical) for analysed trace elements.

Element	Standard	LLD(ppm)	Element	Standard	LLD(ppm)
Ba	NIM-S	10.8	U	SY-1	4.45
Nb	NIM-L	0.032	Th	SY-1	4.83
Zr	NIM-L	2.24	V	MRG-1	5.61
Y	SY-3	1.78	Cr	NIM-P	5.48
Sr	NIM-L	1.56	Nd	NIM-L	8.44
Rb	NIM-S	1.29	Ga	NIM-L	3.05
Zn	NIM-L	3.16	La	NIM-L	11.46
Cu	GR	3.20	Ce	NIM-L	8.42
Ni	PCC-1	5.29	F	NIM-L	1100
Pb	SY-1	5.52	Cl	NIM-L	42.8

be rounded to 6ppm with no apparent error. Small ppm errors thus become enlarged at low concentrations. Many of the lowest correlation levels in these standards are close to the lower limits of detection and at these levels counting statistics etc. become important factors leading to errors.

Table AIII.7 shows the percentage difference between the calculated and accepted values for trace element concentration in the standards from Table AIII.5. It is noticable that many of the largest percentage errors are associated with samples below or near detection limits.

Table AIII.8 shows the percentage of calculated compositions from standards run as unknowns, falling within specified ranges of + or - difference from the accepted value (Abbey 1983), ie. for Sr 36.0% of the standards when run as unknowns fall within ±1.0% of the accepted value. The final column of this table gives the calculated ± percentage error which half of the samples are better than.

Verdict

The trace element method employed in these programs and described above provides a fast and reasonable accurate method of determining trace element abundances in a wide range of igneous rocks. Comparison of standards between accepted and calculated

TABLE AIII.5

Comparison of accepted and calculated composition for standards when run as unknowns.

		Ba	Nb	Zr	Y	Sr	Rb	Zn	Cu	Ni	Pb	U	Th	V	Cr	Nd	Ga	La	Ce
AGV1	A	1200	16	230	19	660	67	86	59	15	33	2	6	125	10	37	21	36	71
	O	1101	11	250	20	667	68	83	61	21	41	3	12	132	12	21	22	41	79
BR	A	1050	100	250	30	1320	447	150	72	260	8	3	12	235	380	60	20	80	140
	O	1193	100	317	30	1336	48	146	55	223	6	8	10	289	362	77	18	95	166
BCR1	A	680	19	185	40	331	49	129	18	13	14	2	6	404	21	32	22	24	54
	O	668	7	188	35	331	49	115	13	13	16	2	7	419	21	32	22	24	45
DTS1	A	2	−1	3	−1	0	0	46	5	2300	11	−1	0	11	4200	0	1	0	0
	O	90	−1	3	−1	0	3	52	16	2009	11	−1	10	5	3825	0	0	0	0
NIMD	A	10	−1	20	−1	3	−1	90	10	2050	7	−1	1	40	2900	−1	−1	0	−1
	O	96	−1	5	−1	3	4	87	4	1669	2	−1	2	33	2874	4	−1	0	−1
GA	A	850	10	150	21	310	175	80	16	11	30	4	17	38	12	25	16	38	70
	O	721	12	137	22	310	174	90	26	11	34	6	24	46	8	17	16	29	65
GH	A	22	85	150	70	10	390	85	14	3	45	18	90	5	6	25	23	25	50
	O	91	91	129	82	10	387	94	28	12	45	16	79	2	0	22	26	6	52
GR	A	1050	−1	180	19	550	175	60	345	55	32	−1	−1	65	110	−1	20	75	−1
	O	837	−1	187	18	595	183	69	330	39	35	−1	−1	71	91	20	22	57	−1
G1	A	1080	24	210	13	250	220	45	12	1	46	4	50	18	20	57	20	104	173
	O	916	21	209	16	261	213	47	22	9	51	4	57	21	8	81	21	125	207
G2	A	1900	13	300	11	480	170	85	11	5	31	2	25	36	9	58	22	90	160
	O	1811	11	307	13	486	168	85	24	11	34	3	35	46	4	43	24	108	175
NIMG	A	120	53	300	143	10	320	50	12	8	40	15	51	2	12	72	27	109	195
	O	194	57	300	141	11	325	52	23	11	39	16	60	4	10	80	31	126	211
GSP1	A	1300	23	500	29	240	250	103	34	10	54	2	105	53	13	190	22	185	400
	O	1168	23	473	29	235	249	99	39	14	60	1	101	68	5	185	22	168	325
GSN	A	1400	23	235	19	570	185	48	20	34	53	8	44	65	55	50	22	75	140
	O	1403	22	233	20	588	184	53	29	35	55	9	48	76	56	43	20	84	119
NIML	A	450	960	11000	22	4600	190	400	13	11	43	14	66	81	10	48	54	250	240
	O	436	901	9484	30	4326	187	393	0	9	43	35	58	77	15	96	49	287	397
NIMN	A	100	2	23	7	260	6	68	14	120	7	1	1	220	30	3	16	3	6
	O	182	0	29	5	261	7	60	14	100	4	0	7	179	35	5	17	0	8
PCC1	A	2	1	7	−1	0	0	42	10	2400	11	−1	−1	30	2800	−1	1	0	0
	O	91	0	3	−1	0	2	47	24	2002	10	−1	−1	25	2628	−1	1	0	0
NIMP	A	46	−1	30	5	32	5	100	18	560	6	0	1	230	24000	−1	8	2	−1
	O	126	−1	12	2	32	5	97	18	431	3	0	3	220	22794	−1	6	0	0
UBN	A	30	−1	8	11	10	6	92	28	2000	18	−1	−1	75	2300	−1	5	−1	−1
	O	119	−1	7	2	8	6	83	35	1673	16	−1	−1	55	2511	−1	3	−1	−1
MRG1	A	50	20	105	16	260	8	190	135	195	10	0	1	520	450	19	18	10	25
	O	152	10	110	12	269	11	197	108	166	9	0	0	628	531	12	18	0	23
T1	A	660	−1	150	−1	390	32	180	48	10	37	−1	−1	96	20	−1	20	−1	−1
	O	633	−1	173	−1	386	31	176	57	13	37	−1	−1	88	23	−1	20	−1	−1
SY1	A	282	150	3030	441	286	195	219	23	43	495	2520	1305	89	56	314	20	233	512
	O	341	137	2796	419	182	179	226	9	37	459	2303	1138	75	49	314	20	204	529
SY2	A	460	23	280	130	275	220	250	5	10	80	290	380	52	12	71	28	88	210
	O	529	23	268	129	267	220	231	9	15	91	252	364	45	15	70	30	78	159
SY3	A	430	130	320	740	306	208	240	16	11	130	650	990	51	10	800	26	1350	2200
	O	480	166	309	658	280	204	217	15	23	134	581	898	39	0	866	27	1496	2121
NIMS	A	2400	4	33	20	65	530	10	19	7	5	1	1	10	12	6	11	5	12
	O	2379	0	21	12	65	517	16	27	11	4	0	1	4	7	0	12	0	0
DRN	A	385	6	125	30	400	70	145	50	16	55	2	5	235	42	22	22	21	46
	O	516	4	134	27	396	72	140	46	19	60	0	13	227	37	27	20	8	52
Corr. coeff.		.9913	.9985	.9998	.9988	.9913	.9995	.9959	.9980	.9995	.9983	.9999	.9995	.9886	.9998	.9967	.9850	.9987	.9958

KEY A Accepted concentration
O Calculated concentration when standard run as unknown.

Table AIII.6

Comparison between standards run as unknowns and actual compositions for F, Cl.

	F actual	F obs	% diff	Cl act	Cl obs	% diff
NIM-L	4400	4121	-6.34	1200	1319	9.92
SY-2	5100	4183	-18.0	130	137	5.38
NIM-S	1200	3997	233.0	—	22.5	—
GS-N	1050	3209	206.0	500	380	-24.0
NIM-G	4020	5055	25.7	170	235	38.2
NIM-N	—	—	—	100	70.4	-29.6
G2	1230	5520	349.0	100	138.1	38.1
GA	500	867	73.4	300	236	-21.3
GH	3500	3956	13.0	100	25.7	-74.3
SY-3	6300	4931	2.17	140	127	-9.29
GSP-1	3650	3754	2.85	335	364	8.66
AGV-1	410	0	—	120	231	92.5
BR	1050	0	—	370	546	47.6
BCR-1	500	0	—	58	190	227.0
$\leq \pm 5\%$			1			0
$\leq \pm 10\%$			2			5
$\leq \pm 20\%$			4			5
$> \pm 20\%$			6			9
n			10			14

contents when run as unknowns are generally good for most elements with over half the standards being calculated in most cases at better than ±15%. Several elements are extremely accurately determined (eg. Sr, Rb) with over half the standards calculating at better than ±2% from their accepted values. Typically, errors may be ±11%.

Detection limits are in general better than TRATIO, although increased counting times on the LREE and Ba would improve this. Over the range of compositions recorded from the Igaliko dykes, agreement between accepted and calculated concentrations for standards is particularly good. In an inter-university comparison, organised by Dr. I. Meighan, trace element abundances calculated by this method were always very close to the average of the reported values from all other departments

TABLE AIII.7

Percentage difference between accepted and calculated composition for standards.

	Ba	Nb	Zr	Y	Sr	Rb	Zn	Cu	Ni	Pb	U	Th	V	Cr	Nd	Ga	La	Ce
AGV1	-8.25	-31.3	8.70	5.26	1.06	1.49	-3.49	3.39	40.0	24.2	50.0#	100.	5.60	20.0	-43.2	4.76	13.9	11.3
BR	13.6	0.0	26.8	0.0	1.21	-89.3	-2.67	-23.6	-14.3	-25.0	167. #	-16.7	23.0	-4.74	28.3	-10.0	18.8	18.6
BCR1	-1.76	-63.2	1.62	-12.5	0.0	0.0	-10.9	-27.7	0.0	14.3	0.0#	16.7	3.71	0.0	0.0	0.0	0.0	-16.7
DTS1	%#	-	0.0	-	0.0	*	13.0	220.	-12.7	0.0	-	*	-54.5	-8.93	0.0	*#	*	*
NIMD	860.#	-	-75.0	-	0.0	-	-3.33	-60.0	-18.6	-71.4	-	100.#	-17.5	-0.90	-	-	*	-
GA	-15.2	20.0	-8.67	4.76	0.0	-0.57	12.5	62.5	0.0	13.3	50.0#	41.2	21.1	-33.3	-32.0	0.0	-23.7	-7.14
GH	314.	7.06	-14.0	17.1	0.0	-0.77	10.6	100.	300.#	0.0	-11.1	-12.2	-60.0#	*	-12.0	13.0	-76.0	4.00
GR	-20.3	-	3.88	-5.26	8.18	4.57	15.0	-4.35	-29.1	9.38	-	-	9.23	-17.3	-	10.0	-24.0	-
G1	-15.2	-12.5	-0.48	23.1	4.40	-3.18	4.44	83.3	800.#	10.9	0.0#	14.0	16.7	-60.0	42.1	5.00	20.2	19.7
G2	-4.68	-15.4	2.33	18.2	1.25	-1.18	0.00	118.	120.#	9.68	50.0#	40.0	27.8	-55.5	-25.9	9.09	20.0	9.38
NIMG	61.7	7.55	0.0	-1.40	10.0	1.56	4.0	91.7	37.5	-2.50	6.67	17.6	100.#	-16.7	11.1	14.8	15.6	8.21
GSP1	-10.2	-4.35	-5.40	0.0	-2.08	-0.40	-3.88	14.7	40.0	11.1	-50.0#	-3.81	28.3	-61.5	-2.63	0.0	-9.19	-18.8
GSN	0.21	-0.85	-0.85	5.26	3.15	-0.54	10.4	45.0	2.94	3.77	12.5	9.09	16.9	1.82	-14.0	-9.09	12.0	-15.0
NIML	-3.11	-13.8	-13.8	36.4	-5.96	-1.58	-1.75	*	-18.2	0.0	150.	-12.1	-4.94	50.0	100.	-9.26	14.8	65.4
NIMN	82.0	*	26.1	-28.6	0.38	16.7	-11.8	0.0	-16.7	-42.9	*	600.#	-18.6	16.7	66.7#	6.25	*#	33.3#
PCC1	%#	*	-57.1	-	0.0	*	11.9	140.	-16.5	-9.09	-	-	-16.7	-6.14	-	0.0#	*	*
NIMP	174.	-	-60.0	-60.0	0.0	0.0	-3.00	0.0	-23.0	-50.0#	*	200.#	-4.35	-5.03	-	-25.0	*#	-
UBN	296.	-	-12.5	-81.8	-20.0	0.0	-9.78	25.0	-16.4	-11.1	-	-	-26.6	9.17	-	-40.0	-	-
MRG1	204.	-50.0	4.76	-25.0	3.46	37.5	3.68	-20.0	-14.9	-10.0	*	*	20.8	18.0	-36.8	0.0	*#	-8.00
T1	-4.09	-	15.3	-	-1.03	-3.13	-2.22	18.8	30.0	0.0	-	-	-8.33	15.0	-	0.0	-	-
SY1	20.9	-8.67	7.72	-4.99	-36.4	-8.21	3.19	-60.1	-14.0	-7.27	-8.61	-12.8	-15.7	-12.5	0.0	0.0	-12.4	3.32
SY2	15.0	0.0	-4.28	-0.77	-2.91	0.0	-7.60	80.0	50.0	13.8	-13.1	-4.21	-13.5	25.0	-1.41	7.14	-11.4	-24.3
SY3	11.6	27.7	-3.44	-11.1	-8.50	-1.92	-9.58	-6.25	109.	3.07	-10.6	-9.29	-23.5	*	8.25	3.85	10.8	-3.59
NIMS	-0.09	*	-36.4	-40.0	0.0	-2.45	60.0	42.1	57.1	-20.0	*	0.0#	-60.0	-41.7	*#	9.09	*	*
DRN	34.0	-33.3	7.20	-10.0	-1.00	2.85	-3.45	-8.00	18.8	9.09	*	160.	3.40	-11.9	22.7	-9.09	-61.9	13.0

KEY: % >1000% ERROR, * ACTUAL OR CALC. COMP =0ppm,

\- NO DATA CITED FOR STD, # BELOW LLD.

Table AIII.8

Percentage of standards within % error ranges given.

	$\leq \pm 1\%$	$\leq \pm 2\%$	$\leq \pm 5\%$	$\leq \pm 10\%$	$\leq \pm 15\%$	$\leq \pm 20\%$	$\leq \pm 20\%$	n	half better than†
Ba	4.5	13.6	22.7	31.8	50.0	59.09	40.9	22	±15.0
Nb	18.75	18.75	25.0	43.75	56.25	68.75	31.25	16	±12.5
Zr	16.0	20.0	40.0	60.0	72.0	76.0	24.0	25	±7.5
Y	14.3	19.0	28.6	47.6	57.1	66.7	33.3	21	±11.3
Sr	36.0	56.0	76.0	92.0	92.0	96.0	4.0	25	±1.7
Rb	36.4	59.1	81.8	86.4	86.4	90.9	9.1	22	±1.6
Zn	4.0	8.0	56.0	64.0	96.0	96.0	4.0	25	±4.6
Cu	8.3	8.3	16.7	25.0	29.2	37.5	62.5	24	> ±20
Ni	9.0	9.1	13.6	13.6	31.8	59.1	40.9	22	±18.3
Pb	16.7	16.7	29.2	54.7	79.2	83.3	16.7	24	±9.2
U	0	0	0	28.6	85.7	85.7	14.3	7	±11.8
Th	0	0	14.3	28.6	57.1	78.6	21.4	14	±13.8
V	0	0	17.4	30.4	34.7	60.9	39.1	23	±17.9
Cr	8.7	13.0	17.4	34.8	47.8	69.6	30.4	23	±15.5
Nd	17.6	23.5	29.4	35.3	52.9	25.9	47.1	17	±14.2
Ga	27.3	27.3	40.9	81.8	90.9	90.9	9.1	22	±5.8
La	6.25	6.25	6.25	12.5	43.75	68.75	31.25	16	±16.25
Ce	0	0	18.75	43.75	62.5	87.5	12.5	16	±11.7

n – number of valid samples, ie. above LLD, cited by Abbey (1983) and non-zero calculated concentration or reported value. † – over 50% of standards run as unknowns show errors less than this value (calculated by linear interpolation between the values immediately above and below 50%).

(pers. comm. Dr. I. Meighan to R. G. Hardy).

Repeat samples were runs continuously throughout to monitor machine drift. This was invariably small and no correction was made to compensate for this. The use of a monitor and a correction procedure would however remove any effects of drift during an analytical session.

Carbonatite Analyses

Carbonatites were all analysed at Leicester University. Major elements were analysed on fused glass beads made with a 1:5 mix of ashed sample : Johnson Mattey Spectroflux 105. These were standardised against wet chemically analysed carbonatites.

Trace element analyses were made from pressed powder briquettes. Mass absorbtion corrections were made by ratioing the analytical line to either the $W(L_{\beta_1})_{Rayleigh}$ or $Rh(K_\alpha)_{Compton}$ scattered peaks which are proportional to the mass absorbtion of the sample. Both W and Rh X-ray tubes were used as excitation sources in the analyses of the trace elements.

The method of analysis for carbonatites by XRF at Leicester was set up by Neil Hodgson in colaboration with N. Marsh. The method, and a detailed discussion of its accuracy, precision, detection limits, etc. are described by Hodgson (1986). U was analysed at Durham using the methods described elsewhere in this Appendix. Cu and Pb were not analysed in carbonatites.

CIPW Norms

Normative mineralogies were calculated for all samples (with the exclusion of the carbonatites) using a slightly modified version of the program `NORMCAL` written in PL1 by R. C. O. Gill at Durham University (see Gill 1972b). Fe_2O_32/FeO ratios were calculated from a compilation of analysed Fe_2O_3 ratios for these dykes and from similar rocks (Macdonald 1969, Stephenson 1973). These were assigned on the TAS classification of the rock and subdivided on peralkalinity (see Figure 5.2.1).

Tables of normative mineralogies are reported interspersed with the tables of major and trace element data. The norm tables have not been summarised by removal of unreported compositions. This is done to maintain a consistent format for these tables throughout and thus to assist in retrieval of data by any subsequent users.

The following tables contain major, trace and normative data for:

(i) The main swarm of dykes (oversaturated and undersaturated) which excludes lamprophyres, carbonatites and dykes from the Østfjordsdal swarm. It does however include dykes which cut the Østfjordsdal syenite.

(ii) Lamprophyre dykes.

(iii) Carbonatite dykes with no normative data (no CO_2).

(iv) Østfjordsdal Dyke Swarm, which includes lamprophyres and a carbonatite. These dykes all cut the Julianehåb Granite although some (eg. AL) may be Late Gardar and not Mid-Gardar.

The main swarm analyses tables are laid out in numerical order except for samples collected during 1984 which are reported in chronological order, ie. 326200-326999, 325900-326000 and 325600-325619 towards the end of the tables.

In the following tables 'n.d.' indicates not determined. Normative *Nė* - *Ks* - *Qz* (ie. coordinates in the Residua System) are reported for all samples with D.I.>70. Where D.I.<70, 'n.a.' indicates that these values do not apply.

Program TR.PEAK.STD

```
C THIS PROGRAM RECALCULATES FREE FORMAT INTENSITY DATA TO GIVE PEAK HTS
C   FOR TRACE ELEMENTS AND WRITES THIS DATA IN A FIXED FORMAT TO BE USED TO
C CALCULATE PPMS OF TRACE ELEMENTS USING OTHER PROGRAMS,TAKING INTO
C  ACCOUNT PEAK INTERFERENCES.
C
C     WRITTEN BY NICK PEARCE APRIL  1986
C
C  THE NEXT SECTION READS IN RAW COUNT DATA
C
C OUTPUT ORDER IS  NUMBER    BA     NB     ZR     Y     SR     RB     ZN
C        CU      NI      PB     U     TH     V     CR     ND     GA
C     LA     CE
      DIMENSION RBLANK(18),ID(43)
      READ (5,*) IBNO,RBLANK
      DO 30 I=1,1000
      READ (5,*,END=999) INO,ID
C ORDER OF INPUT IS     RNO,BAMIN,BAPE,BAPL,RNB,RNBPL,ZR,ZRPL,Y,YPL,SR,SRPL,
C    RB,RBPL,ZN,ZNPL,CU,CUPL,RNI,RNIPL,PBMIN,PB,PBPL,U,UPL,THMIN,TH,
C    THPL,VMIN,V,CR,CRPL,RND,RNDPL,GAMIN,GA,GAPL,RL,RLPL,CEMIN,CE,CEPL,
C    SE,SEPL
      BAMIN=FLOAT(ID(1))
      BAPE=FLOAT(ID(2))
      BAPL=FLOAT(ID(3))
      RNB=FLOAT(ID(4))
      RNBPL=FLOAT(ID(5))
      ZR=FLOAT(ID(6))
      ZRPL=FLOAT(ID(7))
      Y=FLOAT(ID(8))
      YPL=FLOAT(ID(9))
      SR=FLOAT(ID(10))
      SRPL=FLOAT(ID(11))
      RB=FLOAT(ID(12))
      RBPL=FLOAT(ID(13))
      ZN=FLOAT(ID(14))
      ZNPL=FLOAT(ID(15))
      CU=FLOAT(ID(16))
      CUPL=FLOAT(ID(17))
      RNI=FLOAT(ID(18))
      RNIPL=FLOAT(ID(19))
      PBMIN=FLOAT(ID(20))
      PB=FLOAT(ID(21))
      PBPL=FLOAT(ID(22))
      U=FLOAT(ID(23))
      UPL=FLOAT(ID(24))
      THMIN=FLOAT(ID(25))
      TH=FLOAT(ID(26))
      THPL=FLOAT(ID(27))
      VMIN=FLOAT(ID(28))
      V=FLOAT(ID(29))
      CR=FLOAT(ID(30))
      CRPL=FLOAT(ID(31))
      RND=FLOAT(ID(32))
      RNDPL=FLOAT(ID(33))
      GAMIN=FLOAT(ID(34))
      GA=FLOAT(ID(35))
      GAPL=FLOAT(ID(36))
      RL=FLOAT(ID(37))
      RLPL=FLOAT(ID(38))
      CEMIN=FLOAT(ID(39))
      CE=FLOAT(ID(40))
      CEPL=FLOAT(ID(41))
      SE=FLOAT(ID(42))
      SEPL=FLOAT(ID(43))
C CALCULATE SR PEAK  TO MAKE SR INTERFERENCE CORRECTIONS
      SRPK=SR-((YPL-SRPL)*(1.1/(1.0+1.1))+SRPL)
C
C  CORRECTION FACTORS FOR SR ON OTHER PEAKS, THE FACTORS WERE CALCULATED
C USING A SRCO3 SPIKE IN AN H3BO3 PELLET, AND ARE A FACTOR OF NET SR
C COUNTS AT THE MEASURING POSITIONS FOR SR AND THE AFFECTED ELEMENTS
C
      ZR=ZR-(SRPK*.037180195)
      ZRPL=ZRPL-(SRPK*2.8696759E-3)
C     Y=Y-(SRPK*4.8075081E-3)
C     YPL=YPL-(SRPK*3.7576234E-3)
      SRPL=SRPL-(SRPK*9.3720972E-3)
      RB=RB-(SRPK*6.2095240E-3)
      RBPL=RBPL-(SRPK*2.7732836E-3)
C
C CALCULATION OF RB PEAK HEIGHT
C
      RBPK=RB-((SRPL-RBPL)*(0.7/(1.0+.7))+RBPL)
      BAPK=BAPE-((BAMIN-BAPL)*(1.38/(1.38+.78))+BAPL)
      UPK=U-UPL
C  CORRECTION FOR U INTERFERENCE ON ITS BACKGROUND
      UPK=UPK*1.0060484
      THPK=TH-((THMIN-THPL)*(1.6/(1.6+.76))+THPL)
C CORRECTION FOR TH INTERFERENCE ON ITS OWN BACKGROUND
      THPK=THPK*1.0299596
C
C  MAKE CORRECTIONS FOR U AND TH ON NB PEAK AND BACKGROUNDS
```

```
C  U CORRECTIONS
      RNB=RNB-(0.1159861*UPK)
      RNBPL=RNBPL-(0.023124*UPK)
C  TH INTERFERENCE ON NB
C     RNBPL=RNBPL-(1.0060539*THPK)
C TRY DIFFERENT TH ON NBPL CORRECTIONS
      RNBPL=RNBPL-(0.63*THPK)
      RNBPK=RNB-RNBPL
C     ZRPK=ZR-((RNBPL-ZRPL)*(1.06/(1.06+.90))+ZRPL)
C TRY  ZR -ZRPL FOR PEAK
      ZRPK=ZR-ZRPL
C EFFECTS OF RB ON OTHER ELS
      ZRPL=ZRPL-(9.7266E-3*ZRPK)
      ZRPL=ZRPL-(1.32998E-3*RBPK)
      YPL=YPL-(RBPK*5.6695891E-3)
C EFFECT OF RB ON Y
      Y=Y-(RBPK*.225000)
      YPK=Y-((ZRPL-YPL)*(1.0/(1.0+.9))+YPL)
      ZNPK=ZN-ZNPL
      CUPK=CU-CUPL
      RNIPK=RNI-RNIPL
      PBPK=PB-((PBMIN-PBPL)*(1.2/(1.6+1.2))+PBPL)
      VPK=V-VMIN
      CRPK=CR-CRPL
      RNDPK=RND-RNDPL
      GAPK=GA-((GAMIN-GAPL)*(.9/(.9+.4))+GAPL)
      RLAPK=RL-RLPL
      CEPK=CE-((CEMIN-CEPL)*(2.6/(2.6+1.5))+CEPL)
C
C CALCULATION OF OTHER INTERFERENCES
C  THESE ARE OBTAINED FOR SINGLE ELEMENT SPIKES IN H3BO3
C PELLETS AND ARE FACTORS OF NET COUNTS OF THE INTERFERER UPON THE
C INTERFERED PEAK, MEASURED AT THE MEASURING POSITION OF EACH ELEMENT
C
      CEPK=CEPK-(RNDPK*.03957)
      RNDPK=RNDPK-(CEPK*.02229)
      YPK=YPK-(ZRPK*4.502E-3)
      RNBPK=RNBPK-(YPK*0.01045)
      CRPK=CRPK-(VPK*.08667)
C
C SUBTRACT THE BLANK VALUES AT THE PEAK POSITIONS FOR EACH ELEMENT
C
      BAPK=BAPK-RBLANK(1)
      RNBPK=RNBPK-RBLANK(2)
      ZRPK=ZRPK-RBLANK(3)
      YPK=YPK-RBLANK(4)
      SRPK=SRPK-RBLANK(5)
      RBPK=RBPK-RBLANK(6)
      ZNPK=ZNPK-RBLANK(7)
      CUPK=CUPK-RBLANK(8)
      RNIPK=RNIPK-RBLANK(9)
      PBPK=PBPK-RBLANK(10)
      UPK=UPK-RBLANK(11)
      THPK=THPK-RBLANK(12)
      VPK=VPK-RBLANK(13)
      CRPK=CRPK-RBLANK(14)
      RNDPK=RNDPK-RBLANK(15)
      GAPK=GAPK-RBLANK(16)
      RLAPK=RLAPK-RBLANK(17)
      CEPK=CEPK-RBLANK(18)
C
C  WRITE OUT THE RESULTS
C
C
      WRITE(9,*) IND,BAPK,RNBPK,ZRPK,YPK,SRPK,RBPK,ZNPK,CUPK,RNIPK,PBPK,
     1UPK,THPK,VPK,CRPK,RNDPK,GAPK,RLAPK,CEPK
   30 CONTINUE
  999 STOP
      END
```

Program TR.STDZE

```
C                 *************************************************
C                 **                                             **
C                 **                  TR.STDZE                   **
C                 **                                             **
C                 **    TRACE ELEMENT STANDARDISTION PROGRAM     **
C                 **                                             **
C                 **          NICK PEARCE, MAY 1986              **
C                 **                                             **
C                 *************************************************
C
C THIS PROGRAM IS FOR CALCULATING K VALUES FOR TRACE ELEMENT CALCULATION BY THE
C METHOD OF IB SORENSEN AS USED AT G. G. U. IN COPENHAGEN. THE DATA YOU
C INPUT INTO THIS PROGRAM SHOULD HAVE BEEN PASSED THROUGH TR.PEAK.STD FIRST
C TO PRODUCE PEAK HEIGHT INFORMATION ON THE STANDARDS. ALL THE STANDARDS ETC
C ARE FIXED SO THERE IS NO FLEXIBILITY WITH THIS PROGRAM AS TO INPUT FORMAT
C ALTHOUGH NEW STANDARDS CAN BE ADDED TO THE LIST BY ADDING THE RELEVANT DATA TO
C THE ARRAYS OF STANDARD MAJOR ELEMENT AND TRACE ELEMENT COMPOSITIONS.
C
C-----------------------------------------------------------------------------C
C  PLEASE REFER TO THE HELP FILE TR.HELP OR THE HANDBOOK PREPERED FOR USERS
C             OF THIS METHOD - COPIES OF THIS WITH RON HARDY
C-----------------------------------------------------------------------------C
C
C  LINE ONE OF DATA SHOULD HAVE THE NUMBER OF STANDARDS USED FOLLOWED BY THE
C NUMBER OF ELEMENTS , IN FREE FORMAT, BOTH AS INTEGERS.
C  LINE TWO SHOULD CONTAIN THE STANDARD REFERENCE NUMBER AND THE PEAK HEIGHTS
C FOR THAT STANDARD. THIS IS OUTPUT FROM TR.PEAK.STD
C
C-----------------------------------------------------------------------------C
C ARRAYS ARE 2 DIMENSIONAL AND INDIVIDUAL ELEMENTS ARE REFERENCED (ROW,COLUMN)
C-----------------------------------------------------------------------------C
C   HOWEVER, IN THE 'DATA' STATEMENTS USED THE INPUT IS DEFINED COLUMNWISE
C-----------------------------------------------------------------------------C
C
C AN EXAMPLE OF 2-DIMENSIONAL ARRAY USAGE FOLLOWS
C
C   ARRAY WANTED  * 11 12 13 14 *   THIS ARRAY HAS DIMENSIONS (3,4)
C                 * 21 22 23 24 *
C                 * 31 32 33 34 *
C
C  THIS WOULD BE ENTERED VIA A 'DATA' STATEMENT SO:-
C      DATA ARRAYNAME /11,21,31,12,22,32,13,23,33,14,24,34/
C
C THUS TO FACILITATE THE ADDITION OF EXTRA STANDARDS THE ARRAYS USED ARE
C ARRANGED SO
C        * STANDARD                               * STANDARD
C        * 1 - - - - 25                           * 1 - - - - 25
C    ******************       AND            ******************
C     SI *                                    NB *
C     AL *   MAJOR                            ZR *     TRACE
C      : *                                     : *
C      : *  ELEMENT                            : *    ELEMENT
C     MN *                                    LA *
C    H2O *   COMP                             CE *     COMP
C
C NEW STANDARDS CAN SIMPLY BE TAGGED ON TO THE END OF THE 'DATA' ARRAYS
C AS A SEQUENCE OF NUMBERS SEPARATED BY COMMAS (IN EFFECT ADDING AN EXTRA
C COLUMN TO THE ARRAY).
C YOU MUST REMEMBER TO REDIMENSION THE ARRAYS YOU ARE
C ADDING DATA TO AS IF YOU DONT YOU WILL CAUSE ERROR MESSAGES ETC TO APPEAR.
C
C  IE TO ADD THE NEXT COLUMN  *15*
C                             *25*
C                             *35*
C                                   TO THE ARRAY ABOVE YOU WOULD HAVE TO:-
C
C (1) REDIMENSION THE ARRAY TO "DIMENSION ARRAYNAME(3,5)" AT THE HEAD OF THE
C     PROGRAM
C
C (2) ADD ",15,25,35/" TO THE END OF THE LINE STARTING "DATA ARRAYNAME/....."
C
C REMEMBER ALSO THAT NO MORE THAN 19 CONTINUATION LINES ARE ALLOWED IN FORTRAN
C SO IF THE SIZE OF THE ARRAY WHEN CHANGED EXCEEDS THIS LENGTH IN THE PROGRAM
C LISTING YOU MUST BREAK IT INTO 2 SMALLER ARRAYS AND
C RECOMBINE THEM INTO THE LARGE WORKING ARRAYS OF STDMAJ AND ISTDTR (MAJOR
C AND TRACE ELEMENT COMPOSITION ARRAYS RESPECTIVELY). THIS HAS BEEN DONE FOR
C THE TRACE ELEMENT ARRAY ALREADY IN THIS PROGRAM AND FOLLOWING THE SAME METHOD
C WILL RECOMBINE SPLIT ARRAYS SUCCESFULLY.
C
C  I AM AFRAID THAT THE ELEMENT INPUT ORDER IS  FIXED - NO NEW ELEMENTS
C CAN BE ADDED TO THE PROGRAM UNLESS A MASSIVE RE-WRITE IS UNDERTAKEN.
C

      DIMENSION RMABS(11,18)
      DIMENSION RPEAK(18,25),ISTDNO(25),ISTDCT(25)
      DIMENSION STDCTS(18),RKAR(40),RKFIN(18),RTMAC(11),KUSED(40)
      DIMENSION IELDON(18)
      DIMENSION STDMAJ(11,25),ISTTR1(18,20),ISTTR2(18,5),ISTDTR(18,25)
      CHARACTER*2 ELS(18)
      CHARACTER*5 STAN(25)
```

```
C     DATA ARRAYS NEXT

      DATA ELS/'BA','NB','ZR',' Y','SR','RB','ZN','CU','NI','PB',' U','T
     *H',' V','CR','ND','GA','LA','CE'/

      DATA STAN/'AGV 1','   BR','BCR 1','DTS 1','NIM D','   GA','   GH',
     *'   GR','  G 1','  G 2','NIM G','GSP 1','  GSN','NIM L','NIM N','P
     *CC 1','NIM P',' UB N','MRG 1','  T 1',' SY 1',' SY 2',' SY 3','NIM
     * S','  DRN'/

      DATA STDMAJ /59.61,17.19,6.78,1.52,4.94,4.32,2.92,1.06,.1,.51,.78,
     *38.2,10.2,12.88,13.28,13.8,3.05,1.4,2.6,.2,1.04,2.8,54.53,13.72,13
     *.41,3.48,6.97,3.3,1.7,2.26,.18,.36,.67,40.61,.25,8.7,49.8,.14,.01,
     *.0,.0,.12,.0,.42,38.96,.3,16.96,43.51,.28,.04,.01,.02,.22,.01,.3,6
     *9.90,14.5,2.83,.95,2.45,3.55,4.03,.38,.09,.12,1.06,75.8,12.5,1.34,
     *.03,.69,3.85,4.76,.08,.08,.01,.6,65.9,14.75,4.05,2.4,2.5,3.8,4.5,.
     *65,.06,.28,.8,72.64,14.04,1.94,.38,1.39,3.32,5.48,.26,.03,.09,.4,6
     *9.22,15.4,2.69,.75,1.96,4.06,4.46,.48,.03,.13,.5,75.7,12.08,2.02,.
     *06,.78,3.36,4.99,.09,.02,.01,.49,67.32,15.28,4.3,.97,2.03,2.81,5.5
     *1,.66,.04,.28,.58,65.8,14.67,3.75,2.3,2.5,3.77,4.63,.68,.06,.28,1.
     *35,52.4,13.64,9.96,.28,3.22,8.37,5.51,.48,.77,.06,2.31,52.64,16.5,
     *8.91,7.5,11.5,2.46,.25,.2,.18,.03,.33,42.1,.73,8.28,43.5,.55,.01,.
     *0,.01,.12,.01,4.7,51.1,4.18,12.76,25.33,2.66,.37,.09,.2,.22,.02,.2
     *6,39.43,2.9,8.34,35.21,1.2,.1,.02,.11,.12,.04,12.0,39.32,8.5,17.82
     *,13.49,14.77,0.71,.18,3.69,.17,.06,.98,62.7,16.69,5.9,1.89,5.08,4.
     *39,1.24,.58,.1,.14,1.52,59.5,9.6,8.21,4.2,10.2,3.3,2.67,.49,.4,.22
     *,.69,60.1,12.12,6.28,2.7,7.89,4.34,4.48,.14,.32,.43,.43,59.68,11.8
     *,6.42,2.67,8.26,4.15,4.2,.15,.32,.54,.42,63.63,17.34,1.4,.46,.68,.
     *43,15.35,.04,.01,.12,.22,52.85,17.52,9.7,4.4,7.05,2.99,1.7,1.09,.2
     *2,.25,2.47/
C
C TRACE ELEMENT ARRAYS   -1 FOR MISSING DATA, 0 FOR LESS THAN 0.5 PPM
C
      DATA ISTTR1 /1200,16,230,19,660,67,86,59,15,33,2, 6,125,10,37,21,3
     *6,71,1050,100,250,30,1320,47,150,72,260,8,3,12,235,380,60,20,80,14
     *0,680,19,185,40,330,47,129,18,13,14, 2,6,404,16,29,22,25,54,  2,-1
     *,3,-1,0,0,46,5,2300,11,-1,0,11,4200,0,1,0,0,10,-1,20,-1,3,-1,90,10
     *,2050,7,-1,1,40,2900,-1,-1,0,-1,850,10,150,21,310,175,80,16,7,30,4
     *,17,38,12,25,16,38,70,22,85,150,70,10,390,85,14,3,45,18,90,5,6,25,
     *23,25,50,1050,-1,180,19,550,175,60,345,55,32,-1,-1,65,110,-1,20,75
     *,-1,1080,24,210,13,250,220,45,12,1,46,  4,50,18,20,57,20,104,173,1
     *900,13,300,11,480,170,85,11,5,31,2,25,36,9,58,22,90,160,120,53,300
     *,143,10,320,50,12,8,40,15,51,2,12,72,27,109,195,1300,23,500,29,240
     *,
```



```
     *,103,34,10,54,2,105,53,13,190,22,185,400,1400,23,235,19,570,185,48
     *,20,34,53,8,44,65,55,50,22,75,140,450,960,11000,22,4600,190,400,13
     *,11,43,14,66,81,10,48,54,250,240,100,2,23,7,260,6,68,14,120,7,1,1,
     *220,30,3,16,3,6,2,1,7,-1,0,0,42,10,2400,11,-1,-1,30,2800,-1,1,0,0,
     *46,-1,30,5,32,5,100,18,560,6,0,1,230,24000,-1,8,2,-1,30,-1,8,11,10
     *,6,92,28,2000,18,-1,-1,75,2300,-1,5,-1,-1,50,20,105,16,260,8,190,1
     *35,195,10,0,1,520,450,19,18,10,25,660,-1,150,-1,390,32,180,48,10,3
     *7,-1,-1,96,20,-1,20,-1,-1/
      DATA ISTTR2             /282,150,3030,441,286,195,219,23,43,495,25
     *20,1305,89,56,314,20,233,512,460,23,280,130,275,220,250,5,10,80,29
     *0,380,52,12,71,28,88,210,430,130,320,740,306,208,240,16,11,130,650
     *,990,51,10,800,26,1350,2200,2400,4,33,20,62,530,10,19,7,5,1,1,10,1
     *2,6,11,5,12,385,6,125,30,400,70,145,50,16,55,2,5,225,42,22,22,21,4
     *6/

C MASS ABSORBTION ARRAY

      DATA RMABS /.7,.61,4.55,.59,2.39,.56,2.3,2.54,4.14,.79,.35,4.73,4.
     *29,30.75,3.82,15.9,3.4,16.06,17.42,30.65,5.32,1.55,5.47,4.95,35.5,
     *4.36,18.37,3.9,18.58,20.14,35.42,6.17,1.73,6.34,5.75,41.05,5.08,21
     *.23,4.57,21.54,23.26,40.7,7.13,2.,7.39,6.68,47.54,5.9,24.68,5.43,2
     *4.93,27.02,47.18,8.32,2.36,8.664,7.817,55.53,6.94,28.8,6.21,29.17,
     *31.54,55.,9.75,2.81,29.25,26.51,182.65,23.64,95.7,21.08,97.24,104.
     *28,181.06,32.58,9.39,35.7,32.35,221.64,28.86,116.35,25.78,118.23,1
     *26.76,219.8,40.09,11.53,43.72,39.6,270.5,35.36,142.11,31.67,144.62
     *,154.7,268.25,49.06,14.11,10.16,9.17,64.92,8.16,33.78,7.31,34.14,3
     *6.9,64.35,11.43,3.25,8.26,7.46,52.86,6.62,27.47,5.93,27.8,30.02,52
     *.49,9.28,2.62,9.41,8.49,60.35,7.56,31.35,6.78,31.77,34.26,59.82,10
     *.61,2.98,136.9,124.8,115.93,112.18,442.25,100.01,448.91,71.69,110.
     *67,153.3,44.95,107.27,97.58,90.92,87.4,344.56,77.86,351.48,373.96,
     *86.45,120.45,35.13,117.84,107.11,99.72,95.86,378.07,85.63,385.84,4
     *10.26,94.81,132.31,38.6,24.21,21.9,151.56,19.5,79.29,17.43,80.5,86
     *.4,150.3,27.18,7.79,163.32,148.6,137.56,133.1,521.6,118.83,532.81,
     *85.14,130.76,183.32,53.74,115.97,105.35,98.11,94.32,372.0,84.26,37
     *9.56,403.7,93.27,130.16,37.98/

      DO 3000 I=1,20
      DO 3020 J=1,18
      ISTDTR(J,I)=ISTTR1(J,I)
3020  CONTINUE
3000  CONTINUE

      DO 3100 I=21,25
      DO 3120 J=1,18
      ISTDTR(J,I)=ISTTR2(J,I-20)
```

```
3120  CONTINUE
3100  CONTINUE

      WRITE(6,*)'**********************************************************'
      WRITE(6,*)'**********************************************************'
      WRITE(6,*)'***                                                    ***'
      WRITE(6,*)'***                    TR.STDZE                        ***'
      WRITE(6,*)'***                                                    ***'
      WRITE(6,*)'***     TRACE ELEMENT STANDARDISATION PROGRAM          ***'
      WRITE(6,*)'***                                                    ***'
      WRITE(6,*)'***     WRITTEN BY     NICK PEARCE,                    ***'
      WRITE(6,*)'***                    GEOLOGICAL SCIENCES DEPT.,      ***'
      WRITE(6,*)'***                    DURHAM UNIVERSITY,              ***'
      WRITE(6,*)'***                    DURHAM DH1 3LE.                 ***'
      WRITE(6,*)'***                                         MAY 1986   ***'
      WRITE(6,*)'**********************************************************'
      WRITE(6,*)'**********************************************************'
      WRITE(6,*)' '
      WRITE(6,*)' '
      READ (5,*) NSTDS,NOELS
      DO 999 L=1,NSTDS
      READ (5,*,END=998) NSTDNO,(STDCTS(J),J=1,NOELS)
C THE NEXT LINE WRITES THE STANDARD PEAK DATA INTO AN ARRAY RPEAK FOR THE
C COLUMN NSTDNO ( IE THE STANDARD) FOR ROWS 1-NOELS
        DO 990 J=1,NOELS
        RPEAK(J,NSTDNO)=STDCTS(J)
 990    CONTINUE
 999  CONTINUE
C RPEAK CONTAINS          STANDARDS
C                       *************
C          PEAKS FOR    *
C          EACH EL      *
C  CALIBRATION
 998  CONTINUE
      NCOUNT=0

      DO 2225 I=1,18
      IELDON(I)=0
 2225 CONTINUE
      GOTO 1010
1005  WRITE(6,*) 'YOU HAVE ALREADY DONE ELEMENT  ',IEL
      WRITE(6,*) 'IF YOU WANT TO RECALIBRATE IT ENTER 1 , IF NOT 2'
      READ(6,*) NOPT
      IF (NOPT.EQ.1) GOTO 2240
      IF (NOPT.EQ.2) GOTO 1010
      IF (NOPT.NE.1.AND.NOPT.NE.2) GOTO 1005
1010  WRITE(6,*) 'SELECT THE ELEMENT YOU WANT TO CALIBRATE BY'
      WRITE(6,*)'ENTERING THE RELEVANT ELEMENT NUMBER (AS AN INTEGER)'
      WRITE(8,*) ' '
      WRITE(8,*)'NO  EL  STD    STD  NO      AVERAGE K   PPM ROCK  MASS A
     *BS COEFF  K (THIS STD)      PEAK HT'
      WRITE(8,*)'         COUNT  NAME'
      WRITE(8,*) ' '
      READ(6,*) IEL
      DO 1011 I=1,18
      IF (IELDON(I).EQ.IEL) GOTO 1005
1011  CONTINUE
      IELDON(IEL)=IEL
      NCOUNT=NCOUNT+1
2240  ICOUNT=0
      WRITE(6,*) ' '
      ISTCNT=0
1015  ISTD=0
      WRITE(6,*) ' SELECT THE STANDARD YOU WANT TO USE (AS INTEGER)'
      READ (6,*) ISTD
      ISTCNT=ISTCNT+1
      ICOUNT=ICOUNT+1
      RPK=RPEAK(IEL,ISTD)
      IF (RPK.EQ.0.0000000) RPK=0.0000001
C CALCULATE MASS ABSN COEFFS ETC
      DO 1020 I=1,11
      RTMAC(I)=(RMABS(I,IEL)*STDMAJ(I,ISTD))/100.000
 1020 CONTINUE
      TOTMAC=0.000
      DO 1030 I=1,11
      TOTMAC=TOTMAC+RTMAC(I)
 1030 CONTINUE
C
C  CALCULATE K FACTOR
      RK=FLOAT(ISTDTR(IEL,ISTD))/(RPK*TOTMAC)
      RKAR(ISTCNT)=RK
      ISTDNO(ISTCNT)=ISTD
      RKAVT=0.000
      DO 1040 I=1,ISTCNT
      RKAVT=RKAR(I)+RKAVT
 1040 CONTINUE
      RKAVG=RKAVT/FLOAT(ISTCNT)
      WRITE (6,*) 'STD          K VALUE'
      DO 1045 I=1,ISTCNT
      WRITE(6,1046) ISTDNO(I),RKAR(I)
```

```
 1046 FORMAT(I3,5X,F14.7)
1045  CONTINUE
      WRITE  (6,*) ' AVERAGE K IS  ',RKAVG
C  WRITE ALL VALUES OF K CALCULATED INTO A FILE FOR INSPECTION AFTER THE RUN
      WRITE (8,1038) IEL,ELS(IEL),ISTCNT,STAN(ISTD),ISTDNO(ISTCNT),RKAVG
     *,ISTDTR(IEL,ISTD),TOTMAC,RKAR(ISTCNT),RPEAK(IEL,ISTD)

 1038 FORMAT(I2,2X,A2,I4,4X,A5,I4,F14.7,I10,3F14.7)
C SELECT NEXT THING TO DO FROM OPTIONS BELOW
1047  WRITE (6,*) ' '
      WRITE(6,*) 'SELECT OPTION BY ENTERING AN INTEGER FROM LIST'
      WRITE(6,*) 'NEXT STANDARD      1'
      WRITE(6,*) 'TAKE K             2'
      WRITE(6,*) 'BIAS K             3 - IE REMOVE ODD VALUES'
      WRITE(6,*) 'TO STOP OR CHANGE ELEMENT YOU MUST TAKE K'
      WRITE(6,*) ' '
      WRITE(6,*) 'YOU HAVE SO FAR DONE ',NCOUNT,' ELEMENTS FROM ',NOELS
      READ (6,*) OPTION
      IF (OPTION.EQ.1) GOTO 1015
      IF (OPTION.EQ.2) GOTO 1050
      IF (OPTION.EQ.3) GOTO 1070
      IF (OPTION.LT.1.OR.OPTION.GT.3) GOTO 1047

C  VARIOUS OPTIONS FOLLOW

C SELECTION OF K VALUE
 1050 RKFIN(IEL)=RKAVG
      WRITE(6,*)'K VALUE SELECTED AS  ',RKAVG,' FOR ELEMENT ',IEL
      WRITE(6,*) ' '

      WRITE(8,*)'ALL K VALUES USED IN AVERAGE'
      WRITE(8,*)'AVERAGE K SELECTED IS ',RKAVG
      WRITE(8,*) ' '

 1053 WRITE(6,*) 'SELECT OPTION BY ENTERING AN INTEGER FROM LIST'
      WRITE(6,*) 'NEXT ELEMENT              4 '
      WRITE(6,*) 'STOP                      5 '
      WRITE(6,*) 'CHECK ELEMENTS DONE       6 '
      READ (6,*) NEXTOP
      IF (NEXTOP.EQ.4) GOTO 1010
      IF (NEXTOP.EQ.5) GOTO 1200
      IF (NEXTOP.EQ.6) GOTO 1057
      IF (NEXTOP.LT.4.OR.NEXTOP.GT.6) GOTO 1053
      GOTO 1047
 1057 WRITE(6,*) 'YOU HAVE SO FAR DONE ',NCOUNT,' ELEMENTS FROM ',NOELS
      WRITE(6,*) ' THEY ARE'
      WRITE(6,1058) IELDON
 1058 FORMAT(18I3)
      GOTO 1053

C  SELECTION OF BIASED K

 1070 WRITE(6,*)' NO.   STD NO.   K VALUE'
      DO 1071 I=1,ISTCNT
      WRITE (6,1073) I,ISTDNO(I),RKAR(I)
 1073 FORMAT(I3,I9,2X,F10.7)
 1071 CONTINUE

      WRITE (6,*) 'HOW MANY OF THESE DO YOU WISH TO USE?'
      READ (6,*) KUSE
      WRITE (6,*) 'INPUT THEIR NUMBERS FROM COLUMN ONE AS INTEGERS SEPAR
     *ATED BY COMMAS'
      READ (6,*) (KUSED(I),I=1,KUSE)
      TOTALK=0.000
      DO 1074 I=1,KUSE
      KINPUT=KUSED(I)
      TOTALK=RKAR(KINPUT)+ TOTALK
 1074 CONTINUE
      WRITE (6,*) ' NEW K AVERAGE CALCULATED '
      TOTAVK=TOTALK/FLOAT(KUSE)
      RKFIN(IEL)=TOTAVK
      WRITE (6,*) 'K SELECTED IS ',TOTAVK
1075  WRITE(6,*) ' '

      WRITE(8,*)'OF THE ABOVE YOU HAVE USED ',KUSE,' STANDARDS'
      WRITE(8,*)'THESE ARE NUMBERED IN THE THIRD COLUMN AS :-'
      WRITE(8,1174) (KUSED(L),L=1,KUSE)
1174  FORMAT(25I3)
      WRITE(8,*)'AVERAGE K SELECTED AFTER BIAS IS ',TOTAVK
1275  WRITE(8,*)' '
      WRITE(6,*) 'SELECT OPTION BY ENTERING AN INTEGER FROM LIST'
      WRITE(6,*) 'NEXT ELEMENT              4 '
      WRITE(6,*) 'STOP                      5 '
      WRITE(6,*) 'CHECK ELEMENTS DONE       6 '
      READ (6,*) NEXTOP
      IF (NEXTOP.EQ.4) GOTO 1010
      IF (NEXTOP.EQ.5) GOTO 1200
      IF (NEXTOP.EQ.6) GOTO 1076
      IF (NEXTOP.LT.4.OR.NEXTOP.GT.6) GOTO 1275
 1076 WRITE(6,*) 'YOU HAVE SO FAR DONE ',NCOUNT,' ELEMENTS FROM ',NOELS
```

```
      WRITE(6,*) ' THEY ARE'
      WRITE(6,1077) IELDON
 1077 FORMAT(18I3)
      GOTO 1275

C WRITE K'S INTO ANOTHER FILE BEFORE FINISHING

 1200 DO 1210 I=1,NOELS
      WRITE (9,1220) I,RKFIN(I)
 1220 FORMAT(I6,8X,F12.8)
 1210 CONTINUE
      STOP
      END
```

Program TR.PEAK.UNK

```
C THIS PROGRAM RECALCULATES FREE FORMAT INTENSITY DATA TO GIVE PEAK HTS
C   FOR TRACE ELEMENTS AND WRITES THIS DATA IN A FIXED FORMAT TO BE USED TO
C CALCULATE PPMS OF TRACE ELEMENTS USING OTHER PROGRAMS,TAKING INTO
C  ACCOUNT PEAK INTERFERENCES.
C
C     WRITTEN BY NICK PEARCE APRIL  1986
C
C  THE NEXT SECTION READS IN RAW COUNT DATA
C
C OUTPUT ORDER IS  NUMBER     BA     NB     ZR      Y     SR     RB     ZN
C         CU     NI     PB     U     TH      V     CR     ND    GA
C     LA     CE
C
C   THERE MUST BE A BLANK SAMPLE IN LINE ONE - SEE THE HELP FILE ETC FOR MORE
C    INFORMATION
C

C *************************************************************************
C
C    THE PROGRAM CAN BE SET TO READ IN EITHER REALS OR INTEGERS FOR THE UNKNOWN
C   PEAK HEIGHTS. IF YOU USE A MONITOR YOU WILL NEED IT TO READ REALS, NO
C   MONITOR AND YOU WILL WANT TO INPUT INTEGERS. THIS CAN BE SET AS FOLLOWS:-
C     REALS--- IN THE DIMENSION STATEMENT HAVE RD(43)
C              IN THE SECOND READ STATEMENT HAVE RD AFTER INO
C              IN THE STATEMENTS SUCH AS BAPE=XXX(2) HAVE RD FOR THE XXX
C   INTEGERS-- IN THE DIMENSION STATEMENT HAVE ID(43)
C              IN THE SECOND READ STATEMENT HAVE ID AFTER INO
C              IN THE STATEMENTS SUCH AS BAPE=XXX(2) HAVE ID FOR THE XXX
C      YOU CAN FLIP BETWEEN THE TWO BY USING THE EDITOR TO CHANGE ALL
C     THE BAPE=XXX(N) TYPE STATEMENTS BY USING THE COMMAND
C          :CHGALL/F ;=rd(;=float(id(;    TO GO FROM REAL TO INTEGER MODE
C                                     BUT YOU MUST ADD A ) BRACKET TO THE END
C                                     OF EACH BAPE=float(id(2)  LINE SO IT
C                                     READS BAPE=float(id(2))
C    OR    :CHGALL/F ;=float(id(;=rd(;  TO GO FROM INTEGER TO REAL MODE
C                                     BUT YOU MUST REMOVE THE SECOND (FINAL)
C                                     ) FROM THE BAPE=rd(2)) LINE SO IT
C                                     READS BAPE=rd(2)
C
C   I HAVE HAD TO USE LOWER CAISE LETTERS IN THIS EXPLANATION SO THAT THEY ARE
C  NOT CHANGED BY THE EDITING PROCEDURE. YOU MUST USE UPPER CAISE WHEN EDITING.
C
C   THE CURRENT MODE IS SHOWN IN THE BOX BELOW
C
C                         ********************************
C                         *****                      *****
C                         *****   MODE=FLOAT(ID(N)
C                         *****                      *****
C                         ********************************
C
C ***************************************************************************

      DIMENSION RBLANK(18),ID(43)
      CHARACTER*12 IBNO
      CHARACTER*12 INO

      READ (5,*) IBNO,RBLANK

      DO 30 I=1,1000

      READ (5,*,END=999) INO,ID

C ORDER OF INPUT IS     RNO,BAMIN,BAPE,BAPL,RNB,RNBPL,ZR,ZRPL,Y,YPL,SR,SRPL,
C    RB,RBPL,ZN,ZNPL,CU,CUPL,RNI,RNIPL,PBMIN,PB,PBPL,U,UPL,THMIN,TH,
C    THPL,VMIN,V,CR,CRPL,RND,RNDPL,GAMIN,GA,GAPL,RL,RLPL,CEMIN,CE,CEPL,
C    SE,SEPL
      BAMIN=FLOAT(ID(1))
      BAPE=FLOAT(ID(2))
      BAPL=FLOAT(ID(3))
      RNB=FLOAT(ID(4))
      RNBPL=FLOAT(ID(5))
      ZR=FLOAT(ID(6))
      ZRPL=FLOAT(ID(7))
      Y=FLOAT(ID(8))
      YPL=FLOAT(ID(9))
      SR=FLOAT(ID(10))
      SRPL=FLOAT(ID(11))
      RB=FLOAT(ID(12))
      RBPL=FLOAT(ID(13))
      ZN=FLOAT(ID(14))
      ZNPL=FLOAT(ID(15))
      CU=FLOAT(ID(16))
      CUPL=FLOAT(ID(17))
      RNI=FLOAT(ID(18))
      RNIPL=FLOAT(ID(19))
      PBMIN=FLOAT(ID(20))
      PB=FLOAT(ID(21))
      PBPL=FLOAT(ID(22))
      U=FLOAT(ID(23))
      UPL=FLOAT(ID(24))
```

```
      THMIN=FLOAT(ID(25))
      TH=FLOAT(ID(26))
      THPL=FLOAT(ID(27))
      VMIN=FLOAT(ID(28))
      V=FLOAT(ID(29))
      CR=FLOAT(ID(30))
      CRPL=FLOAT(ID(31))
      RND=FLOAT(ID(32))
      RNDPL=FLOAT(ID(33))
      GAMIN=FLOAT(ID(34))
      GA=FLOAT(ID(35))
      GAPL=FLOAT(ID(36))
      RL=FLOAT(ID(37))
      RLPL=FLOAT(ID(38))
      CEMIN=FLOAT(ID(39))
      CE=FLOAT(ID(40))
      CEPL=FLOAT(ID(41))
      SE=FLOAT(ID(42))
      SEPL=FLOAT(ID(43))
C CALCULATE SR PEAK  TO MAKE SR INTERFERENCE CORRECTIONS
      SRPK=SR-((YPL-SRPL)*(1.1/(1.0+1.1))+SRPL)
C
C  CORRECTION FACTORS FOR SR ON OTHER PEAKS, THE FACTORS WERE CALCULATED
C USING A SRCO3 SPIKE IN AN H3BO3 PELLET, AND ARE A FACTOR OF NET SR
C COUNTS AT THE MEASURING POSITIONS FOR SR AND THE AFFECTED ELEMENTS
C
      ZR=ZR-(SRPK*.037180195)
      ZRPL=ZRPL-(SRPK*2.8696759E-3)
C     Y=Y-(SRPK*4.8075081E-3)
C     YPL=YPL-(SRPK*3.7576234E-3)
      SRPL=SRPL-(SRPK*9.3720972E-3)
      RB=RB-(SRPK*6.2095240E-3)
      RBPL=RBPL-(SRPK*2.7732836E-3)
C
C CALCULATION OF RB PEAK HEIGHT
C
      RBPK=RB-((SRPL-RBPL)*(0.7/(1.0+.7))+RBPL)
      BAPK=BAPE-((BAMIN-BAPL)*(1.38/(1.38+.78))+BAPL)
      UPK=U-UPL
C  CORRECTION FOR U INTERFERENCE ON ITS BACKGROUND
      UPK=UPK*1.0060484
      THPK=TH-((THMIN-THPL)*(1.6/(1.6+.76))+THPL)
C CORRECTION FOR TH INTERFERENCE ON ITS OWN BACKGROUND
      THPK=THPK*1.0299596
C
C  MAKE CORRECTIONS FOR U AND TH ON NB PEAK AND BACKGROUNDS
C  U CORRECTIONS
      RNB=RNB-(0.1159861*UPK)
      RNBPL=RNBPL-(0.023124*UPK)
C  TH INTERFERENCE ON NB
      RNBPL=RNBPL-(0.63*THPK)
      RNBPK=RNB-RNBPL
      ZRPK=ZR-((RNBPL-ZRPL)*(1.06/(1.06+.90))+ZRPL)
C EFFECTS OF RB ON OTHER ELS
      ZRPL=ZRPL-(9.7266E-3*ZRPK)
      ZRPL=ZRPL-(1.32998E-3*RBPK)
      YPL=YPL-(RBPK*5.6695891E-3)
C EFFECT OF RB ON Y
      Y=Y-(RBPK*.225000)
      YPK=Y-((ZRPL-YPL)*(1.0/(1.0+.9))+YPL)
      ZNPK=ZN-ZNPL
      CUPK=CU-CUPL
      RNIPK=RNI-RNIPL
      PBPK=PB-((PBMIN-PBPL)*(1.2/(1.6+1.2))+PBPL)
      VPK=V-VMIN
      CRPK=CR-CRPL
      RNDPK=RND-RNDPL
      GAPK=GA-((GAMIN-GAPL)*(.9/(.9+.4))+GAPL)
      RLAPK=RL-RLPL
      CEPK=CE-((CEMIN-CEPL)*(2.6/(2.6+1.5))+CEPL)
C
C CALCULATION OF OTHER INTERFERENCES
C  THESE ARE OBTAINED FOR SINGLE ELEMENT SPIKES IN H3BO3
C PELLETS AND ARE FACTORS OF NET COUNTS OF THE INTERFERER UPON THE
C INTERFERED PEAK, MEASURED AT THE MEASURING POSITION OF EACH ELEMENT
C
      CEPK=CEPK-(RNDPK*.03957)
      RNDPK=RNDPK-(CEPK*.02229)
      YPK=YPK-(ZRPK*4.502E-3)
      RNBPK=RNBPK-(YPK*0.01045)
      CRPK=CRPK-(VPK*.08667)
C
C SUBTRACT THE BLANK VALUES AT THE PEAK POSITIONS FOR EACH ELEMENT
C
      BAPK=BAPK-RBLANK(1)
      RNBPK=RNBPK-RBLANK(2)
      ZRPK=ZRPK-RBLANK(3)
      YPK=YPK-RBLANK(4)
      SRPK=SRPK-RBLANK(5)
      RBPK=RBPK-RBLANK(6)
```

```
      ZNPK=ZNPK-RBLANK(7)
      CUPK=CUPK-RBLANK(8)
      RNIPK=RNIPK-RBLANK(9)
      PBPK=PBPK-RBLANK(10)
      UPK=UPK-RBLANK(11)
      THPK=THPK-RBLANK(12)
      VPK=VPK-RBLANK(13)
      CRPK=CRPK-RBLANK(14)
      RNDPK=RNDPK-RBLANK(15)
      GAPK=GAPK-RBLANK(16)
      RLAPK=RLAPK-RBLANK(17)
      CEPK=CEPK-RBLANK(18)
C
C  WRITE OUT THE RESULTS
C
C
      WRITE(9,91)INO,BAPK,RNBPK,ZRPK,YPK,SRPK,RBPK,ZNPK,CUPK,RNIPK,PBPK,
     1UPK,THPK,VPK,CRPK,RNDPK,GAPK,RLAPK,CEPK
  91  FORMAT(1X,A12,1X,18F13.4)
  30  CONTINUE
 999  STOP
      END
```

Program TR.UNKNOWNS

```
C THIS PROGRAM IS FOR CALCULATING PPM CONCENTRATIONS IN YOUR UNKNOWNS BY THE
C METHOD OF JOHN BAILEY AS USED AT G. G. U. IN COPENHAGEN. THE DATA YOU
C INPUT INTO THIS PROGRAM SHOULD HAVE BEEN PASSED THROUGH TRPEAKS.F77 FIRST
C TO PRODUCE PEAK HEIGHT INFORMATION ON YOUR SAMPLES. ALL THE ROUTINES ETC
C ARE FIXED SO THERE IS NO FLEXIBILITY WITH THIS PROGRAM AS TO INPUT FORMAT.
C K VALUES FROM YOUR STANDARDS SHOULD HAVE BEEN PRODUCED USING THE SISTER
C PROGRAM TR.STDZE .
C

      DIMENSION RMABS(11,18)
      DIMENSION RPEAK(18),RMAJ(11),RTMAC(18),RK(18),RCONC(18)
      CHARACTER*12 NAME(1)
      CHARACTER*12 NAM(1)


C MASS ABSORBTION ARRAY

      DATA RMABS /.7,.61,4.55,.59,2.39,.56,2.3,2.54,4.14,.79,.35,4.73,4.
     129,30.75,3.82,15.9,3.4,16.06,17.42,30.65,5.32,1.55,5.47,4.95,35.5,
     24.36,18.37,3.9,18.58,20.14,35.42,6.17,1.73,6.34,5.75,41.05,5.08,21
     3.23,4.57,21.54,23.26,40.7,7.13,2.,7.39,6.68,47.54,5.9,24.68,5.43,2
     44.93,27.02,47.18,8.32,2.36,8.664,7.817,55.53,6.94,28.8,6.21,29.17,
     531.54,55.,9.75,2.81,29.25,26.51,182.65,23.64,95.7,21.08,97.24,104.
     628,181.06,32.58,9.39,35.7,32.35,221.64,28.86,116.35,25.78,118.23,1
     726.76,219.8,40.09,11.53,43.72,39.6,270.5,35.36,142.11,31.67,144.62
     8,154.7,268.25,49.06,14.11,10.16,9.17,64.92,8.16,33.78,7.31,34.14,3
     96.9,64.35,11.43,3.25,8.26,7.46,52.86,6.62,27.47,5.93,27.8,30.02,52
     1.49,9.28,2.62,9.41,8.49,60.35,7.56,31.35,6.78,31.77,34.26,59.82,10
     2.61,2.98,136.9,124.8,115.93,112.18,442.25,100.01,448.91,71.69,110.
     367,153.3,44.95,107.27,97.58,90.92,87.4,344.56,77.86,351.48,373.96,
     486.45,120.45,35.13,117.84,107.11,99.72,95.86,378.07,85.63,385.84,4
     510.26,94.81,132.31,38.6,24.21,21.9,151.56,19.5,79.29,17.43,80.5,86
     6.4,150.3,27.18,7.79,163.32,148.6,137.56,133.1,521.6,118.83,532.81,
     785.14,130.76,183.32,53.74,115.97,105.35,98.11,94.32,372.0,84.26,37
     89.56,403.7,93.27,130.16,37.98/

      DO 1050 J=1,18
      READ (3,*) INU,RK(INU)
1050  CONTINUE
      DO 990 L=1,1000
      READ (5,*,END=999) NAME,(RPEAK(J),J=1,18)

C THE NEXT READ STATEMENT ASSUMES THAT WATER IS IN THE ANALYSIS

      READ (4,*,END=999) NAM,(RMAJ(K),K=1,11)

C   IF YOU DO NOT HAVE A WATER ANALYSIS YOU NEED THE NEXT LINE OF THE PROGRAM
C   AVAILABLE.
      RMAJ(11)=0.000

C CALCULATE MASS ABSORBTION COEFFICIENT OF UNKNOWN
C I IS FOR THE TRACE ELEMENT
C J IS FOR THE MAJOR ELEMENT

      DO 1000 I=1,18
      RTMAC(I)=0.000
C CALCULATING MAC
      DO 1100 J=1,11
      RTMAC(I)=RTMAC(I)+((RMAJ(J)/100.00)*RMABS(J,I))
1100  CONTINUE
C
C CALCULATING PPM IN ROCK

      RCONC(I)=RK(I)*RPEAK(I)*RTMAC(I)
1000  CONTINUE

      DO 1250 LM=1,18
      IF (RCONC(LM).LT.0.0) RCONC(LM)=0.0
1250  CONTINUE

      WRITE (9,6000)  NAM,RCONC
6000  FORMAT(A10,3F7.0,F6.0,F7.0,F6.0,F7.0,7F6.0,F7.0,F5.0,2F7.0)

 990  CONTINUE

 999  STOP
      END
```

Help File TR.HELP

HELP FILE FOR TRACE ELEMENT ANALYSES

****

Nick Pearce , May 1986.

Trace element analysis at Durham requires the use of four programmes written by me during my PhD research in April/May 1986. All programs are written in FORTRAN 77 to be used on the IBM mainframe computer. Listings of the programs are in the back of my thesis and also with Ron Hardy who should be consulted about their use or in cases of difficulty.

Each program separately performs an integral part of the procedure and must be run as follows. This method is conciderably quicker than the program TRATIO of Robin Gill and it is hoped that this method will replace TRATIO for the routine analysis of trace elements. TRATIO will still be of use for elements not covered by this method.

THE PRINCIPLES

****

The method involved in these programs is that used at GGU in Copenhagen and is outlined in a guide "X ray fluorescence analyses: Trace element techniques in the Institute for Petrology, University of Copenhagen " by John Bailey and Ib Sorensen. Ron Hardy posseses a copy of this.

The method involves the calculation of mass absorbtion coefficients from bulk rock major element compositions ; and from these, using standards a factor K is calculated that relates (counts*mass abs coeff) to ppm concentration in the rock.

The element input order into the programs is fixed I'm afraid. Individual elements and standards have been assigned integers to identify them : these are listed later. There are currently 18 elements and 25 standards in use. The programs have been written however to facilitate the relatively easy addition of more standards and this is explained to some extent in the listings.

THE INPUT DATA

****

Run your standards and unknowns together using SMX 1 on the XRF. I would strongly advise the use of a monitor to correct for machine drift, but if you use one you will have to make the drift corrections yourself (this should be reasonably simple - a small program would take an hour or less to write to perform this). The programs used here cannot handle a monitor themselves. Get the data typed into the computer in two files - one for standards the other for unknowns. I will refer to these as F.STDS and F.UNKNOWNS.

F.STDS should be laid out with the standard number first followed by the 43 counts in free format (i.e. separated by commas) all on one line, with the first case being a blank labelled 99 or a number greater than the number of standards used. The blank data should not be the actual counts from the blank but should in fact be the actual correction to be removed in the (peak - background)- blank part of the calculation. There should thus be 18 values for the blank and they should be integers. This part of the calculation accounts for uneveness in the background of the sample. Below is an example of the input:-

99.0.,0.,20.,42.,11.6,0.,0., etc this being the blank numbered 99

21,345,4567,234,345,5678,456, etc this being standard 21

The order of standards in the file does not matter and you need not use all 25 of them for a run.

F.UNKNOWNS can have up to 12 alphanumeric characters for the sample name. These should be entered in single quotes first followed by the 43 counts in free format all on one line, again with a blank on line one. The same rules apply to the blank as in the case of the standards above and, obviously, you must use the same blank values.

'BLANK',0.,0.,20.,42.,11.6,0.,0., etc

'58019A',234,3456,456,567,6789,789, etc

'NP234.13',235,3567,3467,3235,23,54, etc

THE METHOD
****

All programs are uncompiled so you must compile them first using *FORTRANVS. I am using my identifier as the user on whose filespace the programs are held. This is where thy will be until I finish my sentence at Durham, after that they will probably be held by Ron Hardy or on the Departmental number. I am GL05.

(i)CALCULATE STANDARD PEAK HEIGHTS

$R *FORTRANVS SCARDS=GL05:TR.PEAK.STD

$R -LOAD 5=F.STDS 9=-STDPKS

-STDPKS contains the peak heights for each trace element after removal of interferences etc. SCREENEDIT this file and insert above the first line a line which has the number of standards used and the number of elements in free format, eg 25 standards and 18 elements so enter 25,18

(ii)CALCULATION OF K FACTORS

$R *FORTRANVS SCARDS=GL05:TR.STDZE

$R -LOAD 5=-STDPKS 8=-LARGE 9=-K

This is the interactive part of the run. An example of a short run is listed at the back of this guide. It is best if you standardize all 18 elements in one bash if you can. 18 elements should take about 40 minutes to run through. It does not matter if you do not standardise all elements in one go although this will result in an error message from the computer at the end of the run and you will not be able to use the output file of K values in the next step.

The file -LARGE contains a full rundown on each standard selected for each element during the run and the final selection of standards used to produce the K value that is output (even if you decided to bias the K value). The file -K contains the final values of K selected during the run. You can go on to use these in the calculation of your unknowns or if you are unhappy with them they can be changed after consulting a listing of -LARGE or restandardisation of that particular element.

(iii)CALCULATION OF UNKNOWN PEAK HEIGHTS

```
$R *FORTRANVS SCARDS=GLO5:TR.PEAK.UNK

$R -LOAD 5=F.UNKNOWN 9=-UNKPKS
```

You will now have to edit the file -UNKPKS to insert single quotes around your sample name to allow for the use of characters as well as numbers. To do this

```
$EDIT -UNKPKS
:SET VERIFY=OFF
:COL 1 1
:CHBALL/F ; ;';
:COL 13 13
:CHBALL/F ; ;';
:STOP
```

This file is in a fixed format unlike any of the other files used thus far.

(iv)CALCULATE PPM CONCENTRATIONS

To be able to calculate ppm concentrations in your samples you must have a file containing major element analyses for the samples you want to run. The input order is sample name (maximum of 12 alphanumeric characters in single quotes) followed by the analyses of Si - Mn AND H2O as the last element. The input read statement for this data is in free format, but formatted data will be handled without complaint.

(a)If you do not have analyses for water.

(1)If your output has come from Colin Watsons XRF.CD program , aside from inserting single quotes around your sample name, you must insert a line in the program TR.UNKNOWNS after line 45 that reads RMAJ(11)=0.000. This will enable the file from XRF.CD to be read in directly without having to remove the total in the last column and the inserted line changes RMAJ(11) from the total to 0.00 which the program handles as the amount of H2O in the analysis.

(2)If you just posses a file of title,Si - Mn data you must insert 0.0 for the water after the Mn data or you can change a couple of line in the program TR.UNKNOWNS. This involves a change in line 45 where you will change J=1,11 to J=1,10. You will then have to insert a line that reads RMAJ(11)=0.0 on the line after the change you have just made.

(b)If you do have analyses for water

Water analyses must be placed in the 11th column of analyses in the file containing your major element data. You must not include a total for the analysis after this, ie you have a file of title,Si - Mn,H2O

The file with the major element data in it will referred to as MAJORS.

Obviously the order of samples in the files MAJORS and -UNKPKS must be the same and there must be equal numbers of samples in each file.

To run the final part of this method

```
$R *FORTRANVS SCARDS=GLO5:TR.UNKNOWNS
```

```
$R -LOAD 3=-K 4=MAJORS 5=-UNKPKS 9=-PPM
```

The output file -PPM contains the trace element concentrations of your unknowns in ppm in the order of elements from 1 to 18 (ie Ba to Ce) in a fixed format which is 1X,A12,1X,18F7.0. To read this in to another program you must insert single quotes in columns 1 and 13 and at the top of the program declare
CHARACTER*12 TITLE(1).

I hope that this file explains adequately the method for analysing trace elements using these programs. Any problems with this can probably be solved by consulting Ron Hardy after I leave or flicking through program listings with the help of someone in Computing. I hope the comment labels in the programs are reasonably helpful and explain what is going on in the program.

I have already found that in the limited use I have given this method that there appear to be good standard sets for certain elements. It will benefit future users of this method, when, if you find any of these good sets you can keep a record of these sets and let Ron Hardy have it (in the nicest possible way of course !).

HAVE FUN !

ELEMENT		STANDARD	
1	BA	1	AGV 1
2	NB	2	BR
3	ZR	3	BCR 1
4	Y	4	DTS 1
5	SR	5	NIM D
6	RB	6	GA
7	ZN	7	GH
8	CU	8	GR
9	NI	9	G 1
10	PB	10	G 2
11	U	11	NIM G
12	TH	12	GSP 1
13	V	13	GSN
14	CR	14	NIM L
15	ND	15	NIM N
16	GA	16	PCC 1
17	LA	17	NIM P
18	CE	18	UB N
		19	MRG 1
		20	T 1
		21	SY 1
		22	SY 2
		23	SY 3
		24	NIM S
		25	DRN

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	41908	41909	41910	41911	41926	41932	41934	41935	41939	41941	41945	41954
Major elements, weight %												
	Phon-ite	Benm-ite	Phon-ite	Benm-ite	Tracyand	Trachyte	Phon-ite	Phon-ite	Benm-ite	Phon-ite	Trachyte	Mug-ite
SiO2	52.58	58.94	56.69	55.76	56.06	61.24	52.25	51.00	59.32	54.61	63.95	53.19
Al2O3	17.49	14.44	21.25	15.76	15.37	11.88	15.54	12.59	14.76	16.31	19.67	16.62
Fe2O3	9.08	11.43	3.82	9.68	15.68	11.95	12.16	14.55	11.09	11.44	1.80	9.33
MgO	0.58	0.26	0.26	1.40	0.36	0.16	0.32	0.39	0.80	0.40	0.13	2.35
CaO	3.09	1.40	1.13	3.43	1.82	1.45	2.29	2.73	1.74	2.22	0.71	4.60
Na2O	6.52	6.44	7.89	4.59	6.38	6.79	9.56	11.62	4.95	7.13	6.01	4.57
K2O	6.43	3.73	6.52	4.88	1.06	4.09	4.42	3.52	4.71	4.70	6.58	4.10
TiO2	1.17	0.96	0.36	1.50	0.37	0.59	0.32	0.31	0.31	0.29	0.25	1.83
MnO	0.30	0.39	0.11	0.28	0.78	0.27	0.45	0.58	0.47	0.45	0.03	0.16
P2O5	0.22	0.13	0.05	0.70	0.38	0.00	0.11	0.19	0.12	0.14	0.00	1.15
F	0.40	0.34	0.46	0.26	0.01	0.47	0.53	0.62	0.10	0.24	0.32	0.08
Cl	0.02	0.02	0.00	0.02	0.00	0.03	1.02	1.20	0.02	0.01	0.02	0.03
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.20	n.d.
O=F,Cl	-0.17	-0.15	-0.19	-0.11	-0.00	-0.21	-0.45	-0.53	-0.05	-0.11	-0.14	-0.04
Total	97.71	98.33	98.35	98.15	98.27	98.71	98.52	98.77	98.34	97.83	99.53	97.97
Trace elements ppm												
Ba	6564.	1061.	51.	1860.	28.	0.	130.	116.	631.	881.	539.	4121.
Nb	390.	916.	65.	124.	3210.	994.	1183.	1754.	1026.	1133.	39.	74.
Zr	541.	242.	111.	520.	10899.	6169.	5467.	7494.	4850.	5203.	119.	418.
Y	48.	22.	14.	79.	964.	504.	395.	607.	360.	397.	25.	42.
Sr	5013.	1201.	42.	559.	282.	71.	118.	198.	217.	491.	252.	1246.
Rb	88.	85.	171.	113.	218.	510.	350.	377.	217.	272.	160.	81.
Zn	160.	289.	60.	166.	1611.	783.	629.	918.	514.	679.	39.	112.
Cu	0.	0.	10.	9.	0.	0.	0.	0.	0.	0.	17.	7.
Ni	2.	2.	0.	0.	15.	9.	7.	4.	9.	11.	0.	5.
Pb	0.	19.	5.	15.	342.	220.	136.	219.	94.	163.	14.	19.
U	20.	72.	0.	3.	111.	44.	29.	51.	25.	30.	0.	5.
Th	2.	9.	12.	13.	504.	134.	122.	194.	105.	120.	21.	12.
V	56.	41.	14.	70.	9.	14.	7.	5.	12.	7.	15.	121.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Nd	161.	184.	47.	154.	1512.	983.	648.	977.	545.	598.	19.	64.
Ga	26.	48.	36.	33.	69.	75.	60.	63.	50.	54.	34.	25.
La	196.	135.	42.	181.	1916.	1223.	859.	1391.	752.	806.	45.	84.
Ce	370.	342.	114.	310.	3186.	1994.	1418.	2189.	1213.	1298.	81.	146.
Zr/Nb	1.39	0.26	1.71	4.19	3.40	6.21	4.62	4.27	4.73	4.59	3.05	5.65

SUMMARY NORM TABLE

	41908.0	41909.0	41910.0	41911.0	41926.0	41932.0	41934.0	41935.0	41939.0	41941.0	41945.0	41954.0
Quartz	0.0	4.04	0.0	1.60	5.57	5.43	0.0	0.0	4.78	0.0	2.47	0.0
Corundum	0.0	0.0	0.16	0.0	1.37	0.0	0.0	0.0	0.0	0.0	2.02	0.0
Orthoclase	38.97	22.52	39.19	29.54	6.44	24.58	26.54	21.06	28.50	28.50	39.14	24.88
Albite	25.29	54.67	32.29	39.67	55.51	38.98	19.38	13.17	42.78	40.81	51.07	39.55
Anorthite	0.0	0.0	2.93	8.24	6.73	0.0	0.0	0.0	4.30	0.0	1.86	13.16
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	16.39	0.0	19.29	0.0	0.0	0.0	19.95	17.63	0.0	9.98	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.03	0.03	0.0	0.03	0.0	0.05	1.71	2.00	0.03	0.02	0.03	0.05
Acmite	0.81	0.79	0.0	0.0	0.0	16.98	17.87	27.38	0.0	2.30	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.74	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	4.99	3.89	0.0	2.76	0.0	4.26	7.05	8.09	2.80	7.85	0.0	1.99
Wollaston.	2.52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	3.56	0.0	8.13	14.72	6.97	0.0	0.0	10.08	0.0	1.29	6.78
Olivine	0.0	0.0	2.00	0.0	0.0	0.0	4.49	4.60	0.0	0.52	0.0	2.80
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	7.36	7.62	2.36	4.93	8.02	0.63	1.03	0.0	5.64	8.62	0.98	4.36
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	2.28	1.86	0.70	2.92	0.72	1.14	0.62	0.60	0.60	0.57	0.48	3.57
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.53	0.31	0.12	1.70	0.93	0.0	0.26	0.46	0.29	0.34	0.0	2.80
Fluorite	0.82	0.70	0.96	0.48	0.0	0.98	1.10	1.27	0.20	0.49	0.66	0.06
Diff Index	80.66	81.23	90.77	70.81	67.52	68.99	65.87	51.86	76.05	79.29	92.68	64.43
Na/(Na+K)	0.61	0.72	0.65	0.59	0.90	0.72	0.77	0.83	0.61	0.70	0.58	0.63
(Na+K)/Al	1.01	1.01	0.94	0.81	0.76	1.31	1.32	1.82	0.90	1.03	0.86	0.72
F3/(F2+F3)	0.57	0.47	0.42	0.34	0.34	0.52	0.56	0.64	0.34	0.57	0.37	0.31
Qz residua	35.23	47.79	34.94	45.94	n.a.	n.a.	n.a.	n.a.	48.24	39.11	46.15	n.a.
Ks residua	27.46	15.75	24.53	23.71	n.a.	n.a.	n.a.	n.a.	21.29	20.42	24.00	n.a.
Ne residua	37.31	36.46	40.52	30.35	n.a.	n.a.	n.a.	n.a.	30.47	40.47	29.85	n.a.

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	41999	43802	43845	43855	43895	43897	43898	43902	43916	43918	43939	43967
Major elements, weight %												
	Trachyte	Phon-ite	Phon-ite	Tracyand	Benm-ite	Phon-ite	Phon-ite	Mug-ite	Basalt	Phon-ite	Phon-ite	Phon-ite
SiO2	60.78	52.90	51.04	60.67	58.02	55.72	53.85	46.95	45.36	57.35	54.86	56.12
Al2O3	12.84	16.08	24.85	12.29	16.16	19.37	19.31	16.21	14.35	18.52	15.03	20.15
Fe2O3	11.47	12.11	2.17	13.35	8.95	6.03	7.22	11.70	15.10	6.65	10.42	4.63
MgO	0.14	0.32	0.16	0.20	0.57	0.27	0.46	3.68	7.92	0.61	0.23	0.54
CaO	1.65	2.41	1.02	2.24	2.37	1.34	2.01	6.97	5.15	2.34	2.97	1.72
Na2O	6.30	7.99	13.32	4.82	5.08	9.04	8.29	4.25	2.16	6.06	8.63	7.44
K2O	4.31	4.86	5.03	3.96	5.57	5.47	5.62	2.78	3.60	5.31	4.43	6.52
TiO2	0.56	0.31	0.08	0.63	0.88	0.28	0.50	2.95	3.32	0.76	0.60	0.59
MnO	0.26	0.44	0.10	0.32	0.23	0.22	0.18	0.16	0.30	0.17	0.39	0.15
P2O5	0.02	0.11	0.02	0.00	0.20	0.02	0.14	2.04	0.63	0.22	0.00	0.11
F	0.24	0.37	0.38	0.38	0.10	0.37	0.27	0.04	0.00	0.32	0.37	0.20
Cl	0.01	0.80	0.11	0.01	0.00	0.59	0.08	0.05	0.02	0.09	0.06	0.04
LOI	n.d.	n.d.	1.09	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.10	-0.33	-0.18	-0.16	-0.04	-0.29	-0.13	-0.03	-0.00	-0.15	-0.17	-0.09
Total	98.48	98.37	99.19	98.71	98.09	98.43	97.80	97.75	97.91	98.25	97.82	98.12
Trace elements ppm												
Ba	5.	148.	241.	0.	110.	225.	652.	2259.	1358.	4008.	548.	570.
Nb	953.	1156.	184.	975.	155.	275.	311.	46.	99.	193.	1645.	111.
Zr	5809.	5420.	558.	5876.	493.	1585.	1425.	276.	296.	579.	8791.	212.
Y	560.	402.	134.	477.	56.	108.	99.	43.	29.	65.	329.	34.
Sr	81.	152.	67.	61.	70.	105.	207.	1064.	680.	655.	438.	208.
Rb	565.	358.	393.	554.	149.	290.	211.	51.	163.	116.	358.	185.
Zn	791.	615.	112.	868.	148.	235.	165.	91.	271.	137.	1068.	90.
Cu	0.	0.	21.	0.	14.	9.	4.	19.	15.	5.	0.	7.
Ni	14.	2.	4.	9.	0.	1.	2.	11.	30.	0.	9.	0.
Pb	208.	132.	29.	202.	10.	61.	29.	13.	90.	21.	491.	12.
U	42.	29.	2.	39.	4.	8.	5.	3.	0.	3.	63.	2.
Th	128.	118.	30.	127.	17.	50.	27.	5.	8.	18.	54.	11.
V	14.	7.	0.	16.	36.	9.	17.	241.	360.	31.	21.	24.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	99.	0.	0.	0.
Nd	897.	612.	162.	855.	146.	152.	143.	83.	52.	101.	239.	52.
Ga	71.	57.	61.	80.	32.	47.	41.	23.	23.	30.	68.	34.
La	1092.	853.	246.	1070.	188.	243.	205.	87.	42.	132.	177.	76.
Ce	1761.	1405.	397.	1752.	344.	407.	340.	190.	142.	229.	520.	168.
Zr/Nb	6.10	4.69	3.03	6.03	3.18	5.76	4.58	6.00	2.99	3.00	5.34	1.91

SUMMARY NORM TABLE

	41999.0	43802.0	43845.0	43855.0	43895.0	43897.0	43898.0	43902.0	43916.0	43918.0	43939.0	43967.0
Quartz	5.69	0.0	0.0	10.74	0.31	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	25.98	29.25	30.28	23.88	33.75	32.86	34.06	16.94	21.98	32.03	26.82	39.34
Albite	42.90	30.41	10.93	41.57	44.07	31.75	27.20	33.56	18.77	45.24	24.82	29.93
Anorthite	0.0	0.0	0.0	0.24	4.96	0.0	0.0	17.63	19.51	8.08	0.0	2.50
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	14.23	49.17	0.0	0.0	20.90	23.06	1.76	0.0	3.58	15.77	18.49
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.02	1.34	0.18	0.02	0.0	0.99	0.14	0.09	0.03	0.15	0.10	0.07
Acmite	10.07	6.79	2.68	0.0	0.0	3.65	1.51	0.0	0.0	0.0	18.09	0.0
Na Metasil	0.0	0.0	2.21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	6.14	8.28	2.61	8.03	4.55	4.07	6.79	3.53	2.14	0.56	11.51	3.73
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	3.81	0.0	0.0	6.74	5.41	0.0	0.0	0.0	6.53	0.0	0.0	0.0
Olivine	0.0	1.19	0.94	0.0	0.0	2.53	1.63	11.45	17.45	4.34	0.06	1.26
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	3.77	6.87	0.0	6.78	4.56	1.88	3.73	4.28	5.53	3.37	0.88	2.87
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.08	0.60	0.15	1.22	1.71	0.54	0.97	5.78	6.51	1.47	1.17	1.14
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.05	0.27	0.05	0.0	0.49	0.05	0.34	4.98	1.54	0.53	0.0	0.27
Fluorite	0.50	0.76	0.79	0.80	0.19	0.77	0.56	0.0	0.0	0.65	0.78	0.41
Diff Index	74.56	73.89	90.38	76.19	78.12	85.52	84.32	52.27	40.75	80.85	67.41	87.76
Na/(Na+K)	0.69	0.71	0.80	0.65	0.58	0.72	0.69	0.70	0.48	0.63	0.75	0.63
(Na+K)/Al	1.17	1.14	1.10	0.99	0.89	1.07	1.02	0.62	0.52	0.85	1.26	0.96
F3/(F2+F3)	0.52	0.57	0.42	0.34	0.34	0.42	0.42	0.24	0.24	0.34	0.64	0.42
Qz residua	49.04	35.95	20.01	52.63	44.90	33.61	32.22	n.a.	n.a.	42.75	n.a.	34.98
Ks residua	19.80	22.49	19.04	17.81	24.55	21.84	22.95	n.a.	n.a.	22.51	n.a.	25.47
Ne residua	31.16	41.55	60.95	29.56	30.56	44.55	44.82	n.a.	n.a.	34.74	n.a.	39.54

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	43970	43971	43976	43977	43998	46203	46205	46210	46211	46225	46233	46236
Major elements, weight %												
	Phon-ite	Benm-ite	Phon-ite	Trachyte	Benm-ite	Tep/Basn	Benm-ite	Phon-ite	Tep/Basn	Phon-ite	Tep/Basn	Tep/Basn
SiO2	56.16	55.20	55.32	59.18	56.08	44.83	55.24	55.48	43.69	57.30	46.37	42.78
Al2O3	17.92	15.71	19.94	16.31	15.70	15.77	16.80	15.95	14.39	17.47	15.27	14.67
Fe2O3	6.93	9.68	6.32	7.97	10.66	13.34	8.60	12.66	15.24	7.95	12.46	15.37
MgO	0.82	1.17	0.27	0.38	0.66	3.21	1.24	0.24	6.23	0.57	3.54	4.31
CaO	3.39	3.25	1.63	1.95	2.46	8.10	3.21	1.64	7.83	2.19	7.79	8.43
Na2O	6.12	5.28	7.69	5.92	5.35	4.04	5.17	6.06	3.45	5.12	5.95	3.42
K2O	5.16	5.36	6.00	5.34	5.54	2.26	5.04	5.11	2.03	6.17	1.61	3.15
TiO2	0.83	1.40	0.31	0.68	0.90	3.01	1.69	0.44	3.25	0.79	2.79	2.99
MnO	0.20	0.20	0.23	0.27	0.29	0.26	0.20	0.27	0.20	0.27	0.25	0.31
P2O5	0.35	0.62	0.04	0.10	0.23	2.77	0.68	0.00	1.63	0.11	1.62	2.33
F	0.25	0.09	0.29	0.21	0.00	0.10	0.10	0.14	0.00	0.12	0.05	0.00
Cl	0.06	0.04	0.01	0.06	0.14	0.04	0.00	0.02	0.07	0.00	0.04	0.05
LOI	n.d.	1.21	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.12	-0.05	-0.12	-0.10	-0.03	-0.05	-0.05	-0.06	-0.01	-0.05	-0.03	-0.01
Total	98.07	99.16	97.93	98.27	97.98	97.68	97.92	97.95	98.00	98.01	97.71	97.80
Trace elements ppm												
Ba	2049.	2331.	327.	31.	368.	3660.	3497.	904.	2992.	688.	1608.	3282.
Nb	122.	85.	48.	238.	193.	54.	75.	1536.	33.	227.	173.	60.
Zr	523.	345.	339.	1048.	800.	287.	332.	6133.	232.	915.	523.	262.
Y	55.	43.	21.	101.	94.	49.	62.	103.	62.	92.	92.	101.
Sr	737.	223.	105.	83.	91.	1744.	630.	325.	1914.	269.	1669.	2075.
Rb	121.	84.	288.	194.	160.	33.	107.	247.	36.	194.	31.	58.
Zn	140.	135.	109.	243.	243.	131.	132.	1009.	126.	198.	154.	231.
Cu	1.	2.	7.	1.	7.	11.	2.	0.	11.	9.	6.	75.
Ni	2.	0.	2.	3.	4.	0.	0.	4.	35.	0.	13.	0.
Pb	16.	17.	1.	46.	24.	6.	14.	170.	19.	34.	12.	15.
U	4.	2.	0.	6.	3.	5.	1.	46.	7.	3.	4.	7.
Th	17.	11.	5.	37.	17.	2.	11.	43.	8.	28.	6.	25.
V	44.	60.	12.	26.	31.	187.	67.	19.	309.	27.	248.	195.
Cr	0.	0.	0.	0.	0.	0.	0.	39.	8.	0.	5.	0.
Nd	90.	78.	59.	215.	205.	124.	116.	185.	117.	180.	233.	279.
Ga	34.	25.	59.	43.	37.	23.	27.	64.	20.	38.	27.	24.
La	118.	91.	34.	256.	219.	120.	120.	245.	188.	236.	218.	454.
Ce	236.	154.	126.	428.	407.	232.	224.	408.	307.	413.	409.	680.
Zr/Nb	4.29	4.06	7.06	4.40	4.15	5.31	4.43	3.99	7.03	4.03	3.02	4.37

SUMMARY NORM TABLE

	43970.0	43971.0	43976.0	43977.0	43998.0	46203.0	46205.0	46210.0	46211.0	46225.0	46233.0	46236.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	31.20	32.53	36.30	32.24	33.64	13.80	30.58	31.07	12.37	37.38	9.83	19.24
Albite	40.19	40.69	31.51	50.85	41.97	33.17	43.78	43.27	25.00	40.88	31.21	17.99
Anorthite	6.51	3.55	2.25	2.38	2.95	18.95	7.96	1.32	18.55	6.63	10.66	16.04
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	6.75	2.69	18.99	0.0	2.03	1.05	0.61	5.08	2.56	1.92	11.13	6.30
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.10	0.07	0.02	0.10	0.24	0.07	0.0	0.03	0.12	0.0	0.07	0.09
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	6.03	7.21	3.67	4.99	6.97	3.23	2.90	5.56	8.62	2.73	15.17	9.50
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	1.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Olivine	2.67	3.85	2.04	2.01	4.32	12.16	4.69	5.88	16.86	4.37	7.93	13.64
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	3.60	5.05	3.93	4.40	5.57	4.88	4.39	6.62	5.58	4.06	4.57	5.63
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.61	2.73	0.60	1.32	1.76	5.91	3.30	0.86	6.37	1.54	5.47	5.87
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.85	1.51	0.10	0.24	0.56	6.78	1.65	0.0	3.98	0.27	3.96	5.70
Fluorite	0.49	0.13	0.61	0.43	0.0	0.0	0.15	0.30	0.0	0.24	0.0	0.0
Diff Index	78.13	75.91	86.79	83.09	77.64	48.02	74.97	79.42	39.93	80.18	52.17	43.53
Na/(Na+K)	0.64	0.60	0.66	0.63	0.59	0.73	0.61	0.64	0.72	0.56	0.85	0.62
(Na+K)/Al	0.87	0.92	0.96	0.95	0.94	0.58	0.83	0.97	0.55	0.86	0.76	0.62
F3/(F2+F3)	0.35	0.35	0.42	0.37	0.35	0.24	0.34	0.35	0.24	0.34	0.24	0.24
Qz residua	40.81	43.07	34.69	44.80	43.48	n.a.	44.37	41.86	n.a.	43.50	n.a.	n.a.
Ks residua	22.69	24.35	23.76	22.05	24.62	n.a.	23.18	22.23	n.a.	26.49	n.a.	n.a.
Ne residua	36.50	32.58	41.54	33.15	31.90	n.a.	32.45	35.91	n.a.	30.01	n.a.	n.a.

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	46237	46239	46240	46247	46249	46251	46252	46253	46254	46274	46275	46277
Major elements, weight %												
	Benm-ite	Benm-ite	Phon-ite	Phon-ite	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Phon-ite	Benm-ite	Phon-ite	Phon-ite
SiO2	56.05	55.66	54.32	54.26	56.90	57.60	57.46	58.59	55.51	55.35	55.17	56.33
Al2O3	16.62	16.75	17.04	19.41	16.32	15.87	15.61	16.54	18.38	17.65	18.18	18.97
Fe2O3	8.56	10.14	9.98	5.98	9.17	9.71	9.77	8.53	7.74	10.52	10.34	6.39
MgO	1.44	0.71	0.61	1.09	0.79	0.50	0.60	0.46	0.33	0.41	0.34	0.33
CaO	3.27	2.46	2.42	2.19	2.75	2.15	2.61	2.07	1.19	2.16	1.79	1.38
Na2O	4.84	8.24	5.81	7.03	4.56	5.54	4.71	5.15	8.65	5.90	5.81	7.65
K2O	4.90	2.45	6.16	6.39	5.61	5.29	6.11	5.68	5.33	4.87	5.30	6.18
TiO2	1.60	0.84	0.83	0.85	1.24	0.88	0.76	0.72	0.30	0.46	0.44	0.38
MnO	0.18	0.34	0.33	0.16	0.19	0.28	0.24	0.22	0.26	0.41	0.37	0.21
P2O5	0.51	0.17	0.17	0.47	0.44	0.12	0.13	0.11	0.01	0.03	0.01	0.01
F	0.07	0.16	0.16	0.15	0.08	0.13	0.00	0.11	0.34	0.26	0.15	0.27
Cl	0.04	0.20	0.20	0.16	0.01	0.08	0.03	0.02	0.53	0.01	0.01	0.28
LOI	1.26	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.04	-0.11	-0.11	-0.10	-0.04	-0.07	-0.01	-0.05	-0.27	-0.11	-0.07	-0.17
Total	99.30	98.01	97.92	98.04	98.02	98.08	98.02	98.15	98.30	97.92	97.84	98.21
Trace elements ppm												
Ba	3371.	93.	99.	1405.	1716.	126.	208.	424.	0.	198.	115.	7.
Nb	126.	320.	309.	106.	91.	187.	153.	136.	700.	773.	690.	330.
Zr	524.	1230.	1200.	276.	350.	781.	592.	521.	2531.	2621.	2633.	1326.
Y	53.	105.	104.	38.	45.	82.	69.	59.	129.	171.	142.	97.
Sr	589.	44.	40.	560.	192.	37.	62.	104.	13.	298.	504.	24.
Rb	118.	120.	239.	213.	110.	165.	220.	140.	399.	284.	303.	295.
Zn	137.	254.	245.	121.	152.	220.	190.	171.	309.	428.	326.	205.
Cu	6.	9.	3.	10.	1.	0.	4.	6.	8.	0.	0.	10.
Ni	0.	3.	3.	3.	2.	2.	2.	0.	2.	2.	2.	0.
Pb	20.	39.	33.	10.	18.	28.	21.	21.	65.	48.	23.	49.
U	4.	5.	6.	2.	0.	0.	0.	1.	17.	21.	16.	10.
Th	16.	29.	26.	11.	12.	20.	15.	18.	63.	53.	19.	39.
V	75.	32.	29.	51.	51.	31.	32.	31.	7.	12.	12.	12.
Cr	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Nd	89.	229.	208.	83.	101.	166.	156.	123.	250.	371.	273.	196.
Ga	28.	46.	43.	33.	29.	38.	39.	33.	56.	53.	55.	48.
La	130.	267.	260.	118.	118.	208.	163.	144.	343.	500.	314.	254.
Ce	218.	499.	450.	217.	214.	364.	290.	277.	584.	796.	568.	464.
Zr/Nb	4.16	3.84	3.88	2.60	3.85	4.18	3.87	3.83	3.62	3.39	3.82	4.02

SUMMARY NORM TABLE

	46237.0	46239.0	46240.0	46247.0	46249.0	46251.0	46252.0	46253.0	46254.0	46274.0	46275.0	46277.0
Quartz	0.35	0.0	0.0	0.0	1.33	0.0	0.0	0.45	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	29.69	14.85	37.38	38.61	34.02	32.06	37.07	34.38	32.10	29.56	32.21	37.27
Albite	41.77	55.59	31.58	27.54	39.54	47.62	40.75	44.52	32.93	43.35	40.59	34.20
Anorthite	9.50	2.12	2.88	3.07	7.72	3.12	3.59	5.43	0.0	7.52	8.13	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	8.03	9.63	17.55	0.0	0.0	0.0	0.0	17.97	4.27	5.37	16.39
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.07	0.34	0.34	0.27	0.02	0.14	0.05	0.03	0.89	0.02	0.02	0.47
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.86	0.0	0.0	0.02
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	2.89	7.30	6.49	3.48	2.57	5.52	7.66	3.30	3.62	1.66	0.12	4.75
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	6.91	0.0	0.0	0.0	6.51	0.75	1.89	5.66	0.0	0.0	0.0	0.0
Olivine	0.0	4.11	4.13	2.71	0.0	3.57	2.20	0.0	3.95	6.61	6.96	1.63
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.37	5.30	5.21	3.71	4.67	4.95	4.99	4.35	2.35	5.50	5.41	3.94
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	3.12	1.64	1.62	1.65	2.42	1.71	1.48	1.40	0.58	0.90	0.86	0.74
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	1.24	0.41	0.41	1.14	1.07	0.29	0.32	0.27	0.02	0.07	0.02	0.02
Fluorite	0.10	0.32	0.32	0.27	0.13	0.26	0.0	0.22	0.71	0.55	0.32	0.57
Diff Index	71.81	78.47	78.59	83.70	74.89	79.68	77.82	79.34	83.01	77.18	78.17	87.86
Na/(Na+K)	0.60	0.84	0.59	0.63	0.55	0.61	0.54	0.58	0.71	0.65	0.62	0.65
(Na+K)/Al	0.80	0.97	0.95	0.95	0.83	0.94	0.92	0.88	1.09	0.85	0.84	1.02
F3/(F2+F3)	0.34	0.35	0.35	0.42	0.34	0.34	0.34	0.34	0.42	0.35	0.35	0.42
Qz residua	44.99	40.64	38.95	35.00	45.59	44.76	44.56	44.98	34.88	42.28	41.59	36.15
Ks residua	23.50	10.76	27.03	26.21	25.81	22.86	27.07	24.62	21.98	21.77	23.41	24.10
Ne residua	31.51	48.61	34.02	38.79	28.60	32.38	28.37	30.40	43.14	35.96	35.00	39.74

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	46280	46282	46284	46289	46290	46294	46296	52201	52202	52211	52216	52242
Major elements, weight %												
	Benm-ite	Phon-ite	Phon-nep	Tracyand	Tracyand	Trachyte	Benm-ite	Benm-ite	Benm-ite	Trachyte	Benm-ite	Benm-ite
SiO2	56.12	54.48	49.80	62.16	58.00	61.24	58.26	58.95	59.47	60.53	59.92	56.12
Al2O3	17.00	18.26	16.09	13.08	13.57	14.34	15.17	13.96	14.79	12.87	13.27	15.83
Fe2O3	9.17	8.56	11.70	9.88	10.93	8.75	9.05	11.25	10.09	12.31	10.99	11.11
MgO	0.94	0.30	0.48	0.39	1.44	0.34	0.84	0.64	0.42	0.14	0.33	0.45
CaO	2.78	1.68	5.38	2.13	3.39	1.87	2.79	2.57	2.02	1.18	2.76	2.31
Na2O	4.42	8.01	9.07	4.26	4.05	5.57	3.89	5.57	5.09	6.28	5.99	5.32
K2O	5.79	5.65	3.24	5.38	4.89	5.24	6.31	3.93	5.25	4.21	3.80	5.33
TiO2	1.13	0.32	0.22	0.86	1.41	0.72	1.24	0.93	0.71	0.55	0.82	0.92
MnO	0.28	0.31	0.80	0.26	0.23	0.21	0.18	0.28	0.25	0.27	0.27	0.27
P2O5	0.30	0.00	0.40	0.10	0.27	0.03	0.42	0.11	0.09	0.01	0.06	0.20
F	0.17	0.48	0.87	0.24	0.19	0.27	0.17	0.27	0.21	0.15	0.21	0.27
Cl	0.02	0.56	0.03	0.04	0.01	0.11	0.02	0.03	0.08	0.04	0.08	0.07
LOI	n.d.	1.44	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.08	-0.33	-0.37	-0.11	-0.08	-0.14	-0.08	-0.12	-0.11	-0.07	-0.11	-0.13
Total	98.04	99.72	97.71	98.67	98.30	98.55	98.26	98.37	98.36	98.47	98.39	98.07
Trace elements ppm												
Ba	586.	0.	91.	119.	524.	42.	646.	147.	71.	0.	20.	140.
Nb	270.	762.	1944.	108.	73.	136.	42.	243.	254.	945.	177.	208.
Zr	1026.	3201.	7506.	681.	466.	982.	297.	1490.	1472.	5863.	1271.	906.
Y	86.	198.	592.	75.	59.	91.	41.	132.	125.	470.	117.	97.
Sr	309.	22.	1205.	115.	254.	29.	74.	105.	65.	35.	29.	36.
Rb	222.	419.	284.	199.	176.	155.	110.	111.	276.	576.	131.	162.
Zn	216.	373.	953.	228.	180.	248.	148.	286.	298.	928.	278.	205.
Cu	0.	0.	0.	14.	17.	17.	3.	2.	4.	0.	8.	0.
Ni	0.	5.	9.	3.	11.	0.	2.	0.	0.	9.	0.	0.
Pb	27.	77.	357.	70.	23.	56.	21.	53.	60.	202.	50.	23.
U	4.	15.	74.	4.	1.	3.	1.	9.	9.	31.	0.	4.
Th	23.	66.	418.	23.	13.	25.	9.	36.	37.	119.	22.	15.
V	44.	12.	0.	31.	104.	33.	49.	35.	29.	16.	26.	33.
Cr	0.	0.	0.	0.	12.	0.	0.	77.	0.	0.	1.	0.
Nd	182.	356.	907.	132.	106.	213.	88.	257.	240.	859.	235.	198.
Ga	40.	59.	72.	42.	34.	45.	29.	48.	47.	78.	45.	38.
La	234.	484.	1275.	159.	123.	228.	88.	274.	290.	1119.	260.	225.
Ce	401.	819.	2090.	328.	246.	378.	177.	498.	518.	1816.	499.	368.
Zr/Nb	3.80	4.20	3.86	6.31	6.38	7.22	7.07	6.13	5.80	6.20	7.18	4.36

SUMMARY NORM TABLE

	46280.0	46282.0	46284.0	46289.0	46290.0	46294.0	46296.0	52201.0	52202.0	52211.0	52216.0	52242.0
Quartz	0.0	0.0	0.0	11.67	6.64	6.27	4.50	4.48	4.22	6.17	6.76	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	35.09	34.03	19.62	32.39	29.59	31.51	38.15	23.76	31.71	25.40	22.92	32.32
Albite	38.24	31.28	20.33	36.50	35.03	45.37	33.56	48.05	43.57	43.66	48.08	45.00
Anorthite	9.75	0.0	0.0	0.81	4.54	0.0	5.48	1.61	2.29	0.0	0.0	3.87
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	17.55	24.92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.43
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.03	0.94	0.05	0.07	0.02	0.18	0.03	0.05	0.13	0.07	0.13	0.12
Acmite	0.0	2.01	10.71	0.0	0.0	1.74	0.0	0.0	0.0	9.14	2.83	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	1.32	5.20	15.71	7.01	8.39	6.72	4.33	8.06	5.46	4.52	9.38	4.49
Wollaston.	0.0	0.0	0.86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.69	0.0
Hypersthen	6.87	0.0	0.0	3.72	6.45	0.35	5.61	5.64	5.02	4.77	0.0	0.0
Olivine	0.77	3.08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.27
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.67	4.28	4.62	5.44	5.57	5.83	4.60	5.73	5.57	4.88	7.03	5.67
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	2.20	0.62	0.43	1.66	2.74	1.39	2.41	1.81	1.38	1.07	1.59	1.79
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.73	0.0	0.97	0.24	0.65	0.07	1.02	0.27	0.22	0.02	0.15	0.49
Fluorite	0.33	1.01	1.79	0.49	0.37	0.56	0.32	0.56	0.43	0.31	0.43	0.55
Diff Index	73.33	82.86	64.86	80.56	71.26	83.15	76.21	76.29	79.50	75.22	77.76	77.75
Na/(Na+K)	0.54	0.68	0.81	0.55	0.56	0.62	0.48	0.68	0.60	0.69	0.71	0.60
(Na+K)/Al	0.80	1.06	1.15	0.98	0.88	1.03	0.87	0.96	0.95	1.16	1.05	0.92
F3/(F2+F3)	0.34	0.42	0.57	0.37	0.34	0.52	0.34	0.34	0.37	0.52	0.52	0.34
Qz residua	44.56	35.04	n.a.	52.61	49.77	48.91	47.70	48.19	47.64	49.37	49.76	44.47
Ks residua	27.19	23.34	n.a.	22.85	23.59	21.53	28.45	17.70	22.67	19.19	16.75	23.62
Ne residua	28.25	41.63	n.a.	24.54	26.63	29.56	23.86	34.12	29.69	31.44	33.49	31.91

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	52267	52286	52289	52293	52298	54156	54158	54175	54225	54230	54258	54272
Major elements, weight %												
	Phon-ite	Phon-ite	Benm-ite	Benm-ite	Phon-ite	Benm-ite	Phon-ite	Phon-ite	Benm-ite	Phon-ite	Mug-ite	Benm-ite
SiO2	52.12	53.50	57.48	55.84	55.07	60.09	57.61	57.16	59.40	56.73	46.87	56.88
Al2O3	20.55	18.90	16.07	16.63	17.14	18.19	18.64	16.46	14.07	20.22	13.73	16.80
Fe2O3	6.34	8.04	10.47	8.84	8.97	8.51	7.12	9.14	9.74	5.27	13.62	9.83
MgO	0.36	0.43	0.50	1.51	0.77	0.23	0.16	0.47	0.56	0.34	4.36	0.45
CaO	2.05	1.81	2.54	3.47	2.60	0.83	1.64	1.93	2.39	1.25	7.06	2.80
Na2O	8.88	7.86	5.19	4.44	5.96	6.26	6.75	6.18	4.56	7.16	4.27	5.02
K2O	6.16	6.12	4.76	4.94	5.57	3.36	5.64	5.45	6.12	6.44	2.97	5.37
TiO2	0.66	0.49	0.62	1.58	1.11	0.21	0.18	0.76	0.96	0.33	2.84	0.33
MnO	0.21	0.32	0.26	0.19	0.22	0.54	0.19	0.23	0.23	0.22	0.22	0.32
P2O5	0.11	0.05	0.09	0.51	0.35	0.00	0.01	0.11	0.15	0.04	1.90	0.12
F	0.48	0.30	0.21	0.28	0.33	0.11	0.39	0.06	0.12	0.51	0.13	0.13
Cl	0.23	0.38	0.05	0.05	0.17	0.01	0.03	0.12	0.03	0.06	0.03	0.01
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.25	-0.21	-0.10	-0.13	-0.18	-0.05	-0.17	-0.05	-0.06	-0.23	-0.06	-0.06
Total	97.90	97.99	98.14	98.15	98.08	98.29	98.19	98.02	98.27	98.34	97.94	98.00
Trace elements ppm												
Ba	3186.	1024.	96.	3733.	764.	78.	145.	70.	85.	114.	3215.	301.
Nb	245.	401.	205.	128.	221.	1159.	271.	224.	69.	647.	38.	224.
Zr	796.	1293.	859.	560.	898.	6258.	753.	935.	488.	1025.	238.	1107.
Y	37.	81.	82.	55.	72.	368.	80.	85.	60.	59.	51.	110.
Sr	3400.	3708.	131.	841.	199.	165.	120.	42.	101.	120.	1470.	228.
Rb	167.	232.	106.	97.	181.	248.	194.	185.	278.	249.	87.	142.
Zn	134.	254.	243.	137.	182.	884.	196.	215.	196.	126.	146.	274.
Cu	0.	0.	2.	0.	9.	0.	6.	3.	4.	4.	4.	0.
Ni	0.	0.	0.	0.	0.	8.	3.	3.	2.	1.	18.	0.
Pb	8.	41.	28.	19.	29.	114.	19.	35.	31.	13.	17.	36.
U	26.	33.	6.	5.	4.	30.	4.	7.	0.	7.	5.	5.
Th	15.	44.	23.	13.	23.	116.	28.	25.	9.	32.	4.	27.
V	26.	19.	21.	77.	48.	5.	7.	28.	41.	12.	262.	12.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	0.
Nd	117.	219.	186.	94.	150.	526.	163.	177.	132.	176.	101.	214.
Ga	35.	39.	41.	29.	35.	76.	43.	39.	34.	38.	23.	37.
La	136.	353.	234.	128.	168.	889.	196.	212.	134.	258.	125.	245.
Ce	263.	534.	388.	217.	290.	1326.	369.	389.	261.	433.	210.	425.
Zr/Nb	3.25	3.22	4.19	4.38	4.06	5.40	2.78	4.17	7.07	1.58	6.26	4.94

SUMMARY NORM TABLE

	52267.0	52286.0	52289.0	52293.0	52298.0	54156.0	54158.0	54175.0	54225.0	54230.0	54258.0	54272.0
Quartz	0.0	0.0	1.17	1.79	0.0	5.99	0.0	0.0	5.55	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	3.03	0.0	0.0	0.0	0.34	0.0	0.0
Orthoclase	37.23	37.00	28.84	29.88	33.70	20.30	34.03	33.04	36.96	38.73	18.10	32.58
Albite	17.07	25.12	44.74	38.17	38.46	54.10	43.34	44.20	39.14	35.30	30.27	43.55
Anorthite	0.0	0.0	6.81	11.26	4.16	3.62	4.08	1.46	0.0	3.34	9.91	7.68
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	30.31	21.39	0.0	0.0	6.62	0.0	8.02	4.75	0.0	14.10	3.69	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.39	0.64	0.08	0.08	0.29	0.02	0.05	0.20	0.05	0.10	0.05	0.02
Acmite	2.22	1.15	0.0	0.0	0.0	0.0	0.0	0.0	0.11	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	6.16	6.29	3.84	1.31	4.30	0.0	1.83	6.37	7.73	0.0	10.86	4.47
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.56	0.0	0.0	0.0
Hypersthen	0.0	0.0	7.33	8.15	0.0	7.59	0.0	0.0	0.0	0.0	0.0	0.77
Olivine	1.25	2.28	0.0	0.0	4.14	0.0	3.05	3.34	0.0	3.05	11.84	4.73
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	2.81	4.42	5.34	4.50	4.66	4.70	4.41	4.76	7.44	3.26	4.98	5.02
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.28	0.95	1.21	3.07	2.16	0.41	0.35	1.48	1.86	0.64	5.56	0.64
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.27	0.12	0.22	1.24	0.85	0.0	0.02	0.27	0.36	0.10	4.64	0.29
Fluorite	1.00	0.63	0.43	0.54	0.66	0.23	0.82	0.12	0.24	1.06	0.10	0.26
Diff Index	84.62	83.51	74.74	69.85	78.78	80.40	85.39	82.00	81.65	88.12	52.06	76.13
Na/(Na+K)	0.69	0.66	0.62	0.58	0.62	0.74	0.65	0.63	0.53	0.63	0.69	0.59
(Na+K)/Al	1.04	1.03	0.85	0.76	0.92	0.77	0.92	0.98	1.00	0.93	0.75	0.84
F3/(F2+F3)	0.42	0.42	0.34	0.34	0.35	0.37	0.42	0.35	0.52	0.42	0.24	0.34
Qz residua	28.24	32.91	45.65	n.a.	40.84	49.19	40.47	42.10	48.31	37.33	n.a.	44.69
Ks residua	25.00	25.18	21.92	n.a.	24.31	14.35	22.64	22.90	25.72	24.97	n.a.	24.32
Ne residua	46.75	41.91	32.43	n.a.	34.85	36.46	36.89	35.00	25.97	37.70	n.a.	30.99

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	54286	54289	54293	54316	54317	54318	54323	54324	54325	58002	58003	58017
Major elements, weight %												
	Tracyand	Benm-ite	Tracyand	Benm-ite	Mug-ite	Benm-ite	Hawaiite	Hawaiite	Phon-ite	Phon-ite	Phon-ite	Benm-ite
SiO2	58.64	57.49	60.01	55.41	48.63	59.38	47.49	48.18	51.08	57.40	53.94	53.26
Al2O3	14.06	16.38	13.86	17.72	15.12	18.29	14.11	14.19	15.59	15.70	17.24	16.74
Fe2O3	14.61	7.24	12.24	8.32	12.48	7.24	13.22	12.93	12.37	10.25	9.57	9.91
MgO	0.40	1.65	0.45	1.42	4.16	0.51	4.88	4.72	0.42	0.38	0.55	2.42
CaO	0.65	3.01	1.55	2.81	6.15	1.25	7.04	6.80	2.29	2.16	2.37	2.91
Na2O	5.12	5.17	7.51	4.56	4.35	6.40	3.99	4.14	9.99	5.88	6.67	5.39
K2O	3.85	4.99	1.87	5.68	2.67	4.19	2.43	2.31	4.72	5.14	5.76	4.39
TiO2	0.34	1.46	0.27	1.25	2.46	0.61	2.73	2.69	0.31	0.67	0.98	1.42
MnO	0.58	0.20	0.46	0.23	0.19	0.24	0.20	0.20	0.43	0.28	0.28	0.37
P2O5	0.19	0.54	0.13	0.56	1.65	0.08	1.83	1.76	0.14	0.07	0.24	1.11
F	0.00	0.28	0.15	0.24	0.00	0.39	0.00	0.01	0.34	0.20	0.24	0.27
Cl	0.02	0.04	0.00	0.00	0.01	0.00	0.09	0.10	1.19	0.02	0.22	0.05
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.00	-0.13	-0.06	-0.10	-0.00	-0.16	-0.02	-0.02	-0.41	-0.09	-0.15	-0.12
Total	98.46	98.32	98.44	98.10	97.87	98.42	97.99	98.01	98.46	98.06	97.91	98.12
Trace elements ppm												
Ba	231.	3178.	270.	1322.	2398.	266.	1512.	1601.	145.	32.	205.	3707.
Nb	1754.	112.	1567.	180.	60.	261.	39.	39.	1076.	178.	261.	162.
Zr	7749.	352.	6764.	685.	301.	993.	239.	246.	5337.	770.	1074.	597.
Y	646.	54.	525.	66.	43.	97.	39.	39.	358.	91.	100.	48.
Sr	131.	516.	175.	553.	1157.	160.	1337.	1387.	117.	59.	65.	1713.
Rb	126.	113.	63.	200.	65.	138.	61.	58.	394.	162.	203.	120.
Zn	506.	176.	800.	183.	161.	250.	153.	140.	582.	237.	219.	181.
Cu	0.	18.	0.	6.	28.	4.	12.	5.	0.	1.	4.	0.
Ni	4.	0.	3.	2.	15.	0.	15.	13.	4.	3.	0.	0.
Pb	211.	36.	158.	29.	10.	44.	16.	13.	125.	30.	25.	12.
U	44.	2.	44.	5.	3.	1.	3.	7.	24.	4.	3.	7.
Th	204.	10.	173.	16.	6.	30.	3.	1.	108.	20.	22.	9.
V	9.	65.	11.	82.	226.	28.	260.	258.	7.	24.	36.	52.
Cr	0.	0.	0.	0.	4.	0.	6.	2.	0.	0.	0.	0.
Nd	1230.	106.	780.	149.	88.	256.	95.	105.	571.	214.	210.	153.
Ga	54.	28.	45.	36.	26.	44.	24.	24.	60.	39.	41.	34.
La	1707.	137.	1084.	189.	96.	319.	84.	81.	765.	239.	228.	173.
Ce	2150.	216.	1729.	321.	201.	492.	172.	180.	1255.	430.	413.	304.
Zr/Nb	4.42	3.14	4.32	3.81	5.02	3.80	6.13	6.31	4.96	4.33	4.11	3.69

SUMMARY NORM TABLE

	54286.0	54289.0	54293.0	54316.0	54317.0	54318.0	54323.0	54324.0	54325.0	58002.0	58003.0	58017.0
Quartz	7.35	0.65	4.73	0.0	0.0	1.66	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.78	0.0	0.0	0.73	0.0	1.92	0.0	0.0	0.0	0.0	0.0	0.99
Orthoclase	23.33	30.10	11.29	34.37	16.27	25.23	14.79	14.06	28.34	31.16	34.93	26.58
Albite	44.32	44.43	62.21	39.51	37.89	55.19	34.26	35.52	10.81	47.45	32.20	45.32
Anorthite	2.03	7.01	0.0	9.38	14.30	3.73	14.08	14.01	0.0	1.36	0.75	6.18
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.82	1.89	13.26	0.61
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.03	0.07	0.0	0.0	0.02	0.0	0.15	0.17	1.99	0.03	0.37	0.08
Acmite	0.0	0.0	2.40	0.0	0.0	0.0	0.0	0.0	21.56	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	0.0	2.69	5.42	0.0	4.98	0.0	7.86	7.33	7.72	7.10	7.35	0.0
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	13.58	6.71	5.41	3.91	0.10	6.10	2.13	4.10	0.0	0.0	0.0	0.0
Olivine	0.0	0.0	0.0	3.62	13.04	0.0	12.10	11.15	3.23	3.89	3.16	9.16
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	7.45	3.67	7.39	4.23	4.56	3.99	4.82	4.11	0.90	5.24	5.00	5.15
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	0.66	2.83	0.52	2.43	4.82	1.18	5.34	5.26	0.60	1.31	1.91	2.76
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.46	1.31	0.31	1.36	4.03	0.19	4.46	4.29	0.34	0.17	0.58	2.69
Fluorite	0.0	0.54	0.30	0.45	0.0	0.81	0.0	0.0	0.70	0.41	0.48	0.46
Diff Index	75.00	75.17	78.24	73.89	54.15	82.08	49.05	49.58	62.96	80.49	80.40	72.51
Na/(Na+K)	0.67	0.61	0.86	0.55	0.71	0.70	0.71	0.73	0.76	0.63	0.64	0.65
(Na+K)/Al	0.90	0.85	1.04	0.77	0.66	0.82	0.65	0.66	1.38	0.97	1.00	0.81
F3/(F2+F3)	0.34	0.34	0.47	0.34	0.24	0.37	0.24	0.21	0.64	0.34	0.35	0.35
Qz residua	50.31	45.23	48.72	44.59	n.a.	46.11	n.a.	n.a.	n.a.	43.73	37.12	44.47
Ks residua	17.68	22.75	8.20	26.44	n.a.	17.47	n.a.	n.a.	n.a.	22.00	24.69	20.83
Ne residua	32.01	32.02	43.08	28.97	n.a.	36.42	n.a.	n.a.	n.a.	34.27	38.19	34.70

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	58019	58022A	58023	58031	58033	58036	58041	58042	58043	58044	58045	58046
Major elements, weight %												
	Phon-ite	Benm-ite	Phon-ite	Phon-ite	Ph-teph	Mug-ite	Phon-ite	Phon-ite	Phon-ite	Phon-ite	Phon-ite	Benm-ite
SiO2	54.05	57.39	57.57	54.22	52.39	50.70	54.77	54.70	55.17	57.12	57.44	56.53
Al2O3	18.02	16.64	19.27	19.15	17.78	15.69	19.31	12.92	13.65	16.19	16.23	16.23
Fe2O3	7.97	9.87	6.46	7.63	8.07	11.20	6.93	13.81	13.41	9.56	9.60	9.16
MgO	0.68	0.31	0.73	0.29	2.42	2.49	0.21	0.31	0.30	0.54	0.33	0.69
CaO	1.68	2.42	1.50	2.02	3.63	5.35	1.23	1.88	1.99	1.90	2.00	2.77
Na2O	8.69	5.51	5.51	7.39	5.36	4.10	8.46	9.10	6.01	6.03	6.03	5.27
K2O	5.15	4.90	6.01	6.09	5.24	3.84	6.17	3.45	5.91	5.24	5.34	5.40
TiO2	0.65	0.58	0.53	0.49	1.61	2.38	0.26	0.82	0.77	0.88	0.63	1.24
MnO	0.40	0.23	0.34	0.28	0.26	0.30	0.30	0.72	0.62	0.27	0.25	0.19
P2O5	0.31	0.06	0.19	0.05	1.04	1.74	0.00	0.01	0.00	0.20	0.07	0.44
F	0.27	0.17	0.30	0.48	0.42	0.30	0.37	0.14	0.57	0.10	0.24	0.29
Cl	0.36	0.01	0.01	0.20	0.01	0.02	0.28	0.01	0.00	0.09	0.05	0.06
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.19	-0.08	-0.13	-0.25	-0.18	-0.13	-0.22	-0.06	-0.24	-0.06	-0.11	-0.14
Total	98.04	98.01	98.29	98.04	98.05	97.98	98.07	97.81	98.16	98.06	98.10	98.13
Trace elements ppm												
Ba	1272.	15.	873.	47.	3658.	4883.	0.	56.	72.	122.	33.	1725.
Nb	468.	223.	393.	453.	134.	47.	581.	1488.	1864.	179.	195.	91.
Zr	1775.	873.	1500.	1725.	586.	274.	1678.	3200.	3342.	739.	746.	350.
Y	105.	84.	95.	131.	44.	37.	103.	193.	229.	80.	81.	47.
Sr	645.	91.	481.	58.	1952.	1544.	16.	2512.	1763.	35.	24.	128.
Rb	287.	140.	342.	278.	147.	51.	285.	175.	304.	160.	175.	90.
Zn	331.	210.	239.	259.	150.	153.	286.	559.	589.	216.	220.	151.
Cu	0.	6.	0.	0.	0.	0.	1.	0.	0.	0.	7.	3.
Ni	0.	0.	5.	0.	2.	0.	2.	6.	4.	3.	2.	0.
Pb	35.	32.	32.	32.	7.	7.	41.	137.	149.	26.	27.	17.
U	9.	4.	6.	6.	3.	2.	12.	84.	88.	3.	3.	3.
Th	30.	23.	23.	33.	11.	5.	45.	120.	178.	19.	20.	11.
V	28.	19.	22.	17.	80.	124.	7.	30.	29.	33.	17.	48.
Cr	0.	6.	0.	0.	0.	0.	0.	0.	0.	28.	0.	0.
Nd	278.	202.	247.	251.	131.	105.	252.	620.	759.	181.	181.	103.
Ga	51.	40.	44.	47.	29.	23.	49.	45.	47.	38.	40.	29.
La	339.	234.	289.	323.	133.	74.	336.	933.	1193.	202.	210.	125.
Ce	608.	414.	519.	569.	246.	165.	581.	1442.	1754.	400.	393.	243.
Zr/Nb	3.79	3.91	3.82	3.81	4.37	5.83	2.89	2.15	1.79	4.13	3.83	3.85

SUMMARY NORM TABLE

	58019.0	58022.1	58023.0	58031.0	58033.0	58036.0	58041.0	58042.0	58043.0	58044.0	58045.0	58046.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	2.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	31.13	29.72	36.24	36.78	31.69	23.31	37.25	20.94	35.70	31.76	32.34	32.67
Albite	28.18	47.79	44.99	29.22	34.01	35.52	24.84	27.77	30.97	46.72	46.21	45.32
Anorthite	0.0	6.39	4.77	1.71	9.22	13.48	0.0	0.0	0.0	1.94	1.63	4.97
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	20.21	0.0	1.37	18.19	6.69	0.0	22.50	11.24	3.88	2.77	3.14	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.61	0.02	0.02	0.34	0.02	0.03	0.47	0.02	0.0	0.15	0.08	0.10
Acmite	6.79	0.0	0.0	0.0	0.0	0.0	4.57	26.38	12.20	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.13	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	4.38	4.06	0.0	4.91	0.21	0.75	3.74	7.70	6.17	5.12	5.96	4.04
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	2.42	0.0	0.0	0.0	11.55	0.0	0.0	0.0	0.0	0.0	0.17
Olivine	4.61	2.93	5.19	2.04	7.53	0.76	3.35	3.91	3.09	4.27	3.85	4.01
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	1.55	5.03	3.28	4.73	4.20	5.24	2.01	0.0	5.30	4.88	4.89	4.66
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.26	1.13	1.03	0.95	3.13	4.64	0.50	1.60	1.49	1.71	1.23	2.41
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.75	0.15	0.46	0.12	2.52	4.23	0.0	0.02	0.0	0.49	0.17	1.07
Fluorite	0.54	0.35	0.61	1.00	0.79	0.47	0.78	0.29	1.20	0.19	0.50	0.57
Diff Index	79.51	77.51	82.60	84.19	72.39	58.83	84.59	59.94	70.55	81.25	81.69	77.99
Na/(Na+K)	0.72	0.63	0.58	0.65	0.61	0.62	0.68	0.80	0.61	0.64	0.63	0.60
(Na+K)/Al	1.10	0.86	0.81	0.98	0.81	0.69	1.07	1.45	1.19	0.96	0.97	0.89
F3/(F2+F3)	0.42	0.34	0.34	0.42	0.35	0.31	0.42	0.64	0.57	0.34	0.34	0.34
Qz residua	33.14	44.81	43.91	34.77	40.43	n.a.	32.47	n.a.	41.97	43.23	43.02	44.72
Ks residua	22.25	21.79	24.93	24.83	24.88	n.a.	25.02	n.a.	28.75	22.21	22.50	23.80
Ne residua	44.61	33.40	31.16	40.40	34.69	n.a.	42.51	n.a.	29.28	34.56	34.49	31.48

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	58047	58048	58050	58059	58060	58061	58062	58063	58065	58074	58076	58078
Major elements, weight %												
	Phon-ite	Phon-ite	Tep/Basn	Phon-ite	Phon-ite	Phon-ite	Mug-ite	Phon-ite	Basalt	Mug-ite	Tep/Basn	Hawaiite
SiO2	56.71	55.72	44.21	56.35	56.28	56.30	51.27	54.82	45.20	48.24	45.21	45.81
Al2O3	17.19	17.49	13.44	17.10	17.62	17.15	15.47	17.06	18.08	15.33	14.25	13.37
Fe2O3	7.95	8.11	16.12	8.22	7.82	8.36	12.59	9.78	13.91	11.78	13.52	14.66
MgO	0.32	0.57	3.28	0.41	0.35	0.43	1.59	0.53	4.80	3.44	4.07	4.97
CaO	1.57	1.92	6.97	1.78	1.56	1.78	4.26	2.42	7.77	5.63	6.93	7.40
Na2O	7.38	6.97	3.93	7.77	7.51	7.01	4.21	6.17	3.24	4.03	3.58	3.71
K2O	5.77	5.86	2.95	5.21	5.74	5.83	4.40	5.77	1.09	4.17	3.99	2.60
TiO2	0.62	0.73	3.35	0.62	0.59	0.63	2.25	0.71	2.72	2.76	3.05	3.26
MnO	0.24	0.28	0.38	0.26	0.24	0.26	0.39	0.31	0.16	0.35	0.38	0.19
P2O5	0.04	0.09	3.09	0.04	0.06	0.04	1.34	0.11	0.86	2.00	2.67	1.98
F	0.30	0.28	0.19	0.35	0.31	0.21	0.08	0.11	0.04	0.00	0.02	0.00
Cl	0.24	0.27	0.05	0.20	0.23	0.17	0.01	0.16	0.02	0.02	0.04	0.03
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.18	-0.18	-0.09	-0.19	-0.18	-0.13	-0.04	-0.08	-0.02	-0.01	-0.02	-0.01
Total	98.15	98.11	97.87	98.12	98.13	98.04	97.82	97.87	97.87	97.74	97.69	97.97
Trace elements ppm												
Ba	2.	110.	2711.	1.	9.	11.	3328.	103.	1624.	5841.	7575.	2695.
Nb	266.	348.	83.	268.	265.	271.	133.	256.	16.	117.	79.	47.
Zr	1004.	1246.	408.	1004.	1005.	1027.	443.	1019.	187.	629.	569.	275.
Y	93.	90.	59.	95.	93.	94.	53.	104.	20.	62.	68.	43.
Sr	11.	39.	1406.	10.	10.	9.	1045.	52.	1575.	3575.	4517.	1133.
Rb	247.	238.	54.	231.	246.	228.	116.	223.	21.	88.	65.	59.
Zn	227.	225.	198.	235.	229.	234.	231.	238.	92.	230.	208.	135.
Cu	6.	5.	0.	2.	7.	6.	0.	0.	0.	0.	0.	14.
Ni	0.	0.	0.	0.	0.	3.	0.	5.	64.	0.	0.	12.
Pb	44.	31.	5.	41.	41.	42.	11.	28.	4.	10.	8.	13.
U	4.	5.	6.	4.	5.	4.	3.	2.	5.	14.	18.	0.
Th	28.	29.	0.	27.	28.	29.	1.	20.	2.	1.	2.	3.
V	24.	29.	222.	19.	21.	21.	99.	29.	388.	149.	141.	259.
Cr	0.	0.	1.	0.	0.	0.	0.	0.	19.	73.	0.	112.
Nd	199.	189.	188.	213.	215.	214.	152.	216.	30.	207.	245.	76.
Ga	46.	41.	24.	46.	45.	43.	29.	43.	20.	26.	22.	21.
La	284.	245.	154.	268.	253.	266.	149.	258.	18.	211.	217.	77.
Ce	462.	409.	297.	479.	468.	473.	283.	452.	80.	402.	422.	193.
Zr/Nb	3.77	3.58	4.92	3.75	3.79	3.79	3.33	3.98	11.69	5.38	7.20	5.85

SUMMARY NORM TABLE

	58047.0	58048.0	58050.0	58059.0	58060.0	58061.0	58062.0	58063.0	58065.0	58074.0	58076.0	58078.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	34.84	35.41	18.02	31.47	34.67	35.27	26.80	35.04	6.66	25.39	24.36	15.84
Albite	35.85	36.23	32.63	36.67	35.48	35.90	36.67	34.19	28.23	32.42	24.99	30.67
Anorthite	0.0	0.0	10.82	0.0	0.0	0.0	10.67	2.34	32.70	11.83	11.51	12.62
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	11.74	12.13	0.79	12.78	13.27	11.48	0.0	10.06	0.0	1.41	3.29	0.83
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.40	0.45	0.09	0.34	0.39	0.29	0.02	0.27	0.03	0.03	0.07	0.05
Acmite	4.35	0.14	0.0	5.13	3.25	2.37	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	5.33	6.57	3.17	6.01	5.11	6.64	1.68	7.56	1.11	2.86	4.95	9.79
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	0.0	0.0	7.69	0.0	6.00	0.0	0.0	0.0
Olivine	2.81	1.90	14.35	3.04	2.69	2.29	2.84	3.56	14.63	10.24	13.36	13.61
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	2.75	4.95	5.90	2.53	3.22	4.01	5.92	5.11	3.18	5.54	4.96	5.37
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.20	1.42	6.58	1.20	1.15	1.22	4.40	1.39	5.34	5.40	5.98	6.38
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.10	0.22	7.56	0.10	0.15	0.10	3.27	0.27	2.11	4.88	6.53	4.84
Fluorite	0.63	0.58	0.11	0.73	0.65	0.44	0.04	0.22	0.0	0.0	0.0	0.0
Diff Index	82.43	83.76	51.43	80.92	83.41	82.64	63.47	79.28	34.89	59.22	52.64	47.35
Na/(Na+K)	0.66	0.64	0.67	0.69	0.67	0.65	0.59	0.62	0.82	0.59	0.58	0.68
(Na+K)/Al	1.07	1.02	0.72	1.08	1.05	1.04	0.76	0.96	0.36	0.73	0.72	0.67
F3/(F2+F3)	0.42	0.42	0.24	0.42	0.42	0.42	0.31	0.35	0.15	0.31	0.24	0.24
Qz residua	38.18	38.07	n.a.	37.56	37.44	38.33	n.a.	38.84	n.a.	n.a.	n.a.	n.a.
Ks residua	24.02	24.02	n.a.	22.10	23.62	24.25	n.a.	25.11	n.a.	n.a.	n.a.	n.a.
Ne residua	37.80	37.91	n.a.	40.34	38.95	37.42	n.a.	36.04	n.a.	n.a.	n.a.	n.a.

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	58083	58086	58092	58104	58105	58106	58109	58110	58123	58128	58130	58132
Major elements, weight %												
	Benm-ite	Ph-teph	Phon-ite	Phon-ite	Basalt	Hawaiite	Basalt	Phon-ite	Mug-ite	Trachyte	Tep/Basn	Benm-ite
SiO2	50.53	53.66	56.39	57.53	43.85	45.65	45.04	53.19	48.99	60.39	45.45	56.46
Al2O3	16.77	15.27	18.07	19.02	13.44	15.78	16.71	17.06	14.51	18.47	16.15	16.56
Fe2O3	8.89	12.65	8.55	5.90	16.05	14.12	13.80	10.55	12.60	5.02	12.82	8.73
MgO	2.77	0.78	0.56	0.69	6.81	4.20	3.89	0.32	3.44	0.25	3.01	1.07
CaO	4.75	2.90	2.17	1.82	7.83	7.25	7.99	2.15	5.23	1.36	7.67	2.76
Na2O	4.63	7.42	4.53	5.26	2.84	3.79	3.86	7.86	3.88	6.17	4.29	4.99
K2O	4.71	3.38	6.48	6.76	2.04	2.16	1.49	5.45	4.58	5.98	2.31	5.69
TiO2	2.58	1.12	0.76	0.78	3.59	3.13	3.11	0.53	2.65	0.62	2.91	1.16
MnO	0.29	0.32	0.30	0.24	0.19	0.18	0.17	0.28	0.23	0.08	0.24	0.21
P2O5	1.81	0.19	0.08	0.10	1.39	1.55	1.73	0.09	1.73	0.00	2.72	0.33
F	0.17	0.26	0.33	0.27	0.00	0.08	0.24	0.23	0.00	0.40	0.20	0.08
Cl	0.04	0.19	0.01	0.01	0.02	0.04	0.03	0.28	0.03	0.00	0.04	0.01
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.08	-0.15	-0.14	-0.12	-0.01	-0.04	-0.11	-0.16	-0.01	-0.17	-0.09	-0.04
Total	97.86	97.99	98.09	98.26	98.04	97.89	97.95	97.83	97.86	98.57	97.72	98.01
Trace elements ppm												
Ba	7411.	156.	164.	501.	1768.	1722.	2097.	149.	3461.	525.	4071.	1713.
Nb	91.	308.	353.	204.	36.	58.	24.	348.	63.	63.	53.	143.
Zr	503.	1254.	1285.	708.	277.	327.	215.	1578.	308.	121.	291.	583.
Y	47.	109.	93.	52.	37.	41.	31.	140.	51.	13.	44.	56.
Sr	3823.	52.	155.	256.	1188.	993.	1276.	62.	1084.	262.	1745.	351.
Rb	83.	204.	292.	216.	56.	56.	23.	220.	89.	137.	34.	141.
Zn	162.	262.	228.	171.	118.	109.	93.	247.	158.	58.	152.	161.
Cu	0.	4.	0.	4.	26.	19.	11.	6.	4.	9.	0.	6.
Ni	0.	2.	0.	0.	117.	45.	39.	0.	10.	0.	0.	0.
Pb	5.	36.	43.	19.	5.	5.	1.	33.	13.	9.	6.	24.
U	13.	5.	6.	0.	4.	4.	3.	3.	0.	1.	8.	3.
Th	4.	30.	30.	16.	1.	3.	0.	25.	9.	8.	3.	17.
V	112.	39.	29.	32.	352.	280.	312.	17.	191.	24.	188.	48.
Cr	0.	1.	13.	0.	171.	33.	14.	15.	60.	0.	2.	0.
Nd	134.	226.	205.	124.	62.	76.	69.	221.	98.	20.	129.	115.
Ga	25.	43.	43.	35.	21.	22.	21.	45.	26.	36.	25.	32.
La	164.	256.	257.	151.	47.	72.	57.	286.	117.	10.	129.	133.
Ce	290.	452.	425.	284.	124.	153.	108.	491.	212.	59.	219.	240.
Zr/Nb	5.53	4.07	3.64	3.47	7.69	5.64	8.96	4.53	4.89	1.92	5.49	4.08

SUMMARY NORM TABLE

	58083.0	58086.0	58092.0	58104.0	58105.0	58106.0	58109.0	58110.0	58123.0	58128.0	58130.0	58132.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.50	0.51	0.0	0.0	0.0	0.0	0.0	0.14	0.0	0.0
Orthoclase	28.59	20.47	39.21	40.75	12.44	13.18	9.07	33.02	27.88	35.91	14.09	34.50
Albite	35.27	47.89	38.67	38.51	24.68	31.98	33.49	26.14	31.73	50.35	35.25	41.86
Anorthite	11.49	0.0	8.74	7.13	18.53	20.42	24.69	0.0	9.00	4.73	18.69	6.17
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	2.58	7.21	0.28	3.70	0.0	0.49	0.0	17.72	1.04	1.46	1.09	0.76
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.07	0.32	0.02	0.02	0.03	0.07	0.05	0.47	0.05	0.0	0.07	0.02
Acmite	0.0	1.82	0.0	0.0	0.0	0.0	0.0	6.83	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	0.08	8.41	0.0	0.0	9.95	5.12	3.01	7.92	5.00	0.0	1.52	4.51
Wollaston.	0.0	0.83	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	1.47	0.0	1.63	0.0	0.0	0.0	0.0	0.0
Olivine	8.13	0.0	5.88	3.43	16.58	13.63	12.35	0.58	9.98	2.62	12.07	4.54
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.17	9.89	4.35	3.65	5.88	5.16	5.05	5.58	5.91	2.75	4.70	4.45
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	5.03	2.18	1.48	1.51	7.04	6.14	6.09	1.03	5.18	1.20	5.71	2.26
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	4.40	0.46	0.19	0.24	3.40	3.79	4.22	0.22	4.22	0.0	6.65	0.80
Fluorite	0.19	0.53	0.69	0.56	0.0	0.02	0.34	0.48	0.0	0.84	0.17	0.14
Diff Index	66.44	75.56	78.16	82.96	37.12	45.65	42.57	76.88	60.65	87.72	50.43	77.12
Na/(Na+K)	0.60	0.77	0.52	0.54	0.68	0.73	0.80	0.69	0.56	0.61	0.74	0.57
(Na+K)/Al	0.76	1.04	0.80	0.84	0.51	0.54	0.48	1.10	0.78	0.90	0.59	0.87
F3/(F2+F3)	0.31	0.57	0.34	0.42	0.24	0.24	0.24	0.57	0.31	0.37	0.24	0.34
Qz residua	n.a.	40.74	44.33	42.48	n.a.	n.a.	n.a.	34.13	n.a.	43.98	n.a.	44.19
Ks residua	n.a.	15.39	28.51	27.91	n.a.	n.a.	n.a.	24.40	n.a.	23.26	n.a.	25.42
Ne residua	n.a.	43.87	27.16	29.61	n.a.	n.a.	n.a.	41.47	n.a.	32.76	n.a.	30.39

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	58133A	58133B	58135	58138	58139	58140A	58140B	58141A	58141B	58151A	58151B	58159
Major elements, weight %												
	Phon-ite	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Phon-ite	Ph-teph	Benm-ite	Phon-ite	Trachyte	Basalt	Benm-ite
SiO2	55.56	57.69	55.44	58.97	57.94	54.09	53.09	58.26	57.38	61.88	45.58	57.23
Al2O3	19.64	16.28	15.32	19.15	16.17	15.51	15.09	16.50	16.22	14.72	12.51	15.44
Fe2O3	6.48	9.43	10.44	4.40	8.62	11.20	12.14	8.14	9.50	8.04	16.52	9.97
MgO	0.34	0.72	1.36	0.76	0.64	0.77	0.76	0.67	0.28	0.38	6.34	0.72
CaO	1.54	2.14	3.24	2.95	2.33	2.80	2.86	2.28	2.14	1.87	7.25	2.61
Na2O	7.74	5.59	4.46	5.13	4.98	6.37	6.45	5.05	6.42	4.95	2.37	4.71
K2O	5.84	4.88	5.19	5.67	5.89	5.25	5.66	5.86	5.17	5.49	3.26	5.67
TiO2	0.39	0.84	1.65	0.79	1.04	1.13	1.03	0.93	0.49	0.79	3.23	1.09
MnO	0.21	0.28	0.23	0.10	0.22	0.32	0.36	0.21	0.26	0.20	0.20	0.25
P2O5	0.03	0.15	0.64	0.44	0.19	0.23	0.19	0.19	0.02	0.10	0.87	0.31
F	0.45	0.19	0.10	0.40	0.14	0.18	0.18	0.14	0.14	0.15	0.00	0.02
Cl	0.21	0.05	0.04	0.03	0.08	0.21	0.22	0.05	0.11	0.02	0.01	0.02
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.24	-0.09	-0.05	-0.17	-0.08	-0.12	-0.13	-0.07	-0.08	-0.07	-0.00	-0.01
Total	98.19	98.15	98.06	98.62	98.16	97.94	97.90	98.21	98.05	98.52	98.14	98.03
Trace elements ppm												
Ba	0.	172.	4265.	3344.	520.	255.	149.	514.	17.	154.	1689.	445.
Nb	307.	190.	64.	38.	102.	237.	282.	98.	266.	67.	22.	120.
Zr	1035.	768.	285.	193.	376.	1007.	1207.	360.	1038.	447.	198.	417.
Y	104.	85.	47.	24.	47.	107.	122.	45.	103.	49.	40.	49.
Sr	32.	76.	310.	859.	113.	73.	55.	151.	39.	61.	803.	119.
Rb	283.	170.	109.	96.	112.	183.	206.	118.	214.	136.	313.	139.
Zn	182.	220.	149.	67.	153.	240.	265.	149.	255.	144.	136.	167.
Cu	8.	2.	0.	3.	4.	1.	0.	6.	5.	8.	38.	1.
Ni	0.	3.	0.	0.	0.	0.	0.	0.	2.	3.	42.	0.
Pb	11.	23.	12.	29.	24.	26.	32.	21.	38.	25.	5.	11.
U	5.	3.	3.	0.	1.	4.	4.	0.	4.	1.	1.	0.
Th	19.	20.	8.	10.	12.	21.	23.	14.	30.	13.	0.	11.
V	12.	33.	65.	37.	41.	38.	36.	34.	17.	31.	362.	46.
Cr	0.	15.	0.	0.	0.	0.	1.	1.	0.	0.	68.	0.
Nd	213.	181.	78.	27.	129.	227.	249.	110.	250.	90.	67.	130.
Ga	49.	40.	28.	26.	31.	39.	46.	31.	43.	33.	25.	31.
La	191.	197.	113.	55.	128.	252.	271.	121.	268.	103.	36.	125.
Ce	422.	373.	182.	95.	256.	447.	494.	209.	485.	192.	102.	223.
Zr/Nb	3.37	4.04	4.45	5.08	3.69	4.25	4.28	3.67	3.90	6.67	9.00	3.47

SUMMARY NORM TABLE

	58133.1	58133.2	58135.0	58138.0	58139.0	58140.1	58140.2	58141.1	58141.2	58151.1	58151.2	58159.0
Quartz	0.0	0.0	1.11	1.26	0.15	0.0	0.0	0.05	0.0	7.40	0.0	0.84
Corundum	0.0	0.0	0.0	1.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	35.20	29.54	31.48	34.01	35.63	31.79	34.30	35.43	31.33	33.08	19.87	34.41
Albite	34.43	48.17	38.51	43.90	42.69	37.86	27.41	43.44	45.29	42.59	20.63	40.81
Anorthite	2.25	5.19	6.74	9.92	4.71	0.0	0.0	5.31	0.50	1.83	14.34	4.42
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	16.90	0.0	0.0	0.0	0.0	7.55	10.77	0.0	5.31	0.0	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.35	0.08	0.07	0.05	0.13	0.35	0.37	0.08	0.19	0.03	0.02	0.03
Acmite	0.0	0.0	0.0	0.0	0.0	1.98	6.56	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	2.55	3.19	4.29	0.0	4.43	7.80	10.45	3.68	8.35	5.38	13.87	5.83
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.98	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	5.32	7.55	4.03	5.10	0.0	0.0	5.32	0.0	3.19	1.97	5.67
Olivine	2.54	1.32	0.0	0.0	0.0	0.0	0.24	0.0	2.78	0.0	14.80	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.01	4.80	5.33	2.41	4.39	8.56	7.07	4.14	4.95	4.43	6.04	5.09
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	0.76	1.63	3.22	1.52	2.02	2.20	2.01	1.81	0.95	1.53	6.33	2.13
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.07	0.36	1.56	1.06	0.46	0.56	0.46	0.46	0.05	0.24	2.13	0.75
Fluorite	0.94	0.39	0.15	0.79	0.28	0.36	0.36	0.28	0.29	0.30	0.0	0.01
Diff Index	86.53	77.71	71.10	79.17	78.47	77.21	72.48	78.92	81.93	83.06	40.51	76.06
Na/(Na+K)	0.67	0.64	0.57	0.58	0.56	0.65	0.63	0.57	0.65	0.58	0.52	0.56
(Na+K)/Al	0.97	0.89	0.85	0.76	0.90	1.04	1.11	0.89	1.00	0.96	0.59	0.90
F3/(F2+F3)	0.42	0.34	0.34	0.37	0.34	0.57	0.57	0.34	0.35	0.37	0.24	0.34
Qz residua	35.80	44.82	45.50	45.55	44.73	40.25	37.76	44.67	41.84	49.60	n.a.	45.23
Ks residua	23.12	21.60	25.16	24.41	25.80	23.40	26.89	25.51	21.73	22.63	n.a.	25.70
Ne residua	41.08	33.58	29.34	30.04	29.47	36.35	35.34	29.82	36.43	27.78	n.a.	29.07

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	58173	58197	58206	58212	58216	58219	58223	58224	58225	58226	58227	58235
Major elements, weight %												
	Benm-ite	Benm-ite	Benm-ite	Mug-ite	Rhyolite	Phon-ite	Benm-ite	Phon-ite	Benm-ite	Benm-ite	Trachyte	Phon-ite
SiO2	57.66	53.24	58.78	52.81	65.97	54.51	56.66	56.06	58.52	60.13	59.46	55.19
Al2O3	15.47	14.84	15.00	15.15	13.58	20.18	17.69	19.60	15.53	13.57	14.67	19.07
Fe2O3	9.22	10.85	10.61	11.87	7.19	7.08	7.41	6.04	8.92	11.86	9.50	7.07
MgO	0.63	1.54	0.41	3.16	0.32	0.42	1.37	0.30	0.86	0.17	0.59	0.30
CaO	2.62	4.21	1.97	3.68	1.70	1.66	3.75	1.71	2.35	1.46	1.87	1.45
Na2O	4.90	4.29	5.07	3.24	5.05	7.31	5.07	7.46	4.38	5.65	3.73	8.15
K2O	5.93	5.47	5.22	5.14	4.35	5.73	4.24	6.02	5.81	4.55	7.09	5.79
TiO2	1.01	2.26	0.72	1.98	0.57	0.41	1.22	0.36	1.23	0.60	0.97	0.39
MnO	0.29	0.27	0.25	0.17	0.17	0.30	0.19	0.23	0.18	0.28	0.22	0.26
P2O5	0.28	0.84	0.08	0.84	0.02	0.11	0.43	0.06	0.38	0.02	0.14	0.02
F	0.32	0.00	0.08	0.00	0.33	0.30	0.20	0.33	0.18	0.13	0.09	0.35
Cl	0.03	0.02	0.07	0.07	0.05	0.01	0.04	0.26	0.05	0.05	0.03	0.32
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.14	-0.00	-0.05	-0.02	-0.15	-0.13	-0.09	-0.20	-0.09	-0.07	-0.05	-0.22
Total	98.22	97.83	98.21	98.09	99.15	97.89	98.18	98.23	98.30	98.40	98.31	98.14
Trace elements ppm												
Ba	158.	1552.	130.	1694.	113.	202.	2492.	510.	495.	14.	95.	0.
Nb	120.	83.	250.	37.	253.	269.	97.	417.	38.	649.	66.	388.
Zr	493.	270.	1539.	290.	1695.	1015.	428.	1657.	266.	3905.	449.	1536.
Y	65.	50.	136.	42.	137.	69.	42.	117.	40.	341.	57.	126.
Sr	101.	557.	146.	533.	49.	120.	886.	162.	172.	63.	165.	9.
Rb	173.	98.	222.	189.	229.	220.	78.	273.	135.	456.	326.	301.
Zn	179.	152.	284.	150.	272.	205.	141.	223.	151.	561.	184.	248.
Cu	0.	0.	5.	13.	6.	4.	5.	0.	1.	0.	0.	3.
Ni	0.	2.	5.	15.	6.	3.	0.	6.	3.	5.	0.	3.
Pb	21.	16.	58.	21.	71.	26.	18.	35.	19.	128.	32.	53.
U	0.	3.	8.	1.	17.	7.	3.	6.	0.	21.	0.	6.
Th	17.	6.	35.	8.	59.	28.	15.	35.	8.	83.	8.	39.
V	36.	93.	31.	172.	26.	19.	58.	12.	48.	21.	42.	14.
Cr	0.	0.	0.	12.	0.	0.	0.	0.	0.	0.	17.	0.
Nd	163.	107.	275.	86.	253.	140.	85.	222.	75.	649.	109.	257.
Ga	34.	27.	49.	33.	45.	48.	30.	47.	28.	67.	35.	50.
La	180.	120.	311.	65.	324.	188.	130.	286.	86.	802.	105.	331.
Ce	314.	217.	540.	158.	561.	343.	242.	503.	162.	1278.	234.	568.
Zr/Nb	4.11	3.25	6.16	7.84	6.70	3.77	4.41	3.97	7.00	6.02	6.80	3.96

SUMMARY NORM TABLE

	58173.0	58197.0	58206.0	58212.0	58216.0	58219.0	58223.0	58224.0	58225.0	58226.0	58227.0	58235.0
Quartz	0.11	0.0	2.94	1.19	15.95	0.0	1.08	0.0	4.29	7.14	5.13	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	35.85	33.27	31.62	31.21	26.01	34.71	25.62	36.27	35.11	27.47	42.86	34.93
Albite	42.25	36.20	43.58	27.77	42.95	32.10	43.65	34.40	37.62	45.42	32.12	32.01
Anorthite	2.85	5.29	3.03	12.14	1.70	5.49	13.40	3.03	5.83	0.0	2.49	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.57	0.0	0.0	0.0	16.93	0.0	15.44	0.0	0.0	0.0	19.08
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.05	0.03	0.12	0.12	0.08	0.02	0.07	0.44	0.08	0.08	0.05	0.54
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.76	0.0	1.22
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	5.98	8.83	5.28	0.81	4.31	0.55	1.49	3.01	2.29	5.78	4.85	4.66
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	4.93	0.0	6.26	15.30	3.23	0.0	7.13	0.0	6.60	2.13	4.86	0.0
Olivine	0.0	3.67	0.0	0.0	0.0	4.84	0.0	2.14	0.0	0.0	0.0	2.26
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.69	5.67	5.41	5.56	3.93	3.69	3.77	3.74	4.54	7.74	5.25	3.77
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.96	4.42	1.40	3.86	1.10	0.80	2.37	0.70	2.39	1.16	1.88	0.76
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.68	2.05	0.19	2.04	0.05	0.27	1.04	0.14	0.92	0.05	0.34	0.05
Fluorite	0.65	0.0	0.16	0.0	0.68	0.62	0.38	0.69	0.34	0.27	0.18	0.73
Diff Index	78.21	70.04	78.14	60.17	84.91	83.74	70.36	86.11	77.01	80.02	80.11	86.02
Na/(Na+K)	0.56	0.54	0.60	0.49	0.64	0.66	0.65	0.65	0.53	0.65	0.44	0.68
(Na+K)/Al	0.94	0.87	0.93	0.72	0.96	0.90	0.73	0.96	0.87	1.05	0.94	1.03
F3/(F2+F3)	0.34	0.35	0.34	0.31	0.37	0.35	0.34	0.42	0.34	0.52	0.37	0.42
Qz residua	44.69	44.20	46.79	n.a.	55.19	35.47	45.70	36.49	47.64	49.75	47.88	34.58
Ks residua	26.05	26.99	22.99	n.a.	17.40	23.55	20.70	23.93	25.90	19.50	30.40	23.08
Ne residua	29.26	28.81	30.21	n.a.	27.40	40.98	33.61	39.57	26.46	30.75	21.72	42.34

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	58237	58238A	58238B	58239	58240	58241	58243	58251	58252	58253	58262	58264
Major elements, weight %												
	Mug-ite	Trachyte	Tracyand	Benm-ite	Benm-ite	Benm-ite	Phon-ite	Benm-ite	Phon-ite	Benm-ite	BFD xenxt	Trachyte
SiO2	53.15	60.55	62.10	56.99	54.96	59.72	57.56	58.68	55.69	54.73	53.89	60.02
Al2O3	17.05	16.66	14.51	18.71	15.94	13.34	17.63	18.46	19.08	16.79	28.94	15.48
Fe2O3	9.04	6.63	9.24	7.90	9.79	11.81	6.89	7.27	8.40	8.78	0.67	8.02
MgO	2.48	0.53	0.32	0.71	1.38	0.18	1.20	0.96	0.21	1.89	0.25	0.48
CaO	4.67	2.15	1.92	1.88	3.62	2.23	2.27	1.37	1.36	3.82	9.80	2.04
Na2O	4.67	4.67	6.81	4.39	4.71	5.42	4.57	4.53	6.80	4.49	4.71	3.63
K2O	3.93	6.07	2.54	6.44	5.02	4.62	6.66	5.77	5.67	5.08	0.46	7.41
TiO2	1.65	0.76	0.65	0.65	1.68	0.60	0.86	0.82	0.29	1.51	0.13	0.85
MnO	0.18	0.15	0.28	0.26	0.22	0.28	0.24	0.20	0.29	0.17	0.01	0.19
P2O5	1.07	0.16	0.04	0.09	0.54	0.02	0.26	0.16	0.00	0.68	0.00	0.16
F	0.07	0.26	0.13	0.12	0.02	0.28	0.45	0.08	0.30	0.20	0.52	0.21
Cl	0.02	0.04	0.03	0.08	0.04	0.07	0.06	0.12	0.03	0.04	0.00	0.06
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.04	-0.12	-0.06	-0.07	-0.02	-0.14	-0.20	-0.06	-0.14	-0.09	-0.22	-0.10
Total	97.94	98.51	98.51	98.15	97.90	98.43	98.45	98.36	97.98	98.09	99.16	98.45
Trace elements ppm												
Ba	3817.	1237.	43.	159.	3624.	6.	1823.	395.	14.	3286.	792.	332.
Nb	68.	56.	123.	285.	89.	606.	121.	180.	618.	110.	0.	62.
Zr	338.	388.	856.	1038.	416.	3697.	525.	701.	2554.	474.	132.	398.
Y	43.	43.	83.	74.	57.	327.	57.	63.	192.	49.	2.	52.
Sr	1155.	338.	63.	157.	750.	54.	493.	127.	121.	737.	2118.	181.
Rb	115.	180.	100.	217.	183.	468.	192.	140.	395.	156.	8.	256.
Zn	136.	133.	233.	196.	151.	627.	171.	178.	377.	135.	17.	154.
Cu	2.	4.	1.	0.	1.	0.	0.	9.	0.	7.	4.	6.
Ni	0.	0.	3.	0.	0.	2.	0.	0.	2.	7.	8.	0.
Pb	12.	21.	37.	25.	10.	124.	15.	36.	84.	14.	1.	24.
U	6.	2.	3.	3.	5.	24.	0.	6.	15.	4.	10.	0.
Th	11.	12.	21.	27.	10.	74.	12.	23.	53.	12.	13.	11.
V	109.	29.	25.	27.	77.	21.	39.	33.	5.	95.	8.	35.
Cr	25.	1.	0.	0.	0.	0.	0.	10.	0.	0.	0.	0.
Nd	75.	82.	190.	152.	94.	597.	126.	128.	367.	97.	0.	100.
Ga	30.	35.	54.	40.	28.	65.	36.	41.	62.	30.	19.	35.
La	94.	92.	201.	204.	116.	722.	155.	158.	503.	116.	0.	109.
Ce	209.	171.	361.	343.	233.	1214.	271.	314.	835.	229.	11.	223.
Zr/Nb	4.97	6.93	6.96	3.64	4.67	6.10	4.34	3.89	4.13	4.31	n.a.	6.42

SUMMARY NORM TABLE

	58237.0	58238.1	58238.2	58239.0	58240.0	58241.0	58243.0	58251.0	58252.0	58253.0	58262.0	58264.0
Quartz	0.0	4.61	7.53	0.0	0.0	7.14	0.0	4.83	0.0	0.0	4.38	5.33
Corundum	0.0	0.0	0.0	1.66	0.0	0.0	0.31	2.98	0.0	0.0	3.90	0.0
Orthoclase	23.85	36.53	15.32	38.95	30.49	27.86	40.08	34.82	34.34	30.76	2.74	44.66
Albite	40.47	40.01	58.64	37.57	40.74	43.77	39.05	38.47	37.94	38.70	40.12	30.99
Anorthite	14.39	6.81	1.64	8.32	7.86	0.0	7.40	5.48	5.00	11.04	46.20	4.32
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.30	0.0	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.03	0.07	0.05	0.13	0.07	0.12	0.10	0.20	0.05	0.07	0.0	0.10
Acmite	0.0	0.0	0.0	0.0	0.0	2.32	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	1.74	1.41	6.24	0.0	5.87	8.49	0.0	0.0	0.27	2.42	0.0	3.33
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	4.64	4.54	3.87	7.35	2.90	0.59	2.55	7.40	0.0	4.78	1.03	4.39
Olivine	4.78	0.0	0.0	0.26	2.48	0.0	3.81	0.0	5.52	2.82	0.0	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.23	3.65	5.09	4.02	5.01	7.91	3.48	3.69	4.38	4.47	0.31	4.42
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	3.22	1.47	1.26	1.26	3.28	1.16	1.66	1.59	0.56	2.94	0.25	1.65
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	2.60	0.39	0.10	0.22	1.31	0.05	0.63	0.39	0.0	1.65	0.0	0.39
Fluorite	0.05	0.53	0.27	0.24	0.0	0.59	0.92	0.15	0.63	0.36	1.08	0.43
Diff Index	64.33	81.14	81.49	76.53	71.23	78.78	79.13	78.12	83.58	69.46	47.24	80.98
Na/(Na+K)	0.64	0.54	0.80	0.51	0.59	0.64	0.51	0.54	0.65	0.57	0.94	0.43
(Na+K)/Al	0.70	0.86	0.96	0.76	0.83	1.04	0.84	0.74	0.91	0.77	0.28	0.90
F3/(F2+F3)	0.31	0.37	0.37	0.34	0.34	0.52	0.34	0.34	0.35	0.34	0.31	0.37
Qz residua	n.a.	47.71	50.33	44.48	44.69	49.80	44.48	48.00	38.54	n.a.	n.a.	47.93
Ks residua	n.a.	25.58	10.68	28.92	24.32	20.10	28.78	25.33	23.35	n.a.	n.a.	31.34
Ne residua	n.a.	26.71	38.98	26.60	30.98	30.10	26.73	26.68	38.11	n.a.	n.a.	20.73

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	58265	58276	58290	58291	58292	58293	58294	58295	58296	58297	58298	58332
Major elements, weight %												
	Trachyte	BFD xenxt	Mug-ite	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Benm-ite	BFD xenxt
SiO2	60.07	53.06	49.44	55.09	54.70	55.85	55.83	55.74	55.17	55.59	54.80	53.43
Al2O3	13.49	29.19	23.19	16.68	16.48	17.33	17.77	17.08	17.28	15.41	15.73	28.96
Fe2O3	10.05	0.74	5.05	9.97	10.52	9.34	9.03	9.41	9.61	10.16	10.70	0.94
MgO	0.28	0.35	1.48	0.98	1.02	0.81	0.69	0.98	0.98	1.35	1.29	0.32
CaO	2.11	10.29	8.80	2.84	2.79	2.56	2.52	2.62	2.75	3.14	3.52	9.86
Na2O	4.94	4.45	6.72	4.98	4.91	5.09	5.14	4.89	4.75	4.56	4.41	4.42
K2O	6.10	0.60	0.99	5.32	5.34	5.34	5.43	5.41	5.47	5.28	5.17	0.67
TiO2	0.85	0.14	1.24	1.26	1.35	0.95	0.87	1.08	1.15	1.55	1.45	0.16
MnO	0.26	0.01	0.07	0.25	0.26	0.31	0.30	0.32	0.30	0.25	0.28	0.01
P2O5	0.07	0.00	0.78	0.48	0.47	0.29	0.26	0.36	0.38	0.66	0.54	0.00
F	0.18	0.50	0.36	0.32	0.13	0.33	0.47	0.26	0.13	0.15	0.17	0.42
Cl	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.02	0.02	0.00
LOI	n.d.	n.d.	n.d.	n.d.	1.35	n.d.	n.d.	n.d.	n.d.	n.d.	1.34	n.d.
O=F,Cl	-0.08	-0.21	-0.15	-0.13	-0.06	-0.14	-0.21	-0.11	-0.05	-0.07	-0.08	-0.18
Total	98.33	99.12	97.97	98.04	99.26	98.06	98.14	98.04	97.92	98.05	99.34	99.01
Trace elements ppm												
Ba	10.	678.	2259.	735.	719.	292.	181.	520.	408.	1347.	2706.	1083.
Nb	99.	0.	11.	210.	214.	229.	236.	200.	180.	163.	202.	3.
Zr	628.	128.	200.	860.	872.	855.	587.	691.	433.	572.	744.	138.
Y	73.	2.	14.	87.	86.	87.	64.	85.	70.	71.	77.	2.
Sr	17.	2059.	2254.	297.	298.	216.	199.	211.	261.	244.	697.	2253.
Rb	229.	14.	16.	173.	173.	172.	165.	162.	158.	130.	151.	16.
Zn	213.	17.	41.	193.	205.	210.	176.	194.	167.	159.	178.	19.
Cu	2.	0.	4.	7.	5.	1.	12.	0.	5.	12.	0.	1.
Ni	0.	3.	6.	2.	0.	0.	2.	0.	0.	0.	2.	1.
Pb	34.	3.	4.	29.	28.	23.	16.	21.	9.	17.	16.	3.
U	0.	10.	10.	3.	0.	3.	1.	0.	0.	3.	1.	12.
Th	11.	14.	6.	20.	18.	23.	13.	18.	13.	16.	13.	14.
V	36.	10.	98.	50.	53.	34.	38.	43.	48.	65.	61.	13.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Nd	173.	0.	8.	189.	142.	191.	146.	199.	177.	147.	140.	0.
Ga	40.	20.	19.	36.	35.	40.	39.	37.	36.	34.	34.	20.
La	163.	0.	13.	205.	190.	243.	185.	222.	201.	169.	177.	0.
Ce	296.	0.	58.	358.	350.	391.	338.	391.	343.	307.	299.	6.
Zr/Nb	6.34	n.a.	18.18	4.10	4.07	3.73	2.49	3.45	2.41	3.51	3.68	46.00

SUMMARY NORM TABLE

	58265.0	58276.0	58290.0	58291.0	58292.0	58293.0	58294.0	58295.0	58296.0	58297.0	58298.0	58332.0
Quartz	5.22	3.26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.57	0.0	4.27
Corundum	0.0	3.50	0.0	0.0	0.0	0.0	0.41	0.0	0.0	0.0	0.0	3.88
Orthoclase	36.81	3.57	5.98	32.24	32.43	32.34	32.82	32.78	33.21	32.02	31.37	3.99
Albite	36.18	37.93	35.15	42.61	41.32	43.73	43.61	42.42	41.19	39.48	38.21	37.73
Anorthite	0.0	48.78	30.88	7.64	7.36	8.88	8.60	8.90	9.94	6.20	8.13	47.13
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	12.46	0.33	0.75	0.22	0.36	0.0	0.05	0.0	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.02	0.0	0.0	0.0	0.0	0.0	0.07	0.0	0.0	0.03	0.03	0.0
Acmite	5.68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	8.09	0.0	5.57	1.70	2.67	0.42	0.0	0.61	0.78	3.98	4.58	0.0
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.93	1.32	0.0	0.0	0.0	0.0	0.0	1.82	0.0	7.67	7.46	1.39
Olivine	0.0	0.0	2.61	6.15	5.96	6.43	6.26	5.18	6.50	0.0	0.31	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.88	0.34	2.36	5.08	5.50	4.75	4.60	4.80	4.92	5.18	5.46	0.42
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.65	0.27	2.41	2.45	2.64	1.85	1.69	2.10	2.24	3.02	2.83	0.31
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.17	0.0	1.89	1.17	1.14	0.70	0.63	0.87	0.92	1.60	1.31	0.0
Fluorite	0.37	1.03	0.68	0.63	0.23	0.67	0.96	0.51	0.24	0.25	0.31	0.87
Diff Index	78.21	44.76	53.60	75.18	74.50	76.29	76.79	75.20	74.45	72.07	69.58	46.00
Na/(Na+K)	0.55	0.92	0.91	0.59	0.58	0.59	0.59	0.58	0.57	0.57	0.56	0.91
(Na+K)/Al	1.09	0.27	0.52	0.84	0.84	0.82	0.81	0.81	0.79	0.86	0.82	0.28
F3/(F2+F3)	0.52	0.31	0.32	0.34	0.35	0.34	0.34	0.34	0.34	0.34	0.34	0.31
Qz residua	48.20	n.a.	n.a.	44.49	44.21	44.57	44.48	44.67	44.61	45.08	n.a.	n.a.
Ks residua	26.75	n.a.	n.a.	24.37	24.74	24.09	24.29	24.77	25.35	25.25	n.a.	n.a.
Ne residua	25.06	n.a.	n.a.	31.14	31.05	31.34	31.23	30.56	30.04	29.68	n.a.	n.a.

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	58338	58347A	58347B	58350	58357	58358	58371	58388	59601	59605	59616	59617
Major elements, weight %												
	Benm-ite	Tep/Basn	Tep/Basn	Phon-ite	Benm-ite	Phon-ite	Phon-ite	Basalt	Basalt	Benm-ite	Benm-ite	Benm-ite
SiO_2	59.20	44.85	44.66	57.63	54.40	53.47	54.70	45.08	45.52	54.25	54.52	57.23
Al_2O_3	13.40	13.18	13.26	16.62	17.80	17.67	16.83	16.98	17.54	17.49	16.27	19.33
Fe_2O_3	11.65	16.03	15.34	8.89	9.09	9.56	10.34	12.01	13.49	11.15	10.98	7.72
MgO	0.21	5.12	5.97	0.47	1.10	0.28	0.62	4.27	4.48	0.52	0.82	0.38
CaO	2.32	6.38	7.23	2.00	3.38	2.02	2.56	10.56	7.87	2.77	2.91	2.95
Na_2O	6.01	3.30	2.91	5.62	4.71	8.15	5.83	2.47	3.41	3.30	5.00	5.44
K_2O	4.46	3.81	3.04	5.53	5.33	5.47	5.30	1.97	1.33	7.43	5.59	4.45
TiO_2	0.60	3.56	3.43	0.83	1.20	0.50	1.01	2.80	2.69	0.39	1.10	0.23
MnO	0.27	0.22	0.21	0.22	0.23	0.26	0.27	0.25	0.16	0.43	0.28	0.21
P_2O_5	0.03	1.54	1.93	0.16	0.58	0.11	0.26	1.36	1.32	0.07	0.30	0.00
F	0.33	0.01	0.00	0.15	0.21	0.30	0.14	0.00	0.10	0.01	0.20	0.08
Cl	0.13	0.00	0.01	0.08	0.04	0.27	0.21	0.00	0.02	0.00	0.11	0.02
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.17	-0.00	-0.00	-0.08	-0.10	-0.19	-0.11	-0.00	-0.05	-0.01	-0.11	-0.04
Total	98.44	98.00	97.99	98.12	97.97	97.87	97.96	97.75	97.88	97.80	97.97	98.00
Trace elements ppm												
Ba	0.	3165.	2980.	116.	1259.	197.	333.	1940.	2085.	0.	351.	80.
Nb	601.	39.	38.	201.	146.	337.	259.	27.	20.	754.	255.	379.
Zr	3521.	262.	234.	841.	621.	1521.	1061.	221.	199.	2489.	1060.	1443.
Y	304.	43.	43.	79.	70.	136.	96.	30.	25.	150.	96.	126.
Sr	50.	1455.	1084.	65.	471.	54.	73.	1454.	1527.	282.	317.	108.
Rb	402.	214.	239.	179.	176.	216.	188.	69.	24.	336.	228.	186.
Zn	576.	149.	126.	198.	168.	245.	227.	209.	94.	426.	234.	141.
Cu	1.	9.	12.	6.	3.	2.	5.	6.	17.	0.	0.	0.
Ni	4.	15.	25.	2.	10.	0.	0.	45.	69.	2.	0.	2.
Pb	130.	9.	6.	30.	19.	28.	34.	107.	6.	64.	32.	11.
U	21.	7.	3.	5.	0.	5.	2.	5.	5.	20.	4.	7.
Th	74.	0.	0.	25.	15.	24.	24.	7.	0.	54.	20.	30.
V	21.	301.	302.	31.	68.	19.	38.	262.	301.	12.	46.	5.
Cr	0.	9.	17.	0.	0.	0.	0.	5.	22.	0.	0.	0.
Nd	577.	75.	106.	157.	134.	237.	193.	53.	51.	327.	193.	268.
Ga	68.	22.	21.	37.	34.	43.	42.	23.	19.	54.	41.	64.
La	703.	63.	68.	199.	180.	266.	230.	39.	32.	454.	235.	303.
Ce	1147.	147.	158.	349.	321.	479.	400.	86.	88.	751.	383.	532.
Zr/Nb	5.86	6.72	6.16	4.18	4.25	4.51	4.10	8.19	9.95	3.30	4.16	3.81

SUMMARY NORM TABLE

	58338.0	58347.1	58347.2	58350.0	58357.0	58358.0	58371.0	58388.0	59601.0	59605.0	59616.0	59617.0
Quartz	4.34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.39
Orthoclase	26.88	23.25	18.53	33.48	32.31	33.15	32.16	12.03	8.12	45.22	33.93	26.96
Albite	44.97	21.21	25.35	46.59	39.54	24.77	39.16	21.59	29.70	25.90	37.97	47.09
Anorthite	0.0	10.22	14.62	4.12	12.11	0.0	4.84	30.40	29.63	11.30	5.92	14.58
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	4.13	0.0	0.91	0.61	20.16	5.58	0.0	0.0	1.55	2.63	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.22	0.0	0.02	0.14	0.07	0.46	0.36	0.0	0.03	0.0	0.19	0.03
Acmite	5.43	0.0	0.0	0.0	0.0	6.37	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	8.60	9.95	7.68	3.66	0.19	7.00	5.00	12.05	1.31	2.05	5.08	0.0
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	1.42	0.0	0.63	0.0	0.0	0.0	0.0	0.70	5.85	0.0	0.0	3.43
Olivine	0.0	14.64	16.13	4.28	6.30	3.48	4.64	11.67	13.68	7.19	5.29	2.97
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	6.22	5.87	5.61	4.53	4.74	2.76	5.40	2.74	3.09	5.84	5.73	3.94
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.16	6.98	6.72	1.61	2.34	0.97	1.97	5.49	5.28	0.76	2.15	0.45
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.07	3.77	4.72	0.39	1.41	0.27	0.63	3.33	3.23	0.17	0.73	0.0
Fluorite	0.69	0.0	0.0	0.30	0.39	0.62	0.27	0.0	0.09	0.01	0.39	0.17
Diff Index	76.19	48.58	43.88	80.97	72.46	78.09	76.90	33.62	37.82	72.67	74.53	74.05
Na/(Na+K)	0.67	0.57	0.59	0.61	0.57	0.69	0.63	0.66	0.80	0.40	0.58	0.65
(Na+K)/Al	1.10	0.72	0.61	0.92	0.76	1.09	0.91	0.36	0.40	0.77	0.88	0.71
F3/(F2+F3)	0.52	0.24	0.24	0.34	0.35	0.42	0.35	0.15	0.15	0.35	0.35	0.34
Qz residua	47.98	n.a.	n.a.	44.22	44.26	32.87	41.39	n.a.	n.a.	43.20	43.00	44.86
Ks residua	20.05	n.a.	n.a.	23.49	25.34	24.13	23.76	n.a.	n.a.	35.36	25.87	20.69
Ne residua	31.98	n.a.	n.a.	32.29	30.40	43.00	34.85	n.a.	n.a.	21.44	31.13	34.45

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	59620	59621	59622	59624	59628	59632	59652	59656	59677	59703	59708	59718
Major elements, weight %												
	Benm-ite	Tep/Basn	Basalt	Hawaiite	Benm-ite	Hawaiite	Phon-ite	Phon-ite	Ph-teph	Tep/Basn	Tep/Basn	Trachyte
SiO2	56.38	44.48	46.07	46.08	55.01	48.42	56.25	56.99	53.61	46.18	45.08	59.49
Al2O3	16.68	16.77	18.53	15.28	19.54	19.10	17.19	15.97	15.63	13.17	13.16	12.99
Fe2O3	7.90	14.20	12.17	13.54	9.24	9.61	8.16	9.97	11.96	14.92	15.47	11.74
MgO	1.28	4.03	4.00	4.35	1.59	2.98	0.60	0.32	0.73	4.61	4.89	0.19
CaO	3.41	7.68	7.87	6.92	0.63	7.92	1.77	2.13	2.82	6.14	6.73	2.09
Na2O	5.24	4.31	3.64	3.85	2.43	3.89	7.00	6.63	5.69	3.62	3.28	6.51
K2O	4.98	1.43	1.42	2.42	8.54	2.06	5.89	4.95	5.70	3.96	3.97	4.29
TiO2	1.34	3.13	2.75	3.33	0.75	2.25	0.63	0.58	1.01	2.97	3.04	0.58
MnO	0.26	0.17	0.15	0.18	0.27	0.13	0.26	0.26	0.35	0.22	0.25	0.26
P2O5	0.47	1.55	1.12	1.86	0.14	1.33	0.06	0.05	0.19	2.15	2.08	0.03
F	0.22	0.20	0.11	0.00	0.07	0.22	0.14	0.15	0.08	0.00	0.00	0.19
Cl	0.01	0.03	0.03	0.05	0.04	0.02	0.25	0.09	0.18	0.02	0.03	0.06
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.10	-0.09	-0.05	-0.01	-0.04	-0.10	-0.12	-0.09	-0.08	-0.00	-0.01	-0.09
Total	98.07	97.89	97.81	97.85	98.21	97.83	98.08	98.00	97.87	97.96	97.97	98.33
Trace elements ppm												
Ba	2822.	2172.	1899.	2344.	526.	2199.	6.	4.	150.	3948.	3379.	0.
Nb	104.	25.	20.	45.	419.	33.	265.	232.	284.	50.	53.	837.
Zr	437.	218.	204.	281.	1655.	248.	1010.	902.	1210.	270.	279.	4864.
Y	47.	30.	22.	41.	111.	30.	93.	96.	122.	57.	84.	429.
Sr	631.	1291.	1560.	1047.	204.	1601.	17.	21.	55.	1111.	1076.	58.
Rb	114.	28.	23.	54.	329.	38.	250.	190.	194.	99.	94.	457.
Zn	124.	96.	84.	106.	162.	78.	230.	239.	263.	157.	163.	742.
Cu	0.	11.	10.	16.	0.	15.	4.	6.	0.	9.	7.	0.
Ni	5.	45.	39.	18.	2.	19.	5.	0.	0.	8.	8.	12.
Pb	21.	3.	7.	7.	10.	9.	39.	34.	32.	15.	23.	204.
U	4.	3.	6.	1.	9.	2.	6.	1.	3.	3.	4.	33.
Th	16.	1.	1.	2.	31.	6.	26.	21.	24.	6.	8.	100.
V	48.	322.	297.	309.	32.	206.	21.	19.	38.	233.	247.	14.
Cr	0.	19.	7.	11.	0.	0.	0.	2.	0.	22.	30.	0.
Nd	109.	33.	8.	91.	178.	46.	219.	227.	230.	142.	167.	780.
Ga	32.	20.	22.	19.	38.	21.	43.	42.	45.	23.	22.	72.
La	106.	35.	20.	67.	250.	48.	254.	254.	276.	125.	201.	952.
Ce	205.	94.	81.	150.	426.	98.	452.	428.	479.	221.	353.	1537.
Zr/Nb	4.20	8.72	10.20	6.24	3.95	7.52	3.81	3.89	4.26	5.40	5.26	5.81

SUMMARY NORM TABLE

	59620.0	59621.0	59622.0	59624.0	59628.0	59632.0	59652.0	59656.0	59677.0	59703.0	59708.0	59718.0
Quartz	0.0	0.0	0.0	0.0	2.25	0.0	0.0	0.0	0.0	0.0	0.0	2.84
Corundum	0.0	0.0	0.0	0.0	5.79	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	30.14	8.72	8.66	14.75	51.68	12.53	35.62	29.95	34.66	24.14	24.21	25.91
Albite	45.20	31.88	31.61	33.33	20.83	33.76	35.41	48.27	32.44	26.73	22.13	43.87
Anorthite	7.49	22.99	31.08	17.96	1.92	29.46	0.0	0.0	0.82	8.30	9.85	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.08	3.02	0.0	0.0	0.0	0.0	11.65	4.13	8.72	2.57	3.43	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.02	0.05	0.05	0.09	0.07	0.03	0.42	0.15	0.31	0.03	0.05	0.10
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	2.01	0.92	0.0	0.0	0.0	10.64
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	4.71	4.28	1.11	4.05	0.0	0.96	6.75	5.73	10.32	7.13	8.74	8.28
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.24	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	3.97	0.98	10.71	5.29	0.0	0.0	0.0	0.0	0.0	3.06
Olivine	4.18	13.67	11.39	12.82	0.0	6.94	2.41	0.0	3.89	14.55	14.88	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.02	5.19	3.87	4.95	4.81	3.04	4.07	8.04	6.25	5.46	5.67	3.70
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	2.61	6.13	5.39	6.52	1.46	4.40	1.22	1.13	1.97	5.82	5.96	1.13
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	1.14	3.79	2.74	4.54	0.34	3.24	0.15	0.12	0.46	5.25	5.08	0.07
Fluorite	0.42	0.28	0.13	0.0	0.13	0.34	0.29	0.31	0.15	0.0	0.0	0.40
Diff Index	75.42	43.63	40.27	48.08	74.76	46.29	82.68	82.35	75.82	53.45	49.77	72.62
Na/(Na+K)	0.62	0.82	0.80	0.71	0.30	0.74	0.64	0.67	0.60	0.58	0.56	0.70
(Na+K)/Al	0.84	0.52	0.41	0.59	0.68	0.45	1.04	1.02	0.99	0.78	0.74	1.18
F3/(F2+F3)	0.34	0.24	0.21	0.24	0.35	0.21	0.42	0.57	0.35	0.24	0.24	0.52
Qz residua	44.72	n.a.	n.a.	n.a.	45.63	n.a.	38.23	42.57	39.35	n.a.	n.a.	47.00
Ks residua	22.71	n.a.	n.a.	n.a.	39.28	n.a.	24.48	20.67	25.98	n.a.	n.a.	20.27
Ne residua	32.57	n.a.	n.a.	n.a.	15.09	n.a.	37.29	36.77	34.68	n.a.	n.a.	32.73

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	59719	59720	59731	59743	59771	59779	59782	59806	59866	59880	63704	63712
Major elements, weight %												
	Trachyte	Benm-ite	Benm-ite	Basalt	Benm-ite	Benm-ite	Phon-ite	Tep/Basn	Phon-ite	Phon-ite	Trachyte	Benm-ite
SiO_2	59.94	59.18	55.16	45.31	58.40	56.20	55.09	45.13	57.22	57.62	59.57	58.27
Al_2O_3	13.04	14.31	14.75	14.87	15.34	16.24	18.66	14.58	17.83	17.89	15.42	15.42
Fe_2O_3	11.79	9.75	13.12	14.59	8.91	10.22	7.90	15.27	7.72	7.29	8.52	8.34
MgO	0.15	0.51	0.82	6.60	0.77	0.46	0.38	5.95	0.66	0.48	0.30	1.04
CaO	1.85	2.34	2.89	6.85	2.34	2.41	1.64	6.57	2.27	1.80	2.08	2.36
Na_2O	6.45	4.85	4.30	2.93	3.77	5.65	6.28	3.45	5.93	5.99	6.14	5.81
K_2O	4.20	5.90	5.02	2.02	6.88	5.23	6.85	3.20	5.41	5.91	5.17	5.18
TiO_2	0.57	0.96	1.28	3.52	1.24	0.93	0.54	2.71	0.57	0.69	0.57	1.07
MnO	0.26	0.22	0.29	0.28	0.19	0.25	0.37	0.17	0.22	0.20	0.30	0.29
P_2O_5	0.00	0.12	0.35	0.95	0.33	0.24	0.01	0.85	0.12	0.12	0.01	0.31
F	0.31	0.10	0.00	0.00	0.11	0.17	0.27	0.00	0.16	0.26	0.66	0.25
Cl	0.02	0.02	0.05	0.06	0.04	0.08	0.02	0.01	0.02	0.02	0.03	0.00
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.13	-0.05	-0.01	-0.01	-0.06	-0.09	-0.12	-0.00	-0.07	-0.11	-0.28	-0.11
Total	98.45	98.21	98.02	97.97	98.26	97.99	97.89	97.89	98.06	98.16	98.49	98.23
Trace elements ppm												
Ba	1.	122.	338.	390.	616.	598.	152.	2421.	260.	301.	38.	513.
Nb	790.	72.	197.	27.	40.	186.	817.	0.	193.	182.	637.	170.
Zr	4823.	471.	1239.	272.	308.	821.	1436.	194.	794.	788.	2956.	651.
Y	372.	55.	121.	39.	43.	90.	93.	35.	63.	65.	193.	93.
Sr	60.	35.	118.	305.	176.	94.	2134.	897.	117.	142.	62.	89.
Rb	397.	104.	226.	104.	293.	166.	264.	90.	115.	192.	446.	242.
Zn	640.	186.	286.	208.	146.	193.	285.	119.	191.	175.	388.	258.
Cu	0.	0.	5.	35.	1.	1.	0.	0.	8.	8.	0.	2.
Ni	4.	0.	0.	92.	0.	0.	5.	69.	2.	2.	2.	3.
Pb	145.	30.	45.	6.	22.	25.	63.	10.	33.	33.	110.	34.
U	23.	0.	7.	0.	0.	0.	48.	1.	4.	5.	22.	2.
Th	79.	15.	23.	2.	7.	18.	82.	1.	24.	27.	69.	30.
V	19.	36.	48.	347.	44.	36.	22.	292.	22.	26.	19.	41.
Cr	0.	0.	21.	56.	0.	10.	0.	54.	25.	1.	0.	0.
Nd	704.	132.	223.	71.	84.	159.	255.	11.	133.	152.	465.	262.
Ga	67.	34.	48.	29.	29.	39.	35.	22.	38.	37.	51.	41.
La	858.	111.	248.	37.	98.	194.	385.	16.	185.	200.	618.	276.
Ce	1432.	221.	451.	127.	176.	360.	612.	60.	325.	340.	1007.	463.
Zr/Nb	6.11	6.54	6.29	10.07	7.70	4.41	1.76	n.a.	4.11	4.33	4.64	3.83

SUMMARY NORM TABLE

	59719.0	59720.0	59731.0	59743.0	59771.0	59779.0	59782.0	59806.0	59866.0	59880.0	63704.0	63712.0
Quartz	4.13	4.50	1.92	0.0	3.79	0.0	0.0	0.0	0.0	0.0	1.18	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	25.32	35.65	30.52	12.33	41.60	31.73	41.50	19.54	32.75	35.70	31.06	31.30
Albite	44.58	41.68	37.16	25.27	32.41	44.50	28.96	19.65	43.52	43.51	51.38	49.86
Anorthite	0.0	0.0	6.45	22.35	4.84	3.84	2.62	15.37	6.26	4.63	0.0	0.71
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	0.0	0.0	0.0	2.24	13.76	5.67	4.21	4.43	0.0	0.22
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.03	0.03	0.08	0.10	0.07	0.14	0.03	0.02	0.03	0.03	0.05	0.0
Acmite	9.69	0.15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.13	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	6.81	7.48	5.15	5.22	3.70	5.21	3.65	10.32	3.13	2.00	5.98	6.72
Wollaston.	0.0	0.71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	3.48	0.0	8.65	5.71	5.65	0.0	0.0	0.0	0.0	0.0	0.78	0.0
Olivine	0.0	0.0	0.0	16.45	0.0	4.41	2.92	16.44	4.43	3.01	0.0	3.61
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.20	7.43	6.71	3.34	4.54	5.21	4.92	5.60	3.94	4.52	5.95	4.24
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.10	1.86	2.50	6.91	2.41	1.81	1.05	5.32	1.11	1.34	1.10	2.08
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.0	0.29	0.85	2.32	0.80	0.58	0.02	2.08	0.29	0.29	0.02	0.75
Fluorite	0.65	0.20	0.0	0.0	0.20	0.34	0.57	0.0	0.33	0.53	1.38	0.50
Diff Index	74.03	81.83	69.60	37.60	77.80	78.47	84.22	44.85	80.48	83.64	83.62	81.39
Na/(Na+K)	0.70	0.56	0.57	0.69	0.45	0.62	0.58	0.62	0.62	0.61	0.64	0.63
(Na+K)/Al	1.16	1.00	0.85	0.47	0.89	0.92	0.95	0.63	0.88	0.91	1.02	0.98
F3/(F2+F3)	0.52	0.52	0.34	0.15	0.34	0.34	0.42	0.24	0.34	0.42	0.52	0.34
Qz residua	47.94	47.65	n.a.	n.a.	47.05	43.45	37.03	n.a.	42.35	42.27	45.61	44.68
Ks residua	19.44	24.76	n.a.	n.a.	30.38	22.98	28.00	n.a.	23.12	24.25	21.11	21.86
Ne residua	32.62	27.59	n.a.	n.a.	22.57	33.57	34.97	n.a.	34.52	33.48	33.28	33.46

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	63716	63722	63726	63727	63741	63751	63755	63768	63777	63778	63780	63815
Major elements, weight %												
	Hawaiite	Phon-ite	Tep/Basn	Benm-ite	Phon-ite	Phon-ite	Phon-ite	Benm-ite	Basalt	Basalt	Basalt	Phon-ite
SiO2	48.11	53.64	45.27	52.19	53.44	55.10	53.97	57.47	44.72	46.93	45.81	57.48
Al2O3	16.60	17.66	12.85	15.34	16.96	17.45	17.23	16.55	18.64	17.38	16.39	17.85
Fe2O3	12.36	10.23	15.42	10.84	10.42	8.82	10.35	8.64	7.96	12.10	13.78	6.60
MgO	3.44	0.42	5.16	2.20	0.35	0.66	0.32	1.05	1.71	4.08	5.43	0.65
CaO	6.77	2.16	7.26	4.15	2.15	2.52	2.21	2.77	12.33	7.45	7.81	2.73
Na2O	4.06	7.02	3.28	3.88	7.92	5.94	6.98	4.67	4.09	3.73	3.18	6.14
K2O	2.37	5.54	3.35	5.43	5.40	5.73	5.62	5.07	1.00	1.24	1.33	5.22
TiO2	2.61	0.52	3.36	2.23	0.49	1.00	0.51	1.30	2.62	3.76	2.81	0.85
MnO	0.16	0.27	0.21	0.30	0.28	0.22	0.28	0.19	0.10	0.14	0.17	0.18
P2O5	1.27	0.11	1.85	1.29	0.09	0.31	0.10	0.33	3.86	0.94	1.18	0.29
F	0.17	0.27	0.00	0.13	0.26	0.35	0.14	0.17	0.40	0.16	0.15	0.51
Cl	0.01	0.27	0.04	0.01	0.27	0.15	0.22	0.04	0.02	0.02	0.02	0.21
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.07	-0.18	-0.01	-0.06	-0.17	-0.18	-0.11	-0.08	-0.17	-0.07	-0.07	-0.26
Total	97.86	97.93	98.04	97.93	97.86	98.07	97.82	98.17	97.28	97.86	97.99	98.45
Trace elements ppm												
Ba	2124.	148.	2939.	3215.	175.	413.	181.	1500.	1551.	1460.	1459.	1496.
Nb	47.	345.	45.	92.	352.	245.	347.	101.	23.	14.	18.	177.
Zr	309.	1563.	251.	356.	1603.	995.	1579.	413.	232.	169.	196.	498.
Y	41.	140.	44.	46.	141.	77.	141.	46.	52.	23.	26.	66.
Sr	1011.	83.	1002.	926.	51.	97.	66.	249.	1371.	1097.	1146.	504.
Rb	52.	218.	140.	107.	223.	201.	238.	89.	22.	25.	31.	158.
Zn	103.	250.	132.	147.	251.	185.	251.	147.	69.	86.	97.	126.
Cu	8.	7.	0.	0.	3.	10.	4.	11.	63.	23.	23.	4.
Ni	32.	0.	6.	2.	2.	2.	0.	2.	0.	13.	68.	2.
Pb	7.	32.	2.	9.	30.	32.	33.	17.	9.	2.	6.	16.
U	1.	3.	5.	5.	3.	3.	4.	0.	5.	3.	3.	0.
Th	7.	26.	0.	5.	27.	23.	24.	13.	7.	5.	0.	15.
V	244.	19.	269.	98.	14.	41.	12.	55.	208.	358.	291.	38.
Cr	28.	0.	0.	0.	0.	0.	0.	0.	0.	0.	75.	0.
Nd	60.	236.	85.	112.	237.	154.	232.	88.	106.	21.	46.	151.
Ga	24.	45.	22.	27.	44.	37.	43.	29.	26.	24.	22.	33.
La	69.	280.	81.	115.	281.	188.	266.	108.	81.	1.	32.	154.
Ce	155.	492.	172.	243.	500.	367.	509.	205.	183.	79.	65.	321.
Zr/Nb	6.57	4.53	5.58	3.87	4.55	4.06	4.55	4.09	10.09	12.07	10.89	2.81

SUMMARY NORM TABLE

	63716.0	63722.0	63726.0	63727.0	63741.0	63751.0	63755.0	63768.0	63777.0	63778.0	63780.0	63815.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.86	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	14.44	33.60	20.41	32.99	32.70	34.67	34.07	30.67	6.10	7.56	8.11	31.39
Albite	35.37	31.79	24.53	33.70	26.36	37.42	34.80	40.23	35.61	32.45	27.66	46.18
Anorthite	20.73	1.13	10.89	8.67	0.0	4.57	0.0	9.56	30.56	27.94	27.43	6.45
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	14.97	2.09	0.0	17.45	7.15	13.01	0.0	0.0	0.0	0.0	2.99
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.02	0.46	0.07	0.02	0.46	0.25	0.37	0.07	0.03	0.03	0.03	0.35
Acmite	0.0	0.0	0.0	0.0	7.55	0.0	0.47	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	3.94	6.74	11.35	2.86	7.77	3.75	5.94	1.24	4.40	2.66	3.37	2.35
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	1.21	0.0	0.0	0.0	0.0	0.0
Hypersthen	1.86	0.0	0.0	4.19	0.0	0.0	0.0	7.31	1.92	10.35	9.68	0.0
Olivine	11.25	4.13	13.92	4.83	0.88	4.20	0.0	0.0	3.40	6.32	11.98	3.57
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	3.93	5.34	5.64	5.08	5.12	4.59	8.61	4.39	2.92	2.77	3.14	3.33
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	5.11	1.01	6.58	4.35	0.95	1.94	0.99	2.53	5.14	7.37	5.51	1.64
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	3.10	0.27	4.52	3.14	0.22	0.75	0.24	0.80	9.44	2.30	2.88	0.70
Fluorite	0.24	0.56	0.0	0.15	0.54	0.71	0.29	0.33	0.48	0.25	0.21	1.04
Diff Index	49.82	80.36	47.04	66.69	76.52	79.24	81.87	73.77	41.71	40.02	35.77	80.56
Na/(Na+K)	0.72	0.66	0.60	0.52	0.69	0.61	0.65	0.58	0.86	0.82	0.78	0.64
(Na+K)/Al	0.56	0.99	0.70	0.80	1.11	0.92	1.02	0.80	0.42	0.43	0.41	0.88
F3/(F2+F3)	0.21	0.35	0.24	0.31	0.57	0.35	0.57	0.34	0.24	0.15	0.15	0.34
Qz residua	n.a.	36.18	n.a.	n.a.	34.24	40.53	37.44	46.83	n.a.	n.a.	n.a.	43.09
Ks residua	n.a.	23.76	n.a.	n.a.	24.28	24.86	23.64	23.63	n.a.	n.a.	n.a.	22.14
Ne residua	n.a.	40.07	n.a.	n.a.	41.48	34.60	38.91	29.54	n.a.	n.a.	n.a.	34.76

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	63819	63836	63845B	63881	63882	63884	63890	63891	63895	126752	126753	126754
Major elements, weight %												
	Benm-ite	Trachyte	Basalt	Rhyolite	Trachyte	Basalt	Basalt	Mug-ite	Rhyolite	Benm-ite	Phon-nep	Phon-ite
SiO2	59.50	61.50	46.51	75.08	59.92	44.90	45.28	55.02	74.02	57.62	49.70	52.54
Al2O3	21.63	12.26	15.98	12.29	15.44	14.98	15.32	16.93	12.52	16.56	16.02	17.22
Fe2O3	1.85	11.81	13.76	4.50	8.03	15.03	13.61	13.10	4.26	8.53	11.12	8.75
MgO	0.40	0.15	4.13	0.16	1.10	5.93	5.70	1.21	0.10	1.07	0.94	0.69
CaO	3.76	1.55	9.63	0.10	1.60	7.43	7.91	1.62	0.30	2.37	3.78	1.79
Na2O	5.62	6.42	3.73	3.21	3.50	3.02	3.55	4.01	4.24	4.86	7.82	8.56
K2O	5.07	3.92	0.89	4.72	7.26	1.46	1.87	4.50	4.42	5.34	5.96	6.72
TiO2	0.53	0.57	2.44	0.34	1.10	3.47	3.00	1.11	0.33	1.20	1.27	0.71
MnO	0.03	0.27	0.20	0.04	0.19	0.18	0.16	0.28	0.07	0.21	0.44	0.38
P2O5	0.27	0.00	0.53	0.00	0.25	1.60	1.44	0.29	0.00	0.31	0.19	0.03
F	0.50	0.45	0.19	0.23	0.17	0.00	0.11	0.05	0.50	0.29	0.37	0.53
Cl	0.00	0.02	0.02	0.01	0.05	0.02	0.03	0.03	0.00	0.04	0.01	0.33
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.21	-0.19	-0.09	-0.10	-0.09	-0.00	-0.05	-0.03	-0.21	-0.13	-0.16	-0.30
Total	98.95	98.73	97.92	100.58	98.52	98.02	97.93	98.12	100.55	98.27	97.46	97.95
Trace elements ppm												
Ba	8930.	10.	517.	96.	654.	1884.	2108.	353.	82.	1699.	6209.	258.
Nb	3.	971.	31.	175.	48.	27.	26.	214.	178.	158.	569.	690.
Zr	106.	5910.	273.	1484.	333.	226.	229.	849.	1536.	641.	1371.	1329.
Y	5.	485.	37.	116.	44.	32.	31.	106.	113.	60.	94.	95.
Sr	1542.	101.	822.	28.	291.	1177.	1553.	207.	15.	222.	7202.	2998.
Rb	27.	479.	39.	274.	132.	40.	46.	111.	336.	129.	79.	235.
Zn	27.	829.	105.	86.	143.	102.	109.	235.	224.	151.	310.	293.
Cu	9.	0.	11.	12.	5.	20.	10.	0.	12.	2.	0.	0.
Ni	4.	5.	100.	3.	7.	60.	41.	4.	7.	3.	2.	5.
Pb	1.	204.	10.	54.	22.	7.	5.	45.	39.	25.	28.	51.
U	8.	38.	2.	14.	0.	4.	4.	4.	15.	2.	47.	42.
Th	12.	129.	6.	53.	9.	1.	2.	30.	47.	22.	32.	60.
V	30.	16.	263.	14.	49.	345.	287.	35.	14.	48.	61.	24.
Cr	0.	0.	65.	0.	0.	46.	14.	0.	0.	0.	0.	0.
Nd	0.	951.	46.	180.	58.	35.	61.	269.	217.	112.	305.	270.
Ga	19.	72.	23.	40.	30.	20.	19.	47.	40.	33.	30.	35.
La	0.	1247.	23.	203.	80.	47.	35.	326.	285.	141.	414.	445.
Ce	0.	1953.	95.	401.	178.	124.	92.	521.	493.	264.	663.	680.
Zr/Nb	35.33	6.09	8.81	8.48	6.94	8.37	8.81	3.97	8.63	4.06	2.41	1.93

SUMMARY NORM TABLE

	63819.0	63836.0	63845.2	63881.0	63882.0	63884.0	63890.0	63891.0	63895.0	126752.0	126753.0	126754.0
Quartz	0.38	7.70	0.0	36.91	6.15	0.0	0.0	6.18	31.11	1.66	0.0	0.0
Corundum	1.66	0.0	0.0	1.91	0.0	0.0	0.0	3.41	0.76	0.0	0.0	0.0
Orthoclase	30.25	23.55	5.43	27.81	43.73	8.90	11.40	27.33	26.03	32.25	36.26	40.55
Albite	48.02	41.93	29.21	27.03	29.91	26.24	29.38	34.71	35.76	41.81	1.67	6.73
Anorthite	14.47	0.0	25.08	0.0	5.22	23.79	21.07	6.11	0.0	7.89	0.0	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	1.77	0.0	0.0	0.0	0.78	0.0	0.0	0.0	26.55	24.65
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.0	0.03	0.03	0.02	0.08	0.03	0.05	0.05	0.0	0.07	0.02	0.56
Acmite	0.0	11.62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.32	16.60
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.24
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	0.0	4.80	16.53	0.0	0.30	2.82	7.72	0.0	0.0	0.49	13.72	5.17
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	1.53	5.11	0.0	2.85	7.11	15.30	0.0	12.56	2.61	7.83	0.0	0.0
Olivine	0.0	0.0	12.37	0.0	0.0	6.72	15.13	0.0	0.0	0.0	1.18	2.94
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	1.01	3.21	3.14	2.62	4.42	5.50	4.98	6.69	2.49	4.34	1.58	0.0
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.02	1.10	4.79	0.64	2.13	6.80	5.88	2.17	0.62	2.33	2.48	1.38
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.65	0.0	1.30	0.0	0.60	3.91	3.52	0.71	0.0	0.75	0.46	0.07
Fluorite	1.01	0.94	0.35	0.47	0.33	0.0	0.10	0.08	1.02	0.58	0.76	1.11
Diff Index	78.65	73.18	36.41	91.75	79.80	35.14	41.55	68.22	92.90	75.72	64.48	71.94
Na/(Na+K)	0.63	0.71	0.86	0.51	0.42	0.76	0.74	0.58	0.59	0.58	0.67	0.66
(Na+K)/Al	0.68	1.21	0.44	0.85	0.88	0.44	0.51	0.68	0.94	0.83	1.21	1.24
F3/(F2+F3)	0.37	0.52	0.15	0.40	0.37	0.24	0.24	0.34	0.40	0.34	0.56	0.64
Qz residua	45.07	50.67	n.a.	66.82	48.55	n.a.	n.a.	n.a.	63.22	45.88	n.a.	28.63
Ks residua	21.86	18.29	n.a.	17.22	31.14	n.a.	n.a.	n.a.	15.92	24.20	n.a.	32.03
Ne residua	33.07	31.04	n.a.	15.96	20.30	n.a.	n.a.	n.a.	20.85	29.91	n.a.	39.34

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	126756	126758	126759	126759	126760	126761	126763	126764	126765	126766	126766	126767
Major elements, weight %												
	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Phon-ite	Benm-ite	Benm-ite	Phon-ite	Mug-ite	Mug-ite	Benm-ite
SiO2	55.53	54.90	56.36	54.28	57.18	56.84	59.00	53.33	54.88	49.00	52.12	54.31
Al2O3	16.40	16.20	16.97	17.70	17.61	20.13	16.07	16.26	19.86	13.72	14.90	16.85
Fe2O3	9.68	11.53	10.58	9.56	8.13	7.52	8.79	10.28	6.44	12.41	10.95	10.82
MgO	1.40	0.78	0.49	1.27	0.78	0.42	0.71	1.89	0.51	4.34	2.89	0.98
CaO	2.68	2.57	2.56	3.08	2.43	1.19	2.17	3.50	1.61	6.15	4.79	2.79
Na2O	4.81	4.47	5.57	4.50	4.73	3.51	5.35	4.73	7.22	3.38	4.00	3.93
K2O	5.50	5.87	4.43	5.81	5.90	7.82	4.92	5.31	6.45	4.10	4.83	6.45
TiO2	1.32	0.99	0.48	0.93	0.80	0.28	0.68	1.51	0.51	2.74	2.24	1.09
MnO	0.26	0.34	0.38	0.29	0.27	0.32	0.32	0.26	0.22	0.21	0.23	0.33
P2O5	0.34	0.19	0.05	0.39	0.15	0.05	0.12	0.76	0.05	1.87	0.92	0.24
F	0.14	0.18	0.20	0.44	0.30	0.10	0.19	0.13	0.35	0.12	0.13	0.35
Cl	0.01	0.01	0.00	0.01	0.02	0.00	0.04	0.03	0.30	0.03	0.01	0.02
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.86	n.d.	n.d.
O=F,Cl	-0.06	-0.08	-0.08	-0.19	-0.13	-0.04	-0.09	-0.06	-0.21	-0.06	-0.06	-0.15
Total	98.01	97.95	97.99	98.07	98.17	98.14	98.27	97.93	98.19	98.87	97.95	98.01
Trace elements ppm												
Ba	2034.	385.	514.	741.	322.	177.	64.	2234.	70.	2951.	3098.	233.
Nb	155.	282.	952.	624.	225.	879.	272.	207.	419.	55.	90.	282.
Zr	659.	1217.	3998.	2616.	926.	1987.	1030.	765.	1723.	284.	373.	1159.
Y	68.	122.	240.	172.	90.	84.	96.	67.	108.	49.	50.	106.
Sr	493.	240.	195.	389.	324.	248.	77.	490.	43.	1004.	857.	95.
Rb	183.	206.	244.	315.	174.	303.	121.	165.	290.	86.	108.	175.
Zn	192.	264.	435.	324.	223.	255.	180.	185.	213.	171.	172.	236.
Cu	1.	2.	0.	0.	5.	1.	3.	0.	2.	12.	4.	0.
Ni	0.	0.	0.	3.	0.	3.	0.	0.	2.	0.	0.	0.
Pb	24.	31.	80.	53.	31.	58.	36.	24.	38.	13.	25.	33.
U	4.	4.	19.	13.	4.	27.	2.	6.	7.	6.	3.	4.
Th	21.	21.	78.	49.	25.	56.	27.	20.	38.	5.	14.	26.
V	53.	39.	24.	58.	29.	10.	24.	97.	17.	197.	122.	39.
Cr	0.	0.	0.	0.	0.	22.	0.	0.	0.	7.	0.	0.
Nd	165.	245.	425.	314.	188.	206.	214.	157.	172.	152.	127.	213.
Ga	36.	43.	59.	53.	39.	42.	42.	35.	49.	25.	26.	40.
La	164.	274.	603.	427.	226.	312.	253.	168.	246.	126.	149.	233.
Ce	305.	493.	975.	722.	404.	563.	453.	318.	440.	255.	254.	417.
Zr/Nb	4.25	4.32	4.20	4.19	4.12	2.26	3.79	3.70	4.11	5.16	4.14	4.11

SUMMARY NORM TABLE

	126756.0	126758.0	126759.0	126759.0	126760.0	126761.0	126763.0	126764.0	126765.0	126766.0	126766.0	126767.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.96	2.09	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.17	0.0	4.13	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	33.36	35.66	26.88	35.16	35.66	47.31	29.73	32.24	38.88	24.92	29.35	39.11
Albite	41.69	38.56	48.40	36.56	40.82	30.40	46.07	36.81	29.17	29.25	34.75	34.01
Anorthite	7.13	7.02	8.44	10.77	9.67	5.18	5.54	7.75	3.68	10.54	8.70	9.59
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.02	0.14	0.0	1.29	0.0	0.0	0.0	2.25	17.05	0.0	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.02	0.02	0.0	0.02	0.03	0.0	0.07	0.05	0.50	0.05	0.02	0.03
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	3.01	3.36	2.80	0.0	0.08	0.0	3.17	3.73	1.95	6.59	7.47	1.01
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.70	0.0	4.85	7.23	6.86	0.0	0.0	7.68	1.18	0.16
Olivine	6.18	6.46	5.90	7.41	2.21	0.0	0.0	6.81	2.93	5.18	6.61	7.02
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.94	6.02	5.40	4.97	4.14	3.92	4.46	5.36	3.99	5.82	5.13	5.64
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	2.57	1.93	0.94	1.81	1.55	0.54	1.32	2.95	0.99	5.35	4.37	2.12
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.83	0.46	0.12	0.95	0.36	0.12	0.29	1.85	0.12	4.56	2.24	0.58
Fluorite	0.26	0.36	0.42	0.89	0.62	0.21	0.39	0.20	0.73	0.08	0.19	0.72
Diff Index	75.06	74.36	75.28	73.01	76.49	78.67	77.90	71.30	85.10	54.17	64.09	73.12
Na/(Na+K)	0.57	0.54	0.66	0.54	0.55	0.41	0.62	0.58	0.63	0.56	0.56	0.48
(Na+K)/Al	0.85	0.85	0.82	0.77	0.80	0.71	0.88	0.83	0.95	0.73	0.79	0.80
F3/(F2+F3)	0.34	0.35	0.34	0.35	0.34	0.35	0.34	0.35	0.42	0.31	0.31	0.35
Qz residua	44.64	44.47	44.88	43.74	44.59	44.90	46.27	43.18	35.44	n.a.	n.a.	44.41
Ks residua	25.25	27.25	20.29	27.37	26.49	34.17	21.69	25.70	25.96	n.a.	n.a.	30.39
Ne residua	30.11	28.28	34.83	28.89	28.91	20.94	32.04	31.12	38.60	n.a.	n.a.	25.20

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	126768	126769	126770	126771	126773	126775	126806	126807	127010	127012	127013	127031
Major elements, weight %												
	Ph-teph	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Mug-ite	Benm-ite	Benm-ite	Trachyte	Benm-ite	Benm-ite	Phon-ite
SiO2	52.40	54.95	54.16	57.91	54.80	53.69	57.27	56.26	59.89	58.18	57.90	56.81
Al2O3	15.41	16.07	16.58	17.54	16.98	14.83	13.78	14.28	13.50	17.23	17.10	15.83
Fe2O3	12.15	11.20	9.99	6.81	9.49	11.49	12.73	12.84	10.28	8.40	9.29	10.26
MgO	1.65	0.89	1.20	1.28	1.20	1.67	0.51	0.65	0.33	0.69	0.27	0.30
CaO	3.34	2.55	3.37	2.43	3.29	4.24	2.75	2.83	1.75	1.64	1.70	2.13
Na2O	4.81	5.16	4.96	4.57	5.04	3.85	5.25	4.69	4.32	4.76	6.06	6.54
K2O	5.55	5.49	5.14	5.95	5.35	5.12	4.34	4.78	6.97	5.99	4.90	5.16
TiO2	1.55	1.02	1.49	1.17	1.01	1.85	1.01	1.17	0.87	0.79	0.45	0.50
MnO	0.32	0.30	0.22	0.17	0.29	0.18	0.30	0.28	0.28	0.24	0.25	0.27
P2O5	0.60	0.19	0.71	0.35	0.35	1.02	0.13	0.25	0.08	0.18	0.04	0.03
F	0.05	0.18	0.00	0.16	0.11	0.18	0.01	0.00	0.10	0.01	0.04	0.18
Cl	0.00	0.11	0.02	0.01	0.02	0.04	0.07	0.06	0.07	0.08	0.02	0.19
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.02	-0.10	-0.01	-0.07	-0.05	-0.08	-0.02	-0.01	-0.06	-0.02	-0.02	-0.12
Total	97.81	98.01	97.83	98.28	97.88	98.08	98.13	98.08	98.38	98.17	98.00	98.08
Trace elements ppm												
Ba	847.	186.	1385.	2059.	782.	2637.	125.	264.	45.	730.	7.	1.
Nb	200.	297.	143.	100.	185.	53.	294.	221.	97.	119.	264.	278.
Zr	818.	1207.	611.	397.	764.	385.	1925.	1391.	627.	448.	1037.	1094.
Y	87.	104.	65.	43.	84.	57.	160.	128.	75.	53.	102.	108.
Sr	207.	64.	312.	455.	398.	304.	78.	87.	40.	135.	75.	13.
Rb	167.	225.	127.	115.	170.	96.	225.	278.	179.	172.	185.	208.
Zn	214.	246.	165.	124.	218.	153.	345.	295.	208.	157.	250.	266.
Cu	2.	3.	5.	6.	4.	2.	2.	6.	4.	4.	7.	7.
Ni	0.	2.	0.	0.	2.	0.	0.	0.	0.	0.	2.	0.
Pb	19.	33.	20.	22.	43.	21.	64.	47.	34.	20.	38.	43.
U	2.	4.	0.	1.	5.	0.	9.	3.	3.	0.	5.	2.
Th	19.	26.	18.	16.	19.	4.	33.	24.	10.	15.	25.	26.
V	58.	38.	70.	53.	46.	78.	40.	48.	29.	26.	16.	21.
Cr	0.	0.	0.	0.	6.	0.	0.	2.	0.	0.	0.	0.
Nd	167.	205.	135.	97.	174.	126.	322.	243.	152.	119.	236.	259.
Ga	37.	41.	32.	30.	39.	33.	48.	46.	39.	39.	43.	45.
La	192.	248.	152.	104.	202.	112.	372.	290.	159.	120.	282.	286.
Ce	338.	437.	300.	203.	383.	227.	615.	488.	294.	220.	478.	517.
Zr/Nb	4.09	4.06	4.27	3.97	4.13	7.26	6.55	6.29	6.46	3.76	3.93	3.94

SUMMARY NORM TABLE

	126768.0	126769.0	126770.0	126771.0	126773.0	126775.0	126806.0	126807.0	127010.0	127012.0	127013.0	127031.0
Quartz	0.0	0.0	0.0	1.06	0.0	1.73	2.48	2.42	5.66	1.18	0.0	0.0
Corundum	0.0	0.0	0.0	0.30	0.0	0.0	0.0	0.0	0.0	0.47	0.0	0.0
Orthoclase	33.80	33.32	31.24	35.91	32.49	31.06	26.35	29.05	42.05	36.25	29.73	31.19
Albite	32.34	39.76	40.22	39.44	38.11	33.22	45.25	40.47	31.28	40.80	50.31	46.11
Anorthite	4.19	4.92	8.08	9.21	8.19	8.40	1.46	4.08	0.0	7.12	5.18	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	5.20	2.41	1.54	0.0	3.03	0.0	0.0	0.0	0.0	0.0	1.20	4.22
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.0	0.19	0.03	0.02	0.03	0.07	0.12	0.10	0.12	0.14	0.03	0.32
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.98	0.0	0.0	1.44
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	7.36	5.05	3.68	0.0	4.86	4.73	10.20	7.55	6.79	0.0	2.64	6.32
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.96
Hypersthen	0.0	0.0	0.0	7.19	0.0	8.56	5.34	6.88	1.64	7.79	0.0	0.0
Olivine	6.20	5.68	5.35	0.0	5.31	0.0	0.0	0.0	0.0	0.0	5.10	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	6.36	5.85	5.22	3.47	4.96	5.86	6.51	6.56	5.41	4.28	4.75	8.01
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	3.03	1.99	2.91	2.27	1.97	3.61	1.97	2.28	1.69	1.54	0.88	0.97
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	1.46	0.46	1.73	0.85	0.85	2.48	0.32	0.61	0.19	0.44	0.10	0.07
Fluorite	0.05	0.36	0.0	0.30	0.20	0.28	0.01	0.0	0.20	0.0	0.08	0.38
Diff Index	71.34	75.49	73.00	76.41	73.63	66.01	74.08	71.93	78.99	78.24	81.24	81.53
Na/(Na+K)	0.57	0.59	0.59	0.54	0.59	0.53	0.65	0.60	0.49	0.55	0.65	0.66
(Na+K)/Al	0.90	0.90	0.83	0.80	0.83	0.80	0.97	0.90	1.09	0.83	0.89	1.03
F3/(F2+F3)	0.35	0.35	0.35	0.34	0.35	0.34	0.34	0.34	0.52	0.34	0.34	0.57
Qz residua	41.23	43.19	43.73	45.33	42.77	n.a.	46.70	46.58	48.30	45.42	44.18	42.44
Ks residua	26.92	25.08	24.32	26.71	25.07	n.a.	20.21	22.94	30.25	26.33	20.79	21.74
Ne residua	31.85	31.73	31.95	27.96	32.16	n.a.	33.09	30.48	21.45	28.25	35.03	35.82

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	127035	127037	127039	127040	127041	127042	127043	127044	127045	127047	127048	127054
Major elements, weight %												
	Mug-ite	Phon-ite	Benm-ite	Benm-ite	Basalt	Phon-ite	Benm-ite	Trachyte	Benm-ite	Phon-ite	Benm-ite	Trachyte
SiO2	56.28	54.53	58.11	57.51	41.73	57.31	57.22	61.72	60.24	58.70	60.00	61.30
Al2O3	17.15	15.03	15.29	16.12	13.91	16.88	15.78	13.99	14.57	14.39	14.32	14.18
Fe2O3	8.34	14.34	9.61	8.88	20.41	8.91	10.02	8.85	9.35	9.25	9.36	8.86
MgO	1.50	0.22	0.63	0.91	6.47	0.41	0.52	0.64	0.71	0.70	0.66	0.41
CaO	3.67	1.85	2.22	2.40	6.40	1.88	2.26	1.66	2.04	2.34	2.28	2.09
Na2O	4.70	6.58	5.65	4.79	3.02	6.25	5.30	3.57	4.60	2.56	4.81	5.90
K2O	4.41	4.63	5.24	5.73	0.00	5.37	5.52	6.83	5.30	9.01	5.51	4.47
TiO2	1.32	0.21	0.86	1.20	4.11	0.59	0.89	0.95	1.05	0.96	0.93	0.84
MnO	0.20	0.49	0.29	0.21	0.36	0.24	0.26	0.20	0.20	0.23	0.22	0.20
P2O5	0.41	0.02	0.13	0.29	2.19	0.05	0.17	0.09	0.27	0.09	0.17	0.08
F	0.08	0.08	0.06	0.05	0.00	0.13	0.08	0.12	0.04	0.10	0.04	0.09
Cl	0.03	0.00	0.05	0.03	0.02	0.13	0.02	0.01	0.06	0.06	0.16	0.02
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.04	-0.04	-0.04	-0.03	-0.00	-0.08	-0.04	-0.05	-0.03	-0.06	-0.05	-0.04
Total	98.05	97.92	98.10	98.09	98.62	98.07	98.00	98.58	98.40	98.33	98.41	98.40
Trace elements ppm												
Ba	2356.	0.	126.	957.	237.	18.	90.	402.	355.	156.	97.	58.
Nb	109.	1487.	215.	90.	54.	246.	165.	91.	72.	89.	81.	92.
Zr	455.	7107.	851.	345.	288.	964.	671.	615.	479.	596.	521.	600.
Y	47.	701.	86.	45.	73.	92.	79.	72.	58.	71.	63.	68.
Sr	632.	310.	97.	184.	428.	78.	62.	132.	116.	61.	93.	46.
Rb	100.	834.	196.	128.	25.	205.	163.	188.	115.	254.	182.	128.
Zn	152.	1864.	228.	155.	187.	232.	200.	183.	164.	187.	185.	194.
Cu	6.	0.	0.	6.	0.	7.	2.	2.	5.	8.	6.	1.
Ni	0.	13.	3.	0.	25.	0.	5.	5.	0.	5.	0.	0.
Pb	23.	410.	30.	17.	12.	36.	24.	34.	27.	39.	31.	33.
U	4.	68.	7.	1.	0.	2.	0.	0.	0.	4.	1.	4.
Th	19.	257.	23.	12.	10.	26.	16.	17.	17.	12.	13.	21.
V	58.	0.	36.	48.	331.	24.	33.	56.	43.	51.	36.	33.
Cr	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.	0.
Nd	100.	1615.	173.	120.	165.	204.	153.	138.	111.	147.	127.	147.
Ga	31.	132.	38.	30.	50.	42.	36.	35.	36.	36.	43.	38.
La	132.	2257.	223.	111.	122.	246.	175.	174.	127.	140.	125.	156.
Ce	241.	3458.	396.	226.	289.	426.	326.	274.	234.	272.	231.	272.
Zr/Nb	4.17	4.78	3.96	3.83	5.33	3.92	4.07	6.76	6.65	6.70	6.43	6.52

SUMMARY NORM TABLE

	127035.0	127037.0	127039.0	127040.0	127041.0	127042.0	127043.0	127044.0	127045.0	127047.0	127048.0	127054.0
Quartz	1.72	0.0	0.0	0.63	0.13	0.0	0.0	9.73	7.48	3.48	5.55	6.63
Corundum	0.0	0.0	0.0	0.0	2.64	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	26.72	28.11	31.76	34.72	0.0	32.52	33.50	41.15	32.01	54.44	33.27	26.95
Albite	40.60	42.84	48.75	41.38	26.18	44.84	45.65	30.74	39.45	21.81	40.69	49.03
Anorthite	13.08	0.0	1.06	5.79	17.95	2.59	3.10	2.05	3.71	1.37	1.71	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	5.47	0.0	0.0	0.0	4.67	0.16	0.0	0.0	0.0	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.05	0.0	0.08	0.05	0.03	0.22	0.03	0.02	0.10	0.10	0.27	0.03
Acmite	0.0	3.60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.58
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	2.09	7.78	7.86	3.64	0.0	5.19	5.98	4.41	4.02	8.06	7.35	7.35
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.41
Hypersthen	7.79	0.0	0.18	6.13	32.25	0.0	0.0	4.72	5.32	3.34	3.71	0.0
Olivine	0.0	1.12	3.31	0.0	0.0	3.78	4.15	0.0	0.0	0.0	0.0	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.25	10.47	4.91	4.53	7.44	4.64	5.12	4.88	5.16	5.11	5.17	6.01
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	2.57	0.41	1.67	2.34	8.03	1.15	1.74	1.84	2.04	1.86	1.80	1.63
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	1.00	0.05	0.32	0.70	5.34	0.12	0.41	0.22	0.65	0.22	0.41	0.19
Fluorite	0.13	0.17	0.11	0.08	0.0	0.27	0.15	0.24	0.06	0.20	0.07	0.18
Diff Index	69.04	76.42	80.50	76.73	26.31	82.04	79.31	81.63	78.94	79.73	79.51	82.61
Na/(Na+K)	0.62	0.68	0.62	0.56	1.00	0.64	0.59	0.44	0.57	0.30	0.57	0.67
(Na+K)/Al	0.73	1.05	0.98	0.87	0.36	0.95	0.93	0.95	0.91	0.97	0.97	1.03
F3/(F2+F3)	0.34	0.57	0.34	0.34	0.24	0.35	0.34	0.37	0.37	0.37	0.37	0.52
Qz residua	n.a.	41.57	44.78	45.07	n.a.	42.17	44.62	50.95	49.89	46.38	48.50	49.31
Ks residua	n.a.	20.90	22.42	25.71	n.a.	22.53	24.00	28.65	23.04	38.80	23.78	18.54
Ne residua	n.a.	37.53	32.80	29.22	n.a.	35.31	31.38	20.40	27.07	14.82	27.72	32.15

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	127055	127056	127057	127058	127059	127064	127065	127066	127067	127068	127069	127072
Major elements, weight %												
	Tep/Basn	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Ph-teph	Tep/Basn	Tep/Basn	Trachyte	Tracyand	Benm-ite	Benm-ite
SiO2	43.02	55.96	54.56	55.96	54.96	52.36	43.10	42.57	61.06	61.04	54.72	56.36
Al2O3	12.62	14.22	15.45	14.03	16.18	17.85	12.34	12.33	14.34	14.30	14.54	14.00
Fe2O3	16.98	13.20	11.91	13.09	10.64	11.14	16.70	17.34	8.74	10.50	13.26	12.99
MgO	5.95	0.63	0.67	0.56	0.67	0.24	6.34	6.19	0.40	0.24	0.88	0.59
CaO	7.06	2.68	3.44	2.82	3.01	3.31	6.14	7.07	1.70	1.65	3.38	2.90
Na2O	2.99	4.56	4.52	4.74	5.26	10.83	2.69	2.73	5.31	9.07	4.10	4.79
K2O	3.12	5.15	5.28	5.20	5.20	0.05	4.24	3.51	5.74	0.00	5.25	4.89
TiO2	3.85	1.15	1.27	1.12	1.15	0.19	3.96	3.85	0.80	0.17	1.21	1.06
MnO	0.19	0.29	0.25	0.31	0.26	1.18	0.18	0.18	0.17	1.13	0.31	0.30
P2O5	2.32	0.18	0.48	0.16	0.46	0.07	2.37	2.36	0.06	0.03	0.31	0.14
F	0.00	0.06	0.12	0.06	0.21	0.44	0.00	0.00	0.16	0.31	0.00	0.00
Cl	0.07	0.09	0.06	0.06	0.07	0.07	0.03	0.04	0.02	0.02	0.04	0.06
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	6.57	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.02	-0.05	-0.07	-0.04	-0.10	-0.20	-0.01	-0.01	-0.07	-0.13	-0.01	-0.01
Total	98.15	98.12	97.94	98.07	97.97	104.10	98.08	98.16	98.43	98.33	97.99	98.07
Trace elements ppm												
Ba	0.	159.	496.	148.	474.	43.	4716.	3477.	60.	0.	312.	137.
Nb	44.	247.	154.	266.	173.	8704.	52.	45.	91.	1615.	211.	277.
Zr	296.	1595.	991.	1718.	721.	125.	305.	283.	658.	145.	1314.	1815.
Y	50.	130.	106.	150.	70.	575.	51.	49.	70.	469.	128.	151.
Sr	1035.	126.	236.	79.	96.	1870.	1232.	924.	30.	732.	112.	72.
Rb	100.	264.	207.	278.	165.	443.	261.	153.	149.	14.	223.	229.
Zn	129.	307.	254.	333.	230.	4409.	123.	127.	189.	6302.	324.	339.
Cu	36.	4.	6.	3.	9.	-1.	40.	37.	0.	0.	2.	4.
Ni	15.	0.	0.	0.	0.	15.	19.	19.	2.	13.	0.	0.
Pb	6.	49.	33.	56.	23.	-1.	5.	6.	34.	217.	46.	59.
U	2.	7.	4.	7.	3.	149.	4.	1.	0.	205.	7.	6.
Th	0.	24.	15.	29.	11.	2591.	1.	0.	19.	1446.	22.	28.
V	269.	41.	51.	48.	48.	0.	294.	278.	31.	0.	46.	38.
Cr	0.	0.	0.	0.	0.	2.	41.	0.	0.	0.	3.	0.
Nd	106.	264.	212.	291.	155.	2888.	101.	114.	127.	4318.	252.	311.
Ga	26.	46.	44.	49.	38.	30.	26.	21.	41.	213.	50.	46.
La	85.	270.	217.	338.	156.	4611.	78.	66.	156.	7350.	295.	344.
Ce	189.	546.	399.	572.	310.	9522.	199.	188.	286.	11218.	490.	609.
Zr/Nb	6.73	6.46	6.44	6.46	4.17	0.01	5.87	6.29	7.23	0.09	6.23	6.55

SUMMARY NORM TABLE

	127055.0	127056.0	127057.0	127058.0	127059.0	127064.0	127065.0	127066.0	127067.0	127068.0	127069.0	127072.0
Quartz	0.0	1.68	0.0	0.56	0.0	0.0	0.0	0.0	5.58	4.49	0.99	1.53
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	19.01	31.28	32.09	31.60	31.56	0.30	25.84	21.39	34.59	0.0	31.94	29.72
Albite	23.67	39.15	39.00	40.90	42.00	58.08	19.27	20.13	42.62	75.09	35.49	41.35
Anorthite	12.37	3.48	6.63	1.87	5.53	0.15	9.45	11.49	0.0	0.0	6.05	2.50
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	1.09	0.0	0.0	0.0	1.79	19.36	2.19	1.88	0.0	0.0	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.12	0.15	0.10	0.10	0.12	0.12	0.05	0.07	0.03	0.03	0.07	0.10
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.71	2.77	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	6.66	7.58	6.21	9.74	4.93	9.90	4.91	7.21	6.31	5.72	7.89	9.90
Wollaston.	0.0	0.0	0.0	0.0	0.0	1.08	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	7.14	4.02	5.85	0.0	0.0	0.0	0.0	0.78	4.17	7.66	5.85
Olivine	17.67	0.0	2.00	0.0	4.76	0.0	18.62	18.20	0.0	0.0	0.0	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	6.20	6.75	6.08	6.69	5.55	9.54	6.12	6.34	5.35	6.68	6.79	6.64
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	7.54	2.24	2.48	2.19	2.24	0.37	7.76	7.54	1.55	0.33	2.37	2.07
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	5.66	0.44	1.17	0.39	1.12	0.17	5.79	5.76	0.14	0.07	0.76	0.34
Fluorite	0.0	0.11	0.21	0.11	0.40	0.92	0.0	0.0	0.33	0.65	0.0	0.0
Diff Index	43.77	72.11	71.09	73.06	75.35	77.74	47.30	43.39	82.79	79.58	68.41	72.60
Na/(Na+K)	0.59	0.57	0.57	0.58	0.61	1.00	0.49	0.54	0.58	1.00	0.54	0.60
(Na+K)/Al	0.66	0.92	0.85	0.96	0.88	1.00	0.73	0.67	1.04	1.04	0.85	0.94
F3/(F2+F3)	0.24	0.34	0.34	0.34	0.35	0.57	0.24	0.24	0.52	0.52	0.34	0.34
Qz residua	n.a.	45.94	44.63	45.09	43.63	34.41	n.a.	n.a.	48.37	48.88	n.a.	45.88
Ks residua	n.a.	24.65	25.65	24.58	23.80	0.22	n.a.	n.a.	23.74	0.0	n.a.	23.26
Ne residua	n.a.	29.41	29.72	30.33	32.58	65.37	n.a.	n.a.	27.89	51.12	n.a.	30.85

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	127073	127074	127077	127078	127079	127083	127084	127085	127088	127089	141224	141229
Major elements, weight %												
	Benm-ite	Benm-ite	Benm-ite	Benm-ite	Basalt	Hawaiite	Benm-ite	Benm-ite	Phon-ite	Benm-ite	Rhyolite	Trachyte
SiO2	54.83	53.34	60.45	56.69	45.20	50.57	55.82	55.81	54.55	53.86	74.42	61.65
Al2O3	14.83	14.48	14.20	14.32	14.02	14.14	15.75	16.51	16.42	15.74	12.82	13.92
Fe2O3	12.83	13.81	10.11	11.26	15.14	13.36	10.37	8.25	10.65	11.56	4.46	9.82
MgO	0.77	1.12	0.26	0.84	7.43	4.36	0.83	1.36	0.60	1.38	0.12	0.42
CaO	2.96	3.44	2.01	2.96	6.44	5.52	2.90	3.83	2.48	3.06	0.09	1.41
Na2O	4.03	4.33	5.77	4.74	2.69	4.38	4.70	5.08	6.49	4.98	3.43	6.05
K2O	5.77	5.22	4.42	5.28	2.03	1.59	5.76	4.53	5.20	5.11	4.62	3.99
TiO2	1.29	1.40	0.73	1.26	3.71	2.47	1.14	1.60	0.84	1.34	0.34	0.86
MnO	0.26	0.30	0.24	0.24	0.25	0.36	0.27	0.23	0.31	0.29	0.05	0.20
P2O5	0.36	0.48	0.04	0.42	1.06	1.35	0.34	0.75	0.14	0.53	0.00	0.08
F	0.00	0.00	0.17	0.07	0.00	0.00	0.00	0.26	0.26	0.00	0.09	0.07
Cl	0.04	0.28	0.03	0.04	0.06	0.11	0.01	0.01	0.21	0.03	0.01	0.02
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.01	-0.06	-0.08	-0.04	-0.01	-0.02	-0.00	-0.11	-0.16	-0.01	-0.04	-0.04
Total	97.96	98.14	98.35	98.08	98.02	98.19	97.89	98.11	97.99	97.87	100.41	98.45
Trace elements ppm												
Ba	359.	512.	30.	480.	512.	761.	737.	3002.	72.	882.	194.	26.
Nb	187.	169.	195.	95.	28.	64.	185.	66.	258.	162.	166.	90.
Zr	1178.	1056.	1360.	665.	288.	392.	575.	185.	1113.	687.	1415.	615.
Y	117.	113.	120.	73.	41.	49.	53.	57.	113.	82.	112.	69.
Sr	132.	145.	20.	112.	417.	683.	220.	657.	35.	162.	32.	44.
Rb	282.	220.	109.	195.	129.	53.	154.	60.	199.	170.	267.	122.
Zn	275.	291.	276.	205.	172.	277.	170.	131.	242.	199.	129.	209.
Cu	3.	4.	0.	6.	25.	0.	4.	5.	1.	0.	10.	4.
Ni	0.	0.	0.	0.	89.	2.	0.	0.	0.	0.	3.	0.
Pb	41.	34.	58.	26.	0.	25.	16.	12.	32.	17.	74.	39.
U	2.	3.	3.	0.	0.	1.	3.	2.	2.	2.	13.	1.
Th	18.	14.	28.	13.	3.	10.	14.	14.	24.	13.	54.	15.
V	48.	56.	28.	48.	356.	178.	46.	63.	31.	55.	9.	35.
Cr	0.	0.	1.	0.	42.	0.	1.	0.	0.	0.	29.	0.
Nd	231.	204.	249.	149.	66.	137.	103.	109.	231.	157.	150.	146.
Ga	45.	45.	43.	42.	28.	36.	33.	28.	43.	37.	38.	37.
La	241.	233.	277.	159.	30.	112.	143.	125.	258.	173.	128.	165.
Ce	439.	438.	517.	299.	118.	249.	253.	227.	478.	325.	284.	305.
Zr/Nb	6.30	6.25	6.97	7.00	10.29	6.13	3.11	2.80	4.31	4.24	8.52	6.83

SUMMARY NORM TABLE

	127073.0	127074.0	127077.0	127078.0	127079.0	127083.0	127084.0	127085.0	127088.0	127089.0	141224.0	141229.0
Quartz	0.54	0.0	6.62	1.45	0.0	0.49	0.0	0.22	0.0	0.0	35.46	8.52
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.18	0.0
Orthoclase	35.10	31.70	26.67	32.04	12.39	9.66	35.01	27.40	31.53	31.08	27.25	24.06
Albite	34.88	36.07	49.45	40.96	23.17	37.50	40.41	43.95	37.63	39.46	28.92	50.38
Anorthite	5.61	5.62	0.0	2.38	21.03	14.96	5.04	9.11	0.95	5.75	0.0	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	0.0	0.0	0.0	0.0	0.24	0.0	9.50	2.03	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.07	0.47	0.05	0.07	0.10	0.19	0.02	0.02	0.36	0.05	0.02	0.03
Acmite	0.0	0.0	0.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.53
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	6.14	7.47	7.16	8.27	3.95	3.43	6.43	3.43	8.14	5.35	0.0	5.35
Wollaston.	0.0	0.0	0.32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	7.71	5.15	0.0	5.49	11.76	21.43	0.0	6.26	0.0	0.0	2.75	1.36
Olivine	0.0	2.41	0.0	0.0	14.27	0.0	4.50	0.0	3.83	6.32	0.0	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	6.57	7.21	7.67	5.75	3.46	4.23	5.31	4.20	5.55	6.04	2.60	6.78
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	2.52	2.73	1.42	2.46	7.28	4.82	2.23	3.11	1.64	2.62	0.64	1.67
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.88	1.17	0.10	1.02	2.59	3.29	0.83	1.82	0.34	1.29	0.0	0.19
Fluorite	0.0	0.0	0.35	0.11	0.0	0.0	0.0	0.48	0.54	0.0	0.18	0.14
Diff Index	70.51	67.76	82.74	74.45	35.57	47.65	75.66	71.57	78.67	72.57	91.63	82.96
Na/(Na+K)	0.51	0.56	0.66	0.58	0.67	0.81	0.55	0.63	0.65	0.60	0.53	0.70
(Na+K)/Al	0.87	0.88	1.01	0.94	0.47	0.63	0.89	0.80	0.99	0.87	0.83	1.03
F3/(F2+F3)	0.34	0.35	0.52	0.34	0.15	0.21	0.34	0.34	0.35	0.35	0.40	0.52
Qz residua	44.92	n.a.	49.30	45.74	n.a.	n.a.	44.46	44.98	39.23	43.41	66.00	50.62
Ks residua	28.28	n.a.	18.32	24.45	n.a.	n.a.	26.30	21.76	22.78	24.34	16.90	16.48
Ne residua	26.79	n.a.	32.38	29.80	n.a.	n.a.	29.25	33.26	37.99	32.25	17.10	32.90

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	141231	141232	141233	141238	141239	141240	141241	141242	141243	141244	304006	304008
Major elements, weight %												
	Trachyte	Benm-ite	Phon-ite	Benm-ite	Benm-ite	Tracyand	Benm-ite	Benm-ite	Benm-ite	Tracyand	Phon-ite	Phon-ite
SiO2	58.67	57.73	58.48	60.01	59.59	59.65	60.64	59.92	58.34	61.16	58.36	54.83
Al2O3	15.53	15.71	17.84	15.95	16.64	14.55	14.64	14.62	14.79	14.62	22.26	17.61
Fe2O3	8.73	10.01	6.68	7.66	6.99	9.97	9.28	9.44	10.60	9.03	1.68	9.13
MgO	0.81	0.64	0.67	0.84	0.74	0.71	0.79	0.68	0.49	0.46	0.11	0.11
CaO	1.84	2.00	1.72	2.32	2.40	2.45	1.69	2.17	2.67	2.10	0.10	2.46
Na2O	3.06	5.04	5.57	4.46	4.59	4.76	4.36	4.32	4.75	4.90	10.85	8.98
K2O	8.00	5.41	5.99	5.59	5.68	4.56	5.49	5.65	5.13	4.82	4.92	3.98
TiO2	1.13	1.01	0.85	1.02	1.13	1.13	1.03	1.04	0.90	0.90	0.19	0.13
MnO	0.19	0.27	0.19	0.16	0.14	0.23	0.21	0.21	0.24	0.21	0.03	0.31
P2O5	0.29	0.19	0.13	0.29	0.37	0.26	0.25	0.22	0.15	0.15	0.00	0.00
F	0.04	0.02	0.19	0.12	0.25	0.05	0.00	0.06	0.03	0.04	0.42	0.34
Cl	0.06	0.04	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.80	0.14
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.03	-0.01	-0.08	-0.05	-0.11	-0.03	-0.00	-0.03	-0.02	-0.02	-0.36	-0.17
Total	98.32	98.06	98.25	98.38	98.42	98.31	98.40	98.32	98.10	98.40	99.36	97.85
Trace elements ppm												
Ba	567.	157.	310.	960.	1297.	287.	651.	367.	157.	141.	127.	81.
Nb	44.	155.	171.	40.	29.	59.	71.	69.	212.	55.	14.	547.
Zr	350.	639.	667.	273.	196.	393.	479.	446.	1289.	375.	28.	2752.
Y	46.	73.	61.	35.	29.	54.	60.	59.	116.	48.	5.	306.
Sr	463.	175.	139.	111.	237.	101.	381.	154.	157.	61.	115.	416.
Rb	329.	163.	188.	98.	85.	96.	136.	157.	240.	101.	222.	236.
Zn	155.	209.	152.	133.	109.	182.	181.	180.	253.	170.	54.	582.
Cu	0.	0.	8.	1.	4.	1.	4.	6.	3.	5.	10.	0.
Ni	0.	0.	0.	2.	0.	0.	5.	0.	3.	0.	4.	2.
Pb	24.	21.	32.	20.	19.	20.	25.	23.	47.	27.	2.	105.
U	0.	0.	4.	1.	1.	0.	1.	2.	8.	1.	0.	19.
Th	6.	16.	23.	12.	11.	11.	11.	12.	26.	11.	14.	60.
V	52.	36.	36.	41.	51.	45.	48.	46.	36.	36.	7.	0.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	0.	10.	0.	0.
Nd	69.	165.	122.	77.	39.	126.	125.	132.	212.	106.	0.	529.
Ga	32.	33.	37.	30.	27.	32.	37.	31.	43.	32.	61.	69.
La	92.	184.	154.	64.	55.	119.	126.	118.	266.	102.	0.	688.
Ce	179.	320.	307.	146.	127.	219.	258.	231.	454.	192.	11.	1088.
Zr/Nb	7.95	4.12	3.90	6.82	6.76	6.66	6.75	6.46	6.08	6.82	2.00	5.03

SUMMARY NORM TABLE

	141231.0	141232.0	141233.0	141238.0	141239.0	141240.0	141241.0	141242.0	141243.0	141244.0	304006.0	304008.0
Quartz	4.51	0.99	0.0	6.20	5.06	7.43	8.49	7.06	3.67	8.51	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	48.34	32.82	36.15	33.73	34.22	27.59	33.16	34.15	31.12	29.11	29.27	24.13
Albite	26.14	43.56	45.87	38.48	39.54	41.12	37.60	37.28	41.08	42.21	42.06	34.90
Anorthite	5.30	4.50	6.17	7.17	8.21	5.04	4.31	3.96	4.08	3.83	0.0	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	1.17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.72	19.12
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.10	0.07	0.03	0.02	0.02	0.03	0.03	0.03	0.05	0.05	1.33	0.24
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.28	6.14
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	1.66	3.76	0.59	1.76	0.18	4.70	2.21	4.56	7.31	4.89	0.0	9.48
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	6.18	6.74	0.0	5.52	5.35	6.09	6.45	5.07	5.11	4.25	0.0	0.0
Olivine	0.0	0.0	3.98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.86	2.43
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.82	5.11	3.69	4.22	3.84	5.08	5.13	5.22	5.42	4.98	0.88	2.60
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	2.19	1.97	1.65	1.98	2.19	2.20	2.00	2.02	1.75	1.75	0.36	0.25
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.70	0.46	0.31	0.70	0.89	0.63	0.61	0.53	0.36	0.36	0.0	0.0
Fluorite	0.06	0.02	0.39	0.22	0.49	0.08	0.0	0.11	0.05	0.07	0.87	0.72
Diff Index	78.98	77.37	83.19	78.41	78.82	76.14	79.25	78.50	75.87	79.82	96.04	78.14
Na/(Na+K)	0.37	0.59	0.59	0.55	0.55	0.61	0.55	0.54	0.58	0.61	0.77	0.77
(Na+K)/Al	0.88	0.90	0.88	0.84	0.82	0.88	0.90	0.90	0.90	0.91	1.04	1.08
F3/(F2+F3)	0.37	0.34	0.37	0.37	0.37	0.34	0.37	0.37	0.34	0.37	0.42	0.42
Qz residua	47.29	45.40	44.03	48.97	48.16	50.16	50.52	49.55	47.36	50.63	33.23	33.80
Ks residua	34.78	24.11	24.70	24.44	24.67	20.59	23.78	24.72	23.30	20.72	17.32	17.54
Ne residua	17.93	30.50	31.27	26.58	27.17	29.26	25.70	25.73	29.33	28.64	49.46	48.66

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	304023	304045	304050	304050	304096	304111	304150	304761	326202	326202	326203	326204
Major elements, weight %												
	Phon-ite	Basalt	Benm-ite	Mug-ite	Benm-ite	Benm-ite	Mug-ite	Phon-ite	Benm-ite	Benm-ite	Benm-ite	Phon-ite
SiO2	55.84	48.85	54.57	51.21	58.12	54.05	55.05	59.43	58.07	57.39	57.59	57.68
Al2O3	19.32	13.64	16.68	17.05	15.48	17.34	16.09	13.87	15.93	16.43	16.13	16.94
Fe2O3	7.09	13.79	10.84	10.16	10.29	9.63	9.88	10.47	10.09	9.60	9.86	8.76
MgO	0.23	5.60	0.84	2.47	0.46	0.94	1.43	0.41	0.52	0.63	0.66	0.50
CaO	1.12	7.42	2.79	5.70	2.08	3.19	3.75	0.76	2.11	2.13	2.03	1.91
Na2O	8.34	3.18	5.08	4.26	5.46	4.78	4.19	3.15	5.38	5.18	5.08	5.58
K2O	5.22	0.81	5.18	3.48	4.93	5.64	5.10	9.04	4.92	5.36	5.27	5.46
TiO2	0.20	3.64	1.19	2.09	0.83	1.36	1.57	0.95	0.63	0.81	0.86	0.75
MnO	0.39	0.23	0.26	0.17	0.26	0.25	0.17	0.21	0.28	0.23	0.39	0.26
P2O5	0.00	0.96	0.34	1.18	0.11	0.59	0.69	0.06	0.09	0.23	0.12	0.13
F	0.26	0.01	0.27	0.24	0.06	0.19	0.02	0.08	0.20	0.06	0.00	0.17
Cl	0.34	0.02	0.04	0.02	0.04	0.02	0.02	0.01	0.07	0.04	0.06	0.03
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.19	-0.01	-0.12	-0.11	-0.03	-0.08	-0.02	-0.04	-0.10	-0.03	-0.01	-0.08
Total	98.16	98.14	97.96	97.92	98.09	97.90	97.94	98.40	98.19	98.06	98.04	98.09
Trace elements ppm												
Ba	109.	564.	475.	2708.	220.	1015.	3337.	313.	74.	408.	143.	58.
Nb	492.	16.	261.	78.	183.	174.	74.	90.	222.	176.	262.	242.
Zr	2220.	415.	1048.	323.	652.	747.	338.	606.	884.	647.	1032.	939.
Y	102.	66.	95.	43.	66.	80.	41.	74.	82.	66.	98.	89.
Sr	109.	253.	145.	1001.	46.	389.	422.	42.	108.	160.	115.	59.
Rb	342.	45.	163.	74.	186.	170.	100.	434.	151.	150.	298.	198.
Zn	322.	222.	219.	126.	207.	183.	132.	196.	233.	194.	243.	222.
Cu	0.	69.	1.	5.	3.	3.	0.	0.	3.	2.	2.	0.
Ni	0.	39.	0.	6.	0.	3.	0.	5.	2.	0.	4.	4.
Pb	41.	13.	34.	19.	23.	17.	15.	24.	29.	26.	31.	29.
U	11.	0.	0.	0.	1.	2.	0.	1.	0.	0.	1.	0.
Th	29.	10.	20.	3.	18.	17.	7.	5.	16.	12.	19.	20.
V	5.	463.	55.	171.	33.	58.	68.	35.	32.	41.	38.	36.
Cr	0.	68.	0.	2.	0.	0.	0.	0.	0.	0.	1.	0.
Nd	268.	58.	173.	70.	160.	164.	71.	153.	171.	139.	207.	185.
Ga	57.	35.	40.	23.	40.	35.	25.	33.	39.	36.	43.	42.
La	338.	54.	221.	81.	178.	173.	92.	190.	214.	183.	243.	220.
Ce	584.	138.	318.	148.	353.	333.	182.	290.	331.	264.	366.	359.
Zr/Nb	4.51	25.94	4.02	4.14	3.56	4.29	4.57	6.73	3.98	3.68	3.94	3.88

SUMMARY NORM TABLE

	304023.0	304045.0	304050.0	304050.0	304096.0	304111.0	304150.0	304761.0	326202.0	326202.0	326203.0	326204.0
Quartz	0.0	2.54	0.0	0.0	0.90	0.0	1.34	4.83	1.01	0.0	0.58	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	31.50	4.93	31.44	21.13	29.90	34.23	30.97	54.55	29.78	32.50	31.97	33.06
Albite	38.79	27.62	41.63	36.92	47.19	37.21	36.32	21.46	46.24	44.75	43.79	47.24
Anorthite	0.87	21.24	7.73	17.65	3.37	9.51	10.37	0.0	5.11	6.02	5.98	5.26
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	16.99	0.0	1.24	0.0	0.0	2.28	0.0	0.0	0.0	0.0	0.0	0.53
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.57	0.03	0.07	0.03	0.07	0.03	0.03	0.02	0.12	0.07	0.10	0.05
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.02	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	2.99	8.43	2.44	2.04	5.40	1.62	3.46	2.62	3.45	2.61	3.08	2.34
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	22.59	0.0	7.13	5.92	0.0	7.72	3.82	7.30	5.91	7.50	0.0
Olivine	2.96	0.0	6.11	2.99	0.0	5.63	0.0	0.0	0.0	1.01	0.0	4.94
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.40	3.14	5.66	4.77	5.25	5.03	5.05	5.54	5.14	4.89	5.03	4.46
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	0.39	7.13	2.32	4.08	1.62	2.65	3.06	1.84	1.23	1.58	1.68	1.46
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.0	2.34	0.83	2.87	0.27	1.44	1.68	0.15	0.22	0.56	0.29	0.32
Fluorite	0.55	0.0	0.54	0.40	0.12	0.35	0.0	0.16	0.41	0.10	0.0	0.35
Diff Index	87.27	35.10	74.31	58.04	77.99	73.73	68.62	80.83	77.03	77.25	76.34	80.83
Na/(Na+K)	0.71	0.86	0.60	0.65	0.63	0.56	0.56	0.35	0.62	0.59	0.59	0.61
(Na+K)/Al	1.00	0.45	0.84	0.63	0.92	0.81	0.77	1.08	0.89	0.87	0.87	0.89
F3/(F2+F3)	0.42	0.15	0.35	0.31	0.34	0.35	0.34	0.52	0.34	0.34	0.34	0.34
Qz residua	35.95	n.a.	43.94	n.a.	45.44	43.18	n.a.	47.27	45.51	44.71	45.13	44.44
Ks residua	20.51	n.a.	24.04	n.a.	21.78	26.38	n.a.	38.35	21.97	23.91	23.80	23.24
Ne residua	43.54	n.a.	32.02	n.a.	32.78	30.44	n.a.	14.38	32.52	31.38	31.08	32.31

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	326206	326211	326219	326231	326232	326236	326237	326239	326240	326242	326243	326245
Major elements, weight %												
	Phon-ite	Benm-ite	Benm-ite	Phon-ite	Phon-ite	Phon-ite	Benm-ite	Phon-ite	Benm-ite	Phon-ite	Phon-ite	Phon-ite
SiO2	53.81	57.33	56.90	56.93	57.35	55.90	57.12	54.64	57.54	57.38	57.71	55.23
Al2O3	16.67	16.44	15.97	15.78	16.28	18.01	15.18	19.89	16.39	17.31	18.17	19.24
Fe2O3	10.49	9.51	10.78	10.02	9.50	7.66	10.26	7.33	9.45	8.36	7.46	7.04
MgO	0.30	0.54	0.71	0.30	0.27	0.45	0.63	0.27	0.59	0.26	0.38	0.22
CaO	1.82	1.99	2.56	2.21	2.00	1.77	2.33	2.07	2.16	1.75	1.51	1.20
Na2O	8.81	5.30	4.66	6.57	7.35	7.16	5.39	6.56	4.94	7.03	6.09	7.97
K2O	4.79	5.49	5.18	5.15	4.27	5.80	5.52	6.13	5.63	5.03	5.80	6.24
TiO2	0.42	0.92	0.77	0.58	0.54	0.67	1.06	0.46	0.88	0.43	0.58	0.26
MnO	0.38	0.27	0.28	0.26	0.25	0.26	0.29	0.27	0.26	0.28	0.23	0.31
P2O5	0.02	0.18	0.18	0.04	0.05	0.08	0.17	0.07	0.15	0.02	0.05	0.00
F	0.31	0.14	0.00	0.05	0.10	0.09	0.00	0.43	0.00	0.30	0.14	0.22
Cl	0.56	0.03	0.06	0.05	0.03	0.27	0.03	0.29	0.02	0.09	0.04	0.28
LOI	n.d.	1.13	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.26	-0.06	-0.01	-0.03	-0.05	-0.10	-0.01	-0.25	-0.01	-0.15	-0.07	-0.15
Total	98.12	99.21	98.04	97.91	97.94	98.02	97.97	98.16	98.00	98.09	98.09	98.06
Trace elements ppm												
Ba	0.	118.	363.	12.	16.	105.	98.	49.	142.	8.	111.	0.
Nb	923.	196.	188.	248.	244.	369.	188.	495.	192.	312.	274.	631.
Zr	3286.	744.	742.	955.	931.	1317.	721.	1874.	782.	1240.	1027.	1812.
Y	202.	79.	73.	97.	91.	93.	83.	147.	83.	110.	92.	108.
Sr	43.	185.	181.	16.	16.	40.	23.	89.	115.	38.	104.	16.
Rb	325.	200.	136.	148.	141.	229.	188.	281.	186.	173.	235.	283.
Zn	420.	214.	226.	241.	240.	213.	217.	262.	176.	265.	220.	290.
Cu	7.	0.	3.	4.	12.	2.	0.	3.	0.	7.	10.	0.
Ni	2.	6.	4.	0.	0.	4.	2.	4.	0.	2.	0.	7.
Pb	55.	25.	28.	30.	30.	32.	26.	37.	30.	43.	39.	39.
U	16.	0.	0.	2.	0.	6.	0.	4.	3.	2.	1.	8.
Th	71.	12.	11.	19.	16.	24.	10.	31.	13.	28.	17.	42.
V	18.	45.	36.	25.	22.	32.	48.	21.	41.	22.	29.	11.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Nd	389.	158.	146.	211.	194.	184.	159.	280.	154.	239.	188.	227.
Ga	60.	35.	38.	43.	39.	42.	36.	47.	37.	47.	44.	49.
La	585.	206.	191.	272.	260.	260.	194.	410.	222.	329.	260.	367.
Ce	821.	317.	285.	402.	384.	379.	319.	580.	332.	475.	376.	538.
Zr/Nb	3.56	3.80	3.95	3.85	3.82	3.57	3.84	3.79	4.07	3.97	3.75	2.87

SUMMARY NORM TABLE

	326206.0	326211.0	326219.0	326231.0	326232.0	326236.0	326237.0	326239.0	326240.0	326242.0	326243.0	326245.0
Quartz	0.0	0.0	1.46	0.0	0.0	0.0	0.0	0.0	0.04	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	28.95	33.27	31.44	31.21	25.86	35.09	33.52	36.99	34.16	30.41	35.08	37.70
Albite	25.65	45.82	40.17	44.84	51.26	36.39	44.88	31.42	42.81	46.68	44.42	29.07
Anorthite	0.0	5.07	7.74	0.0	0.0	0.68	1.04	7.73	6.14	1.11	5.35	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	18.84	0.0	0.0	4.87	5.52	13.07	0.99	12.80	0.0	7.41	4.38	19.83
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.94	0.05	0.10	0.08	0.05	0.46	0.05	0.49	0.03	0.15	0.07	0.47
Acmite	11.17	0.0	0.0	2.55	1.86	0.0	0.0	0.0	0.0	0.0	0.0	1.51
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	6.56	2.73	3.55	6.53	5.85	6.30	8.40	0.01	3.34	5.28	1.07	4.31
Wollaston.	0.0	0.0	0.0	1.30	1.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	2.42	8.08	0.0	0.0	0.0	0.0	0.0	6.57	0.0	0.0	0.0
Olivine	5.46	3.29	0.0	0.0	0.0	1.58	3.40	4.80	0.0	2.26	3.46	2.53
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	0.91	4.85	5.51	7.29	7.18	4.76	5.24	3.80	4.82	5.19	4.63	3.62
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	0.82	1.79	1.50	1.13	1.05	1.30	2.07	0.89	1.72	0.84	1.13	0.50
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.05	0.44	0.44	0.10	0.12	0.19	0.41	0.17	0.36	0.05	0.12	0.0
Fluorite	0.65	0.28	0.0	0.10	0.21	0.18	0.0	0.90	0.0	0.63	0.29	0.46
Diff Index	73.44	79.09	73.08	80.92	82.63	84.54	79.38	81.22	77.01	84.49	83.88	86.60
Na/(Na+K)	0.74	0.59	0.58	0.66	0.72	0.65	0.60	0.62	0.57	0.68	0.61	0.66
(Na+K)/Al	1.18	0.89	0.83	1.04	1.03	1.00	0.98	0.88	0.87	0.98	0.90	1.03
F3/(F2+F3)	0.42	0.34	0.34	0.57	0.57	0.42	0.34	0.35	0.34	0.42	0.42	0.42
Qz residua	33.03	44.71	45.77	42.05	41.94	37.65	44.14	37.39	44.68	40.86	42.33	34.18
Ks residua	22.40	23.90	24.45	21.92	17.78	23.58	23.99	25.88	25.21	20.45	23.76	24.74
Ne residua	44.57	31.38	29.78	36.04	40.28	38.77	31.87	36.72	30.11	38.69	33.91	41.08

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	326246	326253	326254	326256	326267	326269	326270	326321	326324	326308	326309	326322
Major elements, weight %												
	Phon-ite	Benm-ite	Phon-ite	Phon-ite	Benm-ite	Benm-ite	Trachyte	Trachyte	Phon-ite	Tep/Basn	Phon-ite	Benm-ite
SiO2	57.80	57.02	58.33	55.96	57.58	56.48	58.91	61.06	52.34	41.96	55.68	60.43
Al2O3	18.06	15.85	16.64	18.22	15.81	15.77	16.47	12.26	18.27	13.14	19.96	12.80
Fe2O3	7.25	10.87	8.75	7.80	10.24	11.36	8.93	11.82	8.48	14.63	5.87	12.35
MgO	0.35	0.59	0.39	0.55	0.87	1.01	0.57	0.16	0.62	7.57	0.35	0.20
CaO	1.51	2.80	1.73	1.89	1.96	2.14	1.21	1.70	2.93	10.66	1.34	1.41
Na2O	6.53	5.28	5.64	6.51	4.64	4.16	4.94	6.18	6.22	2.10	8.46	5.92
K2O	5.64	4.35	5.50	5.85	5.42	5.44	6.08	4.35	6.76	2.82	5.58	4.40
TiO2	0.57	0.78	0.68	0.68	1.02	1.10	0.68	0.58	1.30	3.97	0.33	0.56
MnO	0.22	0.28	0.25	0.27	0.28	0.31	0.26	0.27	0.30	0.23	0.18	0.27
P2O5	0.04	0.13	0.10	0.07	0.24	0.28	0.10	0.00	0.26	0.69	0.07	0.01
F	0.18	0.14	0.10	0.28	0.04	0.00	0.11	0.38	0.25	0.01	0.34	0.31
Cl	0.09	0.02	0.03	0.19	0.02	0.04	0.03	0.01	0.08	0.02	0.34	0.01
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.10	-0.06	-0.05	-0.16	-0.02	-0.01	-0.05	-0.16	-0.12	-0.01	-0.22	-0.13
Total	98.14	98.05	98.09	98.11	98.10	98.08	98.24	98.61	97.69	97.79	98.28	98.54
Trace elements ppm												
Ba	118.	115.	24.	18.	106.	410.	209.	0.	5932.	1793.	247.	3.
Nb	275.	196.	257.	449.	176.	168.	257.	1060.	507.	144.	291.	1002.
Zr	1027.	728.	997.	1631.	705.	638.	1022.	6628.	789.	397.	612.	6221.
Y	92.	78.	99.	101.	82.	77.	101.	578.	63.	32.	34.	478.
Sr	45.	194.	36.	216.	155.	265.	162.	101.	4276.	1334.	141.	75.
Rb	233.	79.	180.	258.	148.	146.	175.	587.	108.	172.	209.	441.
Zn	222.	233.	214.	226.	215.	217.	221.	880.	153.	120.	109.	808.
Cu	6.	0.	4.	6.	0.	0.	1.	0.	0.	43.	0.	0.
Ni	2.	0.	0.	9.	4.	0.	2.	17.	0.	105.	2.	15.
Pb	38.	31.	34.	34.	27.	23.	31.	164.	11.	12.	11.	158.
U	1.	0.	0.	3.	1.	0.	1.	40.	15.	0.	0.	36.
Th	22.	17.	22.	34.	10.	10.	20.	140.	5.	4.	13.	135.
V	27.	38.	32.	30.	48.	54.	36.	20.	77.	448.	18.	20.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	0.	378.	0.	0.
Nd	194.	167.	178.	185.	178.	153.	187.	931.	161.	59.	94.	755.
Ga	44.	45.	41.	41.	38.	38.	39.	72.	29.	26.	43.	73.
La	267.	227.	250.	264.	210.	198.	251.	1360.	193.	86.	151.	1124.
Ce	383.	352.	377.	400.	317.	307.	373.	1727.	327.	144.	246.	1560.
Zr/Nb	3.73	3.71	3.88	3.63	4.01	3.80	3.98	6.25	1.56	2.76	2.10	6.21

SUMMARY NORM TABLE

	326246.0	326253.0	326254.0	326256.0	326267.0	326269.0	326270.0	326321.0	326324.0	326308.0	326309.0	326322.0
Quartz	0.0	1.13	0.0	0.0	2.37	2.88	1.46	6.77	0.0	0.0	0.0	7.02
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.0	0.0	0.0	0.0	0.0
Orthoclase	34.08	26.39	33.31	35.36	32.87	33.02	36.76	26.18	41.07	17.23	33.59	26.51
Albite	44.81	45.76	48.73	37.27	40.18	35.93	42.60	39.56	19.96	3.96	35.06	42.16
Anorthite	3.65	6.94	4.03	3.86	6.53	8.63	4.91	0.0	2.26	18.77	1.02	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	6.06	0.0	0.0	9.76	0.0	0.0	0.0	0.0	18.26	7.74	19.49	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.15	0.03	0.05	0.32	0.03	0.07	0.05	0.02	0.14	0.03	0.57	0.02
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.02	0.0	0.0	0.0	7.81
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	2.41	4.98	3.12	3.27	1.45	0.34	0.0	5.80	8.30	25.28	3.01	4.77
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	7.09	0.69	0.0	8.71	10.50	7.45	4.70	0.0	0.0	0.0	4.40
Olivine	2.77	0.0	3.46	4.04	0.0	0.0	0.0	0.0	1.91	12.12	2.11	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.49	5.55	4.84	4.05	5.22	5.81	4.94	3.04	4.43	5.37	3.63	5.56
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.11	1.52	1.32	1.32	1.99	2.15	1.32	1.12	2.54	7.80	0.64	1.08
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.10	0.32	0.24	0.17	0.58	0.68	0.24	0.0	0.63	1.69	0.17	0.02
Fluorite	0.37	0.28	0.20	0.58	0.06	0.0	0.22	0.80	0.50	0.0	0.71	0.65
Diff Index	84.94	73.28	82.04	82.39	75.42	71.83	80.82	72.50	79.29	28.94	88.14	75.69
Na/(Na+K)	0.64	0.65	0.61	0.63	0.57	0.54	0.55	0.68	0.58	0.53	0.70	0.67
(Na+K)/Al	0.93	0.85	0.92	0.94	0.85	0.81	0.89	1.21	0.96	0.50	1.00	1.13
F3/(F2+F3)	0.42	0.34	0.37	0.35	0.34	0.34	0.37	0.52	0.35	0.24	0.42	0.52
Qz residua	41.50	45.71	44.75	39.26	46.38	46.78	45.60	49.93	33.90	n.a.	34.68	49.92
Ks residua	22.80	20.46	23.07	24.39	24.76	26.12	25.85	20.52	29.43	n.a.	21.66	19.91
Ne residua	35.71	33.82	32.18	36.35	28.86	27.10	28.55	29.55	36.66	n.a.	43.66	30.17

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	326331	326340	326346	326348	326355	326356	326357	326360	326364	326371	326372	326375
Major elements, weight %												
	Phon-ite	Phon-ite	Phon-ite	Phon-ite	Phon-ite	Tep/Basn	Mug-ite	Phon-ite	Phon-ite	Mug-ite	Phon-ite	Benm-ite
SiO2	56.04	55.32	56.08	55.20	56.89	43.80	51.30	56.55	55.92	52.61	55.83	57.02
Al2O3	20.44	19.75	19.01	17.32	21.06	12.22	15.56	19.99	19.29	15.57	19.65	16.41
Fe2O3	5.12	5.87	7.03	8.51	4.10	14.94	11.27	5.11	6.45	10.40	6.07	8.94
MgO	0.51	0.37	0.41	0.81	0.25	8.24	2.83	0.35	0.50	2.58	0.23	0.71
CaO	1.52	1.42	1.27	2.15	0.97	7.33	5.07	1.27	1.32	4.83	1.38	2.41
Na2O	7.14	7.96	7.97	6.52	7.91	2.17	4.45	7.79	7.60	4.31	7.87	5.38
K2O	6.46	6.42	5.42	5.92	6.45	4.85	3.86	6.35	6.12	4.40	6.19	5.54
TiO2	0.49	0.37	0.30	0.86	0.29	3.07	1.99	0.29	0.32	1.91	0.28	1.00
MnO	0.15	0.27	0.32	0.28	0.14	0.21	0.26	0.23	0.29	0.25	0.28	0.27
P2O5	0.08	0.03	0.00	0.16	0.03	1.00	1.25	0.03	0.01	1.02	0.01	0.26
F	0.30	0.34	0.46	0.12	0.36	0.00	0.20	0.42	0.52	0.05	0.43	0.19
Cl	0.08	0.20	0.21	0.24	0.02	0.03	0.01	0.13	0.26	0.02	0.25	0.05
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.36	n.d.	n.d.
O=F,Cl	-0.14	-0.19	-0.24	-0.11	-0.16	-0.01	-0.09	-0.21	-0.28	-0.03	-0.24	-0.09
Total	98.19	98.13	98.24	97.98	98.31	97.85	97.96	98.30	98.32	99.28	98.23	98.09
Trace elements ppm												
Ba	156.	20.	16.	350.	19.	2644.	1903.	17.	16.	2809.	2.	471.
Nb	168.	534.	906.	348.	156.	122.	269.	749.	804.	151.	706.	206.
Zr	769.	1472.	2212.	1242.	252.	441.	1170.	1451.	1939.	528.	1771.	969.
Y	55.	91.	102.	87.	27.	34.	103.	84.	89.	53.	91.	91.
Sr	123.	41.	56.	81.	25.	1574.	719.	58.	42.	619.	38.	139.
Rb	226.	242.	276.	208.	189.	171.	114.	268.	261.	109.	265.	151.
Zn	106.	227.	289.	212.	95.	185.	181.	192.	251.	164.	258.	199.
Cu	9.	3.	1.	0.	11.	42.	13.	0.	1.	7.	4.	0.
Ni	2.	3.	0.	0.	2.	238.	11.	2.	5.	6.	3.	0.
Pb	14.	37.	44.	29.	14.	18.	18.	29.	37.	19.	39.	37.
U	0.	9.	21.	0.	0.	4.	0.	11.	19.	0.	14.	1.
Th	15.	33.	61.	23.	6.	8.	15.	37.	49.	9.	45.	27.
V	25.	18.	9.	39.	14.	329.	168.	16.	14.	132.	11.	43.
Cr	0.	0.	0.	0.	0.	360.	0.	0.	0.	0.	0.	0.
Nd	118.	206.	224.	158.	83.	81.	181.	191.	209.	103.	213.	133.
Ga	39.	47.	45.	39.	41.	28.	33.	41.	40.	28.	43.	35.
La	162.	337.	383.	237.	95.	116.	275.	309.	348.	128.	333.	199.
Ce	244.	474.	536.	365.	174.	162.	424.	446.	469.	198.	480.	306.
Zr/Nb	4.58	2.76	2.44	3.57	1.62	3.61	4.35	1.94	2.41	3.50	2.51	4.70

SUMMARY NORM TABLE

	326331.0	326340.0	326346.0	326348.0	326355.0	326356.0	326357.0	326360.0	326364.0	326371.0	326372.0	326375.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.09	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	38.94	38.72	32.66	35.87	38.80	29.61	23.45	38.21	36.82	26.74	37.28	33.54
Albite	31.82	28.35	38.92	34.07	33.31	3.97	38.65	33.20	34.35	37.39	32.49	44.82
Anorthite	4.98	0.0	0.71	1.24	2.79	9.68	11.42	1.22	1.22	10.49	0.75	4.52
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	15.91	21.05	15.53	11.46	18.81	8.04	0.0	17.98	16.08	0.0	18.41	0.84
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.13	0.34	0.35	0.41	0.03	0.05	0.02	0.22	0.44	0.03	0.42	0.08
Acmite	0.0	0.37	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	0.51	4.47	2.82	6.87	0.0	17.15	4.35	2.38	2.24	6.02	3.38	4.33
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	0.0	0.0	1.99	0.0	0.0	2.73	0.0	0.0
Olivine	2.78	1.75	3.11	3.36	2.26	17.54	7.60	2.12	3.14	5.49	2.06	4.35
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	3.17	3.45	4.35	4.43	2.54	5.48	5.29	3.16	3.99	4.88	3.75	4.56
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	0.95	0.72	0.58	1.67	0.56	6.02	3.88	0.56	0.62	3.73	0.54	1.95
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.19	0.07	0.0	0.39	0.07	2.45	3.04	0.07	0.02	2.48	0.02	0.63
Fluorite	0.62	0.71	0.96	0.24	0.75	0.0	0.30	0.88	1.09	0.01	0.90	0.38
Diff Index	86.67	88.12	87.11	81.40	90.91	41.62	62.09	89.39	87.24	64.13	88.18	79.20
Na/(Na+K)	0.63	0.65	0.69	0.63	0.65	0.40	0.64	0.65	0.65	0.60	0.66	0.60
(Na+K)/Al	0.92	1.01	1.00	0.99	0.95	0.72	0.74	0.98	0.99	0.76	1.00	0.90
F3/(F2+F3)	0.42	0.42	0.42	0.35	0.42	0.24	0.31	0.42	0.42	0.31	0.42	0.34
Qz residua	36.23	33.72	36.66	38.21	35.22	n.a.	n.a.	35.48	36.26	n.a.	35.14	44.22
Ks residua	25.53	24.97	21.30	25.04	24.25	n.a.	n.a.	24.29	23.98	n.a.	24.02	24.07
Ne residua	38.24	41.31	42.03	36.75	40.53	n.a.	n.a.	40.23	39.75	n.a.	40.84	31.71

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	326378	326379	326380	326384	326390	326396	326397	325901	325905	325906	325907	325909
Major elements, weight %												
	Phon-ite	Benm-ite	Phon-ite	Benm-ite	Phon-ite	Benm-ite	Phon-ite	Phon-ite	Phon-ite	Phon-ite	Phon-ite	Phon-ite
SiO2	53.30	57.43	53.59	58.57	55.35	55.18	55.71	58.24	56.21	51.72	51.76	56.21
Al2O3	16.80	16.28	16.97	16.46	17.98	17.05	19.46	17.52	21.31	15.42	15.12	19.11
Fe2O3	9.71	9.88	9.12	8.56	7.80	9.16	6.49	7.08	4.98	12.82	12.93	7.00
MgO	0.46	0.71	0.39	0.65	0.31	1.57	0.34	0.83	0.32	0.36	0.35	0.48
CaO	1.63	1.99	1.77	1.94	1.52	2.90	1.40	2.06	0.84	2.48	2.34	1.34
Na2O	7.44	5.20	9.08	5.32	7.03	4.93	7.58	5.06	6.93	9.50	9.90	7.39
K2O	6.97	5.03	5.39	5.26	6.78	5.18	6.22	6.11	6.88	4.17	4.10	5.63
TiO2	0.77	0.96	0.63	0.87	0.62	1.17	0.27	0.88	0.33	0.32	0.32	0.39
MnO	0.38	0.30	0.48	0.27	0.29	0.28	0.31	0.21	0.19	0.48	0.49	0.28
P2O5	0.03	0.24	0.03	0.20	0.02	0.50	0.01	0.12	0.04	0.17	0.12	0.01
F	0.26	0.03	0.45	0.12	0.31	0.18	0.32	0.10	0.55	0.23	0.29	0.31
Cl	0.24	0.00	0.37	0.00	0.20	0.01	0.23	0.00	0.10	0.60	0.93	0.37
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.16	-0.01	-0.27	-0.05	-0.18	-0.08	-0.19	-0.04	-0.26	-0.23	-0.33	-0.21
Total	97.83	98.04	98.00	98.17	98.03	98.03	98.15	98.17	98.42	98.04	98.32	98.31
Trace elements ppm												
Ba	181.	515.	316.	312.	155.	1342.	0.	633.	27.	147.	123.	195.
Nb	988.	198.	1171.	181.	807.	305.	705.	188.	312.	1476.	1510.	610.
Zr	1731.	755.	2000.	693.	1348.	1085.	1781.	747.	879.	6774.	6878.	2014.
Y	90.	72.	100.	79.	52.	75.	91.	64.	51.	408.	418.	106.
Sr	2915.	94.	2069.	41.	2145.	327.	167.	308.	34.	162.	118.	194.
Rb	199.	136.	228.	142.	247.	165.	257.	159.	199.	328.	361.	293.
Zn	334.	212.	428.	200.	195.	206.	277.	177.	165.	736.	761.	286.
Cu	0.	0.	0.	2.	0.	0.	1.	10.	2.	0.	0.	0.
Ni	0.	4.	0.	6.	4.	0.	0.	0.	7.	11.	15.	4.
Pb	31.	29.	48.	27.	26.	29.	39.	34.	27.	122.	129.	41.
U	43.	0.	51.	0.	43.	3.	15.	0.	3.	30.	27.	10.
Th	47.	12.	116.	14.	24.	24.	48.	21.	19.	172.	224.	42.
V	34.	45.	27.	43.	30.	73.	11.	41.	14.	9.	11.	18.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Nd	250.	155.	403.	169.	125.	160.	199.	132.	115.	697.	688.	197.
Ga	39.	35.	40.	38.	35.	37.	44.	37.	39.	56.	58.	50.
La	347.	231.	630.	213.	88.	222.	339.	206.	164.	1072.	1051.	313.
Ce	514.	321.	936.	312.	217.	342.	476.	284.	248.	1451.	1462.	456.
Zr/Nb	1.75	3.81	1.71	3.83	1.67	3.56	2.53	3.97	2.82	4.59	4.55	3.30

SUMMARY NORM TABLE

	326378.0	326379.0	326380.0	326384.0	326390.0	326396.0	326397.0	325901.0	325905.0	325906.0	325907.0	325909.0
Quartz	0.0	0.63	0.0	0.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.23	0.0	0.0	0.0
Orthoclase	42.28	30.52	32.52	31.83	40.99	31.39	37.52	36.93	41.32	25.22	24.70	33.91
Albite	11.35	45.17	18.71	46.09	26.53	42.43	32.22	43.79	33.76	17.18	15.78	38.95
Anorthite	0.0	6.39	0.0	5.63	0.0	9.36	1.40	7.21	1.05	0.0	0.0	3.49
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	20.33	0.0	21.54	0.0	15.96	0.16	17.31	0.0	13.70	21.80	21.80	12.31
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.41	0.0	0.62	0.0	0.34	0.02	0.39	0.0	0.17	1.01	1.56	0.62
Acmite	12.06	0.0	15.76	0.0	3.29	0.0	0.0	0.0	0.0	18.93	21.27	0.0
Na Metasil	0.17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	5.87	1.75	5.53	1.98	5.17	1.01	3.40	1.64	0.0	9.02	8.37	1.35
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	7.99	0.0	6.71	0.0	0.0	0.0	0.86	0.0	0.0	0.0	0.0
Olivine	5.43	0.0	2.30	0.0	2.63	7.14	2.52	3.46	2.83	4.21	5.00	3.62
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	0.0	5.05	0.78	4.36	3.19	4.67	4.03	3.91	3.07	1.12	0.0	4.33
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.50	1.87	1.22	1.69	1.20	2.28	0.52	1.71	0.64	0.62	0.62	0.75
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.07	0.58	0.07	0.49	0.05	1.21	0.02	0.29	0.10	0.41	0.29	0.02
Fluorite	0.55	0.04	0.94	0.23	0.65	0.33	0.67	0.20	1.14	0.47	0.60	0.65
Diff Index	73.95	76.32	72.78	78.91	83.48	73.98	87.05	80.72	88.78	64.20	62.28	85.17
Na/(Na+K)	0.62	0.61	0.72	0.61	0.61	0.59	0.65	0.56	0.60	0.78	0.79	0.67
(Na+K)/Al	1.18	0.86	1.22	0.88	1.05	0.80	0.99	0.85	0.88	1.31	1.37	0.96
F3/(F2+F3)	0.42	0.34	0.64	0.34	0.42	0.34	0.42	0.37	0.42	0.56	0.56	0.42
Qz residua	31.72	45.22	31.08	45.44	35.76	44.60	35.57	44.61	37.52	n.a.	n.a.	38.15
Ks residua	32.49	22.72	25.39	22.92	27.90	24.11	24.49	26.00	26.45	n.a.	n.a.	22.63
Ne residua	35.80	32.06	43.53	31.64	36.34	31.28	39.94	29.39	36.03	n.a.	n.a.	39.22

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	325913	325914	325915	325916	325921	325923	325926	325928	325933	325940	325942	325964
Major elements, weight %												
	Trachyte	Trachyte	Trachyte	Benm-ite	Mug-ite	Phon-ite	Phon-ite	Phon-ite	Phon-ite	Pic-bas	Trachyte	Phon-ite
SiO2	63.34	62.53	59.50	54.91	56.89	56.66	56.70	53.92	57.57	45.34	59.49	54.97
Al2O3	15.31	15.40	17.06	17.47	16.17	20.13	20.10	18.08	16.51	9.46	18.77	20.26
Fe2O3	7.02	6.77	6.15	9.84	10.87	6.98	5.67	9.65	9.09	16.92	5.91	5.00
MgO	0.22	0.43	0.57	0.66	0.87	0.59	0.57	0.28	0.45	9.47	0.69	0.62
CaO	1.26	0.75	2.52	2.64	2.82	0.80	1.22	2.03	1.83	10.51	1.32	1.41
Na2O	7.81	6.63	4.97	4.89	7.07	7.35	6.64	7.24	5.92	1.40	5.32	8.63
K2O	2.94	5.12	6.39	5.90	1.86	4.57	6.24	5.55	5.48	1.09	5.91	6.18
TiO2	0.42	0.58	0.74	0.93	0.87	0.48	0.51	0.47	0.75	3.54	0.58	0.44
MnO	0.26	0.28	0.24	0.29	0.35	0.34	0.30	0.26	0.24	0.24	0.27	0.24
P2O5	0.00	0.02	0.08	0.24	0.22	0.05	0.03	0.09	0.10	0.23	0.03	0.07
F	0.16	0.26	0.16	0.06	0.00	0.14	0.22	0.12	0.02	0.00	0.24	0.25
Cl	0.00	0.01	0.06	0.02	0.00	0.02	0.08	0.27	0.07	0.08	0.00	0.21
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.07	-0.11	-0.08	-0.03	0.00	-0.06	-0.11	-0.11	-0.02	-0.02	-0.10	-0.15
Total	98.67	98.67	98.36	97.82	97.99	98.05	98.17	97.85	98.01	98.26	98.43	98.13
Trace elements ppm												
Ba	24.	0.	157.	394.	95.	139.	7.	176.	125.	686.	340.	273.
Nb	340.	212.	222.	231.	262.	480.	350.	365.	238.	66.	376.	204.
Zr	2054.	999.	1026.	900.	1064.	1647.	1193.	1641.	960.	317.	1506.	749.
Y	101.	88.	72.	94.	106.	84.	73.	141.	86.	25.	78.	46.
Sr	33.	18.	66.	229.	52.	97.	34.	61.	78.	932.	151.	195.
Rb	124.	280.	276.	204.	106.	326.	278.	210.	192.	76.	245.	242.
Zn	115.	172.	142.	216.	249.	256.	225.	247.	198.	236.	266.	155.
Cu	0.	4.	0.	2.	0.	0.	0.	2.	5.	0.	5.	1.
Ni	11.	3.	0.	0.	2.	0.	3.	2.	4.	149.	0.	3.
Pb	53.	34.	32.	25.	25.	31.	24.	31.	29.	14.	60.	18.
U	8.	0.	0.	0.	0.	7.	0.	2.	0.	0.	0.	0.
Th	55.	34.	11.	14.	20.	25.	12.	19.	19.	0.	21.	12.
V	22.	24.	35.	44.	39.	20.	23.	18.	34.	509.	27.	23.
Cr	0.	0.	0.	0.	0.	0.	0.	0.	0.	496.	0.	0.
Nd	271.	187.	162.	180.	215.	176.	171.	214.	152.	34.	178.	117.
Ga	57.	49.	36.	40.	39.	49.	45.	43.	36.	27.	45.	44.
La	405.	244.	204.	247.	253.	189.	208.	272.	207.	13.	236.	140.
Ce	571.	363.	321.	359.	401.	415.	367.	416.	331.	62.	371.	232.
Zr/Nb	6.04	4.71	4.62	3.90	4.06	3.43	3.41	4.50	4.03	4.80	4.01	3.67

SUMMARY NORM TABLE

	325913.0	325914.0	325915.0	325916.0	325921.0	325923.0	325926.0	325928.0	325933.0	325940.0	325942.0	325964.0
Quartz	4.58	3.01	0.22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.95	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	2.09	0.80	0.0	0.0	0.0	1.78	0.0
Orthoclase	17.66	30.73	38.51	35.87	11.30	27.65	37.65	33.70	33.24	6.65	35.58	37.27
Albite	63.40	51.51	42.56	36.58	61.49	49.22	37.54	31.62	45.73	11.78	45.86	25.51
Anorthite	0.0	0.0	5.65	8.59	7.09	2.99	4.81	1.26	2.56	17.08	5.20	0.0
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	0.0	3.18	0.0	7.77	10.50	16.14	2.87	0.0	0.0	24.77
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.0	0.02	0.10	0.03	0.0	0.03	0.13	0.46	0.12	0.14	0.0	0.35
Acmite	3.32	4.78	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.86
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	4.79	1.95	4.89	2.59	5.01	0.0	0.0	6.91	5.23	28.77	0.0	4.54
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	1.41	3.53	2.73	0.0	5.82	0.0	0.0	0.0	0.0	16.81	5.68	0.0
Olivine	0.0	0.0	0.0	5.50	1.50	5.25	3.55	3.49	3.88	7.41	0.0	1.99
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	3.70	2.78	3.39	5.15	5.56	3.64	3.51	5.03	4.64	3.86	3.25	2.16
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	0.81	1.12	1.43	1.82	1.70	0.93	0.99	0.92	1.46	6.94	1.12	0.85
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.0	0.05	0.19	0.58	0.54	0.12	0.07	0.22	0.24	0.56	0.07	0.17
Fluorite	0.33	0.54	0.33	0.10	0.0	0.29	0.46	0.24	0.03	0.0	0.50	0.52
Diff Index	85.63	85.25	81.29	75.63	72.79	84.65	85.68	81.46	81.83	18.43	82.39	87.55
Na/(Na+K)	0.80	0.66	0.54	0.56	0.85	0.71	0.62	0.66	0.62	0.66	0.58	0.68
(Na+K)/Al	1.05	1.07	0.88	0.83	0.84	0.85	0.88	0.99	0.95	0.37	0.81	1.03
F3/(F2+F3)	0.52	0.52	0.37	0.35	0.34	0.35	0.42	0.35	0.34	0.15	0.37	0.42
Qz residua	48.18	46.78	44.72	42.64	45.42	40.75	39.05	35.65	43.15	n.a.	45.31	31.73
Ks residua	11.72	20.49	26.92	26.95	8.82	18.56	24.97	23.51	23.08	n.a.	24.54	24.19
Ne residua	40.11	32.73	28.36	30.41	45.76	40.68	35.98	40.84	33.77	n.a.	30.15	44.08

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	325966	325969	325973	325981	325984	325986	325990	325992	325994	325998	326000	325603
Major elements, weight %												
	Phon-ite	Basalt	Benm-ite	Hawaiite	Benm-ite	Benm-ite	Basalt	Basalt	Benm-ite	Benm-ite	Benm-ite	Basalt
SiO2	55.99	45.00	60.48	49.67	60.43	56.41	46.69	47.32	59.45	56.16	56.64	43.98
Al2O3	20.18	13.22	13.68	13.37	14.18	15.55	13.30	12.96	14.11	14.53	15.29	13.95
Fe2O3	5.39	13.71	10.41	13.73	9.78	11.16	15.31	16.10	10.99	11.99	11.18	16.26
MgO	0.14	6.84	0.42	3.80	0.72	0.72	6.68	6.35	0.37	0.76	0.69	7.49
CaO	0.96	9.55	2.18	6.97	1.92	2.72	7.13	7.31	2.10	2.79	2.60	8.30
Na2O	9.31	2.68	5.00	3.44	4.53	4.66	2.73	2.78	5.08	4.54	4.90	2.68
K2O	5.60	2.38	5.13	2.43	5.29	5.36	1.96	1.59	5.11	5.78	5.30	1.33
TiO2	0.05	3.59	0.68	2.88	1.05	0.96	2.87	2.78	0.65	1.00	0.92	2.55
MnO	0.24	0.18	0.25	0.23	0.22	0.23	0.18	0.20	0.27	0.26	0.25	0.19
P2O5	0.00	0.65	0.07	1.52	0.22	0.17	1.28	0.83	0.07	0.16	0.18	1.35
F	0.26	0.00	0.17	0.02	0.00	0.20	0.00	0.00	0.11	0.15	0.17	0.00
Cl	0.33	0.02	0.08	0.03	0.09	0.06	0.04	0.00	0.04	0.02	0.09	0.07
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.19	-0.00	-0.09	-0.02	-0.02	-0.10	-0.01	-0.00	-0.06	-0.07	-0.09	-0.02
Total	98.26	97.82	98.46	98.07	98.41	98.10	98.16	98.22	98.29	98.07	98.12	98.13
Trace elements ppm												
Ba	53.	1784.	294.	4163.	146.	841.	1917.	1536.	397.	471.	371.	1721.
Nb	353.	143.	206.	60.	88.	303.	27.	15.	232.	236.	230.	42.
Zr	1386.	408.	1483.	384.	513.	1884.	186.	332.	1604.	1350.	1318.	227.
Y	106.	30.	147.	53.	57.	158.	35.	46.	148.	132.	122.	36.
Sr	45.	1031.	111.	959.	99.	166.	830.	659.	114.	94.	94.	1271.
Rb	248.	132.	230.	44.	123.	269.	65.	81.	175.	225.	189.	58.
Zn	274.	114.	298.	177.	167.	235.	116.	147.	304.	288.	258.	136.
Cu	6.	28.	9.	0.	4.	3.	38.	39.	0.	0.	0.	15.
Ni	5.	77.	0.	0.	0.	2.	38.	83.	2.	6.	2.	46.
Pb	33.	14.	56.	25.	32.	52.	11.	10.	58.	40.	39.	10.
U	7.	0.	1.	1.	0.	6.	0.	0.	3.	1.	0.	0.
Th	36.	3.	27.	0.	8.	32.	0.	0.	24.	18.	20.	0.
V	2.	389.	34.	211.	43.	43.	319.	311.	27.	41.	43.	310.
Cr	0.	228.	0.	0.	0.	0.	40.	86.	0.	0.	0.	13.
Nd	197.	65.	264.	121.	117.	251.	53.	46.	265.	187.	180.	71.
Ga	51.	27.	48.	27.	35.	49.	23.	28.	50.	46.	49.	26.
La	330.	52.	309.	125.	103.	337.	27.	35.	318.	252.	242.	51.
Ce	445.	138.	479.	224.	193.	501.	76.	103.	468.	379.	375.	113.
Zr/Nb	3.93	2.85	7.20	6.40	5.83	6.22	6.89	22.13	6.91	5.72	5.73	5.40

SUMMARY NORM TABLE

	325966.0	325969.0	325973.0	325981.0	325984.0	325986.0	325990.0	325992.0	325994.0	325998.0	326000.0	325603.0
Quartz	0.0	0.0	8.12	1.45	8.24	0.68	0.0	0.0	4.47	0.0	0.28	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	33.72	14.53	30.92	14.79	31.96	32.50	11.95	9.70	30.92	35.09	32.13	8.10
Albite	30.31	17.61	42.64	29.82	38.68	40.12	23.60	24.28	43.80	39.35	42.03	22.99
Anorthite	0.0	17.63	0.0	14.37	3.06	6.01	18.94	18.77	0.74	2.32	4.45	23.00
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	23.67	3.09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.55	0.03	0.13	0.05	0.15	0.10	0.07	0.0	0.07	0.03	0.15	0.12
Acmite	3.90	0.0	0.06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	3.06	21.81	8.29	9.17	4.47	4.90	7.36	10.82	7.78	8.71	5.81	8.47
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.04	16.64	5.47	7.30	16.75	18.30	4.48	4.54	6.87	8.02
Olivine	2.77	11.65	0.0	0.0	0.0	0.0	9.09	6.98	0.0	1.20	0.0	15.06
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	1.38	5.02	7.96	4.36	5.40	5.70	3.50	3.68	6.07	6.12	5.70	5.95
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	0.10	7.04	1.32	5.63	2.04	1.87	5.62	5.45	1.26	1.95	1.79	4.99
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.0	1.59	0.17	3.71	0.53	0.41	3.13	2.03	0.17	0.39	0.44	3.30
Fluorite	0.54	0.0	0.35	0.0	0.0	0.41	0.0	0.0	0.22	0.30	0.34	0.0
Diff Index	87.70	35.22	81.69	46.06	78.88	73.30	35.55	33.97	79.19	74.44	74.44	31.09
Na/(Na+K)	0.72	0.63	0.60	0.68	0.57	0.57	0.68	0.73	0.60	0.54	0.58	0.75
(Na+K)/Al	1.06	0.53	1.01	0.62	0.93	0.87	0.50	0.49	0.98	0.94	0.90	0.42
F3/(F2+F3)	0.42	0.24	0.52	0.21	0.37	0.34	0.15	0.15	0.37	0.34	0.34	0.24
Qz residua	32.44	n.a.	50.21	n.a.	50.41	45.16	n.a.	n.a.	47.85	44.58	44.89	n.a.
Ks residua	21.85	n.a.	21.51	n.a.	23.02	25.19	n.a.	n.a.	22.19	26.79	24.53	n.a.
Ne residua	45.71	n.a.	28.28	n.a.	26.56	29.65	n.a.	n.a.	29.96	28.64	30.59	n.a.

MAIN SWARM DYKE ANALYSES - OVERSATURATED AND UNDERSATURATED. EXCLUDES LAMPROPHYRES, CARBONATITES AND OSTFJORDSDAL DYKES

	325608	325610	325611	325612	325614	325615	325616	325618	325619
Major elements, weight %									
	Tracyand	Basalt	Basalt	Benm-ite	Tracyand	Basalt	Benm-ite	Pic-bas	Benm-ite
SiO2	62.93	48.39	49.21	58.04	60.68	47.80	60.10	44.34	58.16
Al2O3	13.09	11.78	14.11	16.33	13.89	12.30	14.20	10.89	15.00
Fe2O3	9.84	17.15	14.74	9.67	9.66	17.97	9.28	18.07	10.99
MgO	0.33	4.82	3.58	0.80	0.76	5.98	0.74	7.24	0.51
CaO	1.80	6.85	7.41	1.82	2.33	6.95	2.69	10.41	2.69
Na2O	4.78	2.88	3.29	5.55	4.43	2.44	4.60	1.87	5.19
K2O	4.64	1.94	1.45	4.68	5.22	1.19	5.16	0.88	4.25
TiO2	0.84	3.49	3.30	0.81	1.02	2.92	1.10	3.57	0.88
MnO	0.26	0.19	0.17	0.24	0.23	0.30	0.22	0.25	0.27
P2O5	0.06	0.87	0.80	0.14	0.14	0.62	0.17	0.94	0.14
F	0.06	0.01	0.08	0.19	0.21	0.00	0.19	0.00	0.00
Cl	0.02	0.02	0.01	0.02	0.02	0.06	0.02	0.12	0.01
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.03	-0.01	-0.04	-0.08	-0.09	-0.01	-0.08	-0.03	-0.00
Total	98.62	98.38	98.11	98.21	98.50	98.52	98.39	98.55	98.09
Trace elements ppm									
Ba	70.	1258.	875.	434.	186.	572.	241.	2367.	198.
Nb	135.	17.	17.	212.	97.	15.	90.	54.	101.
Zr	777.	434.	406.	854.	572.	357.	536.	215.	177.
Y	80.	63.	57.	90.	67.	53.	59.	25.	43.
Sr	70.	446.	377.	91.	130.	666.	150.	1142.	82.
Rb	167.	89.	68.	105.	140.	66.	141.	54.	20.
Zn	224.	127.	113.	226.	191.	236.	184.	262.	181.
Cu	6.	52.	85.	0.	20.	279.	6.	0.	0.
Ni	0.	35.	16.	4.	0.	45.	2.	73.	0.
Pb	39.	12.	14.	31.	29.	27.	31.	16.	6.
U	1.	0.	0.	3.	0.	0.	4.	0.	0.
Th	21.	0.	0.	18.	10.	0.	7.	0.	0.
V	34.	405.	380.	36.	46.	346.	53.	410.	310.
Cr	0.	61.	26.	0.	0.	83.	0.	245.	0.
Nd	168.	88.	65.	158.	135.	41.	118.	46.	191.
Ga	42.	28.	29.	38.	37.	28.	35.	28.	10.
La	199.	37.	35.	212.	141.	27.	129.	39.	176.
Ce	281.	113.	104.	311.	223.	93.	214.	101.	326.
Zr/Nb	5.76	25.53	23.88	4.03	5.90	23.80	5.96	3.98	1.75

SUMMARY NORM TABLE

	325608.0	325610.0	325611.0	325612.0	325614.0	325615.0	325616.0	325618.0	325619.0
Quartz	12.42	0.59	2.11	0.80	8.78	1.18	7.21	0.0	3.70
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	27.97	11.82	8.84	28.32	31.48	7.25	31.15	5.36	25.79
Albite	41.14	25.02	28.67	47.98	38.15	20.94	39.65	15.64	45.04
Anorthite	0.63	13.97	20.10	6.02	2.71	19.86	2.98	19.67	5.25
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.03	0.03	0.02	0.03	0.03	0.10	0.03	0.20	0.02
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	6.80	12.72	10.24	1.12	6.06	9.59	7.32	22.66	6.55
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	3.68	22.96	18.14	8.50	4.72	29.76	3.60	14.33	5.97
Olivine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.61	0.0
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	5.43	3.92	3.37	4.93	5.33	4.09	5.12	2.23	5.61
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilmenite	1.63	6.83	6.47	1.58	1.98	5.72	2.13	6.99	1.72
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.14	2.12	1.96	0.34	0.34	1.51	0.41	2.30	0.34
Fluorite	0.12	0.0	0.09	0.39	0.43	0.0	0.38	0.0	0.0
Diff Index	81.53	37.43	39.62	77.10	78.41	29.37	78.01	21.00	74.54
Na/(Na+K)	0.61	0.69	0.78	0.64	0.56	0.76	0.58	0.76	0.65
(Na+K)/Al	0.98	0.58	0.49	0.87	0.93	0.43	0.93	0.37	0.88
F3/(F2+F3)	0.37	0.15	0.15	0.34	0.37	0.15	0.37	0.08	0.34
Qz residua	53.17	n.a.	n.a.	45.42	50.83	n.a.	49.78	n.a.	47.60
Ks residua	19.49	n.a.	n.a.	20.87	22.82	n.a.	22.69	n.a.	19.66
Ne residua	27.34	n.a.	n.a.	33.71	26.36	n.a.	27.53	n.a.	32.73

OSTFJORDSDAL DYKE SWARM – NO DYKES CUT THE OSTFJORDSDAL SYENITE. INCLUDES LAMPROPHYRES AND CARBONATITE.

	52257	52274	52277	52291	326271	326273	326276	326278	326279	326281	326282	326284
Major elements, weight %												
	AL	Hawaiite	Phon-ite	Phon-ite	UML	Phon-ite	Benm-ite	Hawaiite	Phon-ite	CAL	Phon-ite	Phon-ite
SiO2	45.94	45.61	58.77	58.14	35.15	58.94	53.45	47.35	58.90	38.90	57.14	56.30
Al2O3	15.18	14.33	20.00	18.81	7.58	20.40	16.73	14.35	20.53	11.35	19.82	19.71
Fe2O3	12.06	13.87	4.84	6.91	16.61	4.33	10.97	13.16	3.89	18.30	5.85	5.73
MgO	5.83	4.62	0.11	0.21	14.78	0.11	1.12	6.05	0.13	6.24	0.18	0.47
CaO	6.66	8.24	0.94	1.21	12.78	1.32	3.43	7.09	1.06	11.11	0.91	1.49
Na2O	3.70	3.31	8.10	6.90	0.00	7.31	5.17	2.76	7.91	2.42	8.31	7.89
K2O	3.54	3.30	5.15	5.41	4.43	5.56	4.68	3.40	5.59	2.74	5.38	5.56
TiO2	3.69	3.30	0.07	0.22	4.32	0.11	1.36	2.91	0.09	4.90	0.19	0.39
MnO	0.22	0.27	0.21	0.21	0.22	0.17	0.23	0.18	0.19	0.26	0.18	0.22
P2O5	0.85	0.90	0.00	0.00	0.96	0.00	0.63	0.58	0.00	2.05	0.00	0.16
F	0.04	0.03	0.42	0.28	0.24	0.52	0.21	0.07	0.66	0.04	0.30	0.48
Cl	0.04	0.02	0.09	0.04	0.01	0.00	0.05	0.01	0.01	0.01	0.29	0.32
LOI	n.d.	n.d.	n.d.	n.d.	0.92	1.02	n.d.	n.d.	1.02	n.d.	n.d.	n.d.
O=F,Cl	-0.03	-0.02	-0.20	-0.12	-0.10	-0.22	-0.10	-0.03	-0.28	-0.02	-0.19	-0.27
Total	97.72	97.78	98.50	98.22	97.90	99.57	97.93	97.88	99.70	98.30	98.36	98.45
Trace elements ppm												
Ba	1732.	1560.	55.	164.	2832.	39.	5035.	3232.	29.	2537.	50.	426.
Nb	137.	128.	116.	268.	154.	230.	128.	114.	253.	151.	459.	370.
Zr	447.	441.	1171.	871.	400.	1029.	402.	330.	1401.	627.	1175.	1045.
Y	28.	34.	41.	71.	52.	64.	63.	27.	63.	54.	13.	86.
Sr	1910.	1362.	55.	220.	2135.	195.	738.	1752.	26.	1443.	83.	133.
Rb	171.	175.	215.	164.	209.	224.	116.	150.	269.	90.	274.	223.
Zn	105.	113.	247.	182.	164.	135.	170.	96.	206.	177.	129.	147.
Cu	20.	13.	4.	4.	48.	11.	0.	23.	7.	5.	4.	12.
Ni	63.	44.	10.	2.	480.	8.	0.	67.	3.	19.	2.	10.
Pb	7.	7.	31.	26.	18.	17.	14.	10.	28.	16.	11.	19.
U	8.	7.	4.	9.	2.	1.	0.	0.	4.	0.	1.	3.
Th	7.	4.	34.	35.	0.	17.	5.	1.	59.	0.	0.	17.
V	371.	340.	0.	5.	513.	7.	61.	321.	2.	495.	4.	16.
Cr	145.	136.	0.	0.	721.	0.	0.	186.	0.	13.	0.	0.
Nd	69.	54.	100.	154.	137.	93.	120.	57.	114.	135.	5.	182.
Ga	25.	26.	51.	39.	26.	44.	32.	20.	48.	31.	49.	43.
La	72.	79.	330.	177.	297.	102.	161.	62.	164.	119.	0.	254.
Ce	167.	159.	366.	301.	321.	165.	206.	95.	271.	234.	37.	362.
Zr/Nb	3.26	3.45	10.09	3.25	2.60	4.47	3.14	2.89	5.54	4.15	2.56	2.82

SUMMARY NORM TABLE

	52257.0	52274.0	52277.0	52291.0	326271.0	326273.0	326276.0	326278.0	326279.0	326281.0	326282.0	326284.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.30	0.0	0.0	0.97	0.0	0.0	0.83	0.0	0.0	0.0
Orthoclase	21.60	20.15	30.92	32.64	0.0	33.35	28.42	20.74	33.46	16.57	32.37	33.39
Albite	20.00	18.16	47.85	46.82	0.0	46.76	41.21	23.05	45.77	9.52	41.55	38.72
Anorthite	14.95	15.04	2.50	4.59	7.91	3.88	9.01	17.30	1.83	12.32	1.77	2.92
Leucite	0.0	0.0	0.0	0.0	21.27	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nepheline	6.55	5.78	11.54	6.81	-0.03	8.68	1.87	0.54	11.90	6.16	15.40	14.82
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.07	0.03	0.15	0.07	0.02	0.0	0.08	0.02	0.02	0.02	0.49	0.54
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	10.86	17.37	0.0	0.04	16.12	0.0	2.79	12.15	0.0	23.64	1.08	0.87
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Olivine	12.24	9.70	2.74	3.74	21.49	2.40	6.31	14.80	2.27	3.46	2.73	3.08
Larnite	0.0	0.0	0.0	0.0	9.14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Magnetite	4.42	5.08	2.99	4.28	5.60	2.66	5.74	4.19	2.39	5.73	3.62	3.54
Hematite	0.0	0.0	0.0	0.0	7.20	0.0	0.0	0.0	0.0	8.08	0.0	0.0
Ilmenite	7.24	6.48	0.14	0.43	8.50	0.21	2.65	5.71	0.17	9.52	0.37	0.75
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	2.08	2.20	0.0	0.0	2.36	0.0	1.53	1.42	0.0	4.97	0.0	0.39
Fluorite	0.0	0.0	0.88	0.59	0.42	1.08	0.38	0.09	1.37	0.0	0.63	0.99
Diff Index	48.16	44.09	90.30	86.28	21.24	88.79	71.50	44.33	91.12	32.25	89.32	86.93
Na/(Na+K)	0.61	0.60	0.71	0.66	0.0	0.67	0.63	0.55	0.68	0.57	0.70	0.68
(Na+K)/Al	0.65	0.63	0.94	0.91	0.63	0.88	0.81	0.57	0.93	0.61	0.98	0.96
F3/(F2+F3)	0.24	0.24	0.42	0.42	0.64	0.42	0.35	0.21	0.42	0.64	0.42	0.42
Qz residua	n.a.	n.a.	39.07	41.21	n.a.	40.35	43.57	n.a.	38.87	n.a.	36.97	37.00
Ks residua	n.a.	n.a.	19.46	21.50	n.a.	21.34	22.58	n.a.	20.86	n.a.	20.59	21.83
Ne residua	n.a.	n.a.	41.48	37.29	n.a.	38.31	33.84	n.a.	40.27	n.a.	42.44	41.17

OSTFJORDSDAL DYKE SWARM - NO DYKES CUT THE OSTFJORDSDAL SYENITE. INCLUDES LAMPROPHYRES AND CARBONATITE.

	326285	326288	326292	326293	326294	326296	326298	326301	326303	326304	326305	326306
Major elements, weight %												
	Phon-ite	Phon-ite	Mug-ite	Tep/Basn	Ph-teph	Tracyand	Neph-ite	UML	UML	UML	Phon-ite	CAL
SiO2	56.09	56.42	48.62	46.05	52.88	61.41	40.34	35.51	32.85	33.09	56.81	38.20
Al2O3	21.30	20.36	14.38	13.56	17.85	20.50	10.50	6.16	7.75	5.75	20.44	10.80
Fe2O3	5.53	5.14	12.45	13.67	8.59	4.93	17.74	20.01	19.09	15.79	5.23	17.73
MgO	0.67	0.14	3.72	4.19	1.51	0.13	8.50	12.23	12.91	17.25	0.67	7.12
CaO	1.54	1.40	6.23	6.69	3.46	1.35	10.79	15.55	14.98	14.63	1.39	14.83
Na2O	7.89	8.63	4.63	3.46	7.02	7.82	2.04	0.48	0.00	0.00	7.82	1.93
K2O	4.20	5.54	3.15	4.33	4.62	2.02	3.19	1.30	4.00	2.91	4.94	2.32
TiO2	0.43	0.07	2.52	3.21	0.96	0.03	4.00	5.29	3.73	3.92	0.44	2.78
MnO	0.20	0.20	0.29	0.27	0.30	0.34	0.25	0.27	0.28	0.24	0.16	0.40
P2O5	0.13	0.00	1.82	2.36	0.44	0.00	0.73	1.71	2.23	2.28	0.13	2.21
F	0.32	0.50	0.11	0.04	0.29	0.32	0.00	0.02	0.16	0.66	0.38	0.02
Cl	0.02	0.36	0.00	0.03	0.32	0.02	0.05	0.22	0.02	0.03	0.42	0.01
LOI	1.82	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.96	n.d.	n.d.	n.d.
O=F,Cl	-0.14	-0.29	-0.05	-0.02	-0.20	-0.14	-0.01	-0.06	-0.07	-0.28	-0.25	-0.01
Total	100.00	98.47	97.87	97.84	98.04	98.73	98.12	98.69	98.89	96.27	98.58	98.34
Trace elements ppm												
Ba	1144.	213.	1169.	7406.	1340.	768.	1771.	734.	1946.	2808.	236.	2272.
Nb	465.	302.	98.	79.	334.	157.	112.	150.	87.	162.	182.	145.
Zr	1667.	1075.	364.	367.	1172.	950.	398.	531.	508.	715.	740.	726.
Y	81.	69.	46.	44.	86.	72.	59.	46.	52.	76.	46.	93.
Sr	571.	112.	1075.	1965.	615.	743.	1165.	1192.	2097.	1955.	190.	2900.
Rb	223.	203.	83.	80.	194.	77.	134.	61.	155.	169.	173.	122.
Zn	164.	130.	186.	138.	207.	888.	176.	215.	207.	155.	104.	248.
Cu	3.	3.	0.	0.	2.	44.	99.	137.	65.	0.	19.	0.
Ni	5.	0.	0.	0.	10.	3.	195.	465.	409.	356.	0.	172.
Pb	41.	18.	23.	15.	24.	36.	23.	21.	14.	19.	14.	31.
U	13.	1.	0.	2.	3.	5.	0.	0.	4.	4.	0.	9.
Th	50.	17.	0.	0.	27.	44.	4.	0.	0.	0.	12.	31.
V	18.	4.	157.	199.	73.	4.	498.	615.	463.	497.	22.	282.
Cr	0.	5.	0.	0.	10.	0.	501.	727.	391.	321.	0.	211.
Nd	129.	127.	131.	111.	167.	110.	112.	146.	141.	143.	106.	288.
Ga	42.	42.	27.	22.	39.	42.	30.	24.	22.	18.	38.	30.
La	214.	136.	109.	107.	239.	243.	203.	141.	156.	296.	172.	454.
Ce	313.	240.	222.	168.	346.	307.	270.	273.	271.	326.	234.	583.
Zr/Nb	3.58	3.56	3.71	4.65	3.51	6.05	3.55	3.54	5.84	4.41	4.07	5.01

SUMMARY NORM TABLE

	326285.0	326288.0	326292.0	326293.0	326294.0	326296.0	326298.0	326301.0	326303.0	326304.0	326305.0	326306.0
Quartz	0.0	0.0	0.0	0.0	0.0	4.06	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	1.95	0.0	0.0	0.0	0.0	3.68	0.0	0.0	0.0	0.0	1.20	0.0
Orthoclase	25.34	33.25	19.17	26.41	27.95	12.11	19.33	0.0	0.0	0.0	29.63	12.20
Albite	47.02	36.54	36.10	24.35	33.30	67.03	2.24	0.0	0.0	0.0	45.10	0.0
Anorthite	5.25	1.53	9.43	9.05	4.59	5.10	10.48	11.68	9.65	7.48	4.15	14.30
Leucite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.14	19.04	14.05	0.0	1.42
Nepheline	11.39	19.30	2.30	3.08	13.93	0.0	8.22	1.58	-0.06	-0.09	10.68	9.01
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.03	0.60	0.0	0.05	0.54	0.03	0.08	0.37	0.03	0.05	0.70	0.02
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	0.0	2.52	8.21	7.67	7.21	0.0	30.76	42.58	13.28	17.30	0.0	35.93
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	0.0	4.56	0.0	0.0	0.0	0.0	0.0	0.0
Olivine	4.34	1.92	9.49	12.34	4.51	0.0	5.21	7.92	18.83	25.74	3.38	1.03
Larnite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.27	10.63	8.46	0.0	0.0
Magnetite	2.87	3.17	5.85	5.00	4.47	2.71	7.79	6.39	10.16	6.04	3.22	11.88
Hematite	0.0	0.0	0.0	0.0	0.0	0.0	6.32	8.70	5.60	6.41	0.0	3.46
Ilmenite	0.83	0.14	4.93	6.29	1.87	0.06	7.79	10.24	7.28	7.75	0.85	5.40
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	0.31	0.0	4.44	5.77	1.07	0.0	1.77	4.13	5.43	5.62	0.31	5.35
Fluorite	0.66	1.04	0.06	0.0	0.57	0.67	0,0	0.0	0.13	1.19	0.78	0.0
Diff Index	83.75	89.09	57.58	53.84	75.18	83.20	29.79	7.72	18.98	13.95	85.41	22.64
Na/(Na+K)	0.74	0.70	0.69	0.55	0.70	0.85	0.49	0.36	0.0	0.0	0.71	0.56
(Na+K)/Al	0.82	0.99	0.77	0.77	0.93	0.73	0.65	0.36	0.56	0.55	0.89	0.53
F3/(F2+F3)	0.35	0.42	0.31	0.24	0.35	0.37	0.64	0.64	0.64	0.64	0.42	0.64
Qz residua	38.79	34.91	n.a.	n.a.	36.35	48.09	n.a.	n.a.	n.a.	n.a.	39.18	n.a.
Ks residua	17.19	21.21	n.a.	n.a.	21.13	8.27	n.a.	n.a.	n.a.	n.a.	19.71	n.a.
Ne residua	44.01	43.88	n.a.	n.a.	42.52	43.64	n.a.	n.a.	n.a.	n.a.	41.11	n.a.

OSTFJORDSDAL DYKE SWARM - NO DYKES CUT THE OSTFJORDSDAL SYENITE. INCLUDES LAMPROPHYRES AND CARBONATITE.

	326307	326302
Major elements, weight %		
	Phon-ite	Cbtite
SiO2	56.47	8.60
Al2O3	19.93	0.10
Fe2O3	5.73	0.91
MgO	0.18	0.13
CaO	1.24	42.52
Na2O	8.42	0.00
K2O	5.51	0.05
TiO2	0.22	0.05
MnO	0.15	1.71
P2O5	0.03	0.02
F	0.39	0.50
Cl	0.58	0.00
LOI	n.d.	43.98
O=F,Cl	-0.30	-0.21
Total	98.55	98.36
Trace elements ppm		
Ba	17.	346.
Nb	233.	9.
Zr	415.	0.
Y	25.	306.
Sr	43.	6486.
Rb	225.	3.
Zn	86.	215.
Cu	7.	-1.
Ni	3.	9.
Pb	12.	-1.
U	0.	11.
Th	5.	5.
V	7.	4.
Cr	0.	5.
Nd	135.	187.
Ga	44.	0.
La	193.	300.
Ce	283.	553.
Zr/Nb	1.78	0.00

SUMMARY NORM TABLE

	326307.0
Quartz	0.0
Corundum	0.0
Orthoclase	33.05
Albite	38.49
Anorthite	2.03
Leucite	0.0
Nepheline	16.58
Kaliop-ite	0.0
Halite	0.97
Acmite	0.0
Na Metasil	0.0
K metasil	0.0
Diopside	1.71
Wollaston.	0.0
Hypersthen	0.0
Olivine	2.34
Larnite	0.0
Magnetite	3.53
Hematite	0.0
Ilmenite	0.42
Titanite	0.0
Perovskite	0.0
Rutile	0.0
Apatite	0.07
Fluorite	0.81
Diff Index	88.12
Na/(Na+K)	0.70
(Na+K)/Al	0.99
F3/(F2+F3)	0.42
Qz residua	36.21
Ks residua	21.31
Ne residua	42.47

CARBONATITE DYKE ANALYSES

	54244	58254	41958	127052	54243	41982	54275	41963	43859	46257	43931	326247.0
Major elements, weight %												
	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite
SiO2	3.08	1.97	3.40	12.34	6.59	10.16	5.63	14.55	0.14	3.59	17.54	1.97
Al2O3	0.23	0.52	0.76	1.02	0.37	1.97	0.44	0.22	0.22	1.03	4.07	0.78
Fe2O3	13.32	14.26	4.40	26.42	11.23	6.73	13.43	3.05	3.89	14.92	0.51	5.92
MgO	1.40	1.97	0.79	10.11	1.32	0.87	2.36	0.58	0.67	2.35	0.55	0.20
CaO	41.19	39.38	49.43	40.43	41.05	40.36	38.04	44.21	46.42	42.24	34.57	42.39
Na2O	0.60	0.58	0.51	0.86	0.71	0.83	0.65	0.54	0.75	0.65	2.35	0.00
K2O	0.00	0.48	0.04	0.78	0.00	0.76	0.12	0.00	0.00	0.95	0.00	0.01
TiO2	0.12	0.29	0.10	0.26	0.12	0.14	0.13	0.10	0.09	0.14	0.09	0.07
MnO	2.43	1.71	2.37	2.46	2.44	3.04	3.48	1.44	2.01	1.90	1.78	2.41
P2O5	3.35	2.66	0.04	0.64	4.09	0.33	3.15	0.08	0.93	2.88	0.00	1.20
F	0.60	0.99	0.22	0.76	0.30	0.27	0.60	0.58	0.31	2.83	0.39	0.47
Cl	0.00	0.01	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.01
LOI	29.85	29.40	38.50	7.67	27.46	32.34	27.51	34.88	39.90	24.80	36.75	41.98
O=F,Cl	-0.25	-0.42	-0.09	-0.32	-0.12	-0.12	-0.25	-0.24	-0.13	-1.19	-0.17	-0.20
Total	95.92	93.80	100.47	103.45	95.56	97.69	95.29	99.99	95.20	97.09	98.45	97.21
Trace elements ppm												
Ba	3593.	19048.	174.	6011.	2766.	276.	9051.	415.	5206.	187.	78.	586.
Nb	293.	987.	21.	20.	647.	47.	566.	30.	42.	248.	25.	94.
Zr	0.	42.	11.	0.	1.	35.	0.	7.	0.	1.	14.	0.
Y	860.	581.	568.	102.	809.	1365.	960.	899.	433.	1171.	1820.	663.
Sr	39348.	23975.	2793.	8180.	39933.	5970.	46670.	4679.	30574.	7970.	4595.	8299.
Rb	40.	54.	25.	28.	40.	107.	58.	18.	36.	67.	20.	0.
Zn	1052.	1224.	525.	490.	849.	545.	1828.	293.	51.	135.	613.	889.
Cu	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.
Ni	23.	19.	11.	25.	24.	22.	29.	15.	15.	25.	21.	18.
Pb	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.
U	38.	23.	4.	9.	40.	6.	44.	5.	37.	7.	9.	8.
Th	311.	240.	14.	55.	314.	133.	843.	87.	35.	755.	8.	383.
V	58.	61.	0.	234.	11.	0.	8.	13.	0.	0.	0.	0.
Cr	0.	0.	2.	83.	3.	0.	0.	2.	0.	1.	5.	4.
Nd	1541.	1459.	768.	237.	1757.	1463.	1585.	913.	2017.	2267.	263.	1661.
Ga	4.	2.	7.	2.	3.	13.	3.	2.	1.	10.	4.	7.
La	1784.	2131.	1080.	306.	1845.	2099.	2079.	1242.	1992.	3171.	209.	2841.
Ce	3820.	3860.	2104.	607.	4154.	4104.	4204.	2429.	4451.	6331.	516.	5124.
Zr/Nb	0.00	0.04	0.52	0.00	0.00	0.74	0.00	0.23	0.00	0.00	0.56	0.00

CARBONATITE DYKE ANALYSES

	326302	326343	326333	326329	326336	326263	325908	325910	326395	326323	326347	326388.0
Major elements, weight %												
	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite	Cbtite
SiO2	8.60	3.33	5.18	1.47	9.33	9.79	1.71	4.87	15.16	8.42	0.97	6.47
Al2O3	0.10	0.15	0.02	0.05	0.08	1.50	0.01	0.03	0.09	1.41	0.13	0.03
Fe2O3	0.91	10.07	4.07	8.42	11.20	18.12	7.37	8.65	9.31	6.67	6.62	11.57
MgO	0.13	0.98	0.33	0.45	1.38	1.53	0.54	0.97	1.51	0.45	0.48	1.84
CaO	42.52	37.23	42.97	35.95	38.19	31.64	44.01	46.97	43.06	43.07	42.70	39.83
Na2O	0.00	0.12	0.00	0.05	0.30	0.53	0.05	0.01	0.48	0.01	0.01	0.09
K2O	0.05	0.22	0.00	0.01	0.01	0.64	0.01	0.06	0.01	0.79	0.10	0.48
TiO2	0.05	0.05	0.04	0.06	0.13	0.34	0.03	0.03	0.06	0.15	0.07	0.08
MnO	1.71	1.78	0.97	1.67	2.44	3.09	2.19	2.30	3.99	3.12	1.41	1.75
P2O5	0.02	3.11	2.79	2.62	3.53	0.05	1.11	3.00	8.37	0.35	3.89	0.91
F	0.50	0.76	0.36	0.59	0.59	0.43	0.47	9.45	13.70	0.53	0.85	2.70
Cl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOI	43.98	35.75	38.45	36.70	25.46	26.96	35.68	14.36	5.37	33.48	34.76	25.02
O=F,Cl	-0.21	-0.32	-0.15	-0.25	-0.25	-0.18	-0.20	-3.98	-5.77	-0.22	-0.36	-1.14
Total	98.36	93.23	95.03	87.79	92.39	94.44	92.98	86.72	95.34	98.23	91.63	89.63
Trace elements ppm												
Ba	346.	5394.	3035.	3859.	5299.	1146.	4779.	5216.	491.	485.	5125.	4344.
Nb	9.	286.	186.	481.	221.	275.	512.	94.	79.	95.	639.	176.
Zr	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y	306.	812.	523.	651.	786.	488.	602.	859.	1903.	1797.	738.	1100.
Sr	6486.	41605.	35172.	45885.	45946.	38631.	42064.	51538.	27646.	6130.	46509.	54036.
Rb	3.	0.	0.	0.	0.	17.	0.	0.	0.	123.	0.	0.
Zn	215.	836.	149.	892.	1065.	3553.	805.	788.	1175.	611.	499.	1636.
Cu	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.
Ni	9.	25.	18.	22.	27.	26.	19.	28.	38.	25.	21.	27.
Pb	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.
U	11.	45.	43.	45.	47.	31.	46.	46.	23.	6.	49.	45.
Th	5.	271.	67.	285.	233.	646.	161.	293.	1055.	235.	69.	657.
V	4.	37.	2.	19.	27.	28.	4.	74.	8.	0.	6.	21.
Cr	5.	0.	0.	0.	0.	1.	0.	6.	1.	1.	0.	0.
Nd	187.	1759.	909.	1558.	1870.	1707.	2032.	1939.	2985.	1482.	1910.	2516.
Ga	0.	5.	2.	4.	4.	8.	3.	1.	0.	11.	3.	4.
La	300.	2126.	859.	1686.	2325.	1998.	2182.	2325.	4056.	2171.	1846.	4886.
Ce	553.	4268.	1988.	3702.	4610.	4086.	4790.	4744.	7869.	4180.	4051.	8237.
Zr/Nb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CARBONATITE DYKE ANALYSES

	326337	326362
Major elements, weight %		
	Cbtite	Cbtite
SiO2	7.23	2.24
Al2O3	0.99	0.00
Fe2O3	3.57	7.44
MgO	4.11	1.03
CaO	43.38	42.81
Na2O	0.17	0.04
K2O	1.12	0.01
TiO2	0.17	0.05
MnO	0.97	2.32
P2O5	1.07	3.68
F	0.52	0.67
Cl	0.00	0.01
LOI	34.19	32.67
O=F,Cl	-0.22	-0.28
Total	97.27	92.69
Trace elements ppm		
Ba	1433.	5637.
Nb	74.	372.
Zr	103.	0.
Y	438.	893.
Sr	9601.	22373.
Rb	43.	0.
Zn	278.	1125.
Cu	-1.	-1.
Ni	20.	21.
Pb	-1.	-1.
U	14.	21.
Th	194.	537.
V	25.	5.
Cr	47.	0.
Nd	1088.	2345.
Ga	4.	0.
La	1778.	2981.
Ce	3011.	6020.
Zr/Nb	1.39	0.00

LAMPROPHYRE DYKE ANALYSES

	41904	41906	41907	43887	43894	46208	46279	52257	52285	52287	54164	326271
Major elements, weight %												
	CAL	UML	CAL	AL	AL	AL	UML	AL	AL	AL	AL	UML
SiO2	45.05	35.25	45.20	46.34	40.97	42.06	42.07	45.94	44.62	44.64	40.82	35.15
Al2O3	12.77	10.49	12.88	15.93	12.00	12.33	15.70	15.18	14.23	13.90	13.17	7.58
Fe2O3	14.55	16.66	14.33	12.13	17.42	17.71	13.03	12.06	12.87	12.72	15.07	16.61
MgO	7.39	9.38	6.83	4.13	7.04	5.68	7.01	5.83	6.01	5.87	6.86	14.78
CaO	6.35	15.36	6.77	7.65	10.38	8.40	10.87	6.66	8.39	8.26	10.42	12.78
Na2O	1.80	0.79	1.48	4.08	2.30	3.54	4.32	3.70	3.99	3.22	2.22	0.00
K2O	6.11	3.42	6.46	2.75	2.41	2.45	2.65	3.54	2.98	3.75	4.02	4.43
TiO2	2.67	4.15	2.73	2.63	4.41	3.82	1.50	3.69	3.33	4.43	3.44	4.32
MnO	0.20	0.31	0.20	0.17	0.23	0.36	0.20	0.22	0.20	0.20	0.26	0.22
P2O5	1.00	2.27	1.02	1.91	0.96	1.79	0.12	0.85	1.07	0.69	1.55	0.96
F	0.06	0.25	0.21	0.00	0.00	0.00	0.26	0.04	0.14	0.09	0.00	0.24
Cl	0.01	0.01	0.01	0.07	0.02	0.02	0.57	0.04	0.02	0.02	0.01	0.01
LOI	1.08	n.d.	1.23	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.92
O=F,Cl	-0.03	-0.11	-0.09	-0.02	-0.01	-0.00	-0.24	-0.03	-0.06	-0.04	-0.00	-0.10
Total	99.01	98.23	99.26	97.77	98.13	98.16	98.06	97.72	97.79	97.75	97.84	97.90
Trace elements ppm												
Ba	2781.	2924.	2542.	3985.	1612.	3218.	1281.	1732.	2097.	1356.	3064.	2832.
Nb	98.	165.	106.	49.	94.	44.	79.	137.	122.	137.	120.	154.
Zr	452.	619.	447.	290.	419.	238.	192.	447.	426.	525.	559.	400.
Y	34.	78.	34.	42.	38.	134.	42.	28.	32.	30.	47.	52.
Sr	2020.	4146.	1569.	1717.	1614.	1002.	992.	1910.	2227.	1302.	3017.	2135.
Rb	199.	125.	197.	60.	122.	86.	81.	171.	158.	169.	163.	209.
Zn	192.	162.	171.	118.	156.	156.	117.	105.	101.	113.	161.	164.
Cu	99.	180.	68.	9.	147.	1.	0.	20.	25.	18.	20.	48.
Ni	203.	223.	195.	17.	191.	31.	217.	63.	88.	66.	79.	480.
Pb	21.	45.	16.	16.	6.	21.	8.	7.	4.	3.	14.	18.
U	9.	17.	7.	7.	5.	0.	2.	8.	8.	3.	13.	2.
Th	5.	17.	7.	9.	3.	14.	1.	7.	5.	6.	9.	0.
V	323.	415.	317.	185.	459.	370.	251.	371.	358.	481.	357.	513.
Cr	322.	262.	298.	1.	96.	17.	145.	145.	265.	165.	185.	721.
Nd	70.	198.	66.	80.	65.	263.	41.	69.	72.	53.	137.	137.
Ga	28.	23.	32.	20.	32.	22.	21.	25.	23.	30.	25.	26.
La	101.	348.	110.	95.	57.	350.	81.	72.	101.	49.	154.	297.
Ce	178.	417.	174.	216.	142.	572.	137.	167.	196.	137.	309.	321.
Zr/Nb	4.61	3.75	4.22	5.92	4.46	5.41	2.43	3.26	3.49	3.83	4.66	2.60

SUMMARY NORM TABLE

	41904.0	41906.0	41907.0	43887.0	43894.0	46208.0	46279.0	52257.0	52285.0	52287.0	54164.0	326271.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	37.28	0.0	39.34	16.76	14.60	14.94	5.46	21.60	18.18	22.89	24.40	0.0
Albite	2.53	0.0	1.33	28.87	12.87	17.61	0.0	20.00	15.19	11.68	2.32	0.0
Anorthite	9.03	15.35	9.74	17.77	15.74	10.91	17.76	14.95	12.57	12.86	14.51	7.91
Leucite	0.0	16.21	0.0	0.0	0.0	0.0	8.33	0.0	0.0	0.0	0.0	21.27
Nepheline	7.11	3.67	6.24	3.43	3.77	7.14	18.61	6.55	10.59	8.85	9.16	-0.03
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.02	0.02	0.02	0.12	0.03	0.03	0.97	0.07	0.03	0.03	0.02	0.02
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	13.57	24.37	13.96	6.99	23.83	16.51	28.96	10.86	18.42	19.75	21.94	16.12
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Olivine	17.42	8.83	15.95	11.80	4.85	14.51	11.40	12.24	10.97	8.78	5.17	21.49
Larnite	0.0	4.75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.14
Magnetite	5.33	6.37	5.24	4.44	6.17	6.48	4.75	4.42	4.71	4.66	6.65	5.60
Hematite	0.0	6.56	0.0	0.0	7.22	0.0	0.0	0.0	0.0	0.0	5.36	7.20
Ilmenite	5.23	8.06	5.34	5.15	8.58	7.49	2.93	7.24	6.53	8.69	6.71	8.50
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	2.44	5.50	2.49	4.67	2.33	4.37	0.29	2.08	2.62	1.69	3.77	2.36
Fluorite	0.03	0.31	0.35	0.0	0.0	0.0	0.54	0.0	0.20	0.13	0.0	0.42
Diff Index	46.92	19.89	46.91	49.06	31.24	39.69	32.40	48.16	43.96	43.42	35.88	21.24
Na/(Na+K)	0.31	0.26	0.26	0.69	0.59	0.69	0.71	0.61	0.67	0.57	0.46	0.0
(Na+K)/Al	0.75	0.48	0.73	0.61	0.53	0.69	0.64	0.65	0.69	0.67	0.61	0.63
F3/(F2+F3)	0.24	0.64	0.24	0.24	0.64	0.24	0.24	0.24	0.24	0.24	0.64	0.64
Qz residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ks residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ne residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

LAMPROPHYRE DYKE ANALYSES

	326281	326301	326303	326304	326306	326314	326317	326318	325936	325943	325948	325955
Major elements, weight %												
	CAL	UML	UML	UML	CAL	AL	CAL	CAL	AL	AL	UML	odd UML
SiO2	38.90	35.51	32.85	33.09	38.20	38.10	40.24	41.15	40.40	42.03	37.62	38.16
Al2O3	11.35	6.16	7.75	5.75	10.80	9.80	10.34	11.87	12.58	12.98	6.78	5.55
Fe2O3	18.30	20.01	19.09	15.79	17.73	21.09	19.01	17.44	15.36	16.74	15.81	17.25
MgO	6.24	12.23	12.91	17.25	7.12	8.44	8.01	6.63	7.24	5.18	15.93	14.43
CaO	11.11	15.55	14.98	14.63	14.83	10.65	10.26	10.20	11.02	10.69	9.04	11.37
Na2O	2.42	0.48	0.00	0.00	1.93	1.46	1.95	3.10	2.39	2.02	0.00	0.42
K2O	2.74	1.30	4.00	2.91	2.32	2.69	3.31	2.26	3.38	3.19	5.83	4.63
TiO2	4.90	5.29	3.73	3.92	2.78	5.62	4.49	4.63	3.55	3.99	4.00	3.85
MnO	0.26	0.27	0.28	0.24	0.40	0.24	0.24	0.22	0.26	0.25	0.27	0.45
P2O5	2.05	1.71	2.23	2.28	2.21	0.51	0.39	0.56	1.69	0.95	0.99	1.13
F	0.04	0.02	0.16	0.66	0.02	0.00	0.00	0.00	0.00	0.00	0.13	0.13
Cl	0.01	0.22	0.02	0.03	0.01	0.09	0.15	0.24	0.01	0.01	0.01	0.10
LOI	n.d.	n.d.	0.96	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
O=F,Cl	-0.02	-0.06	-0.07	-0.28	-0.01	-0.02	-0.03	-0.06	-0.00	-0.00	-0.06	-0.08
Total	98.30	98.69	98.89	96.27	98.34	98.67	98.36	98.24	97.88	98.03	96.35	97.39
Trace elements ppm												
Ba	2537.	734.	1946.	2808.	2272.	1428.	1398.	1425.	3441.	2256.	2273.	1189.
Nb	151.	150.	87.	162.	145.	78.	78.	92.	130.	140.	139.	119.
Zr	627.	531.	508.	715.	726.	290.	295.	350.	558.	508.	468.	305.
Y	54.	46.	52.	76.	93.	34.	34.	38.	49.	45.	48.	50.
Sr	1443.	1192.	2097.	1955.	2900.	714.	874.	1173.	3257.	2085.	1063.	108.
Rb	90.	61.	155.	169.	122.	144.	177.	119.	146.	129.	254.	380.
Zn	177.	215.	207.	155.	248.	173.	214.	169.	156.	157.	375.	231.
Cu	5.	137.	65.	0.	0.	24.	87.	158.	27.	18.	3.	31.
Ni	19.	465.	409.	356.	172.	139.	137.	68.	99.	65.	571.	525.
Pb	16.	21.	14.	19.	31.	16.	17.	90.	11.	8.	22.	10.
U	0.	0.	4.	4.	9.	0.	0.	0.	11.	1.	0.	0.
Th	0.	0.	0.	0.	31.	0.	0.	0.	3.	4.	9.	6.
V	495.	615.	463.	497.	282.	699.	593.	536.	369.	352.	424.	412.
Cr	13.	727.	391.	321.	211.	240.	262.	109.	184.	86.	389.	543.
Nd	135.	146.	141.	143.	288.	46.	28.	49.	152.	75.	176.	14.
Ga	31.	24.	22.	18.	30.	28.	28.	28.	23.	30.	18.	19.
La	119.	141.	156.	296.	454.	34.	24.	34.	164.	100.	238.	5.
Ce	234.	273.	271.	326.	583.	89.	84.	131.	285.	147.	297.	48.
Zr/Nb	4.15	3.54	5.84	4.41	5.01	3.72	3.78	3.80	4.29	3.63	3.37	2.56

SUMMARY NORM TABLE

	326281.0	326301.0	326303.0	326304.0	326306.0	326314.0	326317.0	326318.0	325936.0	325943.0	325948.0	325955.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	16.57	0.0	0.0	0.0	12.20	16.23	20.02	13.77	20.50	19.47	0.0	0.0
Albite	9.52	0.0	0.0	0.0	0.0	3.14	2.80	6.27	4.12	5.55	0.0	0.0
Anorthite	12.32	11.68	9.65	7.48	14.30	12.76	10.36	12.88	14.01	17.52	1.37	0.0
Leucite	0.0	6.14	19.04	14.05	1.42	0.0	0.0	0.0	0.0	0.0	28.19	22.18
Nepheline	6.16	1.58	-0.06	-0.09	9.01	4.86	7.18	10.52	8.99	6.53	-0.03	1.55
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halite	0.02	0.37	0.03	0.05	0.02	0.15	0.25	0.41	0.02	0.02	0.02	0.17
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.21
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diopside	23.64	42.58	13.28	17.30	35.93	29.40	30.45	29.00	23.96	25.42	23.94	35.78
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Olivine	3.46	7.92	18.83	25.74	1.03	5.48	4.41	10.35	5.18	9.21	21.23	14.41
Larnite	0.0	0.27	10.63	8.46	0.0	0.0	0.0	0.0	0.0	0.0	2.31	1.33
Magnetite	5.73	6.39	10.16	6.04	11.88	6.48	7.64	6.38	6.65	6.14	5.91	12.87
Hematite	8.08	8.70	5.60	6.41	3.46	9.37	7.24	0.0	5.54	0.0	6.53	0.99
Ilmenite	9.52	10.24	7.28	7.75	5.40	10.90	8.73	9.06	6.92	7.83	7.93	7.56
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	4.97	4.13	5.43	5.62	5.35	1.23	0.95	1.37	4.11	2.32	2.45	2.77
Fluorite	0.0	0.0	0.13	1.19	0.0	0.0	0.0	0.0	0.0	0.0	0.18	0.17
Diff Index	32.25	7.72	18.98	13.95	22.64	24.22	29.99	30.55	33.61	31.55	28.15	23.73
Na/(Na+K)	0.57	0.36	0.0	0.0	0.56	0.45	0.47	0.68	0.52	0.49	0.0	0.12
(Na+K)/Al	0.61	0.36	0.56	0.55	0.53	0.54	0.66	0.64	0.60	0.52	0.93	1.03
F3/(F2+F3)	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.24	0.64	0.24	0.64	0.56
Qz residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ks residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ne residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

LAMPROPHYRE DYKE ANALYSES

	325958	325959	325961	325962	325963	325972	127051	46256	325952	326249	326358	326345
Major elements, weight %												
	UML	UML	Breccia/UML	UML	UML	UML	odd UML	UML	UML	Cbt/UML	Cbt/UML	odd UML
SiO2	31.54	35.83	40.51	36.08	26.86	40.74	28.57	30.53	39.42	15.76	3.00	26.05
Al2O3	5.52	7.10	7.32	6.54	5.06	5.16	1.37	5.59	5.59	5.04	0.61	5.13
Fe2O3	14.72	19.95	9.10	14.86	16.27	16.20	37.74	15.61	16.02	14.87	5.17	20.99
MgO	16.68	10.51	7.70	17.47	15.82	16.25	9.74	17.14	16.02	8.39	1.25	14.00
CaO	18.48	11.31	20.11	10.92	23.46	9.48	18.75	17.56	9.23	25.61	42.82	17.53
Na2O	0.09	0.29	6.21	0.24	0.00	0.21	1.01	0.00	0.25	0.03	0.02	0.00
K2O	3.82	4.85	0.28	4.29	3.61	4.25	0.13	4.11	5.40	3.66	0.49	5.14
TiO2	3.92	6.55	4.32	3.73	3.73	2.89	0.30	3.47	3.85	2.27	0.09	6.91
MnO	0.39	0.61	0.54	0.33	0.48	0.28	1.92	0.22	0.28	1.33	0.48	0.60
P2O5	1.17	1.49	2.16	0.97	2.10	1.00	1.66	1.81	0.29	3.00	2.08	1.99
F	0.22	0.00	0.29	0.10	0.26	0.15	0.45	0.46	0.37	0.28	0.58	0.77
Cl	0.04	0.11	1.53	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOI	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.46	7.97	7.21	18.50	33.39	n.d.
O=F,Cl	-0.10	-0.03	-0.47	-0.05	-0.12	-0.06	-0.19	-0.19	-0.16	-0.12	-0.24	-0.33
Total	96.49	98.57	99.60	95.53	97.58	96.55	102.91	104.28	103.77	98.62	89.74	98.78
Trace elements ppm												
Ba	2509.	2582.	306.	3892.	2086.	2289.	333.	2528.	2074.	139.	2122.	1712.
Nb	178.	160.	273.	128.	218.	212.	22.	179.	116.	650.	17.	614.
Zr	526.	592.	480.	366.	532.	488.	41.	371.	581.	50.	0.	589.
Y	77.	68.	105.	35.	98.	55.	236.	77.	74.	165.	1429.	177.
Sr	1979.	907.	1057.	770.	2576.	1924.	1854.	9896.	753.	3202.	51256.	2940.
Rb	202.	297.	55.	232.	249.	221.	6.	169.	210.	191.	0.	248.
Zn	736.	701.	373.	638.	340.	341.	592.	248.	326.	2028.	158.	391.
Cu	246.	0.	0.	128.	0.	98.	-1.	-1.	-1.	-1.	-1.	-1.
Ni	524.	285.	155.	615.	365.	360.	33.	390.	590.	118.	36.	412.
Pb	27.	16.	28.	21.	13.	51.	-1.	-1.	-1.	-1.	-1.	-1.
U	4.	0.	15.	0.	6.	4.	4.	15.	3.	3.	57.	4.
Th	19.	0.	28.	0.	22.	32.	522.	28.	28.	135.	579.	178.
V	337.	583.	383.	434.	340.	418.	501.	231.	246.	78.	57.	393.
Cr	526.	343.	301.	461.	290.	368.	105.	274.	313.	148.	0.	923.
Nd	284.	181.	227.	100.	452.	202.	1239.	122.	140.	606.	2257.	209.
Ga	21.	30.	22.	18.	15.	21.	7.	25.	26.	28.	5.	25.
La	344.	209.	306.	140.	494.	270.	1390.	166.	198.	674.	3528.	181.
Ce	496.	334.	438.	208.	781.	423.	3190.	270.	343.	1348.	6710.	440.
Zr/Nb	2.96	3.70	1.76	2.86	2.44	2.30	1.86	2.07	5.01	0.08	0.00	0.96

SUMMARY NORM TABLE

	325958.0	325959.0	325961.0	325962.0	325963.0	325972.0	127051.0	46256.0	325952.0	326249.0	326358.0	326345.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	0.0	0.0	0.0	0.0	0.0	21.10	0.0	0.0	0.0	0.0	0.0	0.0
Albite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Anorthite	3.64	4.15	0.0	4.46	3.39	0.61	0.0	3.25	0.0	1.00	0.04	0.0
Leucite	18.43	22.94	1.30	20.91	17.22	3.96	0.60	19.85	24.93	12.69	2.64	22.37
Nepheline	0.31	1.02	19.62	1.00	-0.15	1.00	3.43	0.0	0.0	0.05	0.03	0.0
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.60	73.54	0.0
Halite	0.07	0.19	2.53	0.09	0.08	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acmite	0.0	0.0	7.12	0.0	0.0	0.0	1.96	0.0	1.94	0.0	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.40	0.0	0.0	0.67
Diopside	-3.27	32.64	41.49	19.73	-22.77	31.90	25.20	-6.22	32.46	0.0	0.0	-15.91
Wollaston.	0.0	0.0	5.73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Olivine	31.36	8.12	0.0	25.66	35.82	19.16	18.79	33.19	18.57	5.21	0.95	30.05
Larnite	26.97	0.39	5.54	6.25	40.45	0.0	15.23	25.12	0.64	11.44	19.33	28.52
Magnetite	5.37	3.74	0.91	5.97	7.84	9.71	29.52	7.13	10.75	4.68	1.53	9.04
Hematite	6.15	10.50	2.00	5.93	5.36	4.14	0.0	5.54	1.22	0.17	0.0	5.68
Ilmenite	7.75	12.70	8.23	7.45	7.29	5.72	0.57	6.87	7.62	1.53	0.05	13.36
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	2.88	3.60	5.13	2.42	5.12	2.47	3.93	4.47	0.72	2.53	1.57	4.80
Fluorite	0.36	0.0	0.40	0.12	0.35	0.23	0.77	0.81	0.76	0.11	0.32	1.43
Diff Index	18.73	23.96	20.92	21.91	17.07	26.06	4.03	19.85	24.93	73.34	76.20	22.37
Na/(Na+K)	0.03	0.08	0.97	0.08	0.0	0.07	0.92	0.0	0.07	0.01	0.06	0.0
(Na+K)/Al	0.78	0.81	1.44	0.77	0.77	0.96	1.32	0.80	1.12	0.80	0.92	1.08
F3/(F2+F3)	0.64	0.64	0.56	0.64	0.64	0.64	0.56	0.64	0.56	0.64	0.64	0.56
Qz residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.76	0.95	n.a.
Ks residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	95.17	99.01	n.a.
Ne residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.07	0.04	n.a.

LAMPROPHYRE DYKE ANALYSES

	326266	325939	325956	325941	326264	326222	326258	326259	326260	326359
Major elements, weight %										
	Alt UB	UML	UML	UML	Alt UB	Alt UB	UML sill	UML sill	UML sill	Cbt/UML
SiO2	28.87	38.04	38.39	38.91	33.54	35.44	33.78	14.47	30.34	14.94
Al2O3	7.07	8.85	10.93	9.55	8.24	7.74	7.29	3.48	5.64	5.87
Fe2O3	18.16	19.21	18.98	19.09	18.47	18.58	17.49	29.20	25.06	19.61
MgO	14.26	10.18	10.76	11.09	12.03	12.34	7.51	8.16	16.39	12.12
CaO	19.41	12.45	6.62	10.64	14.31	11.90	22.94	19.05	10.66	18.49
Na2O	0.08	0.83	0.83	0.49	0.69	1.17	0.59	0.21	0.00	0.10
K2O	4.44	3.14	6.18	2.90	5.82	5.26	1.77	3.29	3.22	3.80
TiO2	3.98	4.03	4.34	4.45	3.22	3.77	4.87	2.67	4.31	9.59
MnO	0.43	0.30	0.22	0.24	0.25	0.28	0.58	2.45	0.72	0.70
P2O5	0.95	1.28	0.67	0.70	1.30	1.29	2.30	2.18	1.22	0.97
F	0.09	0.06	0.19	0.03	0.09	0.19	0.26	1.08	0.38	0.04
Cl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
LOI	0.81	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	12.85	n.d.	11.64
O=F,Cl	-0.04	-0.03	-0.08	-0.01	-0.04	-0.08	-0.11	-0.45	-0.16	-0.02
Total	98.51	98.34	98.03	98.08	97.92	97.88	99.27	98.64	97.79	97.85
Trace elements ppm										
Ba	1211.	1582.	3774.	1802.	619.	931.	3138.	3559.	5557.	971.
Nb	109.	118.	82.	74.	81.	107.	565.	335.	980.	175.
Zr	254.	338.	295.	283.	217.	408.	339.	289.	370.	36.
Y	35.	48.	33.	31.	53.	42.	140.	997.	120.	31.
Sr	1769.	2070.	1407.	1230.	1638.	3244.	3427.	2910.	1393.	1219.
Rb	537.	183.	432.	162.	392.	367.	115.	286.	216.	159.
Zn	102.	158.	141.	124.	187.	188.	378.	812.	453.	186.
Cu	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.
Ni	370.	256.	174.	270.	256.	280.	310.	209.	349.	366.
Pb	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.	-1.
U	4.	5.	3.	3.	3.	5.	7.	3.	4.	-1.
Th	13.	20.	8.	6.	28.	10.	47.	1095.	131.	12.
V	374.	269.	333.	332.	309.	300.	265.	169.	274.	887.
Cr	277.	239.	174.	289.	187.	190.	268.	197.	291.	325.
Nd	68.	100.	48.	52.	124.	95.	423.	1968.	468.	125.
Ga	35.	27.	27.	25.	26.	33.	23.	18.	24.	24.
La	84.	142.	62.	63.	160.	106.	792.	2088.	648.	160.
Ce	146.	250.	103.	114.	300.	199.	1220.	4682.	1172.	222.
Zr/Nb	2.33	2.86	3.60	3.82	2.68	3.81	0.60	0.86	0.38	0.21

SUMMARY NORM TABLE

	326266.0	325939.0	325956.0	325941.0	326264.0	326222.0	326258.0	326259.0	326260.0	326359.0
Quartz	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corundum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	0.0	11.06	15.19	17.59	0.0	0.0	0.0	0.0	0.0	0.0
Albite	0.0	0.0	0.0	2.97	0.0	0.0	0.0	0.0	0.0	0.0
Anorthite	5.99	11.41	8.05	15.70	2.26	0.34	12.17	0.0	6.09	5.08
Leucite	21.19	6.22	17.48	0.0	27.71	25.05	8.30	12.74	15.37	20.58
Nepheline	0.38	3.89	3.90	0.70	3.25	5.51	2.74	0.0	-0.03	0.54
Kaliop-ite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.43	0.0	0.0
Halite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.0
Acmite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.58	0.0	0.0
Na Metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
K metasil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.0	0.0
Diopside	-17.92	33.66	15.80	26.30	3.50	18.73	40.84	0.0	12.41	-58.71
Wollaston.	0.0	0.0	0.0	0.0	0.0	0.0	-12.29	0.0	0.0	0.0
Hypersthen	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Olivine	31.45	7.25	14.14	11.32	20.44	16.05	0.0	7.68	25.43	43.80
Larnite	33.91	0.0	0.0	0.0	17.74	8.33	19.81	8.58	6.96	50.41
Magnetite	8.95	9.40	8.00	7.88	10.92	9.48	5.96	8.42	16.28	0.0
Hematite	5.85	6.16	7.00	7.16	4.67	5.73	7.27	0.0	5.37	14.74
Ilmenite	7.78	7.83	8.46	8.68	6.28	7.36	9.36	1.87	8.43	17.30
Titanite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perovskite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.57
Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apatite	2.32	3.10	1.63	1.70	3.16	3.14	5.52	1.91	2.98	2.69
Fluorite	0.10	0.01	0.34	0.0	0.07	0.28	0.33	0.75	0.69	0.0
Diff Index	21.57	21.18	36.58	21.26	30.96	30.56	11.04	70.17	15.34	21.12
Na/(Na+K)	0.03	0.29	0.17	0.20	0.15	0.25	0.34	0.09	0.0	0.04
(Na+K)/Al	0.70	0.54	0.74	0.41	0.90	0.98	0.40	1.12	0.62	0.73
F3/(F2+F3)	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.56	0.64	0.64
Qz residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.00	n.a.	n.a.
Ks residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	95.00	n.a.	n.a.
Ne residua	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.0	n.a.	n.a.

APPENDIX IV

This appendix presents in full the mass balance calculations discussed in Chapters 5.5 and 5.6.

Mineral phases, such as HAW-PL, BEN-PL, BEN-PX, BEN-PX2, represent actual analysed phases from the dykes and a key to these is tabulated below.

The mass balance calculations require a parent rock, a fractionating mineral assemblage and a daughter rock. The program then adjusts the proportions of crystallising phases to minimise the sum of the squares of the residuals. This in the result is printed out in the 'Solution' and '% Cumulate' table. The table at the bottom presents the calculated and observed daughter compositions and the weighted residuals. The interpretation of these results is discussed in Chapters 5.5 and 5.6.

LOW ZR/NB TEPHRITE-MUGEARITE

WEIGHTED INPUT DATA:

		16	60	62	58	22	23	
	PARENT	NE-BI2	AN-80	USP-60	FO-80	TEP-PX	APATIT	DAUGHTER
SIO2	44.72	41.56	47.58	0.00	38.78	45.58	0.00	53.59
TIO2	3.30	2.91	0.00	21.52	0.00	3.23	0.00	1.95
AL2O3	12.74	11.90	33.03	0.00	0.00	8.77	0.00	16.14
FEO	14.20	14.34	0.00	77.43	18.54	7.61	0.00	10.19
MNO	0.27	0.37	0.00	0.00	0.00	0.00	0.00	0.25
MGO	7.10	18.89	0.00	0.00	41.63	11.65	0.00	2.50
CAO	8.48	0.00	16.07	0.00	0.00	21.36	56.51	4.62
NA2O	2.67	0.00	2.12	0.00	0.00	0.81	0.00	4.52
K2O	4.00	10.03	0.17	0.00	0.00	0.00	0.00	4.10
P2O5	1.48	0.00	0.00	0.00	0.00	0.00	42.47	1.07

(PARENT-MINERALS=DAUGHTER)

PARENT: TEPH
DAUGHTER: MUG

	SOL'N	% CUMULATE
TEPH	1.000	
NE-BI2	-0.183	36.867
AN-80	-0.020	4.112
USP-60	-0.063	12.692
FO-80	-0.000	0.089
TEP-PX	-0.204	41.233
APATIT	-0.025	5.007
MUG	0.504	

R SQUARED = 0.491

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	44.72	53.59	53.52	0.08
TIO2	3.30	1.95	1.52	0.43
AL2O3	12.74	16.14	16.15	-0.01
FEO	14.20	10.19	10.31	-0.12
MNO	0.27	0.25	0.40	-0.15
MGO	7.10	2.50	2.53	-0.02
CAO	8.48	4.62	4.78	-0.16
NA2O	2.67	4.52	4.89	-0.37
K2O	4.00	4.10	4.33	-0.23
P2O5	1.48	1.07	0.86	0.22

LOW ZR/NB BASALT-MUGEARITE

WEIGHTED INPUT DATA:

		58	27	60	61	28	
	PARENT	FO--80	BAS-PX	AN-80	USP-80	BAS-IL	DAUGHTER
SIO2	46.74	39.19	48.25	47.59	0.00	0.00	54.18
TIO2	3.57	0.00	1.90	0.00	28.49	50.61	1.97
AL2O3	14.26	0.00	2.72	33.04	0.00	0.00	16.32
FEO	13.40	18.74	12.73	0.00	70.46	46.85	10.30
MNO	0.12	0.00	0.13	0.00	0.00	1.28	0.12
MGO	7.63	42.07	12.32	0.00	0.00	0.22	2.53
CAO	7.60	0.00	20.27	16.08	0.00	0.00	4.67
NA2O	2.50	0.00	0.67	2.12	0.00	0.00	4.57
K2O	3.09	0.00	0.00	0.17	0.00	0.00	4.14
P2O5	0.07	0.00	0.00	0.00	0.00	0.00	0.11

(PARENT-MINERALS=DAUGHTER)

PARENT: BASALT
DAUGHTER: MUG

	SOL'N	% CUMULATE
BASALT	1.000	
FO-80	-0.112	24.769
BAS-PX	-0.122	27.085
AN-80	-0.151	33.557
USP-80	-0.047	10.494
BAS-IL	-0.018	4.095
MUG	0.549	

R SQUARED = 2.924

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	46.74	54.18	53.99	0.19
TIO2	3.57	1.97	1.97	0.00
AL2O3	14.26	16.32	16.46	-0.14
FEO	13.40	10.30	10.31	-0.00
MNO	0.25	0.25	0.31	-0.03
MGO	7.63	2.53	2.71	-0.18
CAO	7.60	4.67	5.02	-0.35
NA2O	2.50	4.57	3.86	0.71
K2O	3.09	4.14	5.63	-1.49
P2O5	0.66	1.09	1.22	-0.01

LOW ZR/NB MUGEARITE-BENMOREITE

WEIGHTED INPUT DATA:

		31	36	32	24	70	23	
	PARENT	BAS-OL	HAW-PX	BA-IL2	TEP-OX	ANT-44	APATIT	DAUGHTER
SIO2	53.67	35.49	48.47	0.00	0.00	56.50	0.00	58.45
TIO2	1.96	0.00	2.27	52.52	21.33	0.00	0.00	1.10
AL2O3	16.17	0.00	3.89	0.00	8.17	26.33	0.00	16.36
FEO	10.21	36.65	10.08	43.00	68.93	0.33	0.00	8.18
MNO	0.12	0.25	0.12	0.23	0.55	0.00	0.00	0.14
MGO	2.51	27.26	12.20	3.27	0.00	0.00	0.00	0.95
CAO	4.63	0.35	21.30	0.00	0.00	9.07	56.51	2.71
NA2O	4.53	0.00	0.56	0.00	0.00	5.35	0.00	5.19
K2O	4.11	0.00	0.11	0.00	0.00	1.38	0.00	5.51
P2O5	1.08	0.00	0.00	0.00	0.00	0.00	42.48	0.34

(PARENT-MINERALS=DAUGHTER)

PARENT: MUG
DAUGHTER: BEN

	SOL'N	% CUMULATE
MUG	1.000	
BAS-OL	-0.063	22.218
HAW-PX	-0.007	2.440
BA-IL2	-0.014	5.052
TEP-OX	-0.019	6.603
ANT-44	-0.161	57.034
APATIT	-0.019	6.652
BEN	0.717	

R SQUARED = 0.024

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	53.67	58.45	58.47	-0.02
TIO2	1.96	1.10	1.10	-0.00
AL2O3	16.17	16.36	16.35	0.02
FEO	10.21	8.18	8.18	-0.00
MNO	0.25	0.28	0.26	0.01
MGO	2.51	0.95	0.92	0.03
CAO	4.63	2.71	2.68	0.03
NA2O	4.53	5.19	5.10	0.10
K2O	4.11	5.51	5.41	0.10
P2O5	1.08	0.34	0.38	-0.04

LOW ZR/NB BENMOREITE-PHONOLITE

WEIGHTED INPUT DATA:

		46	50	45	23	
	PARENT	BE-PX1	BE-OX1	BE-AN1	APATIT	DAUGHTER
SIO2	58.26	49.94	0.00	65.07	0.00	56.80
TIO2	1.09	0.65	27.03	0.00	0.00	0.57
AL2O3	16.31	1.44	2.43	19.20	0.00	18.33
FEO	8.15	17.17	67.80	0.00	0.00	7.65
MNO	0.14	0.20	0.99	0.00	0.00	0.14
MGO	0.95	8.11	0.69	0.00	0.00	0.45
CAO	2.71	21.90	0.00	1.40	91.50	1.89
NA2O	5.17	0.58	0.00	5.13	0.00	7.32
K2O	5.49	0.00	0.00	8.15	0.00	5.78
P2O5	0.03	0.00	0.00	0.00	6.88	0.01

(PARENT-MINERALS=DAUGHTER)

PARENT: BEN
DAUGHTER: PHON

	SOL'N	% CUMULATE
BEN	1.000	
BE-PX1	-0.132	27.230
BE-OX1	-0.028	5.819
BE-AN1	-0.343	70.633
APATIT	0.018	-3.682
PHON	0.514	

R SQUARED = 1.654

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	58.26	56.80	56.92	-0.12
TIO2	1.09	0.57	0.47	0.10
AL2O3	16.31	18.33	18.37	-0.04
FEO	8.15	7.65	7.69	-0.05
MNO	0.28	0.29	0.33	-0.02
MGO	0.95	0.45	-0.28	0.73
CAO	2.71	1.89	1.87	0.02
NA2O	5.17	7.32	6.48	0.84
K2O	5.49	5.78	5.24	0.54
P2O5	0.34	0.09	3.05	-0.30

LOW ZR/NB TRACHYTE-PHONOLITE

WEIGHTED INPUT DATA:

		46	50	45	
	PARENT	BE-PX1	BE-OX1	BE-AN1	DAUGHTER
SIO2	59.22	49.84	0.00	65.08	56.65
TIO2	0.60	0.65	26.77	0.00	0.57
AL2O3	18.34	1.44	2.40	19.20	18.28
FEO	6.13	17.14	67.14	0.00	7.63
MNO	0.23	0.40	1.96	0.00	0.29
MGO	0.44	8.09	0.69	0.00	0.45
CAO	1.59	21.86	0.00	1.40	1.89
NA2O	6.14	0.58	0.00	5.13	7.30
K2O	6.21	0.00	0.00	8.15	5.76
P2O5	0.04	0.00	0.00	0.00	0.09

(PARENT-MINERALS=DAUGHTER)

PARENT: TR
DAUGHTER: PHON

	SOL'N	% CUMULATE
TR	1.000	
BE-PX1	-0.007	1.972
BE-OX1	-0.014	3.976
BE-AN1	-0.329	94.052
PHON	0.651	

R SQUARED = 0.767

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	59.22	56.65	56.79	-0.14
TIO2	0.60	0.57	0.33	0.24
AL2O3	18.34	18.28	18.17	0.11
FEO	6.13	7.63	7.73	-0.10
MNO	0.23	0.29	0.31	-0.03
MGO	0.44	0.45	0.57	-0.12
CAO	1.59	1.89	1.48	0.41
NA2O	6.14	7.30	6.75	0.55
K2O	6.21	5.76	5.33	0.43
P2O5	0.04	0.09	0.06	0.03

HIGH ZR/NB BASALT - HAWAIITE

WEIGHTED INPUT DATA:

	-	25	21	26	28	27	3
	PARENT	BAS-IL	TEP-OX	BA-PL2	BAS-OL	BA-PX2	DAUGHTER
SIO2	47.64	0.00	0.00	53.57	35.14	50.29	49.60
TIO2	3.25	51.15	21.33	0.00	0.00	1.48	2.92
AL2O3	15.68	0.00	8.17	28.84	0.00	2.67	15.82
FEO	13.64	47.35	68.93	0.00	36.29	9.30	12.15
MNO	0.10	1.29	0.55	0.00	0.24	0.00	0.10
MGO	5.54	0.22	0.00	0.00	26.99	12.84	4.35
CAO	8.16	0.00	0.00	11.65	0.35	21.72	7.31
NA2O	3.24	0.00	0.00	4.56	0.00	0.70	4.09
K2O	1.57	0.00	0.00	0.36	0.00	0.00	2.41
P2O5	0.13	0.00	0.00	0.00	0.00	0.00	0.17

(PARENT-MINERALS=DAUGHTER)

PARENT: BAS
DAUGHTER: HAW

	SOL'N	% CUMULATE
BAS	1.000	
BAS-IL	-0.012	3.709
TEP-OX	-0.026	7.958
BA-PL2	-0.162	48.702
BAS-OL	-0.068	20.433
BA-PX2	-0.064	19.198
HAW	0.668	

R SQUARED = 0.228

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	47.64	49.60	49.66	-0.06
TIO2	3.25	2.92	2.92	0.00
AL2O3	15.68	15.82	15.81	0.01
FEO	13.64	12.15	12.15	-0.00
MNO	0.21	0.21	0.17	0.02
MGO	5.54	4.35	4.28	0.08
CAO	8.16	7.31	7.23	0.08
NA2O	3.24	4.09	3.66	0.43
K2O	1.57	2.41	2.25	0.15
P2O5	1.32	1.71	1.97	-0.03

HIGH ZR/NB HAWAIITE-MUGEARITE

WEIGHTED INPUT DATA:

	PARENT	25 BAS-IL	32 HAW-PL	33 HAW-PX	34 HAW-OL	59 USP-60	4 DAUGHTER
SIO2	49.59	0.00	53.84	48.47	33.12	0.00	52.11
TIO2	2.91	51.15	0.00	2.27	0.00	21.54	2.31
AL2O3	15.81	0.00	28.29	3.89	0.00	0.00	16.95
FEO	12.15	47.35	0.26	10.08	39.56	77.47	10.04
MNO	0.10	1.29	0.00	0.12	4.45	0.00	0.10
MGO	4.35	0.22	0.00	12.20	21.63	0.00	2.94
CAO	7.31	0.00	11.54	21.30	0.31	0.00	6.01
NA2O	4.09	0.00	4.75	0.56	0.00	0.00	4.54
K2O	2.40	0.00	0.33	0.11	0.00	0.00	3.78
P2O5	0.17	0.00	0.00	0.00	0.00	0.00	0.15

(PARENT-MINERALS=DAUGHTER)

PARENT: HAW
DAUGHTER: MUG

	SOL'N	% CUMULATE
HAW	1.000	
BAS-IL	-0.015	5.231
HAW-PL	-0.120	42.119
HAW-PX	-0.077	27.088
HAW-OL	-0.059	20.584
USP-60	-0.014	4.978
MUG	0.715	

R SQUARED = 0.485

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	49.59	52.11	52.14	-0.03
TIO2	2.91	2.31	2.33	-0.01
AL2O3	15.81	16.95	16.88	0.07
FEO	12.15	10.04	10.04	0.00
MNO	0.21	0.21	-0.52	0.36
MGO	4.35	2.94	2.97	-0.04
CAO	7.31	6.01	5.93	0.08
NA2O	4.09	4.54	4.84	-0.30
K2O	2.40	3.78	3.29	0.49
P2O5	1.71	1.48	2.38	-0.09

HIGH ZR/NB MUGEARITE-BENMOREITE

WEIGHTED INPUT DATA:

	PARENT	32 HAW-PL	34 HAW-OL	33 HAW-PX	29 BA-IL2	21 TEP-OX	DAUGHTER
SIO2	52.11	54.37	33.11	48.50	0.00	0.00	59.43
TIO2	2.31	0.00	0.00	2.27	52.52	21.33	1.02
AL2O3	16.95	28.57	0.00	3.89	0.00	8.17	15.13
FEO	10.04	0.26	39.56	10.09	43.00	68.93	9.74
MNO	0.10	0.00	4.45	0.12	0.23	0.55	0.13
MGO	2.94	0.00	21.62	12.21	3.27	0.00	0.66
CAO	6.01	11.66	0.31	21.31	0.00	0.00	2.58
NA2O	4.54	4.80	0.00	0.57	0.00	0.00	4.96
K2O	3.78	0.33	0.00	0.11	0.00	0.00	5.27
P2O5	0.15	0.00	0.00	0.00	0.00	0.00	0.02

(PARENT-MINERALS=DAUGHTER)

PARENT: MUG
DAUGHTER: BEN

	SOL'N	% CUMULATE
MUG	1.000	
HAW-PL	-0.297	66.190
HAW-OL	-0.069	15.280
HAW-PX	-0.048	10.657
BA-IL2	-0.030	6.745
TEP-OX	-0.005	1.127
BEN	0.552	

R SQUARED = 4.705

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	52.11	59.43	59.00	0.43
TIO2	2.31	1.02	1.01	0.01
AL2O3	16.95	15.13	15.62	-0.50
FEO	10.04	9.74	9.69	0.05
MNO	0.21	0.26	-0.78	0.52
MGO	2.94	0.66	1.52	-0.85
CAO	6.01	2.58	2.97	-0.39
NA2O	4.54	4.96	5.79	-0.83
K2O	3.78	5.27	6.81	-1.54
P2O5	1.48	0.25	2.75	-0.25

HIGH ZR/NB BENMOREITE - TRACHYTE

WEIGHTED INPUT DATA:

	PARENT	USP-20 (61)	BE-PX2 (45)	APATIT (68)	DAUGHTER
SIO2	59.24	0.00	50.48	0.00	60.17
TIO2	1.02	7.36	1.00	0.00	0.75
AL2O3	15.08	0.00	1.45	0.00	16.37
FEO	9.71	92.64	12.76	0.00	8.67
MNO	0.25	0.00	0.36	0.00	0.23
MGO	0.66	0.00	11.13	0.00	0.38
CAO	2.57	0.00	21.26	56.52	1.73
NA2O	4.94	0.00	0.49	0.00	5.28
K2O	5.25	0.00	0.00	0.00	5.33
P2O5	0.24	0.00	0.00	42.48	0.08

(PARENT-MINERALS=DAUGHTER)

PARENT: BEN
DAUGHTER: TR

	SOL'N	% CUMULATE
BEN	1.000	
USP-20	-0.010	17.855
BE-PX2	-0.046	80.756
APATIT	-0.001	1.390
TR	0.942	

R SQUARED = 0.408

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	59.24	60.17	60.28	-0.11
TIO2	1.02	0.75	0.95	-0.20
AL2O3	15.08	16.37	15.90	0.46
FEO	9.71	8.67	8.65	0.02
MNO	0.25	0.23	0.25	-0.02
MGO	0.66	0.38	0.15	0.22
CAO	2.57	1.73	1.63	0.11
NA2O	4.94	5.28	5.21	0.07
K2O	5.25	5.33	5.56	-0.23
P2O5	0.24	0.08	0.22	-0.14

HIGH ZR/NB TRACHYTE-RHYOLITE

WEIGHTED INPUT DATA:

	PARENT	ANT-1 (64)	USP-20 (61)	TRA-AF (53)	TR-AF (49)	TR-PX1 (46)	DAUGHTER
SIO2	60.30	62.67	0.00	65.39	66.07	50.16	72.06
TIO2	0.75	0.00	7.28	0.00	0.00	0.92	0.39
AL2O3	16.40	22.72	0.00	19.31	19.20	1.56	12.75
FEO	8.69	0.00	91.66	0.00	0.00	14.14	4.57
MNO	0.11	0.00	0.00	0.00	0.00	0.23	0.04
MGO	0.38	0.00	0.00	0.00	0.00	10.95	0.18
CAO	1.74	4.77	0.00	0.85	0.45	20.35	0.55
NA2O	5.29	6.65	0.00	5.48	7.11	0.71	3.96
K2O	5.34	3.18	0.00	7.91	6.19	0.00	4.51
P2O5	0.01	0.00	0.00	0.00	0.00	0.00	0.00

(PARENT-MINERALS=DAUGHTER)

PARENT: TR
DAUGHTER: RHY

	SOL'N	% CUMULATE
TR	1.000	
ANT-1	-0.120	14.285
USP-20	-0.082	9.762
TRA-AF	-0.289	34.399
TR-AF	-0.315	37.582
TR-PX1	-0.033	3.971
RHY	0.161	

R SQUARED = 0.623

	PARENT ANALYSIS	DAUGHTER ANALYSIS	DAUGHTER CALC	WEIGHTED RESID
SIO2	60.30	72.06	72.04	0.02
TIO2	0.75	0.39	0.81	-0.42
AL2O3	16.40	12.75	12.72	0.02
FEO	8.69	4.57	4.54	0.03
MNO	0.23	0.08	1.33	-0.62
MGO	0.38	0.18	0.08	0.10
CAO	1.74	0.55	0.64	-0.10
NA2O	5.29	3.96	4.11	-0.15
K2O	5.34	4.51	4.62	-0.11

APPENDIX V

REE Analytical Methods

The method of sample preparation used for separation and analysis of the REE is a modified version of that proposed by Walsh *et al.* (1981) and is the method currently employed at Leicester University.

Sample Digestion

Weighed amounts of dried sample were heated for approximately 2 hours in a furnace at 950°C. When cool these were re-weighed to determine a loss on ignition and, if necessary, reground by hand to a fine powder. They were then stored in sealed sample tubes in a dessicator until ready for use. An accurately weighed batch of powder (usually 0.5g, but this can vary) is then dispensed into a clean, 50ml PTFE beaker. This is dampened down with a few drops of distilled, de-ionised water (dd H_2O), prior to the addition of 15ml of 40%HF and 4ml of 67-70% $HClO_4$. This is done for each sample in the batch.

The PTFE beakers are then placed on a hotplate at 180-200°C and allowed to evaporate almost dry. This must be carried out in an approved fume cupboard. Digestion of the samples is more satisfactory if they are allowed to stand 'cold' overnight in the HF-$HClO_4$ mixture.

When almost dry, a green/yellow to brownish sludge is left in the beakers. To this add a further 4ml of $HClO_4$ and again this is allowed to evaporate dry. When dry the residue is taken back into solution using 20ml of warmed 25% HCl. At this stage any undigested material becomes evident, often an opaque oxide phase or occasionally a white suspension, which on gentle heating will dissolve. If the residue is thought to be a REE bearing phase, evaporate back to dryness and try to redigest with more HF and $HClO_4$. If it is thought not to contain appreciable REE (eg. magnetite) then it can be filtered off before proceeding to the next stage.

When the sample is free from undissolved material it can be diluted down to 50ml with dd H_2O.

Ion Exchange Chromatography

Principles: Broadly speaking an ion exchange resin can be defined as an insoluble matrix containing labile ions capable of being exchanged for ions in the surrounding medium, without any physical change taking place in the resin structure. The method employed here uses strongly acidic cation exchange based on a sulphonated polystyrene resin; 'Dowex AG 50W-X8(H)' which is 'cross linked' with 8% di-vinyl benzene.

In dilute solutions the exchanging potential on these resins decreases with valency in the following order; $Fe^{3+} > Al^{3+} > REE^{3+} > Ba^{2+} > Sr^{2+} > Ca^{2+} \ldots\ldots > K^{+} > Na^{+} > H^{+}$. Thus at low acidity, the REE plus Ba, Sr, some Ca, Fe and Al are retained on the resin. As the acidity of the fluid medium in which the resin sits is increased, H^{+} ions gradually replace those ions held by the resin structure.

Thus, by varying the strength of an acid eluted through the resin, various cations can be selectively 'washed out'.

Technique: Six ion exchange columns, 2cm in diameter, were prepared with 'bed lengths' of 11cm of 200-400 mesh Dowex AG 50W-X8(H) resin. This was acidified to a low pH using 250ml 1N HCl, after 'cleaning' the resin with 4N HCl. The sample, diluted to 50ml after digestion, was added to this and allowed to run through. The columns were then eluted with 450ml of 1.7N HCl which removed most of the 2^{+} cations although some Ba and Sr were left. The REE remained in the resin and these were then eluted with 600ml 4N HCl which was collected. The 600ml of 4N HCl, with REE (and some Sr and Ba) was then evaporated to almost dry, at which point 2ml of concentrated HNO_3 was added to the solution. The sample was then evaporated to total dryness after being transferred to a 50ml pyrex beaker, in which it was stored.

Large amounts of both REE and other trace elements such as Sr and Ba may 'saturate' the resin in the columns if 0.5g of sample is digested. This can be overcome by digesting less sample and, for the carbonatites in particular, this was necessary (very high Sr, Ba and REE). The results can then be corrected for the weight used by multiplication of the results by 0.5/weight used, the ICPAES being calibrated for 0.5g of powder.

Batches of 6 'samples' were run at one time. These 6 always included a blank (an empty beaker that underwent exactly the same treatment as the rest of the batch) and a standard (which in this case was always NIM-G).

Analysis: Samples were analysed using a Philips PV8210 1.5m Inductively Coupled Plasma (ICP) spectrophotometer at Kings College, London and later at Royal Holloway and Bedford New College, Egham. The techniques of analysis are described fully in Walsh *et al.* (1981).

The REE suffer badly from interferences from other REE as well as Ba, Fe, etc. These can be corrected for subsequently during the data processing stage. Data can also be corrected for contamination using the analysis of the blank and machine drift although this tends to be of low magnitude and erratic (personal experience and also pers. comm. N. G. Marsh and Dr. R. J. E. Tarzey, Leicester University). Thus, no drift corrections were applied but blank corrections and corrections for interelement interferences were made.

Prior to analysis the 'dried' samples from the ion exchange process are redissolved in exactly 5ml of 10% HNO_3. This solution is then passed into the ICPS for analysis, requiring about 90 seconds and 3ml of sample to analyse 12 REE elements plus Fe, Ba, Sr, Y, Zr, Cu, Cr and Ca. Checks on machine drift are made every 10 unknowns and the observed drift was always within acceptable limits (pers. comm. Dr. J. N. Walsh and A. Warren, Royal Holloway and Bedford New College).

Data Correction: All data were corrected for contamination by subtraction of the blank, assuming that each sample suffered the same degree of contamination. This is a reasonably fair assumption as each addition of acid or ddH_2O was done from the same batch, bottle etc. Batches of reagents were not changed after treating only a few samples from the batch being separated at that time. After correction for blank values, the concentrations of REE in NIM-G were checked against those of Walsh *et al.* (1981) to ensure that each particular batch had been treated and had reacted properly. The variance of NIM-G from the values cited by Walsh *et al.* (1981) was always insignificant and no systematic 'scaling' of results was undertaken.

In some cases, where total REE contents were high (from XRF analyses) especially in the carbonatites, a risk exists of saturating the ion exchange columns. This is also true if Sr, Ba etc. are also high (ie. Sr>5000ppm, Ba>2000ppm, Ce>3000ppm). In these cases the amount of sample used was scaled down from 0.5gms to an appropriate fraction (usually 0.25gms or 0.125gms or 0.100gms) and the results treated accordingly by multiplication to a 0.5gm equivalent concentration. In practice all samples were treated in this fashion as, although close to 0.5gms, the weight of sample analysed was never exactly 0.5000gms. Each analysis is also corrected for the LOI of the sample calculated from the early heating stage.

ICPAES vs. ICPMS

Several samples of REE separates were analysed at Durham on a new VG Isotopes ICP-MS 'Plasmaquad'. ICP-MS is a very sensitive technique which counts directly the atoms of each element in the sample. Spectral resolution is extremely good with detection limits down to parts per trillion (10^{12}). In general there are no problems with overlapping spectra and where these exist correction is reasonably straight forward if the various isotopic abundances of the interfering elements are known.

The dilutions of the samples analysed were not known exactly as they were the residual 1-2ml of sample after analysis by ICPAES. As this was the case the results are standardised against the ICPAES Ce concentrations. Normally an In spike is used for standardisation on ICPMS analysis.

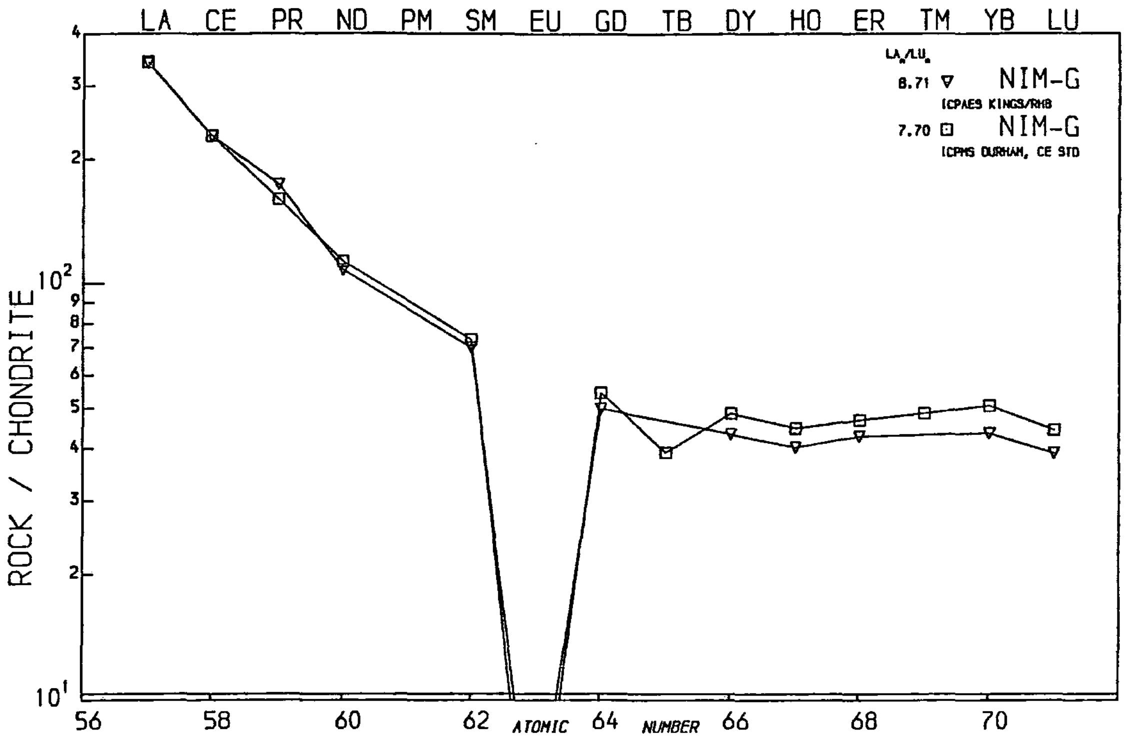
Figure AV.1 shows chondrite normalised spidergrams of the ICPAES data against the ICP-MS data for seven samples including the international standard NIM-G. These data are uncorrected for the sample weight used (ie. uncorrected to 0.5gms of sample) and are not corrected for the blank concentrations run with each batch. They thus show the concentration of REE in the solution and not absolute ppm in the rock. Blank values were typically low (0.1-0.5ppm for Ce, 0.01-0.05ppm for Yb typically) and these will make little relative difference to the LREE/HREE ratios.

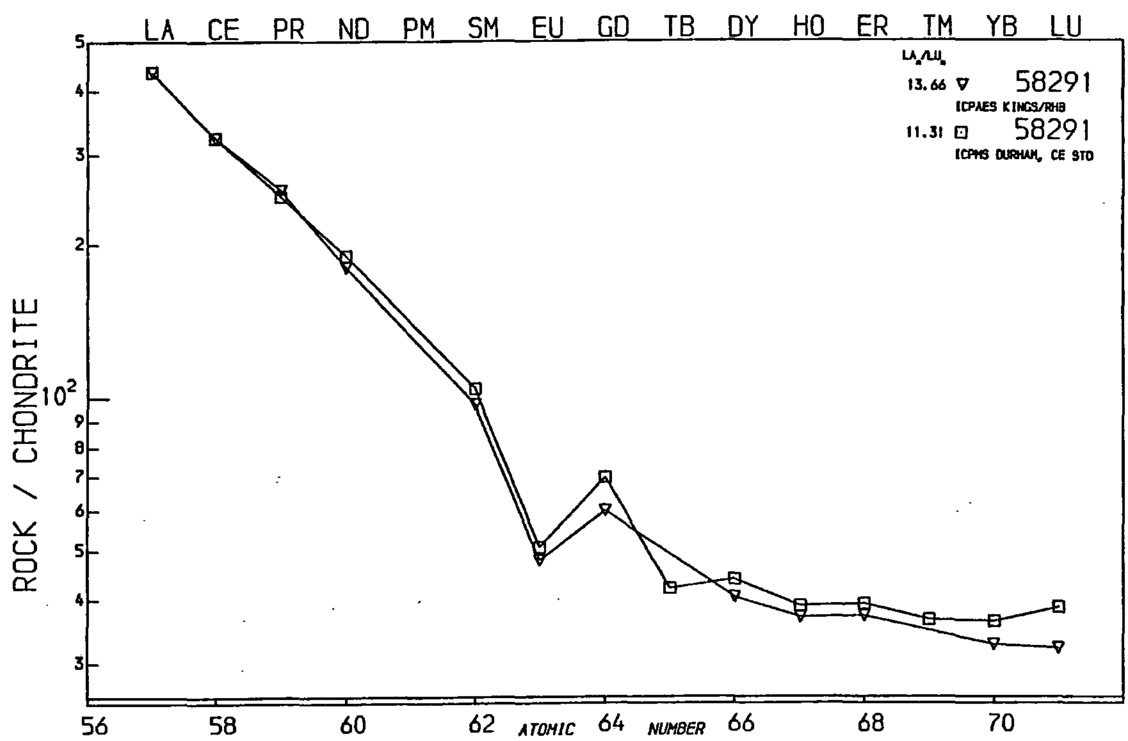
Results of Comparison

(i) In all but 1 of the 6 cases presented, the ratio $(La/Lu)_{cn}$ is lower in the ICP-MS data. These are tabulated in Table AV.1. It is clear that there is a definite and

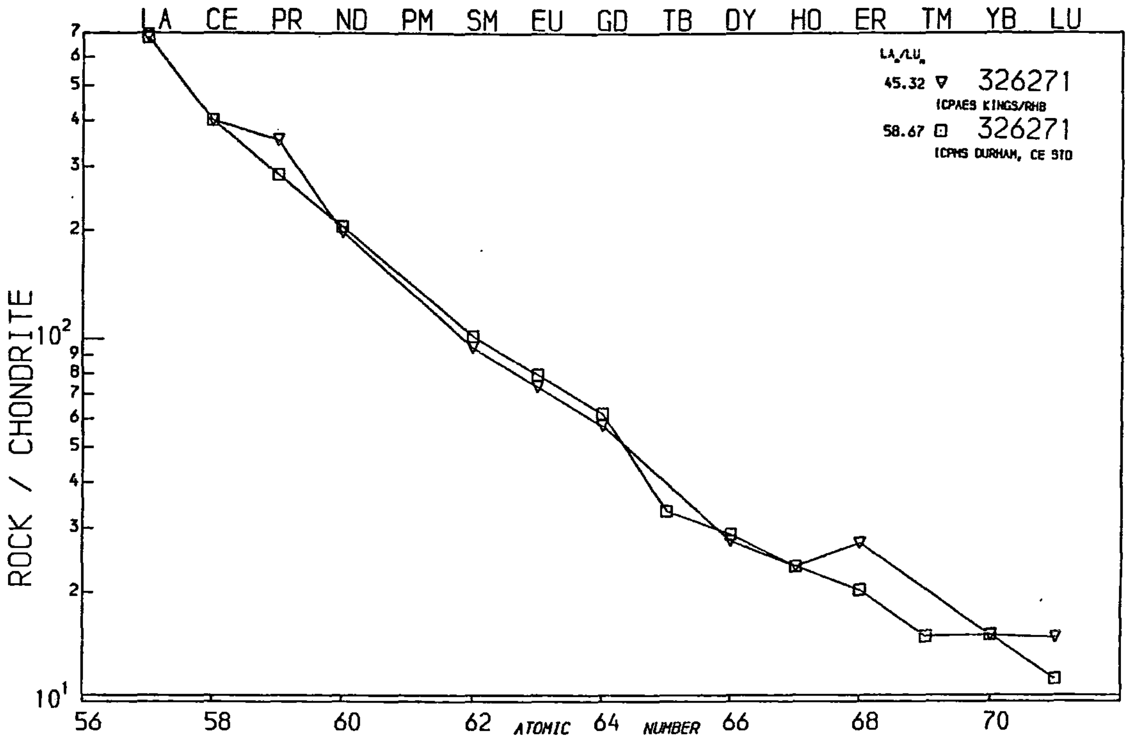
Fig. AV.1A

COMPARISON OF RHB ICPAES VS DURHAM ICPMS





COMPARISON OF RHB ICPAES VS DURHAM ICPMS



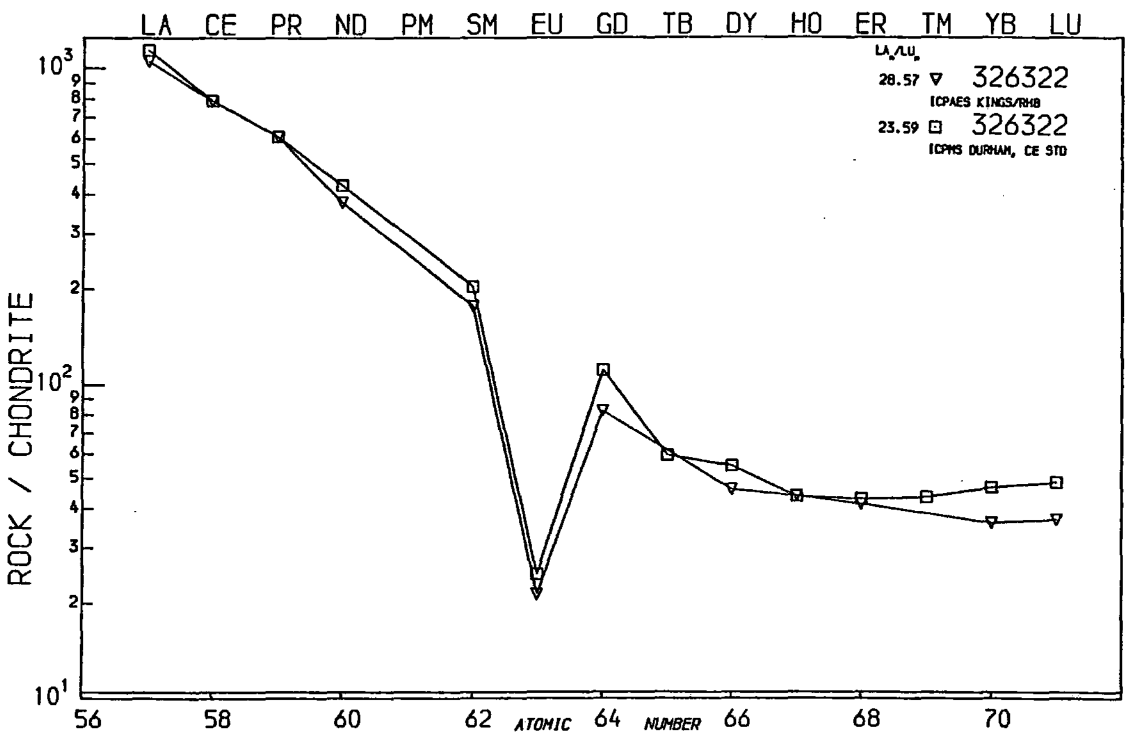
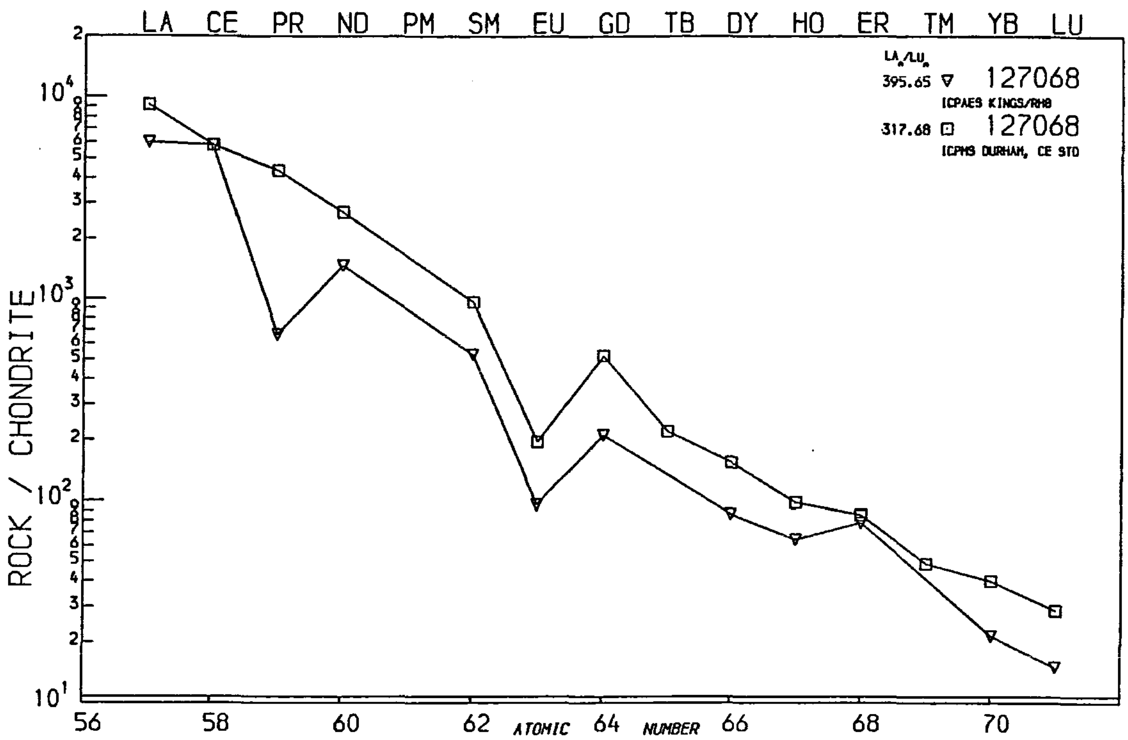


Fig. AV,1C

COMPARISON OF RHB ICPAES VS DURHAM ICPMS



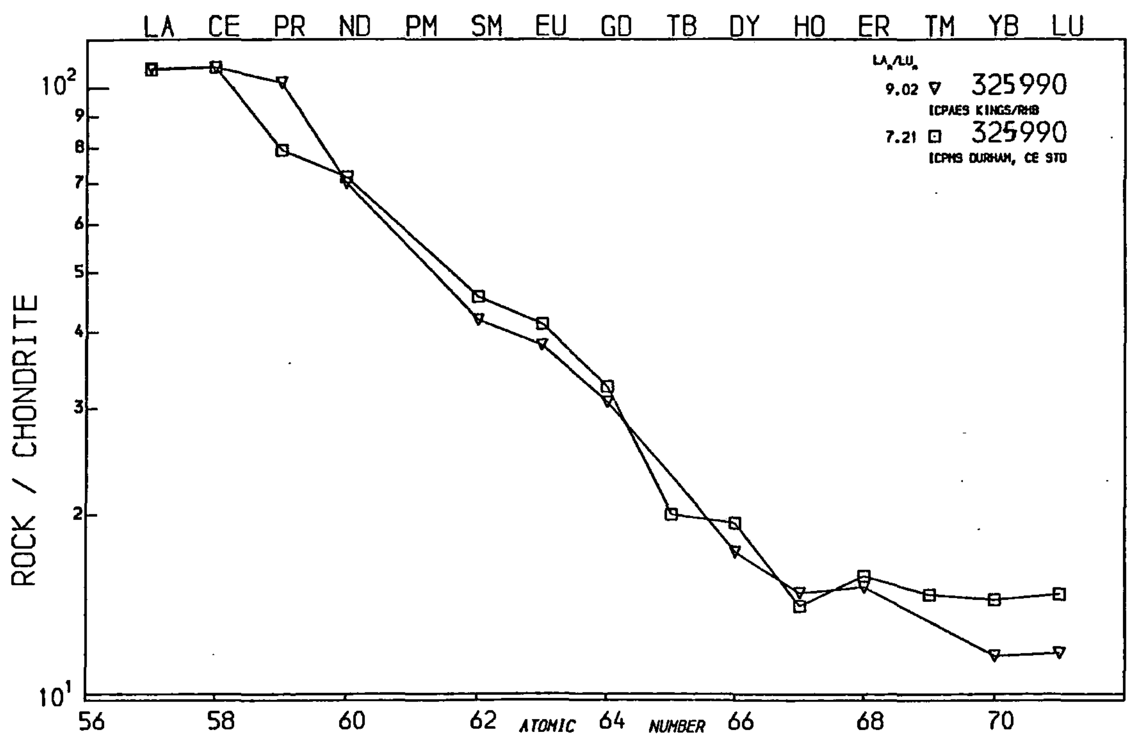


Table AV.1

$(La/Lu)_{cn}$ data from ICP-MS and ICPAES

	ICP-AES	ICP-MS	ICP-MS/ICP-AES
325990	9.02	7.21	0.799
58291	13.66	11.31	0.828
128068	395.65	317.68	0.803
326.271	45.32	58.67	1.295
NIM-G	8.71	7.70	0.884
326322	28.57	23.59	0.826

fairly consistent difference in the normalised slopes with the ICP-MS data generally 15-20% less than the ICPAES data. These differences, in the basic rocks, would have significant effects on modelled degrees of partial melting. The overall constancy of the difference would however not induce errors in fractional crystallisation modelling using REE.

(ii) The size of the (negative) Eu anomalies compares very well between methods, although fractionally deeper in the ICP-MS data.

(iii) Chondrite-normalised slopes are generally very smooth. Tb and Ho occasionally plot away from a smooth curve through the data and this may be a result of uncorrected interferences. Tm appears to plot very close to, or be on a smooth curve between the other HREE.

(iv) Pr, on ICP-MS , does not suffer from the interferences that it is prone to in ICPAES, especially at high LREE contents (eg. 127068).

(v) High REE contents (eg. in 127068) risk saturating the counter in the ICP-MS and great dilutions of the sample on analysis may be necessary.

(vi) There is apparently a systematic increase in the difference between ICP-MS and ICPAES with increasing atomic number, when standardised against Ce. Standardisation against, say, Y would cause a systematic increase in the difference with decreasing atomic number.

In conclusion, the difference of about 20% of La/Lu between ICP-MS and ICP-

AES is worrying in its implications. It is however fairly consistent and further work, comparing absolute concentrations may provide a factor to give direct comparison. Chondrite normalised patterns for ICP-MS seem to be fairly smooth with the exception of Tb and Ho. Ho is occasionally anomalous on ICP-AES analysis and thus may be either interelement inerference and its correction procedures or poorly constrained chondrite REE abundances for these elements.

REE ANALYSES - PPM

	41906	41926	41932	41939	41941	41984	41999	43916	43976	43867	43887	43931
	UML	Tracyand	Trachyte	Benm-ite	Phon-ite	Igdl SI6	Trachyte	Basalt	Phon-ite	Basalt	CAL	Cbtite
La	242.87	1307.29	474.08	340.66	547.24	61.70	628.22	35.13	10.46	67.62	61.30	187.32
Ce	461.62	3327.09	919.86	595.75	1050.94	125.59	1342.98	65.90	27.72	150.38	121.94	469.63
Pr	45.54	93.23	74.39	61.66	83.62	16.60	92.17	13.46	4.68	20.54	23.15	44.06
Nd	190.46	828.60	293.16	229.59	346.61	54.35	431.25	37.61	16.56	92.64	65.04	222.17
Sm	28.66	162.21	52.20	40.08	58.73	10.52	78.90	6.56	3.21	15.64	10.20	91.30
Eu	8.967	14.675	2.665	3.992	5.644	1.369	3.795	2.293	0.327	5.165	3.629	16.279
Gd	23.45	124.31	42.72	32.05	46.21	9.29	67.24	6.03	2.44	14.27	13.41	141.11
Dy	15.07	103.41	40.81	32.39	46.13	10.59	62.20	3.63	1.94	9.13	6.08	-0.66
Ho	3.163	21.906	9.023	6.250	9.288	2.301	13.808	0.646	0.397	1.632	1.183	53.941
Er	7.908	63.713	27.912	17.780	28.320	7.255	44.141	1.951	1.257	4.480	3.391	236.964
Yb	3.945	31.454	28.032	9.192	18.276	8.307	41.542	1.252	2.163	2.702	2.544	267.061
Lu	0.533	2.635	3.832	0.843	1.907	1.279	5.280	0.199	0.466	0.387	0.339	23.081
(La/Lu)cn	47.33	51.53	12.85	41.97	29.81	5.01	12.36	18.34	2.33	18.15	18.78	0.84

REE ANALYSES - PPM

	46236	46257	52274	52285	52289	58022	58128	58130	58138	58151A	58223	58240
	Tep/Basn	Cbtite	AL	AL	Benm-ite	Benm-ite	Trachyte	Tep/Basn	Benm-ite	Trachyte	Benm-ite	Benm-ite
La	290.60	6540.82	57.86	62.70	109.97	94.66	9.51	64.80	33.99	34.25	80.95	56.32
Ce	515.70	15168.48	111.88	122.78	160.05	205.56	19.85	132.17	67.04	73.09	152.46	112.73
Pr	50.97	-2.15	21.10	14.74	22.43	22.91	3.23	18.77	14.11	11.03	24.61	16.18
Nd	174.95	3278.06	53.18	56.84	84.16	87.40	11.36	73.57	34.61	37.61	69.73	56.02
Sm	26.83	515.37	9.01	9.09	13.77	14.29	2.15	11.58	5.69	6.91	11.29	9.96
Eu	7.429	113.055	3.064	3.257	1.383	0.920	1.114	4.946	4.716	0.585	3.929	3.416
Gd	22.76	310.63	7.72	7.98	11.37	11.19	2.46	12.06	4.79	6.01	9.41	9.36
Dy	14.80	159.59	5.39	5.35	9.19	9.51	1.46	6.62	3.77	5.15	6.44	6.79
Ho	2.738	33.800	0.995	1.185	1.753	1.777	0.297	1.717	0.733	1.024	1.212	1.340
Er	8.259	116.402	2.900	2.712	4.930	5.544	0.935	5.312	2.613	3.177	3.972	3.881
Yb	4.964	74.225	2.170	1.816	3.982	4.603	1.027	2.478	1.880	3.161	2.728	3.406
Lu	0.609	8.622	0.298	0.259	0.611	0.727	0.227	0.596	0.274	0.488	0.399	0.541
(La/Lu)cn	49.57	78.80	20.17	25.15	18.69	13.53	4.35	11.29	12.89	7.29	21.07	10.81

REE ANALYSES - PPM

	58241	58253	58251	58262	58291	59622	59636	59703	59708	59782	63891	126806
	Benm-ite	Benm-ite	Benm-ite	BFD xen	Benm-ite	Basalt	BFD xen	Tep/Basn	Tep/Basn	Phon-ite	Mug-ite	Benm-ite
La	256.59	58.28	51.51	2.10	131.85	24.18	2.74	79.79	117.91	135.94	191.66	104.86
Ce	509.69	111.41	76.41	5.59	261.79	53.45	4.91	169.09	239.42	260.20	369.69	213.47
Pr	52.36	16.21	12.99	2.32	27.73	7.96	2.16	21.62	27.89	30.06	43.69	27.26
Nd	187.85	52.79	40.99	3.43	107.83	32.58	3.25	91.46	113.73	90.57	155.86	94.51
Sm	33.85	9.13	6.95	0.11	17.54	5.83	0.09	14.64	17.95	14.02	24.66	18.44
Eu	1.865	2.838	0.908	0.741	3.514	2.683	0.654	5.218	5.419	3.878	3.291	1.600
Gd	27.77	8.40	6.25	0.15	14.85	5.09	0.13	13.47	15.76	10.50	19.21	16.37
Dy	26.35	5.45	3.30	0.07	12.83	4.00	0.06	9.09	12.12	8.54	12.56	15.42
Ho	5.419	1.051	0.594	0.759	2.519	0.812	0.727	1.763	2.533	1.607	2.062	3.266
Er	16.246	3.292	1.701	0.124	7.924	2.279	0.102	4.942	7.133	4.882	5.695	10.003
Yb	15.511	2.499	1.098	0.115	6.510	1.726	0.101	3.141	4.566	3.701	2.379	10.940
Lu	2.259	0.435	0.242	0.007	1.001	0.256	0.005	0.446	0.577	0.546	0.320	1.715
(La/Lu)cn	11.80	13.92	22.11	31.22	13.68	9.81	56.96	18.58	21.23	25.86	62.21	6.35

REE ANALYSES - PPM

	127045	127064	127065	127068	325610	325611	325618	325619	325905	325908	325910	325914
	Benm-ite	Ph-teph	Basalt	Tracyand	Basalt	Basalt	Pic-bas	Benm-ite	Phon-ite	'Cbtite	Cbtite	Trachyte
La	35.88	5483.32	63.70	6028.87	34.65	31.71	33.98	61.63	59.17	3215.35	3234.30	134.59
Ce	72.95	12189.63	136.48	15214.60	78.45	70.78	70.68	131.93	123.09	10035.23	7895.56	264.24
Pr	10.34	392.24	18.47	263.48	10.80	9.94	11.03	17.83	17.20	58.04	192.94	28.39
Nd	35.50	2539.98	74.55	2847.71	46.05	41.82	41.66	62.20	55.17	2456.63	2384.16	109.69
Sm	6.85	297.33	12.14	333.57	9.11	8.14	8.03	11.74	8.83	397.02	370.42	16.97
Eu	0.992	22.629	4.064	22.779	2.688	2.552	3.616	1.986	0.878	95.176	95.618	0.690
Gd	6.03	171.17	10.87	177.37	9.53	8.36	8.27	9.83	6.51	263.78	252.30	12.76
Dy	4.98	81.22	7.70	90.16	8.62	7.50	4.54	8.48	5.66	135.17	144.37	9.07
Ho	1.006	13.475	1.865	14.949	1.736	1.468	0.788	1.635	1.076	24.462	27.718	1.588
Er	2.977	47.581	4.095	53.268	4.790	4.083	2.138	4.983	3.402	72.309	83.343	4.821
Yb	2.934	12.598	2.806	14.448	4.018	3.092	1.383	4.511	2.988	34.593	48.087	3.336
Lu	0.480	1.308	0.377	1.430	0.547	0.424	0.196	0.660	0.449	3.952	5.573	0.512
(La/Lu)cn	7.76	435.44	17.55	437.92	6.58	7.77	18.01	9.70	13.69	84.51	60.28	27.31

REE ANALYSES - PPM

	325915	325941	325943	325952	325956	325990	325992	326249	326258	326259	326264	326266
	Trachyte	UML	AL	UML	UML	Basalt	Basalt	Cbt/UML	UML sill	UML sill	Alt UB	Alt UB
La	122.37	52.05	76.60	200.34	56.13	31.39	32.32	915.87	862.99	2530.86	167.73	96.44
Ce	248.63	102.79	151.55	410.00	112.97	79.67	67.64	1851.41	1584.84	6393.09	319.41	197.35
Pr	27.91	20.78	21.59	48.05	14.31	12.21	9.78	126.00	97.40	215.97	32.63	22.49
Nd	108.78	54.77	72.16	171.72	54.75	41.20	38.94	617.21	474.58	2159.16	130.05	91.29
Sm	16.50	10.27	13.54	27.41	9.45	7.90	7.29	106.15	69.52	345.81	21.65	15.22
Eu	1.964	3.304	3.813	6.743	3.381	2.767	2.266	28.370	19.123	36.926	6.546	5.049
Gd	12.26	8.81	12.98	21.57	8.55	7.76	8.11	74.23	45.69	237.96	16.82	13.07
Dy	9.99	6.04	8.36	13.14	5.45	5.46	6.41	38.50	28.72	169.72	9.35	7.47
Ho	1.774	1.051	1.583	2.359	1.543	1.021	1.344	6.613	5.163	33.079	1.860	1.551
Er	5.413	3.352	4.310	6.956	2.398	3.036	4.060	16.873	15.763	101.950	4.555	3.195
Yb	3.350	1.953	3.182	3.982	1.662	2.349	2.761	4.948	7.622	63.217	2.175	1.558
Lu	0.459	0.262	0.562	0.469	0.217	0.357	0.464	0.731	0.866	7.284	0.281	0.187
(La/Lu)cn	27.69	20.63	14.16	44.37	26.87	9.13	7.23	130.14	103.51	36.09	62.00	53.57

REE ANALYSES - PPM

	326285	326288	326271	326273	326281	326296	326302	326303	326304	326307	326309	326322
	Phon-ite	Phon-ite	UML	Phon-ite	CAL	Tracyand	Cbtite	UML	UML	Phon-ite	Phon-ite	Benm-ite
La	117.56	86.56	206.78	65.48	95.53	47.36	1833.88	104.40	222.23	30.75	88.41	655.33
Ce	217.14	184.53	316.62	127.29	212.06	84.57	1036.66	215.05	531.39	65.80	181.61	1270.57
Pr	21.21	19.92	42.27	16.74	34.56	10.19	9.63	26.63	48.09	9.12	22.78	122.15
Nd	72.75	74.10	115.99	49.85	116.10	27.44	827.69	112.63	159.77	29.09	73.57	454.67
Sm	11.30	11.55	17.97	9.13	20.77	4.48	121.72	19.80	28.32	4.68	11.72	68.68
Eu	2.327	1.746	5.294	0.844	6.273	0.774	26.109	6.407	8.923	0.436	1.562	3.154
Gd	9.23	9.30	14.55	7.71	18.57	3.92	86.80	16.41	27.44	3.45	8.19	42.61
Dy	8.75	8.14	8.71	8.00	10.61	4.27	50.59	10.11	15.97	2.35	6.27	29.59
Ho	1.840	1.545	1.650	1.655	1.800	0.860	10.560	1.976	2.805	0.426	1.238	6.264
Er	5.277	4.786	5.636	5.160	4.887	2.815	28.764	4.931	8.164	1.395	3.484	17.235
Yb	4.362	4.003	3.059	5.153	2.871	2.666	13.102	2.358	4.068	1.300	3.396	14.980
Lu	0.555	0.575	0.458	0.752	0.351	0.354	1.357	0.321	0.549	0.231	0.578	2.354
(La/Lu)cn	22.00	15.64	46.90	9.04	28.27	13.89	140.37	33.78	42.05	13.83	15.89	28.92

REE ANALYSES - PPM

	326329	326333	326337	326345	326358	326359	326371	326378	326380	326395
	Cbtite	Cbtite	Cbtite	UML	Cbtite	Cbt/UML	Mug-ite	Phon-ite	Phon-ite	Cbtite
La	1880.34	1168.04	1621.31	189.23	5244.05	174.43	90.96	101.12	150.27	6257.00
Ce	5369.75	2156.22	3393.38	542.37	10610.77	311.64	182.75	199.33	302.49	16369.73
Pr	156.05	157.48	134.77	61.17	-0.14	42.86	21.32	23.86	37.95	72.83
Nd	1554.17	1099.56	799.45	251.23	2574.05	166.82	85.11	70.37	107.36	3457.81
Sm	249.18	182.21	124.53	53.27	364.92	19.01	13.13	11.47	17.22	644.13
Eu	67.421	50.064	31.158	15.129	88.295	5.869	4.786	3.587	4.993	157.862
Gd	176.01	131.70	93.38	40.48	251.93	21.09	14.12	9.02	13.08	483.23
Dy	102.98	86.59	62.92	29.07	151.76	8.22	8.40	7.34	9.93	268.51
Ho	21.153	16.520	12.890	5.742	32.562	2.337	1.667	1.397	1.885	58.807
Er	49.390	46.445	36.322	17.203	95.906	5.154	4.603	4.153	5.285	179.174
Yb	19.958	20.834	17.300	12.893	42.822	1.977	3.341	3.314	3.628	115.417
Lu	2.067	2.078	1.872	1.387	4.158	0.404	0.445	0.485	0.469	12.723
(La/Lu)cn	94.49	58.39	89.96	14.17	131.00	44.85	21.23	21.66	33.28	51.08

APPENDIX VI

FeO, H_2O and CO_2

A selection of samples have been analysed for their FeO, H_2O and CO_2 contents.

FeO

A known weight of fresh sample removed from the 'Tema' swing mill after about 30 seconds is allowed to dissolve in HF in the presence of ammonium metavanadinate. Any unreduced vanadic ion can then be titrated against a standardised solution of ammonium sulphate to determine its quantity. From this it is possible to calculate the amount of FeO present, and hence, from the XRF analysis of total iron expressed as Fe_2O_3, actual contents of Fe_2O_3 and FeO can be produced.

H_2O

Approximately 2gm of rock powder is weighed into a Ni boat and heated in a furnace at about 1100°C for approximately 15 minutes under a stream of nitrogen gas, which passes through a 'U' tube filled with $CaCl_2$. The change in weight of the $CaCl_2$ in the 'U' tube is the water driven from the sample on heating and this can easily be converted to weight per cent.

CO_2

0.5gm of rock powder is allowed to react with 50ml of orthophosphoric acid under a partial vacuum. The CO_2 generated is sucked through a 'U' tube containing 'soda lime'. The air which is sucked into the 'CO_2 train' is passed through $CaCl_2$ to absorb any water it may contain. The analytical 'U' tube of soda lime also contains some $CaCl_2$ to absorb water that is liberated by the reaction of CO_2 with the soda lime. Any weight change in this 'U' tube is due to absorbed CO_2 liberated from the reaction of the sample with the acid, and can be converted simply to weight per cent.

Table AVI.1

FeO, H_2O and CO_2 analyses of selected samples

Sample No.	FeO wt%	Sample No.	H_2O wt%	CO_2 wt%	Total
41945	2.47	325992	1.34	0.22	1.56
58151B	10.64	63895	0.06	0.23	0.29
43867	0.00	46237	1.13	0.13	1.26
127067	5.96	46282	1.24	0.20	1.44
127052	7.18	326271	0.74	0.18	0.92
58290	5.36	326285	1.73	0.09	1.82
127051	9.85	326279	0.87	0.15	1.02
58141A	6.18	326273	0.86	0.16	1.02
58223	7.41	326303	0.73	0.23	0.96
46247	4.83	326302	1.09	37.26	38.35
52274	8.25	326371	1.08	0.28	1.36
58076	9.30	326266	0.66	0.15	0.81
58083	7.10	326333	1.38	31.57	32.95
54244	4.30	325910	0.59	12.53	13.12
46210	4.71	58292	1.09	0.26	1.35
43902	9.76	58298	1.18	0.16	1.34
41904	10.25	41907	1.20	0.03	1.23
41906	7.98	41945	0.07	0.13	0.20
41907	9.44	43845	0.81	0.28	1.09
41941	3.57	43971	1.02	0.19	1.21
41982	5.76	126766B	0.79	0.07	0.86
41958	4.40	304006	0.21	0.28	0.49
58251	6.22	326211	0.95	0.18	1.13
41910	3.16	326359	1.00	11.64	12.64
52291	5.93	46256	0.98	4.58	1.13
46284	2.30	41904	0.72	0.36	1.08
52285	3.08				
58151A	5.84				

APPENDIX VII

Computer Programs

During the course of this study many computer programs were written for handling, processing, recalculating and plotting both XRF and microprobe data. These are presented in the following pages. A brief description of each is given below. The 'read' and 'write' statemenets are designed for the arrangement of my data files. These could be changed to suit if necessary.

The probe data files read Spl. no., Si, Ti, Al, Fe tot., Mn, Mg, Ca, Na, K, Ba, Zr, Cl, S, P, Min type., rock no., rock type 1, rock type 2, grain type, grain position in format (F9.2, 14F7.3, F4.0, F5.0, 4F4.0) and recalculated to output in the same order but reports Spl. no., Si, Ti, Al, Fe^{3+}, Fe^{2+}, Mn ......in format (F9.2, 14F7.3, F4.0, F5.0, 4F4.0)

Major and trace element programs (CHOND.13, CHSIN2, XYPLOT.80) read major elements from unit 5 in the order Spl. No., rock type 1, rock type 2, Si, Ti, Al, Fe tot, Mg, Ca, Na, K, Ti, Mn, P, F, Cl, LOI, O≡F and Cl, Total in the format (10A1, I2, I4, 14F7.2, F8.2). Trace elements are read from unit 4 in the order Spl. no., Ba, Nb, Zr, Y, Sr, Rb, Zn, Cu, Ni, Pb, U, Th, V, Cr, Nd, Ga, La, Ce in the format (10A1, 3F7.0, F6.0, F7.0, F6.0, F7.0, 7F6.0, F7.0, F5.0, 2F7.0) and a full norm summary (56 normative components including coordinates in various systems) from unit 3 in free format.

`AMPH.CLAS`

Classifies amphiboles on the system proposed by Leake (1978) after recalculation to Fe^{3+}/Fe^{2+} by the method of T+C=13 by the program IRON3.AMP, (see Chapter 4).

`CHEM.CLAS`

Classifies fine grained igneous rocks on their total alkali - silica contents by the schemes proposed either by Cox *et al.* (1979) or Le Bas *et al.* (1986). Only requires major element analyses to be input.

CHOND.13 (FORTRAN77 and GHOST)

Produces 13 element 'spidergrams' either chondrite- or mantle- normalised. Plots 6 or 10 spidergrams on one A4 page. Requires major and trace element data to be input. The minimum and maximum values of rock/chondrite are entered in the program and can be changed.

CHSIN2

Produces a 'postcard sized' incompatible element spidergrams for each sample. Scaling down the output to 0.58 on a plotter will produce 9 to an A4 page (see Figure 8.4.4).

CHREEP.LAN

Produces chondrite-normalised REE spidergrams for 6 or 10 samples at 1 time on A4 paper. Calculates and writes $(La/Lu)_{cn}$ in the key. Minimum and maximum values set at the head of the input data. Data order is La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, sample name (10 characters), sample description (25 characters), sample code (5 characters), sample code number (3 numbers) and Sr content ppm (6 numbers) in format (15F9.3, 10A1, 25A1, I3, I6). Where an element has not been analysed (eg. Pm), -1 in the data file indicates a missing value.

IRON3.AMP

Calculates Fe^{3+} and Fe^{2+} for amphiboles by T+C=13 method (see Chapter 4, Leake 1978).

IRON3.OX

Calcualtes Fe^{3+} and Fe^{2+} for amphiboles and reports end member compositions in terms of Mt-Usp, Ht-Il.

IRON3.STOIC

Calculates Fe^{3+} and Fe^{2+} for minerals where stoichiometry can be assumed, eg. pyroxene, garnet. Requires the user to enter the number of cations and number of oxygens when prompted.

`XYPLOT.80` (`FORTRAN77` and `GHOST80`)

An x-y plotting program for A4 paper. Has options for size and axis type that can be changed in the program. Uses a variety of symbols and produces a key. Requires major and trace element data. In this, and in `TRIPLOT.80`, titles etc. all need to be set within the program itself before compiling.

`TRIPLOT.80` (`FORTRAN77` and `GHOST80`)

Produces triangular plots on A4 paper, with or without a 'grid' at each 10%. Reads in A, B, C and a coding in free format (A = bottom left, B = bottom right, C = top). The coding uses different symbols for each level of stratification and produces a key.

PROGRAM AMPH.CLAS

```
C  THIS PROGRAM IS FOR THE CLASSIFICATION OF AMPHIBOLES WHEN RECALCULATED TO
C    23 OXYGENS AND FE3/FE2 HAS BEEN ASSIGNED.

      DIMENSION STR(6)
      REAL*8 RNO
      REAL*4 SI,TI,AL,FE3,FE2,MN,MG,CA,NA,K,BA,ZR,CL,S,P
      REAL*4 MGC,MGXS,MGCP,MGB,MNC,MNXS,MNCP,MNB,NAB,NABP,NAXS,NAA,KA
      REAL*4 MAGB,MGNO
      CHARACTER*25 FEMGMN(9),CALCIC(36),SODCAL(10),ALKALI(9)
      CHARACTER*15 CLASS(5),GROUP(18)
      CHARACTER*35 NN
      CHARACTER*10 PP
      CHARACTER*10 PQ,PR
      DATA CLASS /'IRON-MAG-MANG','CALCIC','SODIC-CALCIC','ALKALI',
     *'UNCLASSIFIED'/
      DATA GROUP/'BENMOREITE','TRACHYBASALT','TRACHYTE','PHONOLITE',
     *'CARBONATITE','U-MAF LAMP','SYENO-GAB','BFD','REXTAL TR',
     *'UMAFICS','QTZ PORP','ALTD U-BAS','REXTAL PHON',
     *'BRECCIAS','GLASSY ROCK','BASALT','OTHER LAMP',' TR-ANDESITE'/
    1 CONTINUE
      PP='          '
      PR='          '
      PQ='          '
      READ(5,*,END=99) RNO,SI,TI,AL,FE3,FE2,MN,MG,CA,NA,K,BA,ZR,CL,S,P,
     *STR
      ISTR=INT(STR(4))
C
C     SET ALL VALUES TO 0.000
      SIT=0.00
      ALT=0.00
      ALTP=0.00
      ALXS=0.00
      FE3T=0.000
      FE3TP=0.000
      FE3XS=0.000
      TITP=0.000
      TIT=0.000
      TIXS=0.000
      ALC=0.000
      TICP=0.00
      TIC=0.000
      FE3CP=0.00
      FE3C=0.000
      MGCP=0.00
      MGC=0.00
      MGXS=0.000
      FE2CP=0.00
      FE2C=0.00
      FE2XS=0.00
      MNCP=0.00
      MNC=0.00
      MNXS=0.00
      FE2B=0.00
      MGB=0.00
      MAGB=0.000
      MNB=0.00
      CABP=0.00
      CAB=0.00
      CAXS=0.00
      NAB=0.00
      NAXS=0.00
      NABP=0.00
      NAA=0.00
      KA=0.00

C   ASSIGN THE DIFFERENT ATOMS TO DIFFERENT SITES

C  T SITE FIRST  SI +  AL  +  FE3  +  TI     FOUR FOLD SITE
      SIT=SI
      IF (SIT.GE.8.000)  GOTO  1100
      ALTP=8.00-SIT
      IF ((AL+SIT).GT.8.000) ALT=ALTP
      IF ((AL+SIT).GT.8.000) ALXS=AL-ALT
      IF ((AL+SIT).LE.8.000) ALT=AL
      IF ((AL+SIT).LE.8.000) ALXS=0.000
      FE3TP=8.000-ALT-SIT
      IF ((ALT+SIT).LE.8.000) FE3T=FE3TP
      IF (FE3TP.GE.FE3) FE3T=FE3
      IF (FE3TP.GE.FE3) FE3XS=0.000
      IF ((ALT+SIT).LE.8.000) FE3XS=FE3-FE3T
      TITP=8.000-ALT-SIT-FE3T
      IF ((ALT+SIT+FE3T).LE.8.000) TIT=TITP
      IF (TITP.GE.TI) TIT=TI
      IF (TITP.GE.TI) TIXS=0.000
      IF ((ALT+SIT+FE3T).LE.8.000) TIXS=TI-TIT
      GOTO 1120
 1100 ALXS=AL
      ALT=0.0
      FE3XS=FE3
      FE3T=0.0
```

```
      TIXS=TI
      TIT=0.0
1120  CONTINUE
      TTOT=SIT+ALT+FE3T+TIT

C   C SITE  NEXT   EXCESS AL, TI, FE3  FROM ABOVE, THEN  MG + FE2 + MN
C        SIX FOLD SITE

      CSUM=0.00
      ALC=ALXS
      CSUM=CSUM+ALC
      IF (CSUM.GE.5.000) GOTO 1200
      TICP=5.000-ALC
      IF (TICP.GT.TIXS) TIC=TIXS
      CSUM=CSUM+TIC
      IF (CSUM.GE.5.000) GOTO 1210
      FE3CP=5.000-CSUM
      IF (FE3CP.GT.FE3XS) FE3C=FE3XS
      CSUM=CSUM+FE3C
      IF (CSUM.GE.5.000) GOTO 1220
      MGCP=5.000-CSUM
      IF (MGCP.GT.MG) MGC=MG
      IF (MGCP.LT.MG) MGC=MGCP
      IF (MGCP.LT.MG) MGXS=MG-MGC
      CSUM=CSUM+MGC
      IF (CSUM.GE.5.00) GOTO 1230
      FE2CP=5.000-CSUM
      IF (FE2CP.GT.FE2) FE2C=FE2
      IF (FE2CP.LT.FE2) FE2C=FE2CP
      IF (FE2CP.LT.FE2) FE2XS=FE2-FE2CP
      CSUM=CSUM+FE2C
      IF (CSUM.GE.5.00) GOTO 1240
      MNCP=5.000-CSUM
      IF (MNCP.GT.MN) MNC=MN
      IF (MNCP.LT.MN) MNC=MNCP
      IF (MNCP.LT.MN) MNXS=MN-MNCP
      CSUM=CSUM+MNC
      GOTO 1250
1200  TIXS=TIXS
      TIC=0.000
1210  FE3XS=FE3XS
      FE3C=0.000
1220  MGXS=MG
      MGC=0.000
1230  FE2XS=FE2
      FE2C=0.000
1240  MNXS=MN
      MNC=0.000
1250  CONTINUE

C   B SITE  EXCESS FE2, MN, MG  THEN  CA THEN NA

      BSUM=0.000
      FE2B=FE2XS
      MAGB=MGXS
      MNB=MNXS
      BSUM=BSUM+FE2B+MAGB+MNB
      IF (BSUM.GE.2.000)  GOTO 1300
      CABP=2.000-BSUM
      IF (CABP.GT.CA) CAB=CA
      IF (CABP.LT.CA) CAB=CABP
      IF (CABP.LT.CA) CAXS=CA-CABP
      BSUM=BSUM+CAB
      IF (BSUM.GE.2.00) GOTO 1310
      NABP=2.000-BSUM
      IF (NABP.GT.NA) NAB=NA
      IF (NABP.LT.NA) NAB=NABP
      IF (NABP.LT.NA) NAXS=NA-NABP
      BSUM=BSUM+NAB
      GOTO 1350
1300  CAB=0.00
      CAXS=CA
1310  NAB=0.00
      NAXS=NA
1350  CONTINUE

C   A SITE  XS NA THEN ALL  K

      NAA=NAXS
      KA=K
      ASUM=NAA+KA

C  CLASSIFICATION

      IF (MG.LT.0.001.AND.FE2.LT.0.001) MGNO=0.00
      IF (MG.LT.0.001.AND.FE2.LT.0.001) GOTO 2200
      MGNO=MG/(MG+FE2)
2200  ITYPE=5
      IF ((CAB+NAB).LT.1.34) ITYPE=1
      IF ((CAB+NAB).GE.1.34.AND.NAB.LT.0.67) ITYPE=2
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      IF ((CAB+NAB).GE.1.34.AND.NAB.GE.0.67.AND.NAB.LT.1.34) ITYPE=3
      IF (NAB.GT.1.34) ITYPE=4

C   WRITE RESULTS OF SITE ASSIGNMENTS

      WRITE (9,9050) RNO,ITYPE
 9050 FORMAT (F10.2,I6)
      WRITE(9,*) ' '
      WRITE (9,9100) SIT,ALT,FE3T,TIT,TTOT
 9100 FORMAT(5F10.3)
      WRITE(9,*) ' '
      WRITE (9,9200) ALC,TIC,FE3C,MGC,FE2C,MNC,CSUM
 9200 FORMAT(7F10.3)
      WRITE(9,*) ' '
      WRITE (9,9300) FE2B,MNB,MAGB,CAB,NAB,BSUM
 9300 FORMAT(6F10.3)
      WRITE(9,*) ' '
      WRITE(9,9400) NAA,KA,ASUM
 9400 FORMAT(3F10.3)
      WRITE(9,*) ' '

      IF (KA.GE.0.25.AND.KA.LT.0.5.AND.ITYPE.NE.4) PQ='POTASSIAN'
      IF (KA.GE.0.50) PQ='POTASSIUM'
      IF (MN.GE.0.25.AND.MN.LT.1.00) PR='MANGANOAN'
      IF (MN.GE.1.00) PR='MANGANESE'

C     WRITE (8,8000) RNO,CLASS(ITYPE)
C8000 FORMAT(F12.2,A20)

      IF (ITYPE.EQ.1) GOTO 3100
      IF (ITYPE.EQ.2) GOTO 3200
      IF (ITYPE.EQ.3) GOTO 3300
      IF (ITYPE.EQ.4) GOTO 3400

C      IRON-MAGNESIUM-MANGANESE AMPHIBOLES
3100  PP='        '
      IF (SI.LT.7.0.AND.MGNO.LT.0.1)  NN='FERRO-GEDRITE'
      IF (SI.LT.7.0.AND.MGNO.LT.0.9.AND.MGNO.GE.0.1) NN='GEDRITE'
      IF (SI.LT.7.0.AND.MGNO.GE.0.9) NN='MAGNESIO-GEDRITE'
      IF (SI.GE.7.0.AND.MGNO.LT.0.1) NN='FERRO-ANTHOPHYLLITE'
      IF (SI.GE.7.0.AND.MGNO.LT.0.9.AND.MGNO.GT.0.1) NN='ANTHOPHYLLITE'
      IF (SI.GE.7.0.AND.MGNO.GE.0.9) NN='MAGNESIO-ANTHOPHYLLITE'
      GOTO  8888

C     CALCIC AMPHIBOLES
3200  PP='          '
      IF (ALC.GE.1.0) PP='ALUMINO'
      IF (NA.GE.1.0) PP='SODIAN'
      IF (CA.LT.1.5) PP='SUBCALCIC'

      IF ((NAA+KA).LT.0.5.AND.TI.LT.0.5)  GOTO 3210
      IF ((NAA+KA).GE.0.5.AND.TI.LT.0.5.AND.FE3.LE.ALC)  GOTO 3220
      IF ((NAA+KA).GE.0.5.AND.TI.LT.0.5.AND.FE3.GT.ALC)  GOTO 3230
      IF (TI.GT.0.5) GOTO 3240


3210  IF (SI.GE.7.5.AND.MGNO.GE.0.9) NN='TREMOLITE'
      IF (SI.GE.7.5.AND.MGNO.LT.0.9.AND.MGNO.GE.0.5) NN='ACTINOLITE'
      IF (SI.GE.7.5.AND.MGNO.LT.0.5) NN='FERRO-ACTINOLITE'
      IF (SI.LT.7.5.AND.SI.GE.7.25.AND.MGNO.GE.0.9)
     *NN='TREMOLITIC HORNBLENDE'
      IF (SI.LT.7.5.AND.SI.GE.7.25.AND.MGNO.LT.0.9.AND.MGNO.GE.0.5)
     *NN='ACTINOLITIC HORNBLENDE'
      IF (SI.LT.7.5.AND.SI.GE.7.25.AND.MGNO.LT.0.5)
     *NN='FERRO-ACTINOLITIC HORNBLENDE'
      IF (SI.LT.7.25.AND.SI.GE.6.5.AND.MGNO.GE.0.5)
     *NN='MAGNESIO-HORNBLENDE'
      IF (SI.LT.7.25.AND.SI.GE.6.5.AND.MGNO.LT.0.5)
     *NN='FERRO-HORNBLENDE'
      IF (SI.LT.6.50.AND.SI.GE.6.25.AND.MGNO.GE.0.5)
     *NN='TSCHERMAKITIC HORNBLENDE'
      IF (SI.LT.6.50.AND.SI.GE.6.25.AND.MGNO.LT.0.5)
     *NN='FERRO-TSCHERMAKITIC HORNBLENDE'
      IF (SI.LT.6.50.AND.MGNO.GE.0.5)      NN='TSCHERMAKITE'
      IF (SI.LT.6.50.AND.MGNO.LT.0.5)      NN='FERRO-TSCHERMAKITE'
      GOTO 8888

3220  IF (SI.GE.7.5.AND.MGNO.GE.0.5) NN='SILICIC EDENITE'
      IF (SI.GE.7.5.AND.MGNO.LT.0.5) NN='SILICIC FERRO-EDENITE'
      IF (SI.LT.7.5.AND.SI.GE.6.75.AND.MGNO.GE.0.5) NN='EDENITE'
      IF (SI.LT.7.5.AND.SI.GE.6.75.AND.MGNO.LT.0.5) NN='FERRO-EDENITE'
      IF (SI.LT.6.75.AND.SI.GE.6.50.AND.MGNO.GE.0.5)
     *NN='EDENITIC HORNBLENDE'
      IF (SI.LT.6.75.AND.SI.GE.6.50.AND.MGNO.LT.0.5)
     *NN='FERRO-EDENITIC HORNBLENDE'
      IF (SI.LT.6.50.AND.SI.GE.6.25.AND.MGNO.GE.0.7)
     *NN='PARGASITIC HORNBLENDE'
      IF (SI.LT.6.50.AND.SI.GE.6.25.AND.MGNO.LT.0.7.AND.MGNO.GE.0.3)
     *NN='FERROAN PARGASITIC HORNBLENDE'
      IF (SI.LT.6.50.AND.SI.GE.6.25.AND.MGNO.LT.0.3)
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     *NN='FERRO-PARGASITIC HORNBLENDE'
      IF (SI.LT.6.25.AND.MGNO.GE.0.7)  NN='PARGASITE'
      IF (SI.LT.6.25.AND.MGNO.LT.0.7.AND.MGNO.GT.0.3)
     *NN='FERROAN PARGASITE'
      IF (SI.LT.6.25.AND.MGNO.LT.0.3)  NN='FERRO-PARGASITE'
      GOTO 8888

3230  IF (SI.GE.7.5.AND.MGNO.GE.0.5) NN='SILICIC EDENITE'
      IF (SI.GE.7.5.AND.MGNO.LT.0.5) NN='SILICIC FERRO-EDENITE'
      IF (SI.LT.7.5.AND.SI.GE.6.75.AND.MGNO.GE.0.5) NN='EDENITE'
      IF (SI.LT.7.5.AND.SI.GE.6.75.AND.MGNO.LT.0.5) NN='FERRO-EDENITE'
      IF (SI.LT.6.75.AND.SI.GE.6.50.AND.MGNO.GE.0.5)
     *NN='EDENITIC HORNBLENDE'
      IF (SI.LT.6.75.AND.SI.GE.6.50.AND.MGNO.LT.0.5)
     *NN='FERRO-EDENITIC HORNBLENDE'
      IF (SI.LT.6.50.AND.SI.GE.6.25.AND.MGNO.GE.0.7)
     *NN='MAGNESIO-HASTINGSITIC HORNBLENDE'
      IF (SI.LT.6.50.AND.SI.GE.6.25.AND.MGNO.LT.0.7.AND.MGNO.GE.0.3)
     *NN='MAGNESIAN HASTINGSITIC HORNBLENDE'
      IF (SI.LT.6.50.AND.SI.GE.6.25.AND.MGNO.LT.0.3)
     *NN='HASTINGSITIC HORNBLENDE'
      IF (SI.LT.6.25.AND.MGNO.GE.0.7)  NN='MAGNESIO-HASTINGSITE'
      IF (SI.LT.6.25.AND.MGNO.LT.0.7.AND.MGNO.GT.0.3)
     *NN='MAGNESIAN HASTINGSITE'
      IF (SI.LT.6.25.AND.MGNO.LT.0.3)  NN='HASTINGSITE'
      GOTO 8888

3240  IF (SI.GE.6.5) NN='TI RICH, OUT OF RANGE'
      IF (SI.LT.6.5.AND.TI.GE.0.5) NN='KAERSUTITE'
      IF (SI.LT.6.5.AND.TI.LT.0.5) NN='FERRO-KAERSUTITE'
      GOTO 8888

C     SODIC-CALCIC AMPHIBOLES
3300  PP='             '
      IF ((NAA+KA).LT.0.5) GOTO 3310
      IF ((NAA+KA).GE.0.5) GOTO 3320

3310  IF (SI.GE.7.5.AND.MGNO.GE.0.5) NN='WINCHITE'
      IF (SI.GE.7.5.AND.MGNO.LT.0.5) NN='FERRO-WINCHITE'
      IF (SI.LT.7.5.AND.SI.GE.6.5.AND.MGNO.GE.0.5) NN='BARROISITE'
      IF (SI.LT.7.5.AND.SI.GE.6.5.AND.MGNO.LT.0.5) NN='FERRO-BARROISITE'
      IF (SI.LT.6.5) NN='UNCLASSIFIED SOD-CALC AMP'
      GOTO 8888

3320  IF (SI.GE.7.5.AND.MGNO.GE.0.5) NN='RICHTERITE'
      IF (SI.GE.7.5.AND.MGNO.LT.0.5) NN='FERRO-RICHTERITE'
      IF (SI.LT.7.5.AND.SI.GE.6.5.AND.MGNO.GE.0.5)
     *NN='MAGNESIO-KATOPHORITE'
      IF (SI.LT.7.5.AND.SI.GE.6.5.AND.MGNO.LT.0.5) NN='KATOPHORITE'
      IF (SI.LT.6.5.AND.MGNO.GE.0.5) NN='MAGNESIO-TARAMITE'
      IF (SI.LT.6.5.AND.MGNO.LT.0.5) NN='TARAMITE'
      GOTO 8888

C     ALKALI AMPHIBOLES
3400  IF (FE3.LT.0.005.AND.ALC.LT.0.005) FENO=0.00
      IF (FE3.LT.0.005.AND.ALC.LT.0.005) GOTO 3405
      FENO=FE3/(FE3+ALC)
3405  PP='             '
      IF (CA.GE.0.5) PP='CALCIAN'
      IF ((NAA+KA).GE.0.5) GOTO 3410
      IF ((NAA+KA).LT.0.5) GOTO 3420

3410  IF (FENO.LT.0.5.AND.MGNO.LT.0.5) NN='FERRO-ECKERMANITE'
      IF (FENO.LT.0.5.AND.MGNO.GE.0.5) NN='ECKERMANITE'
      IF (FENO.GE.0.5.AND.MGNO.LT.0.5) NN='ARFVEDSONITE'
      IF (FENO.GE.0.5.AND.MGNO.GE.0.5) NN='MAGNESIO-ARFVEDSONITE'
      GOTO 8888

3420  IF (FENO.LT.0.3.AND.MGNO.LT.0.5) NN='FERRO-GLAUCOPHANE'
      IF (FENO.LT.0.3.AND.MGNO.GE.0.5) NN='GLAUCOPHANE'
      IF (FENO.GT.0.3.AND.FENO.LT.0.7) NN='CROSSITE'
      IF (FENO.GE.0.7.AND.MGNO.LT.0.5) NN='RIEBECKITE'
      IF (FENO.GE.0.7.AND.MGNO.GE.0.5) NN='MAGNESIO-RIEBECKITE'
      GOTO 8888
8888  WRITE (7,7000) RNO,GROUP(ISTR)
7000  FORMAT (F12.2,10X,A15)
      WRITE (7,7050) CLASS(ITYPE)
7050  FORMAT (5X,A15)
      WRITE (7,7100) PQ,PR,PP,NN
7100  FORMAT(3A15,A35)
      WRITE (7,*) ' '

      WRITE (8,*) RNO,ITYPE,SIT,ALT,FE3T,TIT,ALC,TIC,FE3C,MGC,FE2C,MNC,
     *ZR,FE2B,MNB,MGB,CAB,NAB,NAA,KA,BA,CL,S,P,STR
9999  GOTO 1
 99   STOP
      END
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PROGRAM CHEM.CLAS

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C     THIS PROGRAM CLASSIFIES FINE GRAINED IGNEOUS ROCKS ON THEIR ALKALI
C     AND SILICA CONTENTS BASED ON THE SCHEME PROPOSED BY LEBAS ET AL. IN
C     JOURNAL OF PETROLOGY VOL 27 1986  PP. 745-750.
C             WRITTEN BY NICK PEARCE  OCTOBER 1986.
C
      CHARACTER*8 NAME(1)
      CHARACTER*20  AA
      CHARACTER*22  NM
      REAL*8 MG,NA,K,MN,P,NAM,SI,AL,FE,CA,TI,F,CL,TOT,A,S

      WRITE(6,*) 'THIS PROGRAM CLASSIFIES FINE GRAINED IGNEOUS ROCKS'
      WRITE(6,*)'ON THE BASIS OF CLASSIFICATIONS GIVEN BY EITHER'
      WRITE(6,*)'         LE BAS ET AL.(1986) J. PET VOL 27 P.745 '
      WRITE(6,*)'OR '
      WRITE(6,*)'         COX,BELL AND PANKHURST(1979) INTERPRETATION'
      WRITE(6,*)'         OF IGNEOUS ROCKS
      WRITE(6,*)'   '
      WRITE(6,*)'TO SELECT THE CLASSIFICATION YOU WANT ENTER  '
      WRITE(6,*)'EITHER 86 FOR LE BAS OR 79 FOR COX,BELL&PANKHIRST'
      READ(6,*) ICLAS

      DO 500 I=1,500

C     READ (5,*,END=999) NAME,SI,AL,FE,MG,CA,NA,K,TI,MN,P,F,CL,RLOI,ROEQ
C    1,TOT

      READ (5,*,END=999) NAME,ITYPE,SI,AL,FE,MG,CA,NA,K,TI,MN,P,F,CL,RLO
     1I,ROEQ,TOT

C    FORMULAE OF LINES USED TO SEPARATE DIFERENT TYPES NOW FOLLOW

      F1=.6086957*SI-17.956552
      F2=.53125*SI-18.90625
      F3=.1764706*SI-4.1764706
      F4=-.4499425*SI+37.621979
      F5=-1.0*SI+77.0
      F6=-.4679642*SI+34.146145
      F7=-.4787407*SI+30.915996
      F8=-.5*SI+27.5
      F9=-.8612335*SI+49.78414
      F10=-.8749999*SI+55.757348
      F11=-.8831877*SI+62.5820001
      F12=-.1635846*SI+11.5

C    CLASSIFICATION
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      A=NA+K
      S=SI
      NAM=0.00
      IF (A.GE.0.00.AND.A.LT.3.00.AND.S.GE.41.0.AND.S.LT.45.0) NAM=1.00
      IF (A.GE.0.00.AND.A.LT.5.00.AND.S.GE.45.0.AND.S.LT.52.0) NAM=2.00
      IF (A.GE.5.00.AND.A.LT.F2.AND.A.LT.F9) NAM=3.00
      IF (A.GE.F3.AND.A.GE.F9.AND.A.LT.F2.AND.A.LT.F10) NAM=4.00
      IF (A.GE.F3.AND.A.GE.F10.AND.A.LT.F2.AND.A.LT.F11) NAM=5.00
      IF (A.GE.F3.AND.A.GE.F11.AND.A.LT.F2.AND.S.LT.69.0) NAM=6.00
      IF (A.GE.F2.AND.A.GE.F4) NAM=7.00
      IF (A.GE.F2.AND.A.GE.F8.AND.A.LT.F1.AND.A.LT.F7) NAM=8.00
      IF (A.GE.3.0.AND.A.LT.F8.AND.S.GE.41.0.AND.S.LT.45.0) NAM=8.00
      IF (A.GE.F2.AND.A.GE.F7.AND.A.LT.F1.AND.A.LT.F6) NAM=9.00
      IF (A.GE.F2.AND.A.GE.F6.AND.A.LT.F1.AND.A.LT.F4) NAM=10.0
      IF (A.GE.0.00.AND.A.LT.F3.AND.S.GE.52.0.AND.S.LT.57.0) NAM=11.0
      IF (A.GE.0.00.AND.A.LT.F3.AND.S.GE.57.0.AND.S.LT.63.0) NAM=12.0
      IF (A.GE.0.00.AND.A.LT.F3.AND.S.GE.63.0.AND.S.LT.F5) NAM=13.0
      IF (A.GE.F5.AND.S.GE.69.0) NAM=14.0
      IF (A.GE.F1.AND.A.LT.F4) NAM=15.0
      IF (A.LT.F1.AND.S.LT.41.0) NAM=15.0

C    SODIC OR POTASSIC VARIETIES

C   NA >> K  USE SODIC SUB-NAME EG MUGEARITE
      IF ((NA-2.0).GE.K) NAM=NAM+0.1

C NA > K USE GROUP NAME
      IF ((NA-2.0).LT.K.AND.NA.GT.K) NAM=NAM+0.2

C K > NA USE POTASSIC SUB-NAME EG SHOSHONITE
      IF (K.GE.NA) NAM=NAM+0.3

C WRITTEN NAMES

      IF (NAM.GT.1.0.AND.NAM.LT.2.0) AA='        PICROBASALT'
      IF (NAM.GT.2.0.AND.NAM.LT.3.0) AA='             BASALT'
      IF (NAM.GT.6.0.AND.NAM.LT.7.0) AA='           TRACHYTE'
      IF (NAM.GT.7.0.AND.NAM.LT.8.0) AA='           PHONOLITE'
      IF (NAM.GT.8.0.AND.NAM.LT.9.0) AA='           TEPHRITE'
      IF (NAM.GT.9.0.AND.NAM.LT.10.0) AA='      PHONOTEPHRITE'
      IF (NAM.GT.10.0.AND.NAM.LT.11.0) AA='    TEPHROPHONOLITE'
      IF (NAM.GT.11.0.AND.NAM.LT.12.0) AA=' BASALTIC ANDESITE'
      IF (NAM.GT.12.0.AND.NAM.LT.13.0) AA='          ANDESITE'
      IF (NAM.GT.13.0.AND.NAM.LT.14.0) AA='            DACITE'
      IF (NAM.GT.14.0.AND.NAM.LT.15.0) AA='          RHYOLITE'
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      IF (NAM.GT.15.0.AND.NAM.LT.16.0) AA='          FOIDITE'
      IF (NAM.GT.3.05.AND.NAM.LT.3.15)    AA='          HAWAIITE'
      IF (NAM.GT.3.15.AND.NAM.LT.3.25)    AA='       TRACHYBASALT'
      IF (NAM.GT.3.25.AND.NAM.LT.3.35)    AA='   K - TRACHYBASALT'
      IF (NAM.GT.4.05.AND.NAM.LT.4.15)    AA='          MUGEARITE'
      IF (NAM.GT.4.15.AND.NAM.LT.4.25)    AA='     TRACHYANDESITE'
      IF (NAM.GT.4.25.AND.NAM.LT.4.35)    AA='        SHOSHONITE'
      IF (NAM.GT.5.05.AND.NAM.LT.5.15)    AA='         BENMOREITE'
      IF (NAM.GT.5.15.AND.NAM.LT.5.25)    AA='     TRACHYANDESITE'
      IF (NAM.GT.5.25.AND.NAM.LT.5.35)    AA='             LATITE'

C K/NA RATIO

      K=K+0.0001
      NA=NA+0.0001
      RKNA=K/NA

C
C.... COX,BELL AND PANKHURST CLASSIFICATION
C
      G1=.5357143*SI-11.785714
      G2=-0.375*SI+25.0
      G3=0.94444444*SI-33.05555555
      G4=.6*SI-17.9
      G5=-.5*SI+32.5
      G6=.3846154*SI-9.9615385
      G7=.7857143*SI-29.214286
      G8=-0.033333333*SI+7.333333333
      G9=1.0769231*SI-50.615385
      G10=.56*SI-22.96
      G11=.2*SI-2.4
      G12=-.1724138*SI+18.8668963
      G13=.1875*SI-4.8125
      G14=SI-56.0
      G15=-.3076923*SI+29.0
      G16=.5*SI-23.5
      G17=-.4285714*SI+40.571429
      G18=.8571429*SI-39.142857
      G19=-.88888888*SI+59.44444444
      G20=-.625*SI+47.0
      G21=-.8947368*SI+68.0
      G22=-.538445*SI+25.307692
      G23=-.33333333*SI+18.0
      G24=-.5*SI+12.5
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      NMB=0
      IF (A.LT.G1.AND.A.GE.G3.AND.A.GE.G22.AND.A.LT.G2.AND.SI.GE.36.0)
     1 NMB=1
      IF (A.GE.G2.AND.A.LT.G1.AND.A.GE.G4.AND.A.LT.G19) NMB=2
      IF (A.GE.G22.AND.A.LT.G5.AND.A.GE.G7.AND.A.LT.G3) NMB=3
      IF (A.GE.3.0.AND.A.LT.G7.AND.A.LT.G8.AND.S.LT.45.0) NMB=4
      IF (A.GE.G23.AND.A.LT.G8.AND.S.LT.48.0.AND.S.GE.45.0) NMB=4
      IF (A.LT.G7.AND.S.LT.52.0.AND.S.GE.48.0) NMB=4
      IF (A.GE.G8.AND.A.LT.G7.AND.A.GE.G9.AND.A.LT.7.0) NMB=5
      IF (A.GE.7.0.AND.A.LT.G7.AND.A.LT.G6.AND.A.GE.G10.AND.A.LT.9.3.AND
     1.A.LT.G12) NMB=6
      IF (A.GE.9.3.AND.A.LT.G6.AND.A.LT.58.5.AND.S.LE.55.5) NMB=7
      IF (A.GE.G12.AND.A.LT.G15.AND.S.GE.55.5.AND.A.GT.G11.AND.A.LT.58.5
     1) NMB=7
      IF (A.GE.G5.AND.A.LT.G4.AND.A.GE.G6.AND.A.LT.G19) NMB=8
      IF (A.GE.G19.AND.A.GT.G18.AND.A.GE.11.0) NMB=9
      IF (A.GE.G15.AND.A.LT.G18.AND.A.GE.G16.AND.A.LT.G17) NMB=10
      IF (A.LT.G8.AND.S.GE.52.0.AND.S.LT.55.0) NMB=11
      IF (A.GE.G8.AND.A.LT.G9.AND.A.LT.G10.AND.A.LT.G11.AND.A.LT.G15.AND
     1.A.GE.G14.AND.A.GE.G13) NMB=12
      IF (A.LT.G13.AND.S.GE.55.0.AND.S.LT.63.0) NMB=13
      IF (A.LT.G14.AND.A.LT.G20.AND.A.LT.G21.AND.S.GE.63.0) NMB=14
      IF (A.GE.G20.AND.A.LT.G16.AND.S.LT.69.0) NMB=15
      IF (A.GE.G21.AND.A.LT.G16.AND.S.GE.69.0) NMB=15
      IF (A.LT.G23.AND.A.LT.3.0.AND.S.GE.41.0.AND.S.LT.48.0) NMB=16
      IF (A.LT.3.0.AND.A.LT.G24) NMB=17
C     IF (S.GE.15.0.AND.S.LT.36.0) NMB=18
      IF (S.GE.25.0.AND.S.LT.36.0) NMB=18
      IF (A.GE.3.0.AND.S.LT.25.0) NMB=18
      IF (A.LT.3.0.AND.S.LT.25.0.AND.A.GE.G24) NMB=18
      IF (S.GE.36.0.AND.A.LT.G22.AND.S.LT.41.0) NMB=18

C  NAMES ACCORDING TO COX BELL AND PANKHURST
      NM='                        '
      IF (NMB.EQ.0)  NM='OUT OF CLASSIF-N RANGE'
      IF (NMB.EQ.1)  NM='           NEPHELINITE'
      IF (NMB.EQ.2)  NM='PHONOLITIC NEPHELINITE'
      IF (NMB.EQ.3)  NM='  TEPHRITE OR BASANITE'
      IF (NMB.EQ.4)  NM='                BASALT'
      IF (NMB.EQ.5)  NM='              HAWAIITE'
      IF (NMB.EQ.6)  NM='             MUGEARITE'
      IF (NMB.EQ.7)  NM='            BENMOREITE'
      IF (NMB.EQ.8)  NM='   PHONOLITIC TEPHRITE'
      IF (NMB.EQ.9)  NM='             PHONOLITE'
      IF (NMB.EQ.10)  NM='             TRACHYTE'
```

```
      IF (NMB.EQ.11)  NM='     BASALTIC ANDESITE'
      IF (NMB.EQ.12)  NM='        TRACHYANDESITE'
      IF (NMB.EQ.13)  NM='              ANDESITE'
      IF (NMB.EQ.14)  NM='                DACITE'
      IF (NMB.EQ.15)  NM='              RHYOLITE'
      IF (NMB.EQ.16)  NM='       PICRITIC BASALT'
      IF (NMB.EQ.17)  NM='           CARBONATITE'
      IF (NMB.EQ.18)  NM='   U-MAFIC LAMPROPHYRE'
C WRITE OUT NAMES AND CLASSIFICATIONS INTO 2 FILES

      IF (ICLAS.EQ.79) GOTO 555
C WRITE OUT LEBAS CLASSIFICATION AND ALL CHEMICAL DATA
      WRITE(8,8001) NAME,NAM,SI,AL,FE,MG,CA,NA,K,TI,MN,P,TOT
8001  FORMAT(A8,F5.1,10F7.2,F8.2)

C WRITE OUT A SMALL VERSION OF LEBAS CLASSIFICATION
      WRITE(9,9001) NAME,NAM,RKNA,S,A,AA
9001  FORMAT(A8,F8.1,F10.5,2F10.2,A20)
      GOTO 500

C WRITE OUT COX,BELL AND PANKHURST CLASSIFICATION AND ALL CHEMICAL DATA
 555  WRITE(8,8002) NAME,NMB,SI,AL,FE,MG,CA,NA,K,TI,MN,P,F,CL,RLOI,ROEQ,
     1TOT
8002  FORMAT(1X,A8,1X,I2,14F7.2,F8.2)

C  WRITE OUT A SHORT VERSION OF C.B AND P CLASSIFICATION
      WRITE(9,9002) NAME,NMB,RKNA,S,A,NM
9002  FORMAT(A8,I5,F10.5,2F10.2,2X,A22)
 500  CONTINUE
 999  STOP
      END
```

PROGRAM CHOND.13

```
C... CHONDRITE AND PRIMORDIAL MANTLE NORMALISATION
C...    AND PLOTTING PROGRAM
C...                         NICK PEARCE JANUARY 1986
C
C... PLOTS LOG ROCK/CHONDRITE (K, P, TI ARE SUN'S (1980) PRIMORDIAL
C...    MANTLE ESTIMATES)
C... CHONDRITE VALUES REVIEWED BY THOMPSON (1982) SCOTT. J. GEOL.
C... PRIMORDIAL MANTLE VALUES FROM WOOD D.A. ET AL. (1981) TECTONOPHYSICS
C
C... PLOTS CAN BE PRODUCED EITHER 9.5" BY 6" ( FITS ONTO A4)
C... OR APPROX 13.5" BY 10" (FULL SIZE PLOTTER PAPER) BY CHANGING
C... THE COMMENT LABELS ON PSPACE AND CSPACE LINES IN SUBROUTINE SETUP
C
C
C   TWO PLOT OPTIONS ARE AVAILABLE 6 OR 10 SAMPLES PER PLOT
C   TO SELECT EITHER SWAP THE COMMENT MARKERS IN COLUNM 1 WHERE
C   INSTRUCTED BY THE SIX PLOT OR TEN PLOT COMMENTS
C
C   THE NEXT LINE PRODUCES TEN PLOTS PER GRAPH

C     DIMENSION CFACT(13),IORD(13),A(37),ANOS(13),X(13),ISYMB(10)

C   THE NEXT LINE WILL PRODUCE SIX PLOTS PER GRAPH
      DIMENSION CFACT(13),IORD(13),ISYMB(6)
      REAL*8 A(28),X(13)
      REAL*4 XG(13),ANOS(13)
C
C SELECT ABOVE OPTION BY EXCHANGING COMMENT LABELS AND FOLLOW
C THROUGH THE REST OF THE PROGRAM CHANGING FOR EITHER TEN PLOT
C OR SIX PLOT
C
      LOGICAL*1 SAMP(10),NAME(10)
      INTEGER COUNT
C
C... THE INPUT ORDER BELOW IS
C...  RB BA TH K NB LA CE SR ND P ZR TI Y
C   THIS OF COURSE CAN BE CHANGED TO SUIT PROVIDED THE PPM CONC'S
C  IN ARRAY IS ALTERED ALSO
C
C     ARRAY DATA IORD GOVERNS THE INPUT ORDER I.E. THE POSITION OF
C  EACH ELEMENT IN YOUR INPUT FILE
C
C...               RB BA TH K NB LA CE SR ND  P ZR TI Y
C     DATA IORD /18,25,19,9,13,26,27,17,28,10,14,2,16/
C  NEW DATA LAYOUT - 17.11.86
      DATA IORD /16,11,22,7,12,27,28,15,25,10,13,8,14/
      DATA CFACT /.35,6.9,.042,120.,.35,.328,.865,11.8,.63,46.,6.84,620.
     1,2./
      DATA ANOS /1.,2.,3.,4.,5.,6.,7.,8.,9.,10.,11.,12.,13./
C
C... TEN PLOT
C     DATA ISYMB /51,52,53,54,55,56,57,58,59,60/
C... SIX PLOT
      DATA ISYMB /51,52,53,54,55,56/

      COUNT = 0
      CALL PAPER(1)
      CALL CTRSET(4)
      CALL CTRMAG(14)
      CALL SETUP
    1 READ(5,1000,END=99) SAMP,ITYPE,ITYP2,(A(I),I=1,10),F,CL,RLOI,ROEQ,
     1TOT
 1000 FORMAT(10A1,I2,I4,14F7.2,F8.2)
      READ(4,4000,END=99) NAME,(A(I),I=11,28)
 4000 FORMAT(10A1,3F7.0,F6.0,F7.0,F6.0,F7.0,7F6.0,F7.0,F5.0,2F7.0)
      TOT = 0.0
      FACT = 1.0
C... TURN TIO2 TO TI PPM
      A(8) = A(8) * 5995.084
C... TURN WTPC K20  TO PPM
      A(7) = A(7) * 8301.611
C... TURN P205 TO PPM
      A(10) = A(10) * 4363.908
      DO 102 I=1,13
      X(I) = 0.01
      IF (A(IORD(I)).GT.0.000001) X(I) = A(IORD(I))/CFACT(I)
  102 CONTINUE
      CALL INTPOL(X,A,IORD)
      DO 125 IN=1,13
      XG(IN)=X(IN)
  125 CONTINUE
      WRITE(8,8001) XG
 8001 FORMAT(13F10.5)
      CALL PTPLOT(ANOS,XG, 1, 13, ISYMB(COUNT+1))
      CALL PTPLOT(ANOS,XG, 1, 13, -2)
      CALL MAP(1.0, 8.0,1.0, 8.0)
      CALL PLOTNC(8.2,8.0-(COUNT/2.0),ISYMB(COUNT+1))
      CALL CTRSET(5)
      CALL PLOTCS(8.5,8.0-(COUNT/2.0),SAMP,10)
C..
```

```
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL MAPYL(0.0,14.0,1.0,20000.0)
      CALL CTRSET(4)
C
C... TEN PLOT
C     COUNT = MOD(COUNT+1,10)

C... SIX PLOT
      COUNT = MOD(COUNT+1,6)

      IF (COUNT.NE.0) GO TO 1
      CALL FRAME
      CALL SETUP
      GO TO 1
   99 CALL GREND
      STOP
      END

      SUBROUTINE SETUP
      CHARACTER*2 ANAME(13)
      DATA ANAME/'RB','BA','TH','K ','NB','LA','CE','SR','ND','P ','ZR',
     1'TI','Y '/
C..
C.. PLOTS TO FIT ON A4 APPROX 9.5" BY 6"
      CALL PSPACE(0.07,0.84,0.07,0.56)
      CALL CSPACE(0.0,1.12,0.0,0.84)
C
C.. PLOTS TO FIT ON PLOTTER PAPER APPROX 13" BY 7"
C     CALL PSPACE(0.1,1.2,0.1,0.8)
C     CALL CSPACE(0.0,1.6,0.0,1.2)
C..
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL MAP(0.0,14.0,1.0,8.0)
C
C..   SET THE TITLE UP THE Y AXIS TO BE WRITTEN WITHIN THE TWO
C..   QUOTES BELOW . THE INTEGER AFTER THE QUOTES IS THE NUMBER OF
C..   CHARACTERS IN THE STRING
C
      CALL CTRMAG(16)
      CALL CTRORI(1.0)
      CALL CTRSET(5)
      CALL PLOTCS(-0.9,2.00, '     ROCK / CHONDRITE', 20)
      CALL CTRORI(0.0)
      CALL CTRMAG(23)
      CALL THICK(2)
      CALL PLOTCS(1.0, 9.0,'AVG DYKE COMPS - INCOMPATIBLE ELS',33)
      CALL THICK(1)
      CALL CTRMAG(8)
      CALL MAP(0.0,14.0,1.0,8.0)
      CALL PLOTCS(14.1,2.10,'CHONDRITE CONCS        ',23)
      CALL PLOTCS(14.1,1.8, 'FROM THOMPSON,',14)
      CALL PLOTCS(14.1,1.50, 'SCOT. J. GEOL., 1982',20)
      CALL PLOTCS(14.1,3.60,'MISSING DATA           ',23)
      CALL PLOTCS(14.1,3.30,'INTERPOLATED FROM      ',23)
      CALL PLOTCS(14.1,3.00,'NEAREST NEIGHBOURS     ',23)
      CALL ITALIC(1)
      CALL PLOTCS(14.2,1.1, 'N. J. G. PEARCE, 1986',21)
      CALL ITALIC(0)
      CALL CTRMAG(14)
      CALL BLKPEN
      CALL BORDER
      CALL MAPYL(0.0,14.0,1.0,20000.0)
      CALL AXEYL
      CALL MAP(0.0,14.0,1.0,8.0)
      CALL POSITN(0.0,1.08)
      CALL JOIN (14.0,1.08)
      CALL GRNPEN
      DO 100 I=1,13
      CALL PLOTCS(FLOAT(I),8.1,ANAME(I),2)
  100 CONTINUE
C..
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL MAPYL(0.0,14.0,1.0,20000.0)
      CALL CTRSET(4)
      RETURN
      END

      SUBROUTINE INTPOL(X,A,IORD)
      DIMENSION IORD(13)
      REAL*8 X(13),A(28)
      REAL*4 F6
      DO 221 I=1,13
      IF (A(IORD(I)).NE.-1.0) GOTO 221
      F1=LOG(X(I-1))*2.3025851
      F3=LOG(X(I+1))*2.3025851
      F2=(F1+F3)/2.0000
      F4=F2/2.3025851
```

```
      F5=EXP(F4)
      F6=F5
      X(I)=F6
221.  CONTINUE
      RETURN
      END
```

PROGRAM CHREEP.LAN

```
C    CHONDRITE REE NORMALISATION
C...    AND PLOTTING PROGRAM       WRITTEN BY NICK PEARCE 1986
C...       PRODUCES PLOTS ANNOTATED WITH LA/LU RATIO ETC
C... CHONDRITE VALUES REVIEWED BY THOMPSON (1982) SCOTT. J. GEOL.
C
C... PLOTS CAN BE PRODUCED EITHER 9.5" BY 6" ( FITS ONTO A4)
C... OR APPROX 13.5" BY 10" (FULL SIZE PLOTTER PAPER) BY CHANGING
C... THE COMMENT LABELS ON PSPACE AND CSPACE LINES IN SUBROUTINE SETUP
C
C** THE INPUT ORDER IS:- LINE ONE- MIN AND MAX VALUES OF Y ( ENRICHMENT
C**                                FACTOR) SEPARATED BY A COMMA
C**                     LINE TWO- DATA IN FORMAT 15F8.3,10A1,30A1
C
C   TWO PLOT OPTIONS ARE AVAILABLE 6 OR 10 SAMPLES PER PLOT
C   TO SELECT EITHER SWAP THE COMMENT MARKERS IN COLUMM 1 WHERE
C   INSTRUCTED BY THE SIX PLOT OR TEN PLOT COMMENTS
C
C   THE NEXT LINE PRODUCES TEN PLOTS PER GRAPH
C     DIMENSION CFACT(11),IORD(11),A(37),ANOS(11),X(11),ISYMB(10)
      DIMENSION CFACT(15),A(15),ANOS(15),X(15),ISYMB(10)
C   THE NEXT LINE WILL PRODUCE SIX PLOTS PER GRAPH
C
C     DIMENSION CFACT(15),A(15),ANOS(15),X(15),ISYMB(6)

C SELECT ABOVE OPTION BY EXCHANGING COMMENT LABELS AND FOLLOW
C THROUGH THE REST OF THE PROGRAM CHANGING FOR EITHER TEN PLOT
C OR SIX PLOT

      LOGICAL*1 SAMP(10),TYPE(25),TYP2(5)
      INTEGER COUNT

C... THE INPUT ORDER BELOW IS
C...  LA CE PR ND ................ YB LU
C   THIS OF COURSE CAN BE CHANGED TO SUIT PROVIDED THE PPM CONC'S
C  IN ARRAY CFACT ARE ALTERED ALSO

C  CHONDRITE CONCENTRATIONS FROM NAKAMURA  1974 and HASKIN 1968
C     DATA CFACT /.329,.865,.112,.63,.1,.203,.077,.276,.047,.343,.07,.22
C    15,.03,.22,.0339/
C  CHONDRITE CONCS FROM BOYNTON 1984 IN HENDERSON 1984 REE GEOCHEM
      DATA CFACT/.31,.808,.122,.6,.1,.195,.0735,.259,.0474,.322,.0718,
     *.210,.0324,.209,.0322/
      DATA ANOS /1.,2.,3.,4.,5.,6.,7.,8.,9.,10.,11.,12.,13.,14.,15./

C... TEN PLOT
```

```
      DATA ISYMB /51,52,53,54,55,56,57,58,59,60/
C... SIX PLOT
C     DATA ISYMB /51,52,53,54,55,56/
      COUNT = 0
      CALL PAPER(1)
      CALL CTRSET(4)
      CALL CTRMAG(14)
      READ(5,*) AXOMN,AXOMX
      CALL SETUP (AXOMN,AXOMX)
    1 READ(5,1000,END=99)(A(I),I=1,15),SAMP,TYPE,TYP2,ITYPE,ISR
 1000 FORMAT (15F9.3,10A1,25A1,5A1,I3,I6)
      TOT =0.0
      FACT = 1.0
      DO 102 I=1,15
C     X(I)=0.01
      X(I)=A(I)/CFACT(I)
  102 CONTINUE
      RLALU=X(1)/X(15)
      IF (X(3).EQ.0.0) X(3)=(X(2)+X(4))/2.00
      IF (X(1).EQ.0.0) X(1)= X(2)+(X(2)-X(3))
C     DO 177 I=1,15
C     IF (X(I).EQ.0.0) X(I)=(X(I-1)+X(I+1))/2.000
C 177 CONTINUE
      CALL CTRMAG(14)
      CALL INTPOL(X,A)
      CALL PTPLOT(ANOS, X, 1, 15, ISYMB(COUNT+1))
      CALL PTPLOT(ANOS, X, 1, 15, -2)
      CALL MAP(1.0,16.0,1.0, 8.0)


      CALL PLOTNC(16.95,8.0-(COUNT/2.0),ISYMB(COUNT+1))
      CALL CTRSET(5)
      CALL PLOTCS(16.65,8.0-(COUNT/2.0),SAMP,10)
      CALL CTRMAG(7)
      CALL PLOTNF(16.42,7.97-(COUNT/2.0),RLALU,2)
      CALL CTRMAG(6)
      CALL PLOTCS(16.5,7.75-(COUNT/2.0),TYPE,30)
C..
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL MAPYL(0.0,16.0,AXOMN,AXOMX)
      CALL CTRSET(4)
C
C... TEN PLOT
      COUNT = MOD(COUNT+1,10)
```

```
C
C... SIX PLOT
C     COUNT = MOD(COUNT+1,6)
      IF (COUNT.NE.0) GO TO 1
      CALL FRAME
      CALL SETUP (AXOMN,AXOMX)
      GO TO 1
   99 CALL GREND
      STOP
      END

      SUBROUTINE SETUP (AXOMN,AXOMX)
      CHARACTER*2  ANAME(15)
      DATA ANAME/'LA','CE','PR','ND','PM','SM','EU','GD','TB','DY','HO
     1','ER','TM','YB','LU'/
C..
C.. PLOTS TO FIT ON A4 APPROX 9.5" BY 6"
      CALL PSPACE(0.07,0.84,0.07,0.56)
      CALL CSPACE(0.0,1.12,0.0,0.84)
C
C.. PLOTS TO FIT ON PLOTTER PAPER APPROX 13" BY 7"
C     CALL PSPACE(0.1,1.2,0.1,0.8)
C     CALL CSPACE(0.0,1.6,0.0,1.2)
C..
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL MAPYL(0.0,16.0,AXOMN,AXOMX)
C
C..   SET THE TITLE UP THE Y AXIS TO BE WRITTEN WITHIN THE TWO
C..   QUOTES BELOW . THE INTEGER AFTER THE QUOTES IS THE NUMBER OF
C..   CHARACTERS IN THE STRING
C
      CALL MAP(0.0,16.0,1.0, 8.0)
      CALL CTRMAG(16)
      CALL CTRORI(1.0)
      CALL CTRSET(5)
      CALL PLOTCS(-0.9, 1.5, '    ROCK / CHONDRITE', 20)
      CALL CTRORI(0.0)
      CALL CTRMAG(23)
      CALL MAP(0.0,16.0,1.0, 8.0)
      CALL THICK(2)
      CALL PLOTCS(1.0,8.7,'OSTFJORDSDAL PHONOLITES & TRACHYANDESITE',40)
      CALL THICK(1)
      CALL CTRMAG(8)
      CALL MAP(1.0,16.0,1.0, 8.0)
      CALL PLOTCS(16.2,3.85,'CHONDRITE RARE EARTH    ',23)
      CALL PLOTCS(16.2,3.62,'NORMALISATION VALUES ',21)
      CALL PLOTCS(16.2,3.39,'FROM BOYNTON WV, 1984',21)
      CALL PLOTCS(16.2,3.16, '                    ',20)
      CALL PLOTCS(16.2,2.93, '                    ',20)
      CALL PLOTCS(16.2,2.5, 'MISSING DATA ',13)
      CALL PLOTCS(16.2,2.27, 'INTERPOLATED',12)
      CALL PLOTCS(16.2,2.04,'FROM NEAREST ',13)
      CALL PLOTCS(16.2,1.81, 'NEIGHBOURS',10)
C     CALL PLOTCS(16.2,1.58, '                 ',17)
      CALL ITALIC(1)
      CALL PLOTCS(16.2,1.0, 'N. J. G. PEARCE, 1987',21)
      CALL ITALIC(0)
      CALL CTRMAG(14)
      CALL BLKPEN
      CALL BORDER
      CALL MAPYL(56.0,72.0,AXOMN,AXOMX)
      CALL AXEYL
      CALL CSPACE(0.0,1.12,0.0,0.84)
      CALL MAP(0.0,16.0,1.0,8.0)
      CALL POSITN(6.75,0.7)
      CALL CTRMAG(8)
      CALL ITALIC(1)
      CALL TYPECS('ATOMIC',6)
      CALL POSITN(8.75,0.7)
      CALL TYPECS('NUMBER',6)
      CALL ITALIC(0)
      CALL CTRMAG(14)
      CALL POSITN(0.0,1.07)
      CALL JOIN (16.0,1.07)
      CALL GRNPEN
      DO 100 I=1,15
      CALL PLOTCS(FLOAT(I),8.1,ANAME(I),2)
  100 CONTINUE

      CALL CTRMAG(6)
      CALL POSITN(16.12,8.28)
      CALL TYPECS('LA',2)
      CALL SUFFIX
      CALL CTRSET(6)
      CALL TYPECS('N',1)
      CALL CTRSET(5)
      CALL NORMAL
      CALL TYPECS('/LU',3)
      CALL SUFFIX
```

```
      CALL CTRSET(6)
      CALL TYPECS('N',1)
      CALL CTRSET(5)
      CALL NORMAL
C..
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL MAPYL(0.0,16.0,AXOMN,AXOMX)
      CALL CTRSET(4)
      RETURN
      END

      SUBROUTINE INTPOL(X,A)
      REAL*8 X(15),A(15)
      REAL*4 F6
      DO 221 I=1,15
      IF (A(I).NE.-1.0) GOTO 221
      F1=LOG(X(I-1))*2.3025851
      F2=LOG(X(I+1))*2.3025851
      F2=(F1+F3)/2.0000
      F4=F2/2.3025851
      F5=EXP(F4)
      F6=F5
      X(I)=F6
  221 CONTINUE
      RETURN
      END
```

PROGRAM CHSIN2

```
C... CHONDRITE
C...    PLOTTING PROGRAM
C...                NICK PEARCE FEB.86
C... PLOTS LOG ROCK/CHONDRITE (K, P, TI ARE SUN'S (1980) PRIMORDIAL
C...    MANTLE ESTIMATES)
C... CHONDRITE VALUES REVIEWED BY THOMPSON (1982) SCOTT. J. GEOL.
C   THE NEXT LINE WILL PRODUCE ONE PLOT PER GRAPH
      DIMENSION CFACT(13),IORD(13),A(28),ANOS(13),X(13),ISYMB(1)
C
      LOGICAL*1 SAMP(10),NAME(10)
      INTEGER COUNT
C
C... THE INPUT ORDER BELOW IS
C...            RB BA TH K NB LA CE SR ND P ZR TI Y
C
      DATA IORD /16,11,22,7,12,27,28,15,25,10,13,8,14/
      DATA CFACT /.35,6.9,.042,120.,.35,.328,.865,11.8,.63,46.,6.84,620.
     1,2./
C
      DATA ANOS /1.,2.,3.,4.,5.,6.,7.,8.,9.,10.,11.,12.,13./
C
      DATA ISYMB /54/
C SET MIN AND MAX VALUES OF Y AXIS   YPMN AND YPMX *************************
      YPMN=10.
      YPMX=2000.0
      COUNT = 0
      XMN=0.05
      XMX=0.50
      YMN=0.04
      YMX=0.31
      CXMN=0.0
      CXMX=0.51
      CYMN=0.0
      CYMX=0.333
      NDIAG=1
      CALL PAPER(1)
      CALL CTRSET(4)
      CALL CTRMAG(14)
      CALL SETUP(XMN,XMX,YMN,YMX,CXMN,CXMX,CYMN,CYMX,NDIAG,YPMN,YPMX)
C  READ STATEMENT FOR ALL GROUPS
C    1 READ(5,1000,END=99) SAMP,ITYPE,ITYP2,(A(I),I=1,10),F,CL,RLOI,ROEQ,
C     1TOT
C1000 FORMAT (10A1,I2,I4,14F7.2,F8.2)
C  READ STATEMENT FOR AVERAGES ONLY
    1 READ(5,1000,END=99) SAMP,ITYPE,(A(I),I=1,10),F,CL,RLOI,ROEQ,
     1TOT
 1000 FORMAT (10A1,I2,14F7.2,F8.2)
      READ(4,4004,END=99) NAME,(A(I),I=11,28)
 4004 FORMAT (10A1,3F7.0,F6.0,F7.0,F6.0,F7.0,7F6.0,F7.0,F5.0,2F7.0)
      TOT = 0.0
      FACT = 1.0
C... TURN TIO2 TO TI PPM
      A(8) = A(8) * 5995.084
C... TURN WTPC K20  TO PPM
      A(7) = A(7) * 8301.611
C... TURN P205 TO PPM
      A(10) = A(10) * 4363.908
      DO 102 I=1,13
      X(I) = 0.099
C
      IF (A(IORD(I)).GT.0.000001) X(I) = A(IORD(I))/CFACT(I)
  102 CONTINUE
      CALL INTPOL(X,A,IORD)
      CALL PTPLOT(ANOS, X, 1, 13, ISYMB(COUNT+1))
      CALL PTPLOT(ANOS, X, 1, 13, -2)
      CALL MAP(1.0, 8.0,1.0, 8.0)

C     CALL PLOTNC(8.2,8.0-(COUNT/2.0),ISYMB(COUNT+1))
      CALL CTRSET(5)
      CALL PLOTCS(1.2,7.5,SAMP,10)
C..
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL MAPYL(0.0,12.0,YPMN,YPMX)
      CALL CTRSET(4)
C
      COUNT = MOD(COUNT+1,1)
      IF (COUNT.NE.0) GO TO 1
C     CALL FRAME
      CALL SETUP(XMN,XMX,YMN,YMX,CXMN,CXMX,CYMN,CYMX,NDIAG,YPMN,YPMX)
9899  GO TO 1
   99 CALL GREND
      STOP
      END

      SUBROUTINE SETUP(XMN,XMX,YMN,YMX,CXMN,CXMX,CYMN,CYMX,NDIAG,YPMN,YP
     1MX)
      CHARACTER*2 ANAME(13)
      DATA ANAME/'RB','BA','TH','K ','NB','LA','CE','SR','ND','P ','ZR',
     1'TI','Y '/
```

```
C..
C.. PLOTS TO FIT SEVERAL ONTO A SHEET
      CALL PSPACE(XMN,XMX,YMN,YMX)
      CALL CSPACE(CXMN,CXMX,CYMN,CYMX)
      YMN=YMN+0.333
      YMX=YMX+0.333
      NDIAG=NDIAG+1
      IF(NDIAG.EQ.4) XMN=XMN+0.6
      IF(NDIAG.EQ.4) XMX=XMX+0.6
      IF(NDIAG.EQ.4) YMN=0.04
      IF(NDIAG.EQ.4) YMX=0.31
      CYMN=CYMN+0.33
      CYMX=CYMX+0.33
      IF(NDIAG.EQ.4) CXMN=CXMN+0.6
      IF(NDIAG.EQ.4) CXMX=CXMX+0.6
      IF(NDIAG.EQ.4) CYMN=0.0
      IF(NDIAG.EQ.4) CYMX=0.333
      IF(NDIAG.EQ.4) NDIAG=1
C..
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL MAPYL(0.0,14.0,YPMN,YPMX)
C
      CALL CTRMAG(14)
      CALL BLKPEN
      CALL BORDER
      CALL AXEYL
C     CALL CTRSET(5)
      CALL MAP(0.0,14.0,1.0,8.0)
      CALL POSITN(0.0,1.08)
      CALL JOIN (14.0,1.08)
      CALL CTRMAG(12)
C     CALL GRNPEN
      CALL CTRSET(1)
      DO 129 I=1,13
      CALL PLOTCS(FLOAT(I),8.14,ANAME(I),2)
  129 CONTINUE
C..
C... THE LAST 2 NOS IN THIS LINE ARE Y-MIN AND Y-MAX
C..
      CALL CTRMAG(6)
      CALL ITALIC(1)
      CALL PLOTCS(12.0,1.15,'             ',12)
      CALL ITALIC(0)
      CALL MAPYL(0.0,14.0,YPMN,YPMX)
      CALL CTRMAG(14)
      CALL CTRSET(4)
      RETURN
      END

      SUBROUTINE INTPOL(X,A,IORD)
      DIMENSION IORD(13)
      REAL*8 X(13),A(28)
      REAL*4 F6
      DO 221 I=1,13
      IF (A(IORD(I)).NE.-1.0) GOTO 221
      F1=LOG(X(I-1))*2.3025851
      F3=LOG(X(I+1))*2.3025851
      F2=(F1+F3)/2.0000
      F4=F2/2.3025851
      F5=EXP(F4)
      F6=F5
      X(I)=F6
  221 CONTINUE
      RETURN
      END
```

PROGRAM IRON3.AMP

```
C THIS  PROGRAM RECALCULATES AMPHIBOLES TO 13 CATIONS, EXCLUDING CA,NA,K,BA
C  AND 23 OXYGENS BY ADJUSTING THE FE2/FE3 RATIO AND THEN SCALING IF NEEDED
C  AFTER THE SUGGESTION OF LEAKE (1978). THE OUTPUT IS COMPATABLE WITH
C  THE AMPHIBOLE CLASSIFICATION PROGRAM GL05:AMPH.CLAS.
C
C  THIS METHOD IS MORE RELIABLE THAN A 16 CATION, 23 OXYGEN BASIS AS ERRORS IN
C  OPTICAL/CHEMICAL CALSSIFICATION WILL BECOME APPARENT WITH STOICHIOMETRY
C  PROBELMS.
C                                                    NICK PEARCE   MAY 1987
C***************************************************************************C
C  WARNING:   AMPHIBOLES ARE NOT ALWAYS WHAT THEY APPEAR. CHECK THE OUTPUT FILE
C             CONTAINING THE TOTALS OF T+C CATIONS AND B+A CATIONS (IE. CA,NA
C             ETC) FOR THESE SHOULD TOTAL BETWEEN 2 AND 3 (OR A BIT MORE DUE
C             TO PROBLEMS WITH NA).  IF THE MINERAL IS SODIC AND B+A IS LESS
C             ABOUT 2.5 IT IS NOT AN AMPHIBOLE. IF B+A>3.2 OR SO, IE 4.0 OR
C             MORE IT IS ALSO NOT AN AMPHIBOLE. CHECK THESE CAREFULLY.
C***************************************************************************C
C  DATA INPUT ORDER
C       SAMPLE NUMBER,SI,TI,AL,FE,MN,MG,CA,NA,K,BA,ZR,CL,S,P,STR
C          *** IN  FREE  FORMAT ***
C       STR IS A 6 FIGURE ARRAY OF PARAMETERS. THIS CAN BE DUMPED BY
C       CHANGING THE READ STATEMENT BUT THE ELEMENT INPUT ORDER MUST NOT
C       CHANGE.

      REAL*8 RNO
      REAL*4 OXNO
      REAL*4 OXI(14), AW(14), PROP(14)
      REAL*4 NOX(14),N(14),AMOL(14),STR(6)
C  INPUT ORDER SI TI AL FE MN MG CA NA K BA ZR CL S P
      DATA AW/60.09,79.9,101.94,71.85,70.94,40.32,
     156.08,61.982,94.20,153.36,123.22,35.457,32.066,141.95/
      DATA NOX/2.,2.,1.5,1.,1.,1.,1.,.5,.5,1.,2.,0.,0.,2.5/
      DATA N/  2.,2.,3.,1.,1.,1.,1.,1.,1.,1.,2.,0.,0.,5./
      WRITE(6,6111)
      WRITE(6,6111)
      WRITE(6,6112)
      WRITE(6,6114)
      WRITE(6,6115)
      WRITE(6,6114)
      WRITE(6,6116)
      WRITE(6,6117)
      WRITE(6,6114)
      WRITE(6,6118)
      WRITE(6,6119)
      WRITE(6,6120)
      WRITE(6,6121)
      WRITE(6,6111)
      WRITE(6,6111)
 6111 FORMAT(10X,'****************************************************')
 6112 FORMAT(10X,'*****     AMPHIBOLE RECALCULATION PROGRAM        *****')
 6114 FORMAT(10X,'*****                                            *****')
 6115 FORMAT(10X,'*****     WRITTEN BY NICK PEARCE, MAY 1987       *****')
 6116 FORMAT(10X,'*****  RECALCULATES TO 13 CATIONS IN X AND Y     *****')
 6117 FORMAT(10X,'*****     SITES BY ADJUSTING FE2/FE3 RATIO.      *****')
 6118 FORMAT(10X,'*****3 OUTPUT DEVICES REQUIRED                   *****')
 6119 FORMAT(10X,'*****  - 7 -RECALCULATED WEIGHT % OXIDE          *****')
 6120 FORMAT(10X,'*****  - 8 -B & A CATIONS, TOTAL CATS, ETC       *****')
 6121 FORMAT(10X,'*****  - 9 -FULL RECAL-C OUTPUT FOR CLASS-N      *****')
 9999 DO 310 I=1,14
  310 AMOL(I)=0.0000
      READ (5,*,END=999) RNO,(OXI(I),I=1,14),STR
      OXNO=23.0000
      SUM=0.0
      DO 100 I=1,11
             IF(OXI(I).LE.00.000)THEN
             PROP(I)=0.00
             GO TO 100
             END IF
      PROP(I)=OXI(I)/AW(I)
  100 SUM=SUM+PROP(I)

      PROP(12)=OXI(12)/AW(12)
      PROP(13)=OXI(13)/AW(13)
      PROP(14)=OXI(14)/AW(14)

      FTOT=0
      DO 200 I=1,11
      AMOL(I)=N(I)*PROP(I)
  200 FTOT=FTOT+AMOL(I)
C
      FOXNO=OXNO
      FACT=FOXNO/FTOT
      DO 300 I=1,11
  300 AMOL(I)=AMOL(I)*FACT
      DO 305 I=1,14
  305 IF (AMOL(I).LT.0.00001) AMOL(I)=0.00001

      AMOL(1)=AMOL(1)/NOX(1)
      AMOL(2)=AMOL(2)/NOX(2)
      AMOL(3)=AMOL(3)/NOX(3)
```

```
      AMOL(8)=AMOL(8)/NOX(8)
      AMOL(9)=AMOL(9)/NOX(9)
      AMOL(10)=AMOL(10)/NOX(10)
      AMOL(11)=AMOL(11)/NOX(11)
      AMOL(12)=PROP(12)*FACT
      AMOL(13)=PROP(13)*FACT
      AMOL(14)=PROP(14)*FACT/NOX(14)
      DO 315 I=1,14
315   IF (AMOL(I).LT.0.0010) AMOL(I)=0.000
C CATIONS EXCEPT CA,NA,K,BA  SHOULD TOTAL 13
      CATTOT=0.000
      DO 320 I=1,6
320   CATTOT=CATTOT+AMOL(I)
      CATTOT=CATTOT+AMOL(11)
      F13ATS=FACT*13.0/CATTOT
      ROXNEC=23.000/F13ATS
      XSOX=ROXNEC-FTOT
      FE3=2.000*XSOX
C     FE3WT=FE3*159.7/1.5
      IF (FE3WT.LT.0.0) FE3WT=0.000
      FE2=AMOL(4)/FACT-FE3
C     FE2WT=FE2*71.85
C     IF (FE3WT.LT.0.0) FE2WT=OXI(4)
      FE2=FE2*FACT
      FE3=FE3*FACT
      TOCAT=AMOL(1)+AMOL(2)+AMOL(3)+FE2+FE3+AMOL(5)+AMOL(6)+AMOL(11)
      DO 325 I=1,14
325   AMOL(I)=AMOL(I)*(F13ATS/FACT)
      FE3=FE3*F13ATS/FACT
      FE2=FE2*F13ATS/FACT
      FE3WT=FE3*159.7/(FACT*2.0)
      FE2WT=FE2*71.85/FACT
      IF (FE3WT.LT.0.0) FE2WT=OXI(4)
      IF (FE3WT.LT.0.0) FE3WT=0.000
      IF (FE3.LT.0.0009) FE3=0.000
      IF (FE3.LT.0.0009) FE2=AMOL(4)
      IF (FE2.LT.0.0009) FE2=0.000
      IF (FE2.LT.0.0009) FE3=AMOL(4)*CF2F3
      TACATS=AMOL(1)+AMOL(2)+AMOL(3)+FE2+FE3+AMOL(5)+AMOL(6)+AMOL(11)
      BCATOT=0.000
      DO 340 I=1,3
340   BCATOT=BCATOT+AMOL(I)
      DO 350 I=5,11
350   BCATOT=BCATOT+AMOL(I)
      BCATOT=BCATOT+FE3
      BCATOT=BCATOT+FE2
      ABSUM=AMOL(7)+AMOL(8)+AMOL(9)+AMOL(10)
      WRITE (8,8001) RNO,TACATS,BCATOT,AMOL(7),AMOL(8),AMOL(9),AMOL(10),
     *ABSUM
8001  FORMAT(F10.2,2X,2F10.3,4F8.3,F9.3)
C WRITE OUT RECALCULATED WT% OXIDES
      WRITE (7,7000) RNO,(OXI(I),I=1,3),FE3WT,FE2WT,(OXI(I),I=5,14),STR
7000  FORMAT (F9.2,15F7.3,F4.0,F5.0,4F4.0)

 900  WRITE (9,9090) RNO,(AMOL(I),I=1,3),FE3,FE2,(AMOL(I),I=5,14),STR
9090  FORMAT (F9.2,15F7.3,F4.0,F5.0,4F4.0)
      GO TO 9999
999   STOP
      END
```

PROGRAM IRON3.STOIC

```
      INTEGER*4 OXNO
      REAL*8 TITLE
      REAL*4 OXI(11), AW(11), PROP(11),STRAT(6)
      REAL*4 NOX(11),N(11),AMOL(11),AMAL(11)
      DATA AW/60.09,79.9,101.94,71.85,70.94,40.32,
     *56.08,61.982,94.20,153.36,123.22/
      DATA NOX/2.,2.,1.5,1.,1.,1.,1.,0.5,0.5,1.,2./
      DATA N/  1.,1.,2.,1.,1.,1.,1.,2.,2.,1.,1./
113   WRITE (6,111)
111   FORMAT ('  NUMBER OF CATIONS >')
      READ (6,*,ERR=113) OXNO
2223  FORMAT (' NUMBER OF OXYGENS >')
2224  WRITE (6,2223)
      READ (6,*,ERR=2224) NUMBER
9999  READ (5,5001,END=999) TITLE,(OXI(I),I=1,11),CHLOR,SULP,RPH,STRAT
5001  FORMAT(F9.2,14F7.3,F4.0,F5.0,4F4.0)
      SUM=0.
      DO 100 I=1,11
              IF(OXI(I).LE.0)THEN
              PROP(I)=0
              GO TO 100
              END IF
      PROP(I)=OXI(I)/AW(I)
100   SUM=SUM+PROP(I)
C     WRITE (1,750) (PROP(I),I=1,11)
C750  FORMAT (10F7.2)
      FTOT=0
      DO 200 I=1,11
      AMOL(I)=N(I)*PROP(I)
200   FTOT=FTOT+AMOL(I)
C
      FOXNO=OXNO
      FACT=FOXNO/FTOT
      DO 300 I=1,11
300   AMAL(I)=AMOL(I)*FACT
C
      COLTOT=0.
      CHLP=(CHLOR/35.457)*FACT
      SULPHP=(SULP/32.066)*FACT
      RPHP=(RPH/141.95)*FACT*0.800
      DO 750 I=1,11
      AMOL(I)=AMAL(I)*NOX(I)
750   COLTOT=COLTOT+AMOL(I)
      FWORK=FLOAT(NUMBER)
      FE3=(FWORK-COLTOT)*2.
      IF (FE3.LT.0.)FE3=0.
      FE2=AMOL(4)-FE3
      WRITE (9,9090) TITLE,(AMAL(I),I=1,3),FE3,FE2,
     *(AMAL(J),J=5,11),CHLP,SULPHP,RPHP,STRAT
9090  FORMAT(F9.2,15F7.3,F4.0,F5.0,4F4.0)
      FE3WT=(FE3*159.70)/(FACT*2.0)
      FE2WT=(FE2*71.85)/FACT
      TOTAL=0.0
      DO 125 I=1,3
      TOTAL=TOTAL+OXI(I)
125   CONTINUE
      TOTAL=TOTAL+FE3WT+FE2WT
      DO 127 I=5,11
      TOTAL=TOTAL+OXI(I)
127   CONTINUE
      TOTAL=TOTAL+CHLOR+SULP+RPH
      WRITE(8,9100) TITLE,(OXI(I),I=1,3),FE3WT,FE2WT,
     *(OXI(J),J=5,11),CHLOR,SULP,RPH,TOTAL
9100  FORMAT(F9.2,15F7.3,F8.3)
      GO TO 9999
999   STOP
      END
```

PROGRAM IRON3.OX

```
      INTEGER*4 OXNO
      REAL*8 TITLE,MGT,USP,ILM,HEM
      REAL*4 OXI(11), AW(11), PROP(11),STRAT(6)
      REAL*4 NOX(11),N(11),AMOL(11),AMAL(11)
      DATA AW/60.09,79.9,101.94,71.85,70.94,40.32,
     *56.08,61.982,94.20,153.36,123.22/
      DATA NOX/2.,2.,1.5,1.,1.,1.,1.,0.5,0.5,1.,2./
      DATA N/  1.,1.,2.,1.,1.,1.,1.,2.,2.,1.,1./
      WRITE(6,*)'****  3 OUTPUT DEVICES REQUIRED  ****'
      WRITE(6,*)'****  UNIT 7 IL-HEM  AND MGT-USP ****'
      WRITE(6,*)'****  UNIT 8 RECAST OXIDES       ****'
      WRITE(6,*)'****  UNIT 9 ATOMS/FORMULA UNIT  ****'
9999  READ (5,5001,END=999) TITLE,(OXI(I),I=1,11),CHLOR,SULP,RPH,STRAT
5001  FORMAT(F9.2,14F7.3,F4.0,F5.0,4F4.0)
      SUM=0.
      IF (INT(STRAT(1)).EQ.9) NUMBER=4
      IF (INT(STRAT(1)).EQ.9) OXNO=3
      IF (INT(STRAT(1)).EQ.29) NUMBER=3
      IF (INT(STRAT(1)).EQ.29) OXNO=2
      OXI(8)=0.000
      OXI(9)=0.000
      OXI(10)=0.000
      DO 100 I=1,11
              IF(OXI(I).LE.0)THEN
              PROP(I)=0
              GO TO 100
              END IF
      PROP(I)=OXI(I)/AW(I)
100   SUM=SUM+PROP(I)
      FTOT=0
      DO 200 I=1,11
      AMOL(I)=N(I)*PROP(I)
200   FTOT=FTOT+AMOL(I)
C
      FOXNO=OXNO
      FACT=FOXNO/FTOT
      DO 300 I=1,11
300   AMAL(I)=AMOL(I)*FACT
C
      COLTOT=0.
      CHLP=(CHLOR/35.457)*FACT
      SULPHP=(SULP/32.066)*FACT
      RPHP=(RPH/141.95)*FACT*0.800
      DO 750 I=1,11
      AMOL(I)=AMAL(I)*NOX(I)
750   COLTOT=COLTOT+AMOL(I)
      FWORK=FLOAT(NUMBER)
      FE3=(FWORK-COLTOT)*2.
      IF (FE3.LT.0.)FE3=0.
      FE2=AMOL(4)-FE3
      WRITE (9,9090) TITLE,(AMAL(I),I=1,3),FE3,FE2,
     *(AMAL(J),J=5,11),CHLP,SULPHP,RPHP,STRAT
9090  FORMAT(F9.2,15F7.3,F4.0,F5.0,4F4.0)
      FE3WT=(FE3*159.70)/(FACT*2.0)
      FE2WT=(FE2*71.85)/FACT
      TOTAL=0.0
      DO 125 I=1,3
      TOTAL=TOTAL+OXI(I)
125   CONTINUE
      TOTAL=TOTAL+FE3WT+FE2WT
      DO 127 I=5,11
      TOTAL=TOTAL+OXI(I)
127   CONTINUE
      TOTAL=TOTAL+CHLOR+SULP+RPH
      WRITE(8,9100) TITLE,(OXI(I),I=1,3),FE3WT,FE2WT,
     *(OXI(J),J=5,11),CHLOR,SULP,RPH,TOTAL
9100  FORMAT(F9.2,15F7.3,F8.3)

C RECALCULATION FOR THE MT-USP OR IL-HT END MEMBERS
      MGT=0.000
      USP=0.000
      ILM=0.000
      HEM=0.000
      IF (INT(STRAT(1)).EQ.9) GOTO 3600
      IF (INT(STRAT(1)).EQ.29) GOTO 3700

3600  USP=((AMAL(2)+AMAL(1))/(AMAL(2)+AMAL(1)+((FE3+AMAL(3))/2.0)))*100.
      MGT=100.0-USP
      GOTO 3800
3700  ILM=((AMAL(2)+AMAL(1))/(AMAL(2)+AMAL(1)+((FE3+AMAL(3))/2.0)))*100.
      HEM=100.0-ILM
3800  WRITE(7,3810) TITLE,MGT,USP,ILM,HEM
3810  FORMAT(F12.2,4F10.1)
      GO TO 9999
999   STOP
      END
```

PROGRAM TRIPLOT.80

```
C
C     THIS PROGRAM PLOTS TRIANGULAR DIAGRAMS. DATA IS INPUT IN FREE
C     FORMAT IN THE ORDER A, B, C  AS SHOWN BELOW.
C     LABELS, TITLES ETC ARE SET IN THE SUBROUTINE SETUP
C
C                             * C
C                           *   *
C                         *       *
C                       *           *
C                     * * * * * * * * *
C                    A                  B
C
C
C     THE TITLES AND LABELS THAT WILL NEED CHANGING ARE AT LINE 130

      DIMENSION ARR(3),CAT(12),RNOCA(12),AW(12)
      DIMENSION ICOUNT(26),ISYMB(26)
      DATA AW/60.08,50.97,159.7,40.32,56.08,61.982,94.2,79.9,70.94,
     *141.95,19.0,35.5/
      DATA RNOCA/1.,2.,2.,1.,1.,2.,2.,1.,1.,2.,1.,1./
C     DATA ISYMB /15,60,61,57,56,58,52,50,53,51,62,45,43,43,54,55,59,63/
      DATA ISYMB /226,250,236,252,240,241,243,251,245,244,255,235,254,25
     13,234,232,249,237,226,226,226,250,236,252,240,241/
      CALL PAPER(1)
      CALL PSPACE(0.12,0.89,0.05,0.71668392)
      CALL CSPACE(0.0,1.3,0.0,0.65)
      CALL MAP(0.0,1.0,0.0,0.866025)
      WRITE (6,*) 'ENTER OPTION, 1 FOR FULL GRID, 2 FOR BORDER ONLY'
      READ (6,*) PROPT
      IF (PROPT.EQ.1) GOTO 4320
4300  CALL POSITN           (0.0   , 0.0   )
      CALL JOIN             (1.0,0.0)
      CALL JOIN             (0.5,0.8660)
      CALL JOIN             (0.0,0.0)
      GOTO 111
4320  CALL POSITN           (0.0   , 0.    )
      CALL JOIN             (1.0000, 0.    )
      CALL JOIN             (0.9500,  .0866)
      CALL JOIN             (0.0500,  .0866)
      CALL JOIN             (0.1000,  .1732)
      CALL JOIN             (0.9000,  .1732)
      CALL JOIN             (0.8500,  .2598)
      CALL JOIN             (0.1500,  .2598)
      CALL JOIN             (0.2000,  .3464)
      CALL JOIN             (0.8000,  .3464)
      CALL JOIN             (0.7500,  .4330)
      CALL JOIN             (0.2500,  .4330)
      CALL JOIN             (0.3000,  .5196)
      CALL JOIN             (0.7000,  .5196)
      CALL JOIN             (0.6500,  .6062)
      CALL JOIN             (0.3500,  .6062)
      CALL JOIN             (0.4000,  .6928)
      CALL JOIN             (0.6000,  .6928)
      CALL JOIN             (0.5500,  .7794)
      CALL JOIN             (0.4500,  .7794)
      CALL JOIN             (0.5000, 0.8660)
      CALL JOIN             (0.5500,  .7794)
      CALL JOIN             (0.1000, 0.    )
      CALL JOIN             (0.2000, 0.    )
      CALL JOIN             (0.6000,  .6928)
      CALL JOIN             (0.6500,  .6062)
      CALL JOIN             (0.3000, 0.    )
      CALL JOIN             (0.4000, 0.    )
      CALL JOIN             (0.7000,  .5196)
      CALL JOIN             (0.7500,  .4330)
      CALL JOIN             (0.5000, 0.    )
      CALL JOIN             (0.6000, 0.    )
      CALL JOIN             (0.8000,  .3464)
      CALL JOIN             (0.8500,  .2598)
      CALL JOIN             (0.7000, 0.    )
      CALL JOIN             (0.8000, 0.    )
      CALL JOIN             (0.9000,  .1732)
      CALL JOIN             (0.9500,  .0866)
      CALL JOIN             (0.9000, 0.    )
      CALL JOIN             (0.4500,  .7794)
      CALL JOIN             (0.4000,  .6928)
      CALL JOIN             (0.8000, 0.    )
      CALL JOIN             (0.7000, 0.    )
      CALL JOIN             (0.3500,  .6062)
      CALL JOIN             (0.3000,  .5196)
      CALL JOIN             (0.6000, 0.    )
      CALL JOIN             (0.5000, 0.    )
      CALL JOIN             (0.2500,  .4330)
      CALL JOIN             (0.2000,  .3464)
      CALL JOIN             (0.4000, 0.    )
      CALL JOIN             (0.3000, 0.    )
      CALL JOIN             (0.1500,  .2598)
      CALL JOIN             (0.1000,  .1732)
      CALL JOIN             (0.2000, 0.    )
      CALL JOIN             (0.1000, 0.    )
      CALL JOIN             (0.0500,  .0866)
```

```
      CALL JOIN            (0.0   , 0.    )
 111  CALL CTRMAG(16)
C111  CALL CTRMAG(12)
      DO 150 JJ=1,26
      ICOUNT(JJ)=0
  150 CONTINUE
      DO 125 II=1,1000
      READ(5,*,END=126)  ARR,NTYPE
      ICOUNT(NTYPE)=ICOUNT(NTYPE)+1
      A=ARR(1)
      B=ARR(2)
      C=ARR(3)
      IF (A.LT.0.001) A=0.00000001
      IF (B.LT.0.001) B=0.00000001
      IF (C.LT.0.001) C=0.00000001
      TOT=A+B+C
      AN=A/TOT
      BN=B/TOT
      CN=C/TOT
      YCO=CN*0.866025
      X=0.577363*YCO
      XLEN=1.00000-(2.000*X)
      XPLUS=(BN/(AN+BN))*XLEN
      XCO=X+XPLUS
      ISY=ISYMB(NTYPE)
      CALL CTRFNT(1)
      CALL PLOTNC(XCO,YCO,ISY)
  125 CONTINUE
  126 CALL SETUP(ICOUNT,ISYMB)
      CALL GREND
      STOP
      END
C
      SUBROUTINE SETUP(ICOUNT,ISYMB)
      DIMENSION ICOUNT(26),ISYMB(26)
      CHARACTER*23 RNAME(26),RNAMOS(26)
      DATA RNAME /'           NEPHELINITE',' PHONOLITIC NEPHELINITE','
     1   TEPHRITE - BASANITE','                BASALT','
     1HAWAIITE','              MUGEARITE','              BENMOREITE','
     1 PHONOLITIC TEPHRITE','             PHONOLITE','                 TR
     1ACHYTE','      BASALTIC ANDESITE','          TRACHYANDESITE','
     1          ANDESITE','                DACITE','                 RHYO
     1LITE','       PICRITIC BASALT','            CARBONATITE','ULTRA-M
     1AFIC LAMPROPHYRE','         BLANK          ','            BLANK
     1   ','ULTRA-MAFIC LAMPROPHYRE','   ALKALINE LAMPROPHYRE','CALC-ALKA
     1LI LAMPROPHYRE','    ALTERED ULTRA-BASIC',
     1' CARBONATITE/U-MAF LAMP','                BRECCIA'/
      DATA RNAMOS/'          NEPHELINITE',' PHONOLITIC NEPHELINITE','
     1   TEPHRITE - BASANITE','                BASALT','
     1HAWAIITE','              MUGEARITE','              BENMOREITE','
     1 PHONOLITIC TEPHRITE','             PHONOLITE','                 TR
     1ACHYTE','      BASALTIC ANDESITE','          TRACHYANDESITE','ULTRA
     1-MAFIC LAMPROPHYRE','   ALKALINE LAMPROPHYRE','CALC-ALKALI LAMPROP
     1HYRE','       PICRITIC BASALT','            CARBONATITE','ULTRA-M
     1AFIC LAMPROPHYRE','         BLANK          ','            BLANK
     1   ','ULTRA-MAFIC LAMPROPHYRE','   ALKALINE LAMPROPHYRE','CALC-ALKA
     1LI LAMPROPHYRE','    ALTERED ULTRA-BASIC',
     1' CARBONATITE/U-MAF LAMP','                BRECCIA'/
C     THE NEXT LINES ANNOTATE THE GRAPH ON REDEFINED MAP,PSPACE,CSPACE
      CALL MAP(0.13,1.13,0.03,1.03)
      CALL CSPACE(0.0,1.3,0.0,0.73)
      CALL CTRMAG(24)
      CALL THICK(2)
C     CALL CTRSET(1)
      CALL CTRFNT(1)
      CALL PLOTCS(0.00,1.0,'Ostfjordsdal Dykes   ',20)
      CALL PLOTCS(0.00,.92,'Cation Proportions   ',20)
      CALL CTRMAG(18)
      CALL THICK(1)
      CALL PLOTCS(0.00,.85,'Na2O+K2O  Fe2O3  MgO',20)
      CALL PLOTCS(0.00,.80,'                    ',20)
      CALL PLOTCS(0.00,.75,'                    ',20)
      CALL THICK(1)
      CALL CTRMAG(14)
C  A LABEL
      CALL PLOTCS(0.10,.00,'Na2O+K2O     ',13)
C  B LABEL
      CALL PLOTCS(1.03,.00,'          MgO ',13)
C  C LABEL
      CALL PLOTCS(0.67,1.02,'Fe2O3        ',13)
C     CALL CTRSET(1)
      CALL CTRFNT(1)
      R=0.98
 110  DO 100 NI=1,26
      IF (ICOUNT(NI).LT.1) GOTO 100
      R=R-0.03
      ISYM=ISYMB(NI)
C     CALL CTRSET(4)
      CALL CTRMAG(14)
      CALL PLOTNC(.95,R,ISYM)
```

```
C     CALL CTRSET(1)
      CALL CTRFNT(1)
      CALL CTRMAG(10)
      CALL PLOTCS(.99,R,RNAMOS(NI),23)
  100 CONTINUE
      RETURN
      END
```

PROGRAM XYPLOT.80

```
C     THIS IS AN X Y PLOTTING PROGRAM
C
C     IT PLOTS CHEMICAL DATA WITH DIFFERENT SYMBOLS FOR EACH ROCK GROUP
C
C      IT READS IN MAJOR ELEMENT DATA FROM UNIT 5
C                  TRACE ELEMEMT DATA FROM UNIT 4
C                  AND NORMATIVE DATA FROM UNIT 3
C  SI=1 AL=2 FE=3 MG=4 CA=5 NA=6 K=7 TI=8 MN=9 P=10 F=11 CL=12
C BA=13 NB=14 ZR=15 Y=16 SR=17 RB=18 ZN=19 CU=20 NI=21 PB=22 U=23
C TH=24 V=25 CR=26 ND=27 GA=28 LA=29 CE=30
      DIMENSION A(30),AW(12),RNOCA(12),CAT(12)
      DIMENSION ISYMB(26),ICOUNT(26)
      REAL*8 NORM(56),KPPM
      LOGICAL*1 SAMP(10),NAME(10)
      DATA AW/60.08,50.97,159.7,40.32,56.08,61.982,94.2,79.9,70.94,
     *141.95,19.0,35.5/
      DATA RNOCA/1.,2.,2.,1.,1.,2.,2.,1.,1.,2.,1.,1./
      DATA ISYMB /226,250,236,252,240,241,243,251,245,244,255,235,254,25
     13,234,232,249,237,226,226,226,250,236,252,240,241/
C ALTERNATIVE SYMBOL SET
C     DATA ISYMB /226,242,236,252,240,241,243,251,245,244,255,235,254,25
C    13,234,232,249,237/
C  SET AXES MAX AND MIN
      XMN=000.00
      XMX=500.0
      YMN=0.0
      YMX=2.500
      CALL PAPER(1)
C  OBLONG PLOT
C     CALL PSPACE(0.070,0.840,0.070,0.560)
C  FLAT OBLONG PLOT ( TO STACK 5 ON A3 PAGE)
C     CALL PSPACE(0.070,0.840,0.070,0.340)
C   SMALL OBLONG PLOT
      CALL PSPACE(0.070,0.410,0.070,0.320)
C  SQUARE PLOT
C     CALL PSPACE(0.070,0.560,0.070,0.560)
C  LINEAR AXES
      CALL MAP(XMN,XMX,YMN,YMX)
      CALL AXORIG(XMN,YMN)
      CALL XAXISI(50.0)
      CALL YAXISI(0.250)
C LOGARITHMIC AXES  ( LOG - LOG )
C     CALL MAPXYL(XMN,XMX,YMN,YMX)
C     CALL AXEXYL
C  LOGARITHMIC X, LINEAR Y
```

```
C     CALL MAPXL(XMN,XMX,YMN,YMX)
C     CALL AXEXL
      CALL BORDER
      XMNW=XMN-(XMX/100.)
      XMXW=XMX+(XMX/250.)
      YMNW=YMN-(YMX/100.)
      YMXW=YMX+(YMX/250.)
      CALL WINDOW(XMNW,XMXW,YMNW,YMXW)
      CALL WINCHR(1)
      CALL CSPACE(0.000,1.120,0.00,.840)
      CALL BLKPEN
      CALL CTRFNT(1)

      DO 178 JJ=1,26
      ICOUNT(JJ)=0
  178 CONTINUE
      DO 1000 I=1,500
    1 READ(5,5000,END=99) SAMP,ITYPE,ITYPE,(A(LL),LL=1,12),RLOI,ROEQ,
     1TOT
 5000 FORMAT(10A1,I2,I4,14F7.2,F8.2)
      READ(4,4000,END=99) NAME,(A(LL),LL=13,30)
 4000 FORMAT(10A1,3F7.0,F6.0,F7.0,F6.0,F7.0,7F6.0,F7.0,F5.0,2F7.0)
      READ(3,*,END=99) NUMBER,NORM
C     IF (ITYPE.LT.20) GOTO 1000
C     IF (ITYPE.EQ.27) ITYPE=21
C     IF (ITYPE.EQ.28) ITYPE=21
C  CALCULATION oF FRACTIONATION INDEX OF MACDONALD 1969
C     FI=NORM(1)+NORM(4)+NORM(5)+NORM(8)+NORM(13)+NORM(14)
C     KPPM=8301.611*A(7)
C  CALCULATION OF DE LA ROCHE ET AL R1-R2 PLOT PARAMETERS
      DO 12 J=1,12
      CAT(J)=A(J)/(AW(J)/RNOCA(J))
12    CONTINUE
      R1=(4*CAT(1)-11*CAT(6)-11*CAT(7)-2*CAT(3)-2*CAT(8))*1000
      R2=(6*CAT(5)+2*CAT(4)+CAT(2))*1000
C  SI=1 AL=2 FE=3 MG=4 CA=5 NA=6 K=7 TI=8 MN=9 P=10 F=11 CL=12
C BA=13 NB=14 ZR=15 Y=16 SR=17 RB=18 ZN=19 CU=20 NI=21 PB=22 U=23
C TH=24 V=25 CR=26 ND=27 GA=28 LA=29 CE=30
C  SET THE TWO VARIABLES YOU WANT TO PLOT
C     IF(A(4).LT.3.0) GOTO 1000
      IF (A(14).LT.1.0) A(14)=.001
      IF (A(15).LT.1.0) A(15)=.001
      IF (A(16).LT.1.0) A(16)=.001
      IF (NORM(5).LT.0.01) NORM(5)=.001
      ZRNB=A(15)/A(14)
```

```
      ZRY=A(15)/A(16)
      IF (ZRNB.LE.001) ZRNB=.001
      RNBZR=1.000/ZRNB
      BANB=A(13)/A(14)
      RNBY=A(14)/A(16)
      CEY=A(30)/A(16)
      RLAY=A(29)/A(16)
      X=A(29)
      Y=A(29)/A(14)
C  SET DIFFERENT SYMBOLS FOR DIFFERENT ROCK TYPES
      ISY=ISYMB(ITYPE)
      CALL CTRFNT(1)
C     CALL CTRMAG(12)
      CALL CTRMAG(16)
      CALL PLOTNC(X,Y,ISY)
      ICOUNT(ITYPE)=ICOUNT(ITYPE)+1
 1000 CONTINUE
   99 CONTINUE
      CALL SETUP(XMN,XMX,YMN,YMX,ICOUNT,ISYMB)
      CALL GREND
      STOP
      END


      SUBROUTINE SETUP(XMN,XMX,YMN,YMX,ICOUNT,ISYMB)
      DIMENSION ICOUNT(26),ISYMB(26)
      CHARACTER*15 RNAME(26),RNAMO(26)
      DATA RNAME/'   NEPHELINITE',' PHONO NEPH-ITE','TEPHRIT,BASANIT','
     1      BASALT','       HAWAIITE','      MUGEARITE','      BENMORE
     2ITE',' PHONO TEPHRITE','       PHONOLITE','       TRACHYTE','    BAS
     3 ANDESITE','TRACHY-ANDESITE','       ANDESITE','         DACITE','
     4       RHYOLITE','PICRITIC BASALT','    CARBONATITE','U-M LAMPROPH
     5YRE','    BLANK       ','    BLANK       ',' ULTRA-MAFIC LP','  ALKA
     6LINE LAMP',' CALC-ALKALI LP','ALT-D ULT-BASIC','CBT-ITE/UMAF LP',
     7'        BRECCIA'/
      DATA RNAMO/'   NEPHELINITE',' PHONO NEPH-ITE','TEPHRIT,BASANIT','
     1      BASALT','       HAWAIITE','      MUGEARITE','      BENMORE
     2ITE',' PHONO TEPHRITE','       PHONOLITE','       TRACHYTE','    BAS
     3 ANDESITE','TRACHY-ANDESITE',' ULTRA-MAFIC LP','  ALKALINE LAMP','
     4 CALC-ALKALI LP','PICRITIC BASALT','    CARBONATITE','U-M LAMPROPH
     5YRE','    BLANK       ','    BLANK       ',' ULTRA-MAFIC LP','  ALKA
     6LINE LAMP',' CALC-ALKALI LP','ALT-D ULT-BASIC','CBT-ITE/UMAF LP',
     7'        BRECCIA'/
      CALL PSPACE(0.070,0.840,0.070,0.560)
      CALL CSPACE(0.000,1.120,0.00,.840)
      CALL MAP(0.000,1.000,0.000,1.000)
      CALL WINCHR(0)
      CALL CTRFNT(1)
      CALL CTRMAG(23)
      CALL POSITN(0.05,1.07)
C  TITLE
      CALL TYPECS('Ostfjordsdal Dykes- Incompatible Elements',40)
C     CALL POSITN(-0.07,0.35)
C   AXES FOR SHALLOW OBLONG
      CALL POSITN(-0.07,0.12)
C   AXES FOR DEEP OBLONG
C     CALL POSITN(-0.07,0.35)
      CALL CTRORI(90.)
      CALL CTRMAG(15)
C  Y LABEL
      CALL TYPECS('La/Nb                   ',24)
      CALL CTRORI(0.0)
      CALL POSITN(1.01,0.00)
C  X LABEL
      CALL TYPECS('La ppm      ',12)
      CALL POSITN(1.05,-0.06)
      CALL TYPECS('         ',9)
C  KEY TO DIFFERENT SYMBOLS FOR DIFFERENT ROCK GROUPS BASED ON COX BELL AND
C  PANKHIRST CLASSIFICATION
      R=0.98
      DO 987 J=1,26
      IF (ICOUNT(J).LT.1) GOTO 987
      R=R-0.04
      NSYMB=ISYMB(J)
      CALL CTRFNT(1)
      CALL CTRMAG(14)
      CALL PLOTNC(1.015,R,NSYMB)
      CALL  CTRFNT(1)
      CALL CTRMAG(10)
      CALL PLOTCS(1.035,R,RNAMO(J),10)
  987 CONTINUE
      CALL MAP(XMN,XMX,YMN,YMX)
      CALL CTRFNT(1)
      RETURN
      END
```