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Abstract

Nuragic Settlement Dynamics: The East Coast of Sardinia

Cezary Namirski (Durham University)

This thesis analyses the settlement dynamics of the Nuragic culture on the east coast of Sardinia during the Bronze Age and Iron Age (c. 2000-550 BC), and compares them with those in the western part of the island. The main themes examined are: the Chalcolithic to Bronze Age transition, settlement patterns, relations between settlement and ritual sites, uses of the coastline, and the implications of these for our understanding of Nuragic societies in this area. The study draws on field surveys conducted for this project in two sample areas: 1) Sarrabus (South-East Sardinia), and 2) Barisardo-Cardedu (Central-East Sardinia), and includes GIS analysis (PPA, viewsheds, least-cost path). The discussion is also placed in the wider context of prehistoric settlement in the Mediterranean.

New insights on the Chalcolithic to Early Bronze Age transition in Sardinia are presented. In sample area 1, a clear relationship between pre-Nuragic and Nuragic sites is recorded, suggesting that the transition was characterized by a significant degree of continuity, rather than the collapse of Chalcolithic settlement observed in western Sardinia. This indicates a need to see this transition not as a unified process, but rather as regionally diverse one.

Furthermore, in sample area 1 there is a low degree of settlement nucleation, while in sample area 2 this phenomenon is much more significant. Several scenarios are proposed to explain this, and it is argued that in some areas of the east coast the degree of societal complexity was more significant than in other areas.

Conclusions are also drawn regarding the relationships between settlement and ritual sites, which turn out to be varied with no single dominant pattern. This indicates a plurality of ritual practices, and potentially different roles for individual megalithic tombs. The lack of sanctuaries in sample area 1 and their presence in sample area 2 is taken as indication of different degrees of social complexity.

Cezary Namirski

Nuragic Settlement Dynamics: The East Coast of Sardinia

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Contents

Chapter 1. Aims of research ……1

Chapter 2. The Nuragic culture of Sardinia ……..……..7

2.1. History of Nuragic archaeology …….. 9

2.2. Nuragic I: Bonnanaro culture and early nuraghi ……..…… 14

2.3. Nuragic II: egalitarian society and early territoriality ……..……. 21

2.4. Nuragic III: settlement nucleation ……..……. 28

2.5. Nuragic IV: social differentiation and Phoenician colonization ……..…… 39

2.6. Decline of the Nuragic culture ……..……51

2.7. Sardinian prehistory in a Mediterranean context ……..…… 54

Chapter 3. Theoretical approaches ……..…….. 62

3.1. Settlement dynamics ……..……62

3.1.1. Relationship between social and settlement dynamics ……..…… 64

3.1.2. Other approaches to settlement dynamics ……67

3.1.3. The significance of maps to the analysis of settlement dynamics …….70

3.2. Networks ……71

3.2.1. Mathematical approaches ……..…72

3.2.2. Non-mathematical approaches ……79

3.3. Conclusions ……82

Chapter 4. Research methodology ……..…84

4.1. Survey methodology ……....85

4.2. Geographical Information Systems (GIS) ……....95

4.3. Published excavation reports and grey literature ……..…97

4.4. Identification of difficulties and limitations ……....98

Chapter 5. The Nuragic east coast of Sardinia: research context ……..102

5.1. Sample areas: a geographical background ……104

5.2. Sarrabus: history and current state of research ……105

5.3. Barisardo and Cardedu: history and current state of research ……109

5.4. Other parts of the east coast of Sardinia ……112

5.5. Conclusions……..116

Chapter 6. The Early and Middle Bronze Age (2000-1200 BC) ……..118

6.1. The Early and Middle Bronze Age in sample area 1 ……120

6.1.1. Settlement patterns and territoriality ……..……126

6.1.2. Relations between domestic and funerary sites ……..144

6.2. The Early and Middle Bronze Age in sample area 2 ……148
6.2.1. Settlement patterns and territoriality ……149
6.2.2. Relations between domestic and funerary sites ……163
6.3. The Early and Middle Bronze Age in a Central Mediterranean context..166
6.4. Conclusions ……167

Chapter 7. The Late Bronze Age (1200-900 BC) ……..170
7.1. The Late Bronze Age in sample area 1 ...……...171
7.1.1. Settlement patterns and territoriality ……172
7.1.2. Ritual and funerary sites ……187
7.2. The Late Bronze Age in sample area 2 ……...191
7.2.1. Settlement patterns and territoriality ……191
7.2.2. Relations between domestic and ritual sites ……...199
7.3. The Late Bronze Age in a Central Mediterranean context ……..…..…202
7.4. Conclusions ……..…203

Chapter 8. The Iron Age (900-500 BC) ……206
8.1. The Iron Age in sample area 1 ……..….207
8.2. The Iron Age in sample area 2 ……...211
8.3. Conclusions ……..….216

Chapter 9. Site biographies: selected case studies ……...217
9.1. Nuraghe Cea (Loceri) ……..218
9.2. *Pozzo sacro* Su Presoni (Cardedu)……....223

Chapter 10. East and West: comparison ……..…….229
10.1. Settlement patterns and territoriality ……...230
10.2. Ritual sites and their relations with settlement sites ……...…243
10.3. Use of the coastline and trade ……..…246
10.4. Identity ……..…252
10.5. Conclusions ……... 254

Chapter 11. Conclusions and future research prospects …….……255

Bibliography ……260
Appendix 1. Nuragic sites in sample area 1 ……..……285
Appendix 2. Nuragic sites in sample area 2 ……..…549
Appendix 3. Spatial relations between pre-Nuragic and Nuragic sites in sample area 1..…671

List of figures

Fig. 1. Plans of the protonuraghi (after Lilliu 2005). 1 – Sant'Alvera (Ozieri), 2 – Cunculu (Scanu Montiferru), 3 – Siligogu (Silanus), 4 – Seneghe (Suni), 5 – Gianna Uda (Bonarcado), 6 – Mulineddu (Sagama) ……15

Fig. 2. Nuraghe Madrone (Silanus) – an example of a well-preserved tholos nuraghe……...22

Fig. 3. Plan of Nuraghe Santa Sabina (Silanus) with visible three niches and an intra-mural staircase (after Moravetti 1998a)……22

Fig. 4. Entrance to Nuraghe Crabia (Bauladu) with a window visible above it……...23

Fig. 5. *Tomba di giganti* Sa Domu 'e S'Orku (Siddi) – view from the South-East…...23

Fig. 6. Plans of trilobate nuraghi: 1 – Longu (Cuglieri), 2 – Pranu Nuracci (Siris, after Lilliu 2005)……...30

Fig. 7. Stone model of a nuraghe in the centre of *capanna delle riunioni* in the Nuragic complex of Palmavera (Alghero)……30

Fig. 8. The bastion of Nuraghe Arrubiu (Orroli) with lateral towers – view from the south……31

Fig. 9. Circular huts in the Nuragic settlement of Santa Vittoria (Serri)……31

Fig. 10. The staircase and chamber of the LBA-Iron Age well of Santa Cristina (Paulilatino)……36

Fig. 11. The atrium and façade of the Nuragic spring of Su Lumarzu (Bonorva)…….36

Fig. 12. A *bronzetto* of a "tribal chief" from Monti Arcosu (after Lilliu 1999b)……...40

Fig. 13. A Nuragic *bronzetto* representing a warrior or deity with a characteristic horned helmet, four arms and two round shields (after Lilliu 1966)……...41

Fig. 14. Statue of a "boxer" (1.02m high) from Monte Prama (Cabras)……44

Fig. 15. Part of a baethyl (0.68m high) from the site of Monte Prama (Cabras)……..45

Fig. 16. Examples of Iron Age pottery (a-d – Geometric period, e-g – Orientalizing period) from Sant'Anastasia (Sardara, after Taramelli 1918; Webster 2015)……49

Fig. 17. The network of Aegean sites created on the basis of PPA method (after Knappett et al. 2008). No. 16 is Rhodes, which does not receive any influx – it indicates its minor rank despite seemingly important geographic location……...74

Fig. 18. The Middle Uruk period connections between the sites and ceramic workshops on Susiana Plains (after Rothman 1987). Notably, this model represents only a specific aspect of the interconnections in the networks and requires the data from archaeological excavations……77

Fig. 19. Map of Sardinia (after Webster 1996) with extent of sample areas 1 and 2……85

Fig. 20. Topography of south-east Sardinia with sample area 1 marked (source of data: sardegnageoportale.it)……...103

Fig. 21. Topography of central-eastern Sardinia with sample area 2 marked (source of data:

sardegnageoportale.it)……..……103

Fig. 22. Two examples of monuments classified as protonuraghi by Ledda (1985) which do not display any typical architectural elements of a corridor nuraghe – Nuraghe Mumosa (left) and Nuraghe Mannu I (right)…….……106

Fig. 23. Nuraghe Nicola Podda (Muravera) – a single-towered nuraghe not included in R. Ledda's (1985) survey…….……...106

Fig. 24. Nuraghe Porceddus (Villasimius), one of the Nuragic sites not included in Valtan's (2003) publication on the nuraghi in Villasimius…….……...107

Fig. 25. The main tower of Nuraghe Sellersu (Barisardo), one of the complex nuraghi in sample area 2…….……....110

Fig. 26. Distribution of pre-Nuragic (red) an Nuragic (green) sites near Costa Rei (northern part of Muravera commune and southern part of Castiadas commune)……..……..125

Fig. 27. *Domus de janas* Monti Ferru (Muravera) – a rock-cut tomb with three chambers, probably associated with the Ozieri culture……...……...126

Fig. 28. Corridor of Protonuraghe Is Laccus (Castiadas), a typical example of a corridor-type nuraghe (protonuraghe)…….……127

Fig. 29. Nuraghe Domu de S'Orcu (Muravera) – an example of a single-towered nuraghe…….……133

Fig. 30. Cyclopean wall which cuts the neck of a promontory with Nuraghe Su Tasuru I (San Vito)…….……133

Fig. 31. Protonuraghe Comideddu (San Vito) – a natural outcrop used as an integral part of the Nuragic wall……..……...134

Fig. 32. Plan of Protonuraghe Comideddu (San Vito) prepared with use of Leica Total Station…….……134

Fig. 33. Plan of Nuraghe Domu de S'Orcu (Muravera) prepared with use of Leica Total Station…….……...…135

Fig. 34. The entrance to Nuraghe Piras (Castiadas) – view from the south……..……...135

Fig. 35. Protonuraghe Pispisa (Muravera), a structure which can be typologically classified as a corridor nuraghe with a chamber (type D) or a single-towered nuraghe with a bastion (plan prepared by the author with use of the Leica Total Station)…….……..136

Fig. 36. Protonuraghe Arrubiu (Muravera, summit to the right) in its landscape context…….……....136

Fig. 37. Distribution of the Nuragic sites in the massif of Monti Ferru and Bruncu Perda Sub'e Pari (Muravera)……..…….137

Fig. 38. Proximal Point Analysis (PPA) of the Nuragic sites near the massif of Bruncu Su Tidori (Muravera)……..……..……140

Fig. 39. Viewshed showing visibility from Nuraghe San Pietro (1), visible area in red…….……...141

Fig. 40. Viewshed showing visibility (in red) from Nuraghe Ponzianu (3), encompassing nuraghi Cuili Senni and S'Acqua Seccis, as well as view of the valley of river Senni…….……..……142

Fig. 41. Northern wing of the exedra in *tomba di giganti* Monte Zippiri (Muravera)……..145

Fig. 42. *Tomba di giganti* Mont' Arbu (Muravera) – the chamber seen from the north……...145

Fig. 43. Nuraghe Su Angedu (Cardedu) – view from the west……..152

Fig. 44. Niches in the tholos chamber of Nuraghe Moru (Barisardo)……...152

Fig. 45. The Nuragic occupation in the massif of Serra 'e Ladamini (Tortoli)……..…154

Fig. 46-47. Typical architectural features of the protonuraghi in Serra 'e Ladamini massif: a corridor (Protonuraghe Serra 'e Ladamini, above) and utilization of the natural rocks (Protonuraghe Serras Interazzas, below)……..…155

Fig. 48. The PPA analysis of connectivity between settlement sites on the plateau of Teccu. Each site is linked to its two closest neighbors……157

Fig. 49. A cumulative viewshed from all the nuraghi and settlement sites on the plateau of Teccu (visible area in red). The areas immediately SW and NW of the plateau are not visible from any of the sites……..…158

Fig. 50. A viewshed illustrating visibility (visible area in red) from Protonuraghe Muxieddu (Tortoli)……..162

Fig. 51. The Nuragic wall with an entrance at the top of Monte Arista (Cardedu)……163

Fig. 52. The chamber of *tomba di giganti* Bellisceddu is trapezoidal in section……..…165

Fig. 53. The Nuragic occupation around Senni valley including the Late Bronze Age sites (single-towered nuraghi with settlements and complex nuraghi)……..…176

Fig. 54. The southern part of Riu Senni valley with the least-cost path between nuraghi S'Acqua Seccis (1) and Santoru (2)……..177

Fig. 55. Proximal Point Analysis (PPA) of the area around the massif of Monte Cannas (Castiadas)……..…178

Fig. 56. Nuraghe Asoru (San Vito) in its landscape context – view from the east……179

Fig. 57. The lateral tower and the antemural of Nuraghe S'Omu 'e S'Orcu (Castiadas)……179

Fig. 58. Plan of the Nuragic complex of Santoru (Muravera) with the main tower and antemural (prepared by the author with use of Leica Total Station)……..…180

Fig. 59. The least-cost path between Nuraghe S'Omu S'Orcu (Castiadas) and Nuraghe Monte Turno located close to a bay with possible landing site……182

Fig. 60. Distribution of the nuraghi located in a mountain massif east of Villasimius……183

Fig. 61. Viewshed illustrating visibility from Nuraghe Baccu 'e Gattus (visible area in red)……184

Fig. 62. Plan of Nuraghe Baccu 'e Gattus (Villasimius) with two probable phases of construction (prepared by the author with use of Leica Total Station)……185

Fig. 63. A circular hut in the settlement near Nuraghe Su Cunventu (Muravera)……185

Fig. 64. A least cost-pathway between nuraghi Mannu (10) and Don Giovanni Mattaciolu (12),

the two major complex nuraghi near Monti Ferru……..186

Fig. 65. A corridor in the bastion of Nuraghe Cea (Loceri), part of the excavated Late Bronze Age phase of the monument……193

Fig. 66. The Nuragic occupation of the Teccu plateau……..……..……..195

Fig. 67. Nuraghe Sellersu (Barisardo) – one of the largest complex nuraghi in sample area 2 is located near the NE edge of the Teccu plateau……..……..…197

Fig. 68. The atrium and entrance to the sacred well of Su Presoni (Cardedu)…..……..200

Fig. 69. The antemural of Nuraghe Puliga (Loceri)……...…213

Fig. 70. Remains of a circular hut with Nuraghe Perd'e Pera (Cardedu) in the background……..……..……..……...213

Fig. 71. The entrance to the main tower of Nuraghe Cea (Loceri)…….…….…….....219

Fig. 72. The Nuragic occupation of the plateau of Loceri…..……..219

Fig. 73. The Nuragic pottery from stratum 1 in the bastion of Nuraghe Cea (after Cossu 1997)……..…….221

Fig. 74. The tholos dome in *pozzo sacro* Su Presoni (Cardedu)……..…….226

Fig. 75. Section of the sacred well of Su Presoni (after Pitzalis 2008)……....226

Fig. 76. Carvings on the architrave of *pozzo sacro* Su Presoni (Cardedu)……..……227

Fig. 77. Cluster of the nuraghi around Gesico and Mandas (Trexenta)…….……231

Fig. 78. The Nuragic occupation of the plateau of Pranu Nuragheddus (Cabras) on the Sinis peninsula……..……..234

Fig. 79. Nuraghe Antigori (Sarroch) where significant quantities of Mycenaean pottery were found……249

Fig. 80. View from Nuraghe Gibe Truttiri (Castiadas) to the bay of Cala Marina and Nuraghe Monte Turno (the hilltop in the centre)…….……..…….…….249

List of tables

Table 1. Proposed chronological model of the Nuragic culture.

Table 2. Radiocarbon datings from the Nuragic sites.

Table 3. Duffy's (2015) model of the six determinants of site size hierarchy.

Table 4. Number of sites recorded during the project divided into types of sites and municipalities.

Table 5. Chronology of *tombe di giganti* based on their architectural typology (based on Contu 2006b: 654-656 and Lilliu 1999b).

Table 6. Pre-Nuragic sites in sample area 1 with the associated Nuragic sites.

Table 7. Data from the Proximal Point Analysis of the area near the massif of Bruncu Su Tidori – number of connections for each site.

Table 8. Quantification of the results of viewshed analysis run from selected Nuragic sites in sample areas 1 and 2.

Table 9. Data from the PPA analysis of the plateau of Teccu – number of connections for each site.

Table 10. Data from the Proximal Point Analysis (PPA) in the area of Monte Cannas.

Table 11. Late Bronze Age sites in sample area 1.

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Chapter 1. Research aims

Summary. *This chapter presents the aims of the project and places them in the wider context of the current state of knowledge of Nuragic archaeology and its major debates. The diversity of Nuragic settlement patterns in the Western and central parts of Sardinia, coupled with the very limited amount of study of Nuragic settlement dynamics in the eastern part of the island, offers potential for recognizing settlement patterns and their relationship to the ritual sites and coastline which are different from those in other areas of Sardinia. Furthermore, landscape archaeology's potential in Sardinia has only been exploited to a limited extent to date, as many areas of the island have never been properly surveyed. These factors make landscape surveys of the east coast of Sardinia one of the most promising fields of research for advancing our knowledge of Nuragic settlement dynamics and their implications for understanding Nuragic society, economy and their changes in consecutive periods. This work aims to: analyze these issues in two selected sample areas of the east coast of Sardinia, compare the results with those from the western part of the island, and set them in a wider context of Central Mediterranean prehistory.*

The Bronze Age (c. 2000-900 BC) and Iron Age (c. 900-500 BC) in the Central and Western Mediterranean saw the emergence of a significant number of cultures which developed mostly indigenously on islands. The Bronze Age Torrean culture of Corsica, the Bronze Age and Early Iron Age Nuragic culture of Sardinia, as well as the Iron Age Talayotic culture of Mallorca and Menorca are often seen as local phenomena, studies of which do not offer a significant contribution to our overall understanding of the Mediterranean later prehistory. Furthermore, many attempts to interpret the development of these cultures (Pericot Garcia 1974, Webster 1996, Lilliu 1999b) constitute an attempt to create a chronological model capturing the main patterns characteristic for each period. Both of these approaches deserve

criticism. Despite their relative isolation, the prehistoric island cultures of the Central Mediterranean have significance going well beyond local scale. This is not only due to the cases of their contacts with other parts of the Mediterranean, but also due to the fact that the knowledge of processes and mechanisms which influenced the development of each of them can contribute to our understanding of other Mediterranean prehistoric island cultures. Furthermore, an attempt to explain their emergence and development through a single model based on dominant patterns often overlooks local variability. That is certainly the case in the studies of the Nuragic culture in Sardinia. Even though its architecture and material culture are relatively uniform across the island, which led to suggestions about possible pan-Sardinian Nuragic identity (Blake 1999), there are significant differences in local settlement patterns and distribution of ritual sites which have not been adequately considered. This work is an attempt to address this particular field of research through analysis of the Nuragic settlement dynamics (understood as patterns and processes shaping the development of settlement in a specific area) on the east coast of Sardinia, an area which has received less attention of archaeolgists than the western part of the island. An emphasis will be placed upon the local patterns and placing them in a wider picture of the Nuragic culture in Sardinia and Central Mediterranen prehistory.

The Nuragic culture started to flourish in the Middle Bronze Age, and reached its zenith in the Late Bronze and Early Iron Age. It changed the Sardinian landscape significantly, marking it with over 7000 nuraghi (conical-shaped stone towers), as well as *tombe di giganti* (megalithic tombs), *pozzi sacri* (sacred wells) and other types of ritual monuments. Some of its elements survived into the Late Iron Age (750-500 BC) and merged with the Punic culture introduced after the Carthaginian conquest of the island in the late 6th century BC, resulting in the emergence of a hybrid culture with both indigenous and Punic characteristics.

The Nuragic culture of Sardinia remains a field of research offering particularly rich opportunities for the use of landscape archaeology, not only due to its scarce application (and

thus unfulfilled potential) in research on the Nuragic culture to date, but also because of the exceptional preservation of the Bronze Age cultural landscape of the island. The rich array of settlement types (protonuraghi, single- towered nuraghi and complex nuraghi with villages), as well as ritual sites (megaron temples, sacred wells) includes monumental architecture, which makes them easy to identify. This monumentality, coupled with the limited impact of modern agriculture and urbanization, has preserved much of the Nuragic cultural landscape, affording particularly wide scope for landscape archaeological research. This contrasts with some areas of the Mediterranean, such as Sicily, where the prehistoric landscape is more obscured through changes which occurred in later periods. For example, Chalcolithic and Early Bronze Age sites are less visible due to post-depositional processes and the impact of agriculture (Ayala 2012). As a result, our understanding of the settlement dynamics of these periods in Sicily is heavily influenced by preservation patterns since the land around rocky hilltops is usually less cultivated (Leighton 2005). This problem is much less common in the case of Bronze Age Sardinia, especially on the east coast, where the impact of agriculture is very limited, while the predominance of sites exhibiting megalithic architecture ensures their visibility in the landscape.

The thesis builds on the author's previous experience in Nuragic archaeology, including a research project on the transition from protonuraghi to tholos nuraghi in the Bronze Age architecture of Sardinia (Namirski 2012, BA dissertation, University of Reading) and a survey of the cluster of nuraghi near Gesico and Mandas (Trexenta, central Sardinia) which provided the basis for the analysis of Nuragic territoriality in this area (Namirski 2013, MA dissertation, University of Durham). Experience gained in these projects, years of extensive studies of Nuragic archaeology, and expertise in landscape archaeology allowed the author to identify the east coast of the island as one of the most promising areas for research into Nuragic archaeology in Sardinia, as well as to determine a suitable methodology. This part of the island has received little attention in comparison with the west, primarily due to less extensive

Nuragic occupation and a smaller number of large nucleated settlements. A wide array of different settlement patterns was distinguished through surveys in different parts of the island – ranging from clusters of nuraghi with buffer zones as territorial boundaries around them (Sedilo, Bonzani 1992), through occupation of the edges of highland plateaus (Giara di Serri, Puddu 2001), to small groups of nuraghi (Pran ‘e Muru, Campus 2008) and dispersed occupation (Gallura, Puggioni 2009). Considering this diversity, it cannot be assumed that the Nuragic occupation near the east coast of the island followed exactly the same patterns as in previously surveyed areas of Campidano (South-West) or Logudoro-Meilogu (North-West). This work is an attempt to distinguish the Nuragic settlement patterns and dynamics in the eastern part of Sardinia and to place them in a wider context of Nuragic cultural landscapes by comparing the results with our knowledge of Bronze Age and Early Iron Age occupation in western Sardinia.

The aims, as well as methodology (see Chapter 4), of this project are partly based upon the earlier survey project conducted by the author in the Gesico-Mandas cluster of nuraghi in Trexenta (Namirski 2013), which resulted in a detailed analysis of the development of settlement dynamics and territoriality in central Sardinia from Early Bronze Age to Iron Age. The main goals of that project were to analyze the evidence for territoriality and special organization of a Nuragic territory from the Bronze Age to the Iron Age. Drawing upon these goals and expanding them, the present research into the Nuragic landscapes of the east coast of Sardinia focuses on the following questions:

1. What were the Nuragic settlement patterns like and how did they change from the Early Bronze Age to the Iron Age? How were settlements distributed and related and what does this tell us about social relations in the Nuragic period?

2. What were the patterns of land use and do they show any evidence for territoriality (understood as emergence of at least semi-independent territorial entities, not necessarily

constituting sub-regional polities)?

3. What was the use and significance of the coastline, both in terms of connectivity and local economy, between the Early Bronze Age and Iron Age?

4. What were the relations between different site types, and how did these change in consecutive periods of development of the Nuragic culture? What can they tell us about social relations in the Nuragic communities?

5. What are the differences and similarities between the Nuragic settlement dynamics of the east coast of Sardinia and those in the western part of the island?

Addressing these research questions enables us to tackle different aspects of the problem of Nuragic settlement dynamics on the east coast of Sardinia, allowing for a more complete reconstruction of these and capture of the complexity of relationships between specific elements of the cultural landscape in the Nuragic period. Such an attempt is important not only due to the insufficient attention paid to Nuragic settlement dynamics of the east coast of Sardinia but, also, due to the fact that many of the regional studies done in western Sardinia (Navarra 1997, Ugas 1998, Cicilloni and Migaleddu 2008) focus only on specific aspects of Nuragic settlement, such as Late Bronze Age nucleation, territoriality or architectural development, rarely contextualizing them by presenting a wider picture of Nuragic settlement, society, economy and ritual in the area in question. This deficiency will be addressed in this project, as the discussion of the results will consider how the above mentioned issues inform us about the development of Nuragic society and economy between the Early Bronze Age and Iron Age, especially in terms of social relations (with particular emphasis on degree of social differentiation), control of resources and ritual (including the role of ritual sites in the social life of the Nuragic people).

Of particular importance is the need to set the results of this research in the wider context of Nuragic settlement patterns in other parts of Sardinia, especially the central and western

areas, which are at present the most thoroughly surveyed (Trump 1990, Bonzani 1992, Navarra 1997, Canino 1998, Moravetti 1998a, 2000b, Melis 2007). This should allow us to address the imbalance of research between the eastern and western parts of the island, which has resulted in a fragmentary and incomplete understanding of Nuragic settlement patterns in Sardinia. This is particularly important since the patterns of Nuragic territoriality, settlement and land use can differ significantly even over relatively short distances, opening up great potential for landscape archaeology as a means of understanding the Nuragic economy, elements of social structure manifested through the distribution and architecture of domestic and ritual sites and symbolic aspects of the Nuragic cultural landscape.

Such an approach, which emphasizes the importance of local patterns and differences between aspects of Nuragic settlement, social relations and economy in specific areas of Sardinia, contributes towards the understanding of Nuragic culture which does not rely on a single model applied to the entire island. This allows us to understand the Nuragic society, its complexity and its development more accurately, without generalizations which often ignore the reality of local diversity.

Chapter 2. The Nuragic culture: an introduction

Summary. *The early phases of the development of Nuragic culture remain a fiercely debated topic. A particularly difficult issue is the scarcity of settlement sites, since most of the protonuraghi (corridor nuraghi) which were originally believed to be Early Bronze Age structures were built either in late phases of the Early Bronze Age or in the Middle Bronze Age. Also, the significance of Bell Beaker influence in the Early Bronze Age remains unclear. After 1500 BC the major features characterizing Nuragic culture were already developed – nuraghi (conical-shaped stone towers with tholos chambers),* tombe di giganti *(megalithic tombs with curved forecourt walls), as well as* pettine *and* metopale *pottery. The Late Bronze Age (c. 1200-900 BC) was a period of increasing settlement nucleation, traditionally associated with competition for resources and social stratification, although this view is now being challenged. Finally, the Early Iron Age (c. 900-750 BC) is marked by development of metallurgy, art (especially sculpture in bronze and stone), as well as the increasing role of sanctuaries associated with water cults, which became centres of metalwork deposition, while many nuraghi (including complex ones) were abandoned. In the Late Iron Age (c. 750-530 BC) the Nuragic culture was already in decline and probably collapsed before the Punic conquest of the island in the late 6th century BC, although indigenous influence on material culture is strongly visible in a hybridized culture from the 5th century BC onwards.*

The Nuragic culture developed in Sardinia between the Early Bronze Age and Iron Age, dominating the island for about a millennium. It emerged after the collapse of the Chalcolithic cultures of Sardinia which occurred around 2300 BC, especially the Monte Claro culture which developed in the Chalcolithic particularly in the fertile areas of the Campidano (about 65% of the settlement sites of the Monte Claro culture in Sardinia) and in the northern part of the island. It was characterized by defensive settlements with megalithic walls such as

Monte Baranta (Moravetti 2000a) and Monte Ossoni (Melis 2007: 21-22), implying a certain degree of social differentiation in the Sardinian Chalcolithic. The major forms of well-fired pottery were hemispherical bowls, large storage jars (*dolii*) and plates, some of them with zigzag ornaments (Corda and Frau 2001: 44). The burial sites include re-used *domus de janas* (rock-cut tombs), some of them with added megalithic corridors – although, as Spanedda (2010: 54) points out, some of these corridors could be of a different period – as well as cist tombs and burials in large jars (Melis 2014: 10). The collapse of the Monte Claro culture was probably caused by overuse of the land and by climatic change, evidence of which can be observed in various parts of the Mediterranean in that period (Webster 1996: 61). Early scholarly views saw the Monte Claro culture as one of the factors which influenced the emergence of the Nuragic culture, mainly due to the Monte Claro pottery discovered in Nuraghe Sa Corona (Villagreca), one of the most archaic Nuragic monuments (Atzeni 1966: 123). However, this evidence is now rejected, as the stratigraphy of the site was not recorded properly. There is little doubt that the Monte Claro culture and fully developed Nuragic culture were separated by at least a few hundred years, the chronology and cultural significance of which remains unclear, mainly due to the insufficient number of excavated sites and too few reliable radiocarbon datings.

The purpose of this chapter is to present the most plausible interpretations of the origins and early chronology of the Nuragic culture, as well as its development through the Middle and Late Bronze Age, as well as the Early Iron Age. Particular attention will be paid to critical interpretation of the architecture and material culture (the best researched fields of Sardinian prehistory) within the socio-politcal context of the Nuragic societies – something which has been largely abandoned in Sardinian archaeology in favour of traditional interpretations which have remained largely unchallenged for decades. Considering the differences between various chronological models proposed for the Nuragic culture (Webster 1996, 2015, Melis 2003, Ugas 2005), I propose a model which takes into account different proposed dating

frameworks and which I have used elsewhere (Table 1, Namirski 2016).

Period	*Characteristics*
Nuragic I (Early Bronze Age, early phase of Middle Bronze Age), c. 2000-1500 BC	- Bonnanaro pottery (Sa Turricula and Corona Moltana) - Protonuraghi, early *tombe di giganti* (with stele) and first tholos nuraghi - Mostly egalitarian societies
Nuragic II (later phase of Middle Bronze Age), c. 1500-1200 BC	- Tholos nuraghi - *Tombe di giganti* without stele - *Pettine* and *metopale* pottery - Early evidence for territoriality (clusters of the nuraghe with buffer zones), but societies still with relatively limited social differentiation
Nuragic III (Late Bronze Age), c. 1200-900 BC	- Complex nuraghi with settlements - First sanctuaries (*pozzi sacri*, megaron temples) - Increasing social stratification - Specialized settlements, wine production - Disappearence of *metopale* pottery
Nuragic IV (Iron Age), c. 900-500 BC	- Further development of sanctuaries - Social stratification - Development of metallurgy - *Bronzetti* and Monte Prama sculptures - Individual burials

Table 1. Proposed chronological model of the Nuragic culture.

2.1. History of Nuragic archaeology

Before moving on to the discussion of consecutive periods of development of the Nuragic culture it is necessary to briefly summarize the history of reseach on this period of Sardinian prehistory, as it helps us to understand the strengths and weaknesses of the research done to this day. The interest in Nuragic monuments grew in the first half of the 19th century. A good example is provided by W. Smith's plans of Nuraghe Santu Antine (Torralba) from 1828, which later helped to reconstruct damaged parts of the nuraghe (Smith 1828). Awareness of Nuragic architecture in Sardinia was also increased through Alberto de La Marmora's volume *Voyage en Sardaigne* (1840), which mentions not only monuments such as *tombe di giganti* Goronna (Paulilatino) and Nuraghe Tamuli (Macomer), but also some of the metal

hoards from the Nuragic period. The second half of the 19th century saw increasing interest in Sardinian archaeology, but excavation efforts were usually focused on Punic and Roman sites rather than Nuragic ones. One of the most important contributions was Filippo Nissardi's excavations of Nuraghe Losa (Abbasanta) and Nuraghe Bullittas (Alghero), both of which were relatively well-documented thanks to his efforts (Nissardi 1904). In the first years of the 20th century Nissardi worked with Antonio Taramelli, who became one of the most important figures in the history of pre-Nuragic and Nuragic archaeology – a graduate of the University of Pavia and later director of the Museo Archeologico Nazionale (National Archaeological Museum) in Cagliari, he excavated numerous archaeological sites in Sardinia, including Nuraghe Palmavera (Alghero, Taramelli 1909), in their early seasons documented by Nissardi with plans and sections, went on for thirty years and are considered to be the first excavations of a Nuragic site done with consideration of scientific methods. Many of Taramelli's interpretations of the site are still considered valid and of fundamental importance for the development of Nuragic archaeology (Moravetti 1992: 42-44). Taramelli also excavated numerous other sites, including the sanctuary of Santa Vittoria (Serri, Taramelli 1911), and undertook important projects of mapping Nuragic sites in different parts of the island. All these efforts laid the foundations for further development of prehistoric archaeology in Sardinia.

In the early decades of the 20th century the Nuragic sites also attracted the attention of archaeologists from abroad. Among the fruits of this interest are the publications of Mackenzie (1913), who documented numerous Nuragic sites in different parts of Sardinia. Davies also (1939) studied the Nuragic megalithic tombs (*tombe di giganti*) and concluded that they evolved from the Neolithic dolmens, a theory which was later upheld by Moravetti (1998c).

An important advance in the development of Nuragic archaeology was the excavations of Nuraghe Su Nuraxi (1951-56) by G. Lilliu. They allowed for proper recording of the stratigraphy and chronology of a multi-period Nuragic complex, thus allowing the establishment of a chronological model of the Nuragic culture which remains mostly valid

today (Lilliu 1999b: 12). Lilliu's vast contribution to Sardinian archaeology also included studies of the Nuragic *bronzetti* (1956), many of which were unfortunately found outside of archaeological contexts. These developments resulted in a further increase of interest in Nuragic archaeology among foreign scholars. 1975-78 saw M. Balmuth excavating the Nuragic complex of Ortu Comidu (Sardara; Balmuth 1987, 1994), Michels and Webster (1987) excavated settlements around nuraghi Bighinzone and Toscono, while Trump (1990) conducted surveys and excavations in Bonu Ighinu valley which contributed to our understanding of the functions of corridor nuraghi. Important advances were also made in understanding of the Mediterranean context of the Nuragic culture – Lo Schiavo's (1985, 2005c) studies have been particularly important in this area.

Although landscape archaeology is still an underdeveloped area of research in Nuragic archaeology, a number of surveys in the western part of the island (Navarra 1997, Canino 1998, Foddai 1998, Moravetti 1998a, 2000b, Maisola 2012) have significantly contributed to our understanding of Nuragic settlement dynamics and their chronological development. Most of the surveys were site-based rather than intensive surveys – as Fois (2008: 9) pointed out, difficult terrain, extensive vegetation and private ownership of many ares often force archaeologists to locate sites on the basis of bibliographical and archival sources. However, given the fact that the majority of the Nuragic sites include architectural remains visible on the ground, site-based surveys were usually sufficient to accurately document the Bronze Age and Early Iron Age occupation in different areas of the island – an example is Moravetti's (1998a, 2000b) research in Marghine and Planargia, where the vast majority of meticulously documented Nuragic sites bear architectural remains. The site-based surveys allowed us to distinguish important settlement patterns, such as the relationship between locations of the nuraghi and water courses (Moravetti 2000b: 79). The studies of monuments in their landscape context also addressed specific issues, such as territoriality (Bonzani 1992) and spatial relationships between settlements and tombs (Blake 2001).

Although processual and post-processual approaches have so far hardly been employed in Sardinian archaeology, the research of recent decades shows awareness of weaknesses in traditional models (such as emergence of chiefdoms in the Late Bronze Age and aristocracy in the Early Iron Age, as well as division of the island into Nuragic interior and Phoenician-controlled coastal zone in the Late Iron Age) of Nuragic social relations and settlement dynamics (Usai 2007, Tronchetti 2012, Araque Gonzalez 2014), as well as employment of new research tools, such as Geographical Information Systems (Soro 2012, Angius et al. 2012). New insights have been achieved with regard to the rise of the Late Bronze Age and Early Iron Age sanctuaries, such as recognition of new types of ritual structures (Lo Schiavo 1997) and improved understanding of the relationship between sanctuaries and economy (Ialongo 2011, 2013). Although the issue of identity in Nuragic Sardinia has received some scholarly attention (Blake 1999, Hayne 2010), further development of interpretative approaches with an emphasis, for example, on individuals and agency is yet to be seen in Nuragic archaeology.

An important prospect emerging in Sardinian archaeology is the possibility of using Geographical Information Systems (GIS) as a new tool to study Nuragic landscapes. This potential has been used only to a limited extent so far – as Minchilli et al. (2017: 2) point out, the use of GIS in Sardinian archaeology is limited to a few instances. Nevertheless, it has yielded important results, the significance of which goes beyond landscape archaeology itself. Many of the GIS studies of the prehistoric landscape in Sardinia focus on specific areas. An example is provided by Cicilloni et al.'s (2015) publication on Nuragic settlement patterns around Mogoro (the study area was clearly defined by the Mogoro river valley and two highland plateaus, Perdiana and Sa Struvina), including viewsheds. These have revealed that Nuraghe Puisteris offers one of the most extensive views among the Nuragic sites of Mogoro. This structure was built next to a Neolithic settlement (Cicilloni et al. 2015: 156-157), which might indicate that such prominent points in the landscape were selected for settlement in

different periods of Sardinian prehistory. Another example of a GIS-based analysis of Nuragic settlement patterns is a study by Angius et al. (2012) on the Nuragic settlements in Gallura, which involved cost surface analysis, as well as the use of cumulative viewsheds. Regional GIS-based studies have also been done in regards to the pre-Nuragic period – one of the examples is Lai's (2010) project in the municipality of Usini, focused primarily on Late Neolithic rock-cut tombs (*domus de janas*).

GIS has not been used solely to analyze the prehistoric settlements of Sardinia in their local context. Some GIS studies deal with specific types of monuments rather than study areas – an example is a study of Neolithic dolmens and *allée couverte* tombs by Cicilloni and Cabras (2015). It revealed that pre-Nuragic megalithic tombs were constructed primarily along natural trails, but decisive conclusions regarding their possible relationship with transhumance routes could not be established (Cicilloni and Cabras 2015: 17). Some of the studies combine an emphasis on regional context with a focus on specific types of sites – for example, De Montis and Caschili (2012) studied the intervisibility of nuraghi on the plateau of Pran'e Muru, but without consideration of ritual and burial sites. In another significant study Soro (2008) looked at sites with Mycenaean finds in Sardinia, analyzing their connectivity using GIS, and dividing them into five classes of accessibility (Soro 2008: 536-537).

To conclude, use of GIS in Nuragic studies has already advanced beyond landscape archaeology. Soro (2012) worked towards the creation of a GIS for the archaeological excavation of the Nuragic settlement of Sa Osa (Cabras), exploring the possibility of creating vector plans on the basis of photogrammetric coverage (Soro 2012: 1201).

Concluding, the GIS studies have been employed in Nuragic archaeology mostly on local scale, and so far have not been sufficiently contextualized through placing them in a wider context of Bronze Age landscape archaeology in Sardinia. However, significant results achieved in specific areas of the island warrant consideration of GIS as a useful tool for studying Nuragic settlement dynamics and networks, which might allow us to tackle important

questions in ongoing debates within Nuragic archaeology, such as the chronological and spatial development of territorial units, the degree and reasons behind the Late Bronze Age settlement nucleation, as well as relations between settlement and ritual sites.

2.2. Nuragic I (Early Bronze Age, early phases of Middle Bronze Age): Bonnanaro culture and early nuraghi

After the collapse of the Monte Claro settlement system there are a few centuries the significance of which remains unclear – as pointed out by Webster (2015: 12), the Early Bronze Age evidence is still extremelly patchy. There is no doubt that elements of the Bell Beaker culture appeared in Sardinia in the Late Chalcolithic and Early Bronze Age. Among the evidence there is Beaker pottery from Grotta Filiestru (Mara) and a cist from Santa Vittoria (Nuraxineddu), as well as re-use of the Late Neolithic and Chalcolithic *domus de janas* (Pau 2010: 221). However, Beaker settlements in Sardinia are very rare, indicating that the arrival of the Bell Beaker tradition in Sardinia was a movement of ideas rather than a migration of people and did not have a crucial impact on Sardinian culture. This has wider implications for the understanding of the Bell Beaker phenomenon in Europe, supporting its interpretation as a package of cultural elements associated with religion and gender (Brodie 1997) as opposed to its traditional interpretation as a folk migration.

The main foundation for the emergence of the Nuragic culture in the Early Bronze Age was laid by the Bonnanaro culture. Its main archaeological feature is pottery, known mainly from burial sites. It can be divided into two major types: Bonnanaro A (known also as Corona Moltana), characterized by poor firing, tripod bases and elbow handles, and Bonnanaro B (known also as Sa Turricula), characterized by simple handles, absence of tripod bases, predominance of shallow pans (*tegami*) and relatively poor ornaments (Webster 1996: 64). The pottery of Bonnanaro A type is rarely found in domestic contexts, but Bonnanaro B sherds occur in the early Nuragic monuments – among the examples are pottery sherds from

Nuraghe Trobas (Lunamatrona, Lilliu 1999b: 24). Nevertheless, there is no sufficient evidence to link the emergence of early Nuragic monumentality with the Bonnanaro culture. Unfortunately, with limited understanding of the settlement patterns in the period of development of the Bonnanaro culture and a limited amounts of human skeletal remains (a problem related to all periods of Sardinian prehistory due to the acidic soils of the island), it is difficult to reconstruct the use of landscape and social organization of the Bonnanaro people. Foschi Nieddu (1988: 15) interprets the emergence of the Nuragic culture as a result of a gradual evolution of the Bonnanaro communities into more complex societies.

Fig. 1. Plans of protonuraghi (after Lilliu 2005). 1 – Sant'Alvera (Ozieri), 2 – Cunculu (Scanu Montiferru), 3 – Siligogu (Silanus), 4 – Seneghe (Suni), 5 – Gianna Uda (Bonarcado), 6 – Mulineddu (Sagama).

There is little evidence to place the Nuragic foundations as early as 2300 BC, which Webster originally (1996: 62) did. Even some of the earliest datings of the Nuragic monuments, such as 1973 ±126 BC for *tomba di giganti* Palatu (Birori) or (904 ±104 BC for Protonuraghe Fruscos (Paulilatino) are not particularly reliable as they were obtained on obsidian samples (Ugas 2005: 40). Thus, it is necessary to consider other chronological

models of the Nuragic culture than the one proposed by Webster. Melis (2003: 6) places the beginning of Nuragic I period at 1700 BC, while Ugas (2005: 36) places it at 1600 BC. In my view, Lilliu's chronological model (1999: 12) is the most plausible one as it achieves balance between the earliest radiocarbon datings (see Table 2) and first occurrences of Bonnanaro pottery and the beginning of the period when Nuragic settlements became widespread in all parts of Sardinia (after 1500 BC). Therefore, I accept Lilliu's date of 1800 BC as the starting date of the developed Nuragic culture. However, lack of clarity in our understanding of the period between 2300 and 1800 BC, as well as possible early datings of some of the protonuraghi warrant considering 2000 BC as the possible date when the processes which led to emergence of the Nuragic culture already started – thus my suggestion of the 2000- 1500 BC chronological range for the Nuragic I period (Namirski 2016: 53-59).

Site name (municipality)	**Site type**	**Radiocarbon dating**	**Literature**
Palatu (Birori)	*tomba di giganti*	1973 (±126) BC	Ugas (2005: 40)
Serbine (Borore)	protonuraghe	1540 (±130) BC	Webster (2001: 6)
Su Cannisoni (Seulo)	rock shelter	1533-1427 (cal.)	Skeates et al. (2013: 105)
Is Janas (Seulo)	cave	1433-1377 (cal.)	Skeates et al. (2013: 105)
Pizzinnu (Posada)	nuraghe	1399 (±50) BC	Lilliu (1999b: 30)
Su Benatzu (Santandi)	cave	820 (±60) BC	Ugas (2005: 43)

Table 2. Radiocarbon datings from the Nuragic sites.

The early Nuragic societies were probably egalitarian, i.e. divided into families of roughly similar status with the head of a family as the highest level of power. Strong evidence for this is provided by the settlement sites, which lack any distinguishable hierarchy. The protonuraghi are relatively squat stone structures of oval (Peppe Gallu – Uri, Murciu – Flussio), rectangular (Fronte Mola – Thiesi) or irregular (Funtanedda – Sagama, Tanca Manna – Tempio) shape usually crossed with a corridor (see Fig. 1). About 300 of them have been recorded in different parts of Sardinia (Bagella 1998: 133-135). Detailed typologies of them have been proposed by

Manca Demurtas and S. Demurtas (1991), as well as Ugas (2005: 71-72), but they contribute little towards understanding of chronology of protonuraghi and their functions. The most convincing approach was taken by Spanedda and Camara Serrano (2012), who divided protonuraghi into those with a corridor and those with a corridor and a chamber. This simple division reflects a major architectural difference among protonuraghi, which might reflect progress in construction techniques and, thus, give a meaningful insight into the chronology and development of Nuragic architecture in Sardinia. However, recent radiocarbon datings of the protonuraghi indicate that the majority of them are later than originally believed by Lilliu (1999b), belonging to the Middle Bronze Age (Webster 2001: 6, Depalmas 2009). Thus, although there is evidence for the architectural development of protonuraghi into tholos nuraghi and for a chronological difference between these two types of structures, such as the corridor nuraghe of Cuccurada (Mogoro) which was later remodeled into a complex tholos nuraghe (Atzeni et al. 2015: 25), the former ones can no longer be attributed solely to the Nuragic I period.

The architecture and distribution of protonuraghi offer clear evidence for the egalitarian structure of the early Nuragic societies. As already mentioned, there is no hierarchy between these settlements; each of them was probably a single household (Lilliu 1988: 179) with the head of the family as the highest level of power. Trump (1992: 198) suggested a storage function for the protonuraghi, which is very plausible with regard to their corridors, which could have been used to keep livestock or store food. They are usually very narrow and low, such as the corridor of Protonuraghe Losa (Sindia) or the 1.50m high entrance to Protonuraghe Seriale (Bortigali, Moravetti 1998a: 269), which does not leave much of a living space in them. However, there is evidence for the possible existence of the wooden structures on the upper terraces of the structures – these could have been living areas. The artefact assemblages recovered from the protonuraghi clearly indicate their domestic function. An example is Protonuraghe Bruncu Madugui (Gesturi), where large amounts of pottery, remains of hearths,

obsidian blades and other objects of domestic use were found (Webster 1996: 71). Notably, the distribution of protonuraghi is not always consistent with the extent of the most fertile soils in Sardinia (whereas such a correlation is clearly visible in the case of the Chalcolithic settlements of the Monte Claro culture). Some of the protonuraghi (Scudu – Sedilo, Peppe Gallu – Uri) were built in areas which were much more suitable for pastoralism than agriculture (Bagella 1998: 133) which implies reliance on animals in the early Nuragic economy. However, it is necessary to note that many structures that have not been surveyed and are assumed to be single-towered nuraghi could turn out to be corridor nuraghi. Therefore, our understanding of their distribution patterns and their association with the early Nuragic economy might be incomplete. Also, as Lewthwaite (1984: 256) points out with reference to Ingold's (1980) understanding of the development of pastoralist societies in later prehistory, it is unlikely that the increasing significance of pastoralism in the economy of 2nd millennium BC societies in the Central and Western Mediterranean was only a result of ecological adaptation – rather, it was also a reflection of socio-economic differentiation between agricultural and pastoral societies.

The egalitarian structure of the Early Bronze Age societies is also confirmed by the lack of large ritual centres comparable to the earlier sanctuaries of Monte D'Accoddi (Sassari) or Birai (Oliena), which were used in the Chalcolithic. Lack of these structures suggests the absence of a privileged caste of priests which may have existed in previous periods of Sardinian prehistory (Webster 1996: 82, Contu 2006a: 294). This does not mean a total absence of symbolic and ritual elements in Early and Middle Bronze Age Nuragic architecture and material culture, examples of which are re-used pre-Nuragic statue-menhirs from Nuraghe Orrubiu and Nuraghe Arraseda (Cicilloni 2008: 214-218) and re-use of some of the *domus de janas*, the Late Neolithic rock-cut tombs associated mainly with the Late Neolithic Ozieri culture. However, these phenomena are rather sporadic in nature and do not indicate the existence of any sort of religious power in the early phases of the Nuragic culture.

The emergence of the Nuragic culture coincided with a collapse of long-distance trade networks which connected Sardinia with other parts of the Mediterranean, especially in terms of obsidian distribution. In the Late Neolithic the obsidian from Monte Arci (especially the high quality material from the SA source near Sas Concas) reached Corsica, Elba, Italy and southern France, prevailing even over the obsidian from Lipari (Phillips 1986: 206). However, these connections did not survive into the Bronze Age and were replaced by local down-the-line exchange networks exploiting the three major sources of obsidian around the Monte Arci volcano (Tykot 1997): the SA source (relatively easily available and high quality material exploited near Sas Concas), the SB source (the eastern slope of Monte Arci volcano), and the SC source (the area near Pedras Urias provided obsidian of lower quality). As we shall see, the use of these sources and patterns of sites located in this area (presumably associated with exploitation of these sources) can contribute to our understanding of changes in the Nuragic economy in consecutive periods.

The use of metal in the Early Bronze Age was still very limited. We do not have any evidence of mining or smelting from this period, which can be explained by the small scale of metal production in this period, or the importation of metal objects from other parts of the Mediterranean. The latter possibility could be indicated by similarities between the Early Bronze Age swords from Sant'Iroxi (1700-1600 BC) and the Iberian swords from El Argar (Lo Schiavo 2005a: 346). However, there is little doubt that any such contacts in the Early and Middle Bronze Age were relatively limited and did not have a significant impact on early Nuragic society or economy. The other Early Bronze Age metal artifacts are knife blades from Frommosa (Villanovatulo) and Serra Is Araus (San Vero Milis, Webster 1996: 72-73).

Finally, it is necessary to describe the early Nuragic burial rites. Perhaps surprisingly, the use of cave sites increased in the Early Bronze Age in comparison to the Neolithic and Chalcolithic – against 46 Neolithic cave sites we have 74 caves used in the EBA, which constitute 25% of all the burial sites of the Bonnanaro culture. This pattern can be partly

explained by a territorial expansion observable from the Later Chalcolithic onwards (Skeates 2012: 176). Another important category of burial site are the *tombe di giganti* (Giant's Tombs) – megalithic tombs with elongated burial chambers and curved exedras which evolved from the Neolithic and Chalcolithic *allée couverte* type tombs (Moravetti 1998c, Mancini 2012: 657). Some of them were built at the sites of earlier Monte Claro cists (Su Cuaddu Nixias – Lunamatrona) or are re-modeled *allée couverte* (Li Lolghi – Arzachena), and others contain Bonnanaro culture material, from which Blake (1999: 43) suggested that some of the Giant's Tombs could slightly predate the nuraghi. The typology of *tombe di giganti*, based primarily on architectural features and construction techniques, was first defined by Castaldi (1968, 1969), and remains mostly valid to this day. The early *tombe di giganti* are characterized by stele located in the middle of the exedra, sometimes having a small opening (false entrance) and burial chambers built of orthostatic slabs with capstones (type "B" by Castaldi). Some of the examples of the earliest Giant's Tombs are Coddu Vecchiu (Arzachena, Antona Ruju and Ceruti 1992: 14), Santu Bainzu (Borore, Moravetti 1998a: 427-429) and S'Ena 'e Thomes (Dorgali, Lilliu 1999b: 37). We do not know much about the burials due to very limited preservation of the human remains, but it seems that collective burial without distinguishing specific individuals was a common practice. Although collective burials with little to no differentiation between individuals, known also from the megalithic tombs in other parts of Europe (Krzak 1994, Scarre 2007, Whittle et al. 2007), cannot be uncritically treated as evidence for the egalitarian structure of society (it is possible that the privilege of being buried in a monumental tomb was an indication of higher social status in itself, not available for everyone), nevertheless in connection with the lack of settlement hierarchy, large religious centres and specialized production centres, it is plausible to interpret the burial rites in early *tombe di giganti* as further evidence for a lack of social hierarchy in the early phases of the Nuragic culture.

2.3. Nuragic II (later phase of Middle Bronze Age): egalitarian society and early territoriality

The Nuragic II period (1500 – 1200 BC in Lilliu's chronological model) saw expansion of Nuragic settlements into all parts of the island and the emergence of the major Bronze Age architectural form: the tholos nuraghe. It emerged as a result of gradual evolution from protonuraghi which involved the creation of larger internal spaces (Manca Demurtas and S. Demurtas 1991: 48) and an improvement of masonry walls from polygonal cyclopean to coursed cyclopean. So called *nuraghi misti* ("mixed-type nuraghi") are hybrids between corridor nuraghi and tholos nuraghi which illustrate this process. One of the most significant examples is Nuraghe Crapianu (Chiaramonti) which was studied by Dore (2010). It has a circular plan and intra-mural staircase typical of the tholos nuraghi, but the construction of its chamber is quite archaic, as it is not vaulted and the scarcement ledges within it supported wooden floors. Another example is Nuraghe Serra Crastula A (Bonarcado). It includes a ruined structure with a long corridor (a typical feature of the protonuraghi), but also the main tower with a typical tholos chamber (Ugas 1999: 60). Furthermore, some of the protonuraghi have small towers (*torrette*) which can be interpreted as a sign of architectural evolution leading to the emergence of the tholos nuraghi (Lewthwaite 1986: 25), which is further evidence for the indigenous development of the Nuragic culture in its early phases.

The nuraghi (Fig. 2) reached up to 25m in height, although none of them are preserved to their full elevation. Their main feature is tholos chambers built one on top of another. In the walls of the tholos chambers there are niches, usually three which form a cross shape (Santa Sabina – Silanus, Fig. 3), but sometimes just two (Crasta – Santulussurgiu) or none (Santa Sofia – Guspini, Lilliu 2005: 154). In rare cases there is a gallery running around the perimeter of the chamber (Santu Antine – Torralba, Domu Beccia – Uras, Lilliu 2005: 157). The chambers are connected with an intra-mural staircase which opens left of the entrance in about 70% of the towers (Tossilo A – Macomer, Santa Sabina – Silanus, Moravetti 1998a:



Fig. 2. Nuraghe Madrone (Silanus) – an example of a well-preserved tholos nuraghe.

Fig. 3. Plan and section of Nuraghe Santa Sabina (Silanus) with visible three niches and an intra-mural staircase (after Moravetti 1998a).



Fig. 4. Entrance to Nuraghe Crabia (Bauladu) with a window visible above it.



Fig. 5. Tomba di giganti *Sa Domu ‘e S’Orku (Siddi) – view from the South-East.*

177, 533), but sometimes right of it (Majore – Perfugas) or in the tholos chamber (Nuraddeo – Suni, Moravetti 2000b: 275), or even a few meters above the floor level (Toroleo – Paulilatino). Over the entrance to the nuraghe there is usually an architrave consisting of one large stone block, occasionally shaped in the form of an arc (Barca – Sassari), as well as a small window (Orolo – Bortigali, Crabia – Bauladu, Fig. 4), in rare cases (Zuras – Abbasanta) two of them (Zedda 2009: 205). Although there are some very clear regional traditions in Nuragic architecture, such as the presence of two staircases and *mezzanini* (small rooms between tholos chamber, usually accessible with separate staircase) in the nuraghi in Anglona (North-Central Sardinia, Dore 2006), or the nuraghi with two towers connected by a single wall (*nuraghi binati*) in Pran'e Muru (Campus and Leonelli 2008), the architecture of the nuraghi is fairly homogenous and shares its main features in almost every part of the island. The homogeneity of architecture has been interpreted as evidence for the shared identity of the Nuragic people from different parts of the island (Blake 1999), which is particularly plausible considering the limited degree of settlement hierarchy in the Middle Bronze Age. However, despite this significant degree of homogeneity in material culture, there are very significant differences in settlement patterns and distribution of ritual sites in various parts of Sardinia – this is demonstrated by different settlement patterns recorded on highland plateaus (Lilliu et al. 1985, Puddu 2001), in mountainous areas (Gallura, Puggioni 2009), and lowland areas in the western part of the island (Sedilo, Tanda 1998), as well as differences in the distribution of ritual sites demonstrated by Depalmas' (2005: 42-43) comparison between the areas of Abbasanta and the Sinis peninsula. This indicates different organization, subsistence strategies and possibly beliefs of the local communities. Coupled with the aforementioned local traditions in architecture, this necessitates locally-focused studies of Nuragic Sardinia in order to capture this variability.

A typical single-towered nuraghe (*monotorre*) was probably a single farmstead occupied by one or few families. It is clearly indicated by the repeated pattern of domestic features and

assemblages found inside the nuraghi – examples are provided by nuraghi Duos Nuraghes A and B (Borore), which produced evidence for hearths (Webster 2001: 29, 34), and Nuraghe Pizzinnu (Posada) where domestic pottery forms (such as plates) and tools (awls) were found (Contu 1960: 240). Therefore, there is no reason to believe that the structure of Nuragic societies underwent any significant degree of stratification in the Middle Bronze Age. However, what we can observe is the emergence of the first territories in the form of clusters of nuraghi. These have been distinguished in Sedilo (Gallin 1989, Bonzani 1992), Borore (Webster 2001) and the Sinis peninsula (Depalmas 2008). Around these a "buffer zone" was maintained as an area where no nuraghi were built, presumably to maintain a territorial boundary. The cooperation needed to form these clusters was probably on the level of individual households which established loose alliances or confederations (Webster 1996: 99), which is consistent with the lack of settlement hierarchy and an interpretation of the Middle Bronze Age societies as egalitarian ones. This does not deny the probability of collective effort put into construction of the nuraghi. As Usai (1995: 254-255) correctly points out, we should not interpret the single-towered Middle Bronze Age nuraghi either as evidence for emerging hierarchical power, or as projects achieved by small groups of people in isolation.

It is probable that the neighboring semi-independent territories maintained peaceful relations, perhaps with some degree of fluidity which could have included episodes of warfare – as suggested by the defensive locations of the nuraghi (Namirski 2012, 2013) and the emergence of buffer zones around the clusters of settlements (Gallin 1989, Bonzani 1992) – the scale of which is difficult to determine. There is possible evidence for trade between different areas of the island. An example is provided by the grinding stones found by Trump (1990: 13) in the Bonu Ighinu valley, made of rocks which were not of local origin. Such contacts probably occurred within down-the-line exchange networks, similar to the ones which emerged in the Early Bronze Age after the collapse of Chalcolithic societies and demise of the

extensive Central Mediterranean exchange networks (Freund and Tykot 2011: 157).

In the material culture we can see some regional traditions. The major example is the division of pottery into two types: *pettine* pottery decorated with linear ornaments prevails in the northern and central part of the island, while *metopale* pottery with triangular and rectangular motifs is more widespread in the south. Among the major forms are hemispherical bowls (*scodelle emisferiche*), shallow pans (*tegami*), cups (*tazze*) and large jars (*dolii*), probably used for storage of food and liquids (Corda and Frau 2001: 66-67). Metal artefacts are rare and most are luxury objects – among them we have examples of bracelets (Nuraghe Flumenelongu – Alghero) and daggers (Nuraghe Su Mulinu – Villanovafranca). Interestingly, their number is decreased in comparison to the Early Bronze Age (Webster 2015: 67). The domestic metal artifacts are even rarer, being limited to hoes and pickaxes (Crescioleddu – Olmedo, Campus and Derudas 2012: 798). This could be interpreted as a result of increased insularity of Sardinia in the Middle Bronze Age; as already discussed (see Chapter 2.2), the Early Bronze Age metalwork could have comprised predominantly of imports.

The Middle Bronze Age saw construction of further *tombe di giganti*, but their architecture was different from the earliest examples. The stele was replaced with a forecourt wall and entrance with architrave. Among the major examples of such tombs are *tomba di giganti* Sa Domu ‘e S’Orku (Siddi, Fig. 5) and *tomba di giganti* Muraguada (Bauladu, Moravetti 1990: 147). The tombs continued to serve not only as burial sites, but also places of communal meetings and meals, as suggested by finds of domestic pottery (not much different from the material discovered in the settlement sites) found within the exedras (Blake 2002: 124). Cave sites were still used for burial purposes, there were also episodes of re-use of the pre-Nuragic *domus de janas* (Sa Figu – Ittiri). At least some of the *tombe a prospetto architettonico* (rock-cut tombs with stele similar to those of *tombe di giganti*) can be dated to the Middle Bronze Age as well (Melis 2014: 105). We know little about the funerary practices associated with these burials, primarily because of the very rare occurrences of intact burials with human

remains, most of which were either cleared in later periods (some of the tombs were re-used up to the medieval period, Melis 2014: 135) or poorly preserved (skeletal remains were mostly dissolved by the acidic soils of Sardinia). Nevertheless, the material culture and environmental evidence give us clues in this area. For example, a basalt basin discovered near the entrance to *tomba di giganti* Sa Domu 'e S'Orku (Siddi) has been interpreted as an object used for funerary libations (Dyson and Rowland, Jr. 2007: 82). Among other examples, a probable votive hearth was discovered (Bittichesu 1998a) in front of the exedra of *tomba di giganti* Barrancu Mannu (Santandi), while ritual deposits with scattered artifacts were found in front of the exedra of *tomba di giganti* Ossono (Trieri, Sanges 1997: 254). The artefacts within the area of exedras are usually located closer to its right wing (Atzeni 2011: 118-119). Thus, as Perra (2008: 82) and Blake (2002: 122-123) point out, it would be a mistake to treat *tombe di giganti* solely as burial sites. Their location in focal points of the landscape (such as ridges, centres of highland plateaus and areas near probable trails), and visibility was probably connected with their function as commemorative monuments and places of ritual gatherings. However, one must note significant differences in the distribution patterns and frequency of *tombe di giganti,* as well as their relations to settlement sites. For example, in Marghine and Planargia the tombs occur in pairs (Santa Sabina – Silanus, Moravetti 1998a: 536-538) or larger groups (Tamuli – Macomer, Moravetti 199a: 123-129), or in relation to a specific nuraghe (nuraghe and *tomba di giganti* Santa Barbara – Macomer, Moravetti 199a: 101). On the other hand, on the Sinis peninsula there are only three *tombe di giganti* (Usai 2014a: 54) in contrast to 93 nuraghi and 71 settlements (Del Vais and Sebis 2015: 28-30), while in some areas of Anglona, such as Castelsardo (Melis 2007: 40), *tombe di giganti* are completely absent. Such differences occur even within relatively short distances – an example is provided by the area of Logudoro-Meilogu, where some tombs are paired with a specific nuraghe (nuraghe and *tomba di giganti* Cabu Abbas – Torralba), while others (*tomba di giganti* Maria Sanna – Torralba) are isolated (Foschi Nieddu 1988: 18-19). Therefore, the usage and

significance of these structures for the religious and social life of the Nuragic people could have varied across Sardinia.

2.4. Nuragic III (Late Bronze Age): settlement nucleation

The Late Bronze Age was characterized by settlement nucleation, the beginnings of social hierarchy and new architectural forms, most of them connected with ritual. The settlement nucleation which resulted in the extension of about 30% of the nuraghi to complex structures (Lilliu 1996: 38) through addition of bastions, courtyards and lateral towers could have been a result of demographic development and increasing competition for resources. The control over them made some of the families and their settlements more powerful than others, relegating some of the nuraghi to an inferior role which ultimately led to their abandonment. It has to be considered, however, that some of the single-towered nuraghi (*monotorri*) still remained important centres. An example is Nuraghe Sa Mandra ‘e Sa Giua (Ossi) where large numbers of prestigious items, such as a warrior figurine and an oxhide ingot, were discovered in the LBA village around the single-towered nuraghe (Rowland Jr. 2001: 39).

The largest Nuragic centres which emerged as a result of settlement nucleation reached up to 100-150 circular huts (Palmavera – Alghero, Moravetti 1992) concentrated around the complex nuraghe. The architecture of complex nuraghi is characterized by great variety and it is not possible to classify them typologically – the floor plans of many monuments are unique. One of the most common forms are the *nuraghe a tancato* (two towers connected by a courtyard, such as Nuraghe Domu de S’Orcu – Sarroch or Nuraghe Mal di Ventre – Cabras), and a triangular-shaped nuraghe with the main tower with the addition of a triangular bastion with lateral towers (Nuraghe Longu – Cuglieri, Fig. 6., Nuraghe Orolo – Bortigali). Among the most important features within the Late Bronze Age villages are *capanne delle riunioni* (meeting huts, Fig. 7), present in most of the largest Nuragic settlements associated with complex nuraghi. They have traditionally been interpreted as meeting places of the elite where

major decisions were made (Moravetti 1992: 116, Lilliu 1999b: 134). However, their ritual interpretation is equally probable. In *capanna delle riunioni* in the Nuragic complex of Palmavera, a decorated cylindrical seat made in sandstone was discovered, as well as a stone model of a nuraghe of 1m height (Moravetti 1992: 83-85), which are objects likely to be associated with ritual, found also in the Nuragic sanctuaries. Most of the huts in Nuragic settlements had beams, cross beams and wooden roofs, while stone roofs made of slabs were very rare (Depalmas and Melis 2010: 172). Some of the settlements are surrounded by antemurals (curtain walls) with towers (Casteddu de Fanaris – Vallermosa, Losa – Abbansanta), which supports Trump's (1992: 199-200) interpretation of complex nuraghi as defensive structures. Webster (1996) has proposed a division of the Late Bronze Age settlements into three classes:

Class I settlements – these constitute over 70% of all Nuragic settlements and usually consist of the single-towered nuraghe with up to 20 huts around it. They were inhabited by an estimated 5-40 people.

Class II settlements – they constitute about 28% of Nuragic settlements and consist of a complex nuraghe with 30-40 huts inhabited by an estimated 70-75 people. One of the examples is Santu Antine (Torralba).

Class III settlements – only 14 Nuragic centres belong to this group. These are the largest complex nuraghi with villages, which could have been inhabited by a few hundred people. Some examples are Su Nuraxi (Barumuni), Arrubiu (Orroli, Fig. 8), Su Mulinu (Villanovafranca) and Lugherras (Paulilatino).

While this division is somewhat arbitrary, it does reflect a significant degree of settlement hierarchy observable in Late Bronze Age Sardinia. However, it is necessary to emphasize that the complexity of the phenomenon of settlement nucleation (primarily through the growth of

Fig. 6. Examples of trilobate nuraghi: 1 – Longu (Cuglieri), 2 – Pranu Nuracci (Siris, after Lilliu 2005: 157).



Fig. 7. Stone model of a nuraghe in the centre of capanna delle riunioni *in the Nuragic complex of Palmavera (Alghero).*



Fig. 8. The bastion of Nuraghe Arrubiu (Orroli) with lateral towers – view from the south.



Fig. 9. Circular huts in the Nuragic settlement of Santa Vittoria (Serri).

existing settlement sites rather than the emergence of new ones) cannot be captured solely in Webster's classification. Large open settlements emerged also around some of the archaic protonuraghi, such as Bruncu Madugui (Gesturi) and Pinnadu (Cossoine, Foddai 1995), and single-towered nuraghi – among the examples are Nuraghe Mannu (Dorgali, Fadda 1980), Nuraghe Ola (Oniferi) and Nuraghe Santa Cristina (Paulilatino, Moravetti 2003). Nevertheless, the main settlements were complex nuraghi, with villages of roundhouses around them, the largest of which are located in the western part of the island – among them Nuraghe Palmavera (Alghero, Moravetti 1992), Nuraghe Serucci (Gonnesa, Santoni 2010) and Nuraghe Su Nuraxi (Barumini, Lilliu and Zucca 2005). The emergence of these settlements, which eventually grew into proto-urban centres in the Iron Age, can be interpreted as a marker of the increasing social hierarchy associated with competition for resources, fitting into Carneiro's (1970) circumscription theory, according to which population pressure and increasing competition lead to warfare and the emergence of chiefdoms or states. However, given the wide variety of Nuragic settlement patterns in different parts of the island, the reasons for and the degree of the Late Bronze Age settlement nucleation could have varied regionally, which will be one of the problems addressed in this work.

Besides the settlements with nuraghi, we have growing evidence for the development of open settlements specialized in production. One of the examples is Sa Osa (Cabras) were evidence for wine production and fishing was discovered, as well as the remains of ponds which might have been used for salt extraction (Castangia 2012: 116). This is consistent with the possible evidence for wine production from Nuraghe Genna Maria (Villanovaforru). The evidence of such settlements in the landscape is more sparse than in the case of sites with monumental architecture (the settlement of Sa Osa was discovered in 2008 during road construction, it did not leave surface evidence allowing to identify it through survey), thus it is possible that a significant number of the Late Bronze Age production sites have not yet been detected. The emergence of structures of specifically economic significance is observable

also in non-specialized open settlements, including ones with monumental architecture. For example, in the settlement of Serra Orrios (Dorgali) there are roundhouses which are likely to have been used exclusively for storage purposes, as suggested by remains of large jars found along their internal perimeter (Moravetti 1998b: 41). A similar pattern is observable in the Late Bronze Age phase of the settlement of Urbale (Teti, Webster 2015: 107).

Increasing competition for resources must have led to alternative subsistence strategies in some parts of the island. This is visible in the area of Pran'e Muru where the palaeopalinological evidence from Nuraghe Gasoru (Orroli) revealed that the area around the monument was mostly woodland (Depalmas and Melis 2010: 175- 76). Therefore, hunting and gathering must have played a more significant role in the life of its inhabitants than in the case of the nuraghi located on fertile plains of Campidano (South-West Sardinia). This is supported by evidence from Duos Nuraghes where a significant number of wild animal bones were discovered (Webster 1996: 134), as well as finds from the Nuragic site in Sarule, where excavations unearthed remains of wild olives from about 1000 BC (Dyson and Rowland, Jr. 2007: 70). These changes in economy can be seen as a direct result of increasing competition pushing part of the population out of the most economically suitable areas, resulting in a search for other subsistence solutions. This led to significant transformations in landscape in at least some parts of the island. The evidence from Nuraghe Arrubiu (Orroli) revealed a significant degree of deforestation which occurred on the plateau of Pran'e Muru between the Middle and Late Bronze Age (Perra 2009: 363). Furthermore, in some of the complex nuraghi we see structures of strictly economic significance, such as cisterns and silos (outer courtyard of Nuraghe Arrubiu – Orroli, Lo Schiavo and Sanges 1994: 29). The presence of the latter ones is understandable in light of the environmental evidence indicating increased production of cereals in the Late Bronze Age (Perra 2010: 83). Another striking pattern is the lack of large complex nuraghi around Monte Arci, which suggests a lesser emphasis on the control of the main source of obsidian in Sardinia, which is probably related to the decreased importance of

obsidian in the economy of the Late Bronze Age societies (Freund and Tykot 2011: 158). This could have been caused by increasing variety of economic strategies and significance of metalwork in the Late Bronze Age Sardinia.

The Late Bronze Age saw the emergence of a specific type of *tombe di giganti*. Most of the structures from this period are located in the central part of the island – among them are *tombe di giganti* Bidistili (Fonni, Lilliu 2008), Troculu (Villagrande Strisaili, Mazzella 1992) and Madau (Fonni, Fadda and Posi 2006: 51-76). Their characteristic element is a frieze with dentiled decoration over the entrance, and many of them are built with precisely cut stone blocks resembling isodomic masonry. Some of the tombs of this period do not have exedra but others have exedra larger than in earlier tombs, thus creating larger forecourts – according to Blake (2002: 124) this could indicate that the communal significance of the tombs became more important than their original funerary function. This very distinctive architecture makes the Late Bronze Age megalithic tombs particularly useful in the context of landscape archaeology, as they can be clearly identified as monuments belonging to this period. Besides the emergence of *tombe di giganti* with dentiled freezes, at least some of the earlier megalithic tombs were still in use or re- use – one of the examples is the Middle Bronze Age necropolis of Sedda Sa Caudeba (Collinas) which consists of three tombs which were in use also in the Late Bronze Age (Atzeni et al. 2012). This indicates a certain degree of social memory maintained by the Nuragic societies despite movement of people caused by changing socio-economic circumstances. The funerary rites still include collective burials in the elongated burial chambers of the *tombe di giganti* (Su Fraigu – San Sperate), but this fact does not rule out a certain degree of social stratification as, besides megalithic tombs, some of the natural caves were used for burial purposes. Comparison of human remains from *tombe di giganti* and those from caves revealed that people buried in the latter ones had a poorer diet and suffered more injuries and illnesses, which implies their lower social status than people deposited in *tombe di giganti* (Depalmas and Melis 2010: 179), further confirming the

existence of social differentiation in the Late Bronze Age Sardinia.

In the Nuragic III period we can also observe the emergence of ritual sites such as megaron temples and sacred wells (*pozzi sacri*). The former, despite their rectangular floor plan which has Aegean parallels, were an indigenous development. The megaron temples usually consist of two or three rooms including a small vestibule. In some cases the innermost room is rounded (Sa Carcaredda – Villagrande Strisaili, Cappellini 2011: 109-111). Some of the major examples are S'Arcu 'e Is Forrus (Villagrande Strisaili) and Gremanu (Fonni) where the ritual complex was created through partial modification of an earlier nuraghe (Fadda and Posi 2008: 31-32). The sacred wells (see Fig. 10) consist of underground tholos chambers with a staircase and an *atrium* on the ground level. It is possible that a significant portion of *pozzi sacri* had above-ground structures built as a direct continuation of the underground tholos chambers, perhaps even relatively small tower-like constructions (Contu 1999: 136). A smaller type of monument connected with the water cult was the Nuragic spring (*fonte sacra*) which consisted of a small chamber and *atrium*, both on the ground level; one of the finest examples is Su Lumarzu (Bonorva, Caprara 1986: 62-65, Fig. 11), where two benches run parallel to both walls of the *atrium*. The ritual function of these structures is confirmed by numerous objects deposited probably as votive offerings – in *fonte sacra* Su Tempiesu (Orune) 20 votive swords were found inserted into the masonry of the spring, many other bronze offerings were recovered from the bottom of the pool (Dyson and Rowland, Jr. 2007: 86), while in *pozzo sacro* Serra Niedda (Sorso) complete goat and sheep skeletons were found, indicating the sacrificial role of deposited animals (Wilkens 2000: 263), as well as bronzes – among them a model of a quadrilobate nuraghe (Blake 1997: 152). In many cases (Sant'Anastasia – Sardara, Santa Vittoria – Serri, Abini – Teti) the well-temples have associated settlements without complex nuraghi, being surrounded by other monumental structures of ritual functions. This is visible especially in the Santa Vittoria complex (Zucca 1988). This suggests the possible emergence of a cast of priests who could have been at least partly independent from



Fig. 10. The staircase and chamber of the LBA-Iron Age well of Santa Cristina (Paulilatino).



Fig. 11. The atrium and façade of the Nuragic spring of Su Lumarzu (Bonorva).

the centres of power in complex nuraghi, since the distribution of ritual sites is clearly divorced from that of the largest complex nuraghi – therefore, religious and secular power could have been separated. These distribution patterns also imply a possible division of the landscape into sacred and domestic areas. However, it needs to be emphasized that there are many areas which deviate from these patterns – examples are provided by western Gallura (Puggioni 2009) and most of Sarrabus (Ledda 1985, 1989), where sanctuaries are absent. There are also local phenomena, such as votive deposits of pottery at the Sinis peninsula which are sometimes associated with the nuraghi (Usai 2014a: 51). Therefore, conclusions regarding social differentiation drawn from the rise of sanctuaries cannot be applied universally to the whole of Sardinia – it is possible that at least in some areas the Middle Bronze Age social relations with lesser degree of differentiation continued in the Late Bronze Age.

The Late Bronze Age pottery shows a certain degree of continuity with earlier phases of the Nuragic culture. Among the dominant forms are shallow pans (*tegami*), cone-truncated cups (*bicchieri troncoconici*), carinated bowls (*ciotole carenate*) and large storage jars (*dolii*). Some of the decorations on pottery include parallel lines, circular motifs and squares (Corda and Frau 2001: 68-69). However, the *metopale* pottery disappeared and was replaced by grey ware (*ceramica grigia*), which Webster (2015: 84) considers as the main characteristic of the earlier sub-phase of the Late Bronze Age. Among other characteristic clay artefacts there are spindle whorls (Castangia 2012) and small portable lamps. Despite continuity in terms of the main forms of pottery, in other areas of the material culture we can observe a significant development in comparison with the Early and Middle Bronze Age. There is increasing evidence for the development of metallurgy, such as the results of the excavations of Nuraghe Ortu Comidu (Sardara, Balmuth 1994) and the site of Monte Zuighe (Ittireddu, Webster 1996: 137). This corresponds with an increase in the number of metal objects found, among which are swords, daggers and bronze beads (Lo Schiavo 2005a). It is also possible that early iron

working dates back to the Late Bronze Age – a piece of worked iron was found in Nuraghe Antigori (Sarroch), there is also evidence for iron working from the South-East part of Sardinia (Dyson and Rowland Jr 2007: 100). Another important aspect of the Late Bronze Age material culture in Sardinia is the use of amber. Beads made of this material were found in the sanctuaries of Sa Carcaredda (Villagrande Strisaili, Minoja 2014: 326) and Su Tempiesu (Orune, Fadda and Posi 2006: 37). Interestingly, the working of amber artefacts differs between sites, which could impliy the existence of local workshops (Fadda and Posi 2006: 38), or import of objects from various sources.

It is possible that at least some of the anthropomorphic clay figurines from the Nuragic sites are of Late Bronze Age origin – an example being a figurine from Nuraghe San Pietro (Thorpe), which was discovered in a disturbed context together with Late Bronze Age pottery. Furthermore, most of the figurines come from the sites of sanctuaries (Santa Cristina – Paulilatino, Abini – Teti), which seems to confirm their Late Bronze Age dating (Babbi 2012: 1539-1540). Due to scant recording and the lack of figurines found in their original stratigraphic context, the precise dating of this particular category of Nuragic material culture needs further investigation.

The Nuragic societies of the Late Bronze Age maintained at least occasional contacts with the Aegean. Evidence for this are assemblages of Mycenaean pottery from nuraghi Antogori and Domu S'Orku (Sarroch) located in the southern part of the island – they included Myceanean craters, kylixes and pithoi (Smith 1987). It is possible that Nuraghe Antigori was a point of barter trade between the Nuragic societies and Mycenaean traders (Melis 2003: 71) – it is indicated not only by the Myceanean finds, but also the coastal location of the site. There are also local imitations of Mycenaean pottery known from Nuragic sites, such as ones from Rio Paiolu (Settimo San Pietro) settlement (Manunza 1994: 73). Further evidence for contacts between Sardinia and the Eastern Mediterranean are oxhide ingots, a number of which were found within Nuragic settlements – at least some of them are of Cypriot origin, but some might

be local imitations. Likewise, we find Nuragic artefacts in other parts of the Mediterranean, such as the Late Bronze Age *dolii* from the site of Kommos in southern Crete (Watrous et al. 1998), providing further evidence of trade contacts between Sardinia and the Aegean in the Late Bronze Age. However, the examples of Aegean finds from the central and northern part of the island are sporadic – one of the finest is an alabastron from Nuraghe Arrubiu (Vagnetti 2010: 32) – therefore the influence of the Aegean cultures on the Nuragic culture should not be overestimated. As Dyson and Rowland Jr. (2007: 100) point out, occasional trade with Aegean merchants would not have significantly altered the development of the well-integrated and increasingly complex societies of Late Bronze Age Sardinia. Furthermore, as Russell (2010: 111) has observed, there is no real correlation between the distribution of the Cypriot finds in Sardinia and the locations of major emerging centres of power.

2.5. Nuragic IV (Iron Age): social differentiation and Phoenician colonisation

The Iron Age (900-500 BC, Nuragic IV period in Lilliu's chronological scheme) saw further differentiation in the Nuragic societies. This period can be divided into two sub-periods on the basis of the material culture, mainly pottery: the Geometric period (850-730 BC) and the Orientalizing period (730-580 BC). There is no evidence for construction of new nuraghi, but the largest among existing ones were re-modeled and settlements around them extended, reinforcing their positions as regional centres of power. An example is Nuraghe Genna Maria (Villanovaforru) where some of the structures around the complex nuraghe were dismantled, including part of a defensive wall (Phillips 1991: 85) in order to construct large multi-chambered buildings which were probably residences of the local elite (Webster 1996: 160). This is indicated by clear evidence for different functions of each room, which implies these were large households including rooms for specific domestic purposes rather than communal buildings.

Further evidence for social differentiation comes from Iron Age Sardinian art. Most of the

Fig. 12. A bronzetto *of a "tribal chief" from Monti Arcosu (after Lilliu 1999b).*

Fig. 13. A Nuragic bronzetto *representing a warrior or deity with a characteristic horned helmet, four arms and two round shields (after Lilliu 1966).*

bronze figurines (bronzetti, see Figs. 12-13) discovered in different parts of the island date to the early phases of the Iron Age (900-750 BC). Considering their presence in Etruscan tombs from the 9th century BC, some of the earliest *bronzetti* might be even earlier (Serra Ridgway 1986: 92-93). Many of them are representations of animals, supernatural creatures, boats and nuraghi (Lilliu 1956), but there is no shortage of human representations. Araque Gonzalez (2012: 90) argues that the imagery of some of the bronzetti, centred around fertility and sexuality, bears a similarity with the figurative bronzes from Iberia and mainland Italy. Among the human representations are figurines of warriors, especially archers (Stary 1991), but also men interpreted as rulers, members of the elite and priests. An example is the *bronzetto* from Monti Arcosu (Uta), known was *capo tribo* (tribal chief), which is a representation of a male with a long coat, dagger and an object similar to a scepter, interpreted as symbol of power (Fig. 12). A similar figurine was found at Santa Vittoria (Serri), one of the largest Nuragic

sanctuaries (Lilliu 1956: 42). Among the representations which can be interpreted as members of the upper classes or priests there is no shortage of women (Alba 2006), which indicates that their status in Late Nuragic societies was not necessarily inferior to men. Among the major female representations in sculpture there are so called “pietas” – figurines of seated females with males or children in their arms. One of the best examples of such a composition is the *bronzetto* from Sa Domu ‘e S’Orcu (Urzulei), which has been interpreted as the representation of warrior (the male has a dagger on his chest) and his mother, or as two divine beings (Alba 2006: 124). Perra (2000: 227) suggests that the Iron Age decline in construction of *tombe di giganti* (which were places of collective burial) to the emergence of sanctuaries and individual representations in art signifies a shift towards an emphasis on the individual, closely associated with a religious cult and possibly mythology.

Most of the *bronzetti* which were discovered in their archaeological contexts come from ritual sites. Ialongo (2013: 199-201) sees this as evidence for a correlation between social stratification and the further development of sanctuaries in the Iron Age, the latter giving legitimization to the Nuragic elites through control of the religious sphere of life and a display of status. This may also be indicated also by the fact that the vast majority of the Iron Age metalwork deposits comes from ritual contexts, unlike in the Late Bronze Age when most of the metal objects were deposited in hoards away from sanctuaries (Lo Schiavo 2005c). It is likely, then, that the legitimacy of power in the Iron Age came through control of the religious sphere. It is possible that the elites controlled production of metal artefacts, which is indicated by the fact that the main identified centres of metallurgy are associated with complex nuraghi – for example, the workshops from Nuraghe Santa Barbara (Bauladu) with over 90 moulds used for production of specific objects (Gallin and Tykot 1993), and the sanctuary of Sant’Anastasia (Sardara), where moulds for the production of nails were discovered. Traces of metallurgical activity were also identified outside hut 3 in the settlement of Iloi (Sedilo, Depalmas 2012).

The Iron Age was probably the period when the sculptures from Monte Prama (Cabras, Fig. 14) were made. These unique examples of monumental statuary in Sardinia include 25 sculptures, among them 17 ‘boxers’ (naked males called so for their emphasized fists) and 8 archers. Unfortunately, the statues were found broken and out of their original context, therefore their chronology is unsure, except for the 4th century BC terminus *ante quem* established on the basis of the presence of Punic pottery (Tronchetti and van Dommelen 2005: 188). It has been suggested that the sculptures were part of a sanctuary, as together with them broken pieces of bases, columns and slabs were found (Balmuth 1984: 42). Although some scholars (Tronchetti 1986) attribute the Monte Prama sculptures to the Late Bronze Age, in my view they are more likely to be of Early Iron Age origin – the surplus labour needed to create them being more likely to be obtained in the stratified societies of the Iron Age. Among other examples of sculpture in stone there are baethyls (Fig. 15) and models of nuraghi, which are particularly useful as they inform us about the construction of the top part of the Nuragic towers, none of which have survived intact. Characteristic corbels (*mensoloni*) visible in stone models from Noragugume (Moravetti 1998a: 707) and San Sperate (Lilliu 1999b: 182) have been found around several nuraghi, confirming the accuracy of these representations (Manconi Quesada 1992). Many of the models of the nuraghi were discovered not in religious contexts, but in roundhouses of villages around the nuraghi, which has led Blake (1997: 161) to suggest that these sculptures might have been used for secular purpose in religious ceremonies. This may also imply two separate sources of power – the largest Nuragic settlements and sanctuaries.

An argument for the hierarchical structure of Iron Age societies in Sardinia has also been made on the basis of the emergence of individual burials, unknown in previous phases of the Nuragic culture. The major example is the necropolis of Monte Prama (Cabras), with 33 individual pit burials covered with sandstone slabs (Tronchetti and van Dommelen 2005: 186-187). Individual burials are known also from Su Bardoni (Cabras), where a cist with remains of



Fig. 14. Statue of a “boxer” (1.02m high) from Monte Prama (Cabras).



Fig. 15. Part of a baethyl (0.68m high) from the site of Monte Prama (Cabras).

a single skeleton and Iron Age pottery was discovered (Usai 2014b), and from Is Aruttas (Cabras) where rock-cut niches with single burials were found (Contu 2006b: 649). However, it is necessary to point out that the distribution of these individual burials is only regional (most of them were discovered on the Sinis peninsula), and none of them included grave-goods which could clearly be identified as high-status objects. Thus, the presence of individual burials has only a limited significance in the debate over the degree of social hierarchy in Iron Age Sardinia, once again pointing towards the necessity of investigating local patterns rather

than attempting to create a general model describing Nuragic societies in whole of Sardinia.

The settlement hierarchy and representations in art led Lilliu (1988) to suggest a division of the Iron Age societies into four distinct classes:

1. Aristocracy – this can be identified mainly with warriors. It is reasonable to infer their status from the significance of weaponry in the Late Bronze Age and Early Iron Age and defensive architecture of the main centres of power, as well as depictions of weapons which might be interpreted as high-status objects – an example is a bronze model of chariot from the Santa Vittoria (Serri) complex, which Zucca (1988: 46) interprets as an object offered in the sanctuary as demonstration of power and status. Such an interpretation finds parallels in the eastern Mediterranean, where chariots were objects of prestige in the Late Bronze Age (Feldman and Sauvage 2010). Furthermore, some of the sculptures which are believed to represent local leaders depict males with a long coat, a characteristic dagger and an elongated ornamented object which might be interpreted as a symbol of power.

2. Priests – their presence and significance is implied by the further development of ritual centres such as Santa Cristina (Paulilatino) and Santa Vittoria (Serri) which lack complex nuraghi. Also, some of the existing nuraghi were re-modeled into temples, in some cases through construction of a *pozzo sacro* inside the tholos chamber. Some major examples are Nuraghe Nurdole (Orani) and Nuraghe Cabu Abbas (Olbia, Petrioli 1999).

3. Commoners – probably living on the outskirts of the Nuragic settlements occupying the buildings used as production centres, such as the ones excavated around Nuraghe Su Nuraxi (Barumini), especially house 42. Inside room 90 a stone basin of 0.77m diameter was discovered, which has led to interpretation of it as a workshop used for the production of mastic oil (Lilliu and Zucca 2005: 109).

4. Shepherds – pastoralism was still an important part of the Nuragic economy in the Iron Age, therefore the existence of a mobile group of shepherds is highly probable. This is also

supported by the representations of domestic animals among the *bronzetti*.

This division, accepted by many scholars for decades, and echoed in more recent publications (Ugas 2014) is certainly not inconsistent or contradictory with our knowledge of Iron Age economy and settlement evidence. Furthermore, Webster (2015: 219) suggested the existence of slavery in the Iron Age Sardinia, as it was practiced in other parts of the Mediterranean at that time (Briggs 2003). Nevertheless, Lilliu's model is of significant complexity, which is hardly supported by specific archaeological evidence. This fact resulted in a critical re-evaluation of this traditional interpretation of the hierarchical structure of the Early Iron Age societies. Tronchetti (2012) pointed out that the evidence for the existence of aristocracy as defined by Lilliu is slim to non-existent, while Araque Gonzalez (2014) argues for the development of complex societies without elites, where large scale projects were accomplished through the mutual cooperation of independent groups of people. These criticisms are certainly valid. Nevertheless the evidence, such as the reorganization of settlements around complex nuraghi and the representations in art, cannot be simply dismissed. Thus, it is probable that Iron Age societies in Sardinia were indeed stratified, but did not necessarily reach the levels of complexity suggested by Lilliu.

As already mentioned, strong archaeological support exists for the significance of warriors in Early Iron Age societies in Sardinia. Among the bronze figurines there are numerous representations of armed men, with daggers and bows and arrows being the most common weapons. Armour is represented by cone-shaped and crested helmets and breastplates (Stary 1991). Of particular interest is the aforementioned *bronzetto* of a chariot from Santa Vittoria (Serri), mainly because a large part of Sardinia is covered by hills and mountains, so the use of chariots in combat is a rather unlikely scenario. Perhaps they were used for ceremonial purposes and during festivals, which would allow us to interpret them as high-status goods, again suggesting a certain degree of social differentiation in Iron Age Sardinia. Some of the Iron Age weapons are known not only from *bronzetti*, but also from the

archaeological record; among them are spearheads and *antenne* swords with a solid decorated handle – this type of sword is known from mainland Italy and the Alps, and is dated to the 8th century BC (Lo Schiavo 2005a: 348). These finds and representations carry implications for our knowledge of warfare in Iron Age Sardinia, which probably increased together with the emergence of social differentiation and competing centres of power.

Some of the economic patterns observable in the Late Bronze Age continued also into the Iron Age. One of these is the significance of hunting and gathering – among the most commonly hunted wild animals were *Prolagus*, deer and birds. There is also evidence for the frequent use of sea resources, indicated, for example, by the numerous remains of shellfish from Nuraghe Sant'Imbenia (Alghero, Depalmas and Melis 2010: 179).

Although architectural development in the Early Iron Age was relatively limited (especially compared with Middle and Late Bronze Age architectural activity), there are specific types of structures and construction techniques which are characteristic of this period. The development of ritual sites, which was one of the main features of the Late Bronze Age, continued also in the Iron Age. Besides the sacred wells (*pozzi sacri*) there are rotundas (*rotonde*), distinguished as a separate type of ritual structure by Lo Schiavo (1997). The circular structures were built with ashlar masonry, and they usually have a circular bench running around the chamber. Among the major examples of this type of monument are the rotundas of Corona Arrubia (Genoni, Lo Schiavo 2001: 78-79), Punta Unossi (Florinas, Derudas 2008: 39-44) and Cuccuru Mudeju (Nughedu San Nicolo, Lo Schiavo 1997: 10-11). If these ritual structures are to be interpreted as evidence for social stratification which resulted in a separation of religious and secular power (just like *pozzi sacri*, rotundas are often located away from the major complex nuraghi), then *rotonde* can be interpreted as a further argument in favour of the hierarchical ordering of Iron Age Nuragic societies.

Some of the most mysterious structures, which can nevertheless be extremely informative about the development of the Nuragic culture in its late phases, are the so called *muras*.

These large megalithic enclosures measure an average 68 x 50m (Lilliu 1999b: 218-219), sometimes lack entrances, and usually lack internal features. Lilliu interprets them as belonging to the Nuragic V period (following the Punic conquest of Sardinia), perhaps as fortifications built as a means of resistance against the Carthaginians, but this theory seems unlikely considering that the decline of the Nuragic culture had already occurred in the Late Iron Age. *Muras* are located primarily near Bonorva (Muras Cariasas, Aeddo, Tilippera), but in other parts of the island there are large towerless megalithic enclosures which could be of a similar age, such as San Bartolomeo (Flussio, Moravetti 2000b: 462) and Roccasedda (Olmedo, Namirski 2016: 203). More precise chronological attribution of these structures and interpretation of their functions must await archaeological excavations.

Fig. 16. Examples of Iron Age pottery (a-d – Geometric period, e-g – Orientalizing period) from Sant'Anastasia (Sardara, after Taramelli 1918; Webster 2015).

Despite this development in architectural form and construction techniques, the Iron Age saw further use of natural caves by the Nuragic people. One of the examples is Su Benatzu

cave (Santandi). Inside its chamber of 10-15m diameter, over 100 metal artifacts were discovered, including daggers, swords and sickles (Webster 1996: 180-181). Some caves also exhibit artificial remodelling through the addition of rock-cut steps, niches and spaces for hearths (Skeates 2012), perhaps in resemblance of the existing architectural monuments.

Nuragic pottery underwent significant changes both in terms of decoration and forms (Fig. 16). In the early phases of the Iron Age (900-750 BC) the motifs are mostly geometric (including lines, points, zigzags and triangles) either imprinted or engraved in clay, while the Late Iron Age pottery (750-500 BC) exhibits Phoenician and Greek influences on the ornamentation. Among the new forms of pottery introduced in the Iron Age are piriform vases (*vasi piriformi*), piriform oil lamps (*lucerne piriformi*) and askoidal jugs (*brocche askoide*). Some of the earlier forms continue to appear, such as carinated bowls, shallow pans and globular vases (Corda and Frau 2001: 70-71). The Phoenician and Greek influence resulted in the introduction of jugs with a lobate edge (*broccha ad orlo lobato*) and so-called pilgrim flasks (*fiasce di pelegrino*).

The Nuragic societies of the Iron Age established contacts with the Phoenicians who founded their colonies on the western and southern coast of Sardinia in the 8th and 7th century BC, among them Bithia, Nora, Sulcis and Karalis. These cities probably functioned as *poleis* with specific territories of influence (Barreca 1986: 145). In the early stages of the Phoenician colonization relations between the colonists and the Nuragic people were probably peaceful. This scenario is suggested by the finds of Phoenician pottery from Nuraghe Piscu (Suelli) and Nuraghe Nurazzolu (Gonnoscodina) – Rowland Jr. (2001: 64) argues that this pottery reached the Nuragic sites through trade. Euboean skyphoi were found in Nuraghe Sant'Imbenia (Hayne 2010), which is interpreted as further evidence for trade contacts between the colonists and indigenous societies. It is also possible that copper deposits such as Funtana Raminosa (Gadoni) and Sa Duchessa (Domusnovas) were first mined under the supervision of the Phoenicians and with the use of their technology (Depalmas and Melis

2010: 175). This possible cooperation would have brought mutual benefits, such as access to a wider range of goods by the Nuragic people and the possibility of exploitation of the natural resources of the island by the Phoenicians. However, eventually must have ended with a conflict once the Phoenician expansion (originally limited mainly to the coastline and areas of economic significance) collided with the influences of the local elite.

The evidence for trade contacts between Nuragic IV Sardinia and other Mediterranean cultures is also substantial – Nuragic pottery from the Geometric period was found in Pantalica necropolis (Sicily, Leighton 1999: 207) and on Lipari (Ferrarese Ceruti 1998: 335). Close similarities between metal mirrors from Su Benatzu (Santandi) and Nuraghe San Pietro (Thorpe), and those from the Balearic Islands indicate possible contacts between the proto-Talayotic/Talayotic and Nuragic societies (Guerrero Ayuso et al. 2007). Nuragic artefacts such as bronze buttons (Campus 2014) and pottery (Milletti 2012b) were found at the Etruscan sites of Vetulonia and Populonia, which confirms contacts between the Nuragic culture and mainland Italy in the Iron Age. As Bartoloni (2002: 250) points out, there is no major Phoenician or Nuragic centre from the 8th-6th century BC in Sardinia which has been excavated and failed to produce finds of Etruscan origin, which emphasizes further need for research on the nature and chronology of contacts between Sardinia and Italy.

2.6. Decline of the Nuragic culture

Although the end of the Nuragic culture is commonly placed at the close of the 6th century BC and associated with the Punic conquest of Sardinia, the processes which led to its gradual decline started a few hundred years earlier. From the 7th century onwards there is evidence for the destruction of the important Nuragic centres such as Nuraghe Palmavera (Alghero) and Nuraghe Funtana (Ittireddu, Webster 1996: 158). These violent events were probably the result of conflicts caused by the Phoenician expansion towards the central part of the island, as suggested by the evidence from sites such as as Pani Loriga (Santandi). However, the

understanding of this process as solely a military confrontation between Nuragic communities and Phoenician colonists would be an oversimplification, as in some cases the Phoenician settlements were founded at the sites of already abandoned Nuragic complexes, such as Monte Sirai (Bartoloni 2004: 39). On the other hand, some of the complex nuraghi in the western part of the island flourished well into the Iron Age – among them are Nuraghe Casteddu de Fanaris (Vallermosa) and Nuraghe Sant'Imbenia (Alghero, Hayne 2010). Despite this evidence for complexity and variation in the nature of contacts between the Nuragic societies and the Phoenicians, there is little doubt that the Late Iron Age (750-500 BC) was a period of decline for the Nuragic culture. One illustrative example is the rapid decrease of metalwork deposition during the Late Iron Age (Ialongo 2013: 203). Usai (2007: 56-57) points out that most of the excavated Nuragic sites were abandoned in the Orientalizing period, which might indicate a significant demographic crisis. He thus argues that the final stage of the Nuragic IV period is in fact non-Nuragic and that resistance against the Punic invasions did not have any Nuragic element in it and can be identified only with the forces of the Phoenician colonies, which by that time controlled at least the most important parts of the western Sardinia. Although his arguments align with our current state of knowledge, two issues must be pointed out. First, the situation seems to be less dramatic in the South-West part of the island where some of the Nuragic centres such as Casteddu de Fanaris (Vallermosa, Webster 2015: 149) and Baratuli (Monastir, Balzano and Atzeni 2013) were still occupied. Second, very few nuraghi in the central and eastern parts of the island have been excavated so far, therefore we cannot be sure whether the majority of them were abandoned in the Late Iron Age. The conflicts between the Nuragic people and the Phoenicians probably contributed to the decline of the Nuragic culture, but there is not enough evidence to say they finished it off in all parts of the island. Moreover, it is necessary to point out that the decline of the Nuragic culture could have taken dfferent paths in specific parts of the island, ranging from the collapse of the settlement system based on centres of power (but with continued

domination of the Nuragic material culture), to gradual integration of the Phoenicians and local communities resulting in hybridized culture (van Dommelen 1998).

The Punic conquest of Sardinia began in the second half of 6th century BC, probably after the battle of Alalia which removed the Phocaean threat from Corsica. We learn from Justin (XVIII, 7, 1-2) that the first invasion under the command of Malco was defeated, but the second one under Hasdrubal and Hamilcar succeeded (XIX, 1, 1-7). As Melis correctly points out (2003: 72) it is very unlikely that these military operations were launched primarily against the Nuragic people – the main opponents were probably the coastal cities which were in competition with Carthaginian trade. It seems that the Punic conquest resulted only in partial control of Sardinia, as evidence for the colonization of the central and eastern part of the island is not sufficient. Furthermore, the culture of Sardinia under Carthaginian rule was influenced by the local Nuragic tradition, which is particularly visible in the sculptures from Neapolis and the presence of typically Nuragic artefacts such as pottery and small lamps in the deposits from the Punic period (van Dommelen 1997). An example is provided by Nuraghe Santu Antine (Torralba), where the architecture and material culture maintained its Nuragic character in the Punic period, undergoing significant changes only after the Roman conquest of Sardinia in 238 BC (Colombi 2008). On the other hand, some of the major complex nuraghi were adopted as Punic shrines; among the examples is Nuraghe Lugherras (Paulilatino, Dyson and Rowland Jr. 2007: 120). Thus, what emerged in the western part of the island was a hybridized culture mixing Punic and Nuragic elements, while some limited native groups could have enjoyed independence in the central and eastern parts of the island well into the Punic period.

The Nuragic sites remained an important element of the cultural landscape of Sardinia also in the Roman period. Many of them were re-used – 29% of the identified Roman sites in the area of Barumuni are re-used Nuragic settlements (Lilliu and Zucca 2005: 13-14), while significant amounts of Roman material (including sherds of *terra sigillata italica*) were found at

Nuraghe Pattada (Lei, Fiori 1997: 209) and at the Nuragic complex of Duos Nuraghes (Borore, Webster 2001). In many cases, the latest phases of occupation inside the nuraghi come from the medieval period. The aforementioned hybridization of culture resulting from the mixture of Phoenician and indigenous influences also resulted in a complexity of religious interactions. Many of the Nuragic sacred wells and springs were still in use, among them *pozzo sacro* Cuccuru Nuraxi (Bernardini and Tore 1987), as well as the spring of Terreseu (Narcao), where votive deposits refer to the cult of Demeter (Dyson and Rowland Jr 2007: 120). Thus, evidence indicates that the Punico-Sardinian hybridization influenced material culture, elements of the economy and religion.

2.7. Sardinian prehistory in its Mediterranean context

Some of the evidence for the contacts between Nuragic people and other Bronze Age and Early Iron Age Mediterranean cultures has already been mentioned (see Sections 2.3 and 2.4), but it needs further contextualization. To achieve this one must first examine the Mediterranean context of the pre-Nuragic cultures of Sardinia in order to understand changes that occurred in the character of contacts between the island and other parts of the Central Mediterranean in the Bronze Age.

During the Neolithic and Chalcolithic, Sardinian communities played an important part of the Central Mediterranen exchange networks. Sardinian obsidian is known from sites in southern France and mainland Italy. In northern Italy, southern France, Elba and Corsica, Sardinian obsidian from Monte Arci volcano dominated the obsidian assemblages together with obsidian from Lipari off the coast of Sicily (Tykot 1992: 60). Moreover, studies have shown that the obsidian from Lipari was more dominant in the earlier phases of the Neolithic (Philips 1986: 203), while the importance and scale of Sardinian exports increased in the later Neolithic and Chalcolithic, even though Lipari obsidian was of superior quality to most of the sources around Monte Arci. Philips (1986: 205-206) interprets this preference for Sardinian

obsidian as a result of social factors and the attraction of Central Mediterranean societies to the elements of strongly ritualistic Bonu Ighinu culture which developed in the 4th millennium BC in Sardinia.

This particular significance of ritual sphere as a driving factor in the contacts between Sardinia and other parts of the Mediterranean is also visible in the case of the Ozieri culture which spread across Sardinia in the Late Neolithic. One of the major forms of its architecture are dolmens and *allée couverte* megalithic tombs, which are known from other parts of the Central Mediterranean (Broodbank 2013: 424). Over 200 of them are known in Sardinia, mostly in central and northern parts of the island (Cicilloni 2009: 207-208), and are associated primarily with the Ozieri culture (Contu 2006: 161). It is possible that the emergence of megalithic tombs in Sardinia was fairly rapid – according to M. and G. Webster (2017) the Ozieri culture replaced the San Ciriaco culture within a short time, perhaps a century. This distribution of dolmens corresponds to the Corsican pattern where most of the dolmens are located in the southern part of the island, which supports the idea that the concept of megalithic architecture reached Sardinia through Corsica, perhaps from the Iberian peninsula, given the similarities between small dolmens of Sardinia and Catalunya (de Lanfranchi 1992: 125). Such a connection between Sardinia and Corsica in the Late Neolithic is visible also on a local scale. An example is provided by the close similarities shared between the earliest Corsican megalithic tombs with stone circles (de Lanfranchi 1992: 122) and the burial sites of the San Ciriaco culture in the North-East of Sardinia (Li Muri – Arzachena). These similarities are not limited to architecture – in Corsican burial sites with stone circles such as Tivolaggiu (Porto Vecchio) and Monte Rotundu (Socca) obsidian tools and other artefacts of Sardinian origin were found (Antona Ruju and Ferrarese Ceruti 1992: 27), providing evidence for contacts between southern Corsica and northern Sardinian in the Late Neolithic. The San Ciriaco burials in the necropolis of Li Muri (Arzachena) contained tools made from the Gargano flint (Melosu and Luglie 2017: 227), which suggests that trade connections existed

also between Sardinia and mainland Italy.

The artefacts of the Neolithic Bonu Ighinu and Ozieri cultures and of the Chalcolithic Abealzu-Filigosa and Monte Claro cultures indicate that their Mediterranean connections were not limited to Corsica and mainland Italy. Among the examples are stone figurines from Cuccuru Arrius (Cabras) which bear significant similarities to the idols from Malta which are dated to 3600-3300/3000 BC. Initially they were attributed to the Late Neolithic Ozieri culture, but Lilliu (1999a: 30) suggested attribution of this class of figurines to the aforementioned Middle Neolithic Bonu Ighinu culture (c. 3730-3300 BC) on the basis of an example from Cuccuru Arrius which was discovered in a stratigraphic context dated for this period. Lilliu (1999a: 72) also draws parallels between a basalt idol from Conca Illonis (a multi-period site, but the idol itself is probably of Chalcolithic origin and is associated with Abealzu-Filigosa or Monte Claro culture) and similar Chalcolithic examples from Portugal, as well as Early Cycladic (c. 3200-2300 BC) sculpture. However, this comparison is based primarily on stylistic elements and is not supported by the more substantial evidence for contacts between those regions and Sardinia. Furthermore, the Chalcolithic statue-menhirs which are known from central and western Sardinia (Barrili – Laconi, Piscina ‘e Sali – Laconi, Pedras Doladas – Silanus; Moravetti 1984, Atzeni 2004) are part of a wider phenomenon of statue-stele in the Chalcolithic and Early Bronze Age Mediterranean Europe, other examples coming from Northern Italy, the Iberian Peninsula, Eastern Provence (Robb 2009: 163-164) and Greece (Chrysanthaki 2004).

As we can see from this brief overview, the development of Neolithic and Chalcolithic cultures in Sardinia was part of wider cultural processes (both in the area of economy and ritual) occurring in the Mediterranean. Even though the local cultures developed elements which are unique to Sardinia, their Mediterranean connections in the areas of trade and exchange, material culture and architecture are very clear. The situation changed significantly after 2300 BC. This is usually associated with the collapse of the Chalcolithic settlement

system of the Monte Claro culture due to overuse of land and climate change (Lewthwaite 1984, Webster 1996), which seems probable given the fact the majority of the Monte Claro settlements are located in the Campidano, an area characterized by particularly fertile soils, suggesting strong reliance on agriculture. Sardinia ceased to be part of Central Mediterranean trade and exchange networks, which is related to their wider decline in this period. For example, the export of obsidian was replaced with local down-the-line exchange networks (see Section 2.2.). The island's connections with other parts of the Mediterranean diminished, although they did not cease completely. This is confirmed by the Early Bronze Age finds of Bell Beakers from different parts of Sardinia. These are found primarily in burial contexts, such as re-used Late Neolithic *domus de janas* (Pau 2010: 122), and are often accompanied by other Beaker artefacts, among them components of necklaces, bracelets and pendants known from such sites as Cuccuru Nuraxi (Settimo San Pietro), Is Calitas (Soleminis) and other burial locations in the southern part of the island (Pau 2007: 30). However, as already mentioned, lack of Beaker settlements founded ex novo indicates that the presence of elements of Beaker package in Sardinia represents influx of ideas rather than large numbers of people.

The Middle Bronze Age saw limited contacts between Sardinia and other parts of the Mediterranean. A theory about the possible Mycenaean origin of the tholos chamber in Sardinian architecture was proved to be incorrect, both on chronological and architectural grounds – Cavanagh and Laxton (1985: 429) compared the Mycenaean tholoi with the Sardinian ones and discovered significant differences between them, concluding that any connection between them is unlikely. Nevertheless, occasional contacts between Sardinia and the Eastern Mediterranean did occur in the Middle Bronze Age. They are confirmed by the Cypriot-style daggers found at Ottana, which are likely to be local imitations modelled after Cypriot and Western imports (Lo Schiavo 1985: 7), as well as by a Mycenaean ivory figurine from Mitza Purdia (Decimoputzu, Contu 2006b: 446). However, considering the scarcity of this

evidence and complete absence of imported goods from the burial record (Webster 2015: 79), it seems that these contacts were infrequent and had little impact on Middle Bronze Age Nuragic society and economy. The Minoan economic expansion of 1700-1600 BC, which affected Sicily and Lipari through trade contacts (Castleden 1990: 120- 121), evidently did not significantly impact Sardinia. Of more importance could have been the contacts between Sardinia and Corsica, although their degree and nature remain a matter of debate. Most of the Middle Bronze Age Corsican megalithic towers, known as *torri,* are located in the southern part of the island. Their striking architectural similarities to the Sardinian nuraghi, such as chambers with niches, intra-mural staircases and corbelled roofs (Kolb 2005: 167-168), indicate that the idea of *torri* might have been directly influenced by the Nuragic culture (Chapman 1985: 144). However, this is not confirmed by the Middle Bronze Age material culture of the two islands. For example, there are very significant differences between the Sardinia and Corsican pottery assemblages of this period. This led Webster to conclude that "for the time at least, it is not possible to attribute the close architectural parallels found between nuraghi and *torri* to sustained interactions between the two islands" (2015: 77). This does not, however, exclude the possibility of the movement of certain ideas between the two islands, which could explain the similarities in their Middle Bronze Age architecture.

The Late Bronze Age evidence for contacts between Sardinia and the Eastern Mediterranean are more substantial, but still do not represent a picture of anything more than occasional interaction, whether direct or indirect. Large quantities of Mycenaean pottery have been found in the southern part of the island, primarily in the nuraghi near Sarroch (Lilliu 1999b: 62), but in other areas of Sardinia the Aegean pottery finds are isolated – among them are sherds from the cave site of Su Guanu (Pozzomaggiore, Smith 1987: 98), Nuraghe Nastasi (Tertenia, Basoli 1980: 436) and Nuraghe Arrubiu (Orroli, Vagnetti 2010: 32). Likewise, the Minoan and Cypriot metalwork is very dispersed in its distribution, including almost 100 oxhide ingots – some of them might be local imitations, but several bear Cypro-

Minoan signs (Webster 2015: 126). There is also a strong likelihood that at least some of the locally-produced metal artefacts were imitations of Cypriot metalwork. The main examples are double axes from Chilivani (Ozieri), a tripod stand from Su Benatzu (Santandi) and numerous double-edged tools of different types (Lo Schiavo 2005b: 312-314). This makes Lo Schiavo's (1985: 9) suggestion that the contacts between Sardinia and Cyprus reached their peak between 1200 and 1100 BC and continued till about 1000 BC reasonable. It is also possible that the Late Bronze Age Nuragic societies maintained trade contacts with Torrean Corsica. The evidence for this is the Mycenaean-style amber beads which were found in the Nuragic sanctuary of Romanzesu (Bitti) and in Corsican sites (Webster 2015: 137). There is also evidence for the export of Sardinian goods to Sicily and Crete – Late Bronze Age Nuragic pottery was found in Cantanello (Sicily, Zedda 2009: 329) and in Kommos (Crete), where large collared jars paralleling ones from nuraghi Antigori and Domu de S'Orku (Sarroch) were found together with pottery possibly originating from Subappenine Italy (Watrous et al. 1998: 337). On this basis, Dickinson (1994: 254) suggested that contacts between Crete and Sardinia intensified in the thirteenth century BC, but the amount and distribution of Sardinian material in the Aegean is insufficient to see these contacts as anything more than occasional trade and exchange. Moreover, the presence of isolated Mycenaean artefacts in contexts dominated by non-Mycenaean material in various parts of the Mediterranean indicates that these goods could have reached Sardinia and other parts of the Central Mediterranean independently of Mycenaean merchants (Dickinson 1994: 252).

The Early Iron Age (900-750 BC) saw a significant expansion in the Mediterranean contacts of the Nuragic culture, primarily taking the form of contacts with the Phoenician colonists (see Chapter 2.5) and the Etruscans. The imports include Phoenician pottery known from Nuraghe S'Uraki and the settlement of Su Padrigheddu (Roppa 2015), Euboean vessels (Webster 2015: 179), Phoenician bronze statuettes found in Nuraghe Flumenelongu (Hayne 2010: 148) and other examples of metalwork. It is also likely that the Phoenician colonists

and/or Cypriot introduced the technology which allowed local societies to establish copper mines such as Sa Duchessa, Gadoni and Funtana Raminosa (Hayne 2010: 152). Furthermore, Nuragic-style artefacts are found in Etruria – they include *bronzetti* such as models of boats and buttons (*bottoni*) of various shapes found in the necropolis of Vetulonia (Milletti 2012a). There are also examples of Etruscan *bucchero* pottery from Sardinia – one of them coming from Nuraghe Erismanzanu (Esporlatu, Tanda 1992: 27). These contacts between Sardinia and Etruria also continued in the Late Iron Age (c. 750-500 BC) when the Nuragic settlement network was already in decline, as confirmed by finds of the 7th-6th century BC *bucchero* pottery from Nora (Bonamici 2002). However, it remains unclear whether the presence of Nuragic material in Etruscan sites is the result of direct contacts between the two cultures, or rather due to the trade activity of Phoenician merchants.

The nature and dynamics of contacts between the Phoenicians and the Nuragic societies remain the subject of debate. The existence of trade routes leading inland from coastal ports and harbours seems very probable (Webster 2015: 176), and the presence of contemporary Nuragic and Phoenician pottery in important Nuragic settlements such as S'Uraki (San Vero Milis), Sant'Imbenia (Alghero) and Piscu (Suelli, Rowland Jr. 2001: 64) indicates that the contacts between the two cultures were characterized by trade and mutual cultural influence. On the other hand, the destruction and/or abandonment of such important Nuragic settlements as Palmavera (Alghero), Arrubiu (Orroli) and Funtana (Ittireddu) in the Iron Age could have been a result of Phoenician expansion leading to military conflicts. As pointed out by Webster (1996: 158), the main problem in verifying of this hypothesis is the difficulties in distinguishing between the results of internal conflicts between the Nuragic societies and possible conflicts with colonists. However, the fact that a large number of Nuragic settlements were abandoned long before the Carthaginian conquest of the island in the 6th century BC suggests that the Nuragic settlement system and social structure did not survive the Phoenician expansion and went into decline, which Usai interprets in terms of the

“demographic collapse and deep disintegration of indigenous communities” (2007: 56) in the Late Iron Age. Alternatively, in some parts of the island the occupation of the Nuragic settlements could have continued, but without social relations and material culture characteristic of the Nuragic societies of the Early Iron Age. An example is provided by the Late Iron Age deposits from Nuraghe Sant’Imbenia (Alghero), which indicate continuous occupation of the settlement, but without typical Nuragic pottery or construction of new buildings (Usai 2007: 40). Thus, although the elements of Nuragic material culture survived the Carthaginian conquest of the island and contributed to the hybridized material culture of this period (van Dommelen 1998), it seems probable that in many parts of the island the Nuragic settlement networks and communities organized around them collapsed in the Late Iron Age. This period can, then, be considered the final phase of the Nuragic culture.

Chapter 3. Theoretical approaches to settlement dynamics and networks

Summary. *Before discussing specific aspects of the methodology of this project, it is necessary to outline the theoretical framework employed in this and other studies of settlement dynamics and networks. A wide range of theoretical approaches have been employed in these closely related fields of research. For settlement dynamics, some approaches prioritize environmental and demographic factors (e.g. Carneiro's circumscription theory), while others place more emphasis on external influences and connectivity. In the field of network archaeology, different theoretical approaches range from the mathematical (Proximal Point Analysis, imperfect optimization model, graph theory) to those including significant elements of subjectivity (phenomenological approaches). Considering this diversity of theoretical approaches, a careful evaluation of their usefulness for the analysis of settlement dynamics and networks in the specific landscape, cultural and archaeological conditions of Nuragic Sardinia is essential.*

This chapter aims to present an overview of archaeological theories of settlement dynamics, networks and their relationship with the nature and structure of society. Rather than being an exhaustive list and discussion of different theories and approaches, it places an emphasis on those which seem particularly relevant to the landscape archaeology of Sardinia. Different theoretical approaches are outlined and evaluated with reference to case studies.

3.1. Settlement dynamics

Archaeological research into settlement dynamics must recognize the fact that any attempt to reconstruct and interpret them will always be based on an incompletely preserved prehistoric landscape. As Bevan and Wilson (2013: 2416) point out, even the most intensive survey

provides only a certain and imperfect sample of data from a specific area, when only certain types of settlement evidence survive in the landscape. Moreover, in many cases we have to deal with palimpsests of preserved remains from different periods, which are often difficult to distinguish. This is certainly the case in Sardinia, where complex nuraghi with surrounding settlements are often the result of several phases of construction which are difficult to distinguish and have been dated solely on the basis of surface evidence. The solution proposed by Bevan and Wilson is to use inhomogeneous point process models which may allow us to predict the location of missing sites on the basis of distribution patterns among the surviving sample of settlements. This approach allows for studies not only of networks (see 2.2), but also settlement dynamics, as it allows for reconstruction of the settlement hierarchy and identification of sites which were likely to be central places, employing simulation of the probable locations of settlements. It proved to be successful in research into the settlement dynamics of Bronze Age Crete, where only some of the large and middle-sized settlements were located and reliably assessed in terms of their extent (Bevan and Wilson 2013: 2418-2420). However, as Harding (2013: 390) points out, changes in settlement dynamics did not necessarily have to be imposed as a result of settlement hierarchy or long distance contacts; in many cases (e.g. the emergence of Iron Age hillforts in Europe) the prerequisites for these changes were present locally.

While discussing general issues associated with studies of settlement dynamics, it is necessary to point out the problems related to the use of artefacts in studying changes in settlement dynamics. As dos Reis Martins (1997: 152) points out in discussing of the dynamics of change during the 1st millennium BC in Portugal, the artefacts do not always change in response to social, economic or ideological transformations. Furthermore, social changes which can bring about changes in settlement dynamics may occur in a different rhythm to that of the artefacts. Thus, the artefacts found during landscape surveys cannot be assessed separately from the architecture and possible functions of sites on which they were

found. This is the case especially in Sardinia, where the architectural typology of monuments allows to reliably assess their function and chronology.

3.1.1. Relationship between social and settlement dynamics

It must be emphasized that a plausible reconstruction of settlement distribution and their hierarchy does not suffice in the discussion of settlement dynamics, as settlement hierarchy does not necessarily reflect political hierarchy (Duffy 2015: 86), even though it has often been treated that way, for example in the case of Neolithic settlements in south-eastern Poland (Milisauskas and Kruk 1984). Also, as Duffy (2015: 96) points out, settlement hierarchy does not necessarily imply the existence of chiefdoms or other forms of organization involving social stratification. An example is the Bronze Age settlements from the Great Hungarian Plain, where people inhabiting large tell sites lived not much differently from the population of smaller hamlet sites. Thus, Duffy proposes six determinants of site size hierarchy (see Table 3) which do not presuppose a link between settlement and political hierarchy. Many of these cannot be determined without excavation and thus the model cannot be fully applied to data obtained from landscape surveys. Nevertheless, this concern is important in the wider context of Nuragic settlement archaeology in Sardinia, where a link between settlement size and political hierarchy has often been assumed (see Section 2.4). However, some categories of evidence defined by Duffy as evidence for determinants of site size hierarchy (such as defensive architecture, presence of storage features, site longevity and ritual differentiation) can often be distinguished through landscape surveys in Sardinia.

As has already been mentioned, settlement hierarchy has often been assumed to reflect political hierarchy and social stratification, especially with reference to the concept of a chiefdom. Its definition has changed over time – as Liu (1996: 238) points out, it has drifted away from its original meaning, which placed particular emphasis on the redistribution of goods, as proposed by Service (1962) and Renfew (1973: 171-172). For example, Carneiro

(1981: 45) offered a much wider definition of a chiefdom as an autonomous political unit comprising a number of villages or communities. Earle (1978: 12) introduced the concept of "complex chiefdom" characterized by a difference in status between chiefs and commoners, specialization in leadership and the emergence of centralized power in regional hierarchies. The history of changes in the definition and understanding of the concept of chiefdom is clearly illustrated by Pool's (2007: 19-25) presentation of the debate about whether Olmec societies in early Mesoamerica formed chiefdoms – a debate which remains unresolved despite numerous changes in definition of chiefdom over time. Nevertheless, the concept of chiefdom with its implications of political and social hierarchy has unquestionably impacted the interpretation of settlement dynamics. An example is Cordy's (1985) model which shows how settlement hierarchy with its different tiers reflects different levels of decision-making, implying that settlement hierarchy is a result of social and political stratification. Such an approach is visible also in studies of Nuragic settlement dynamics, such as Webster's (1996) division into three classes of settlements with the largest being centres of power subordinating ones occupied by the lower classes.

Determinant	***Evidence***
Seasonal occupation	Faunal remains, storage features, diversity in material culture
Long-term aggregation and dispersal	Defensive architecture, trauma on skeletal remains, traces of fire
Fission through growth	Variability in site longevity, depth of deposits and re-building episodes
Differences in productive catchment	Differences in catchment resource productivity
Regional function specialization	Economic and/or ritual differentiation between the sites
Regional political hierarchy	Evidence for inequalities in burial evidence, control of resources

Table 3. Duffy's (2015) model of the six determinants of site size hierarchy.

However, the relationship between settlement hierarchy and socio-political complexity

needs to be argued for rather than presupposed. A perfect example of this is offered by Underhill et al. (2006) in their study of regional settlement patterns in South-East China in the Late Neolithic and Early Bronze Age. The authors point out that the dominant interpretation of the transition between these two periods has considered it to have been a period of state formation resulting from competition between different chiefdoms (Wright 1986). According to this model, the areas beyond modern Henan were peripheral to the centralized power during the Longshan period (Late Neolithic) and the Early Bronze Age, which implies a significant degree of settlement hierarchy and social stratification. Contrary to this, systematic landscape surveys in the area of Shandong have revealed that, despite less extensive settlement and relatively little evidence for the emergence of centres of power, this area probably did not come under the control of states until the late phases of the Bronze Age (Underhill at al. 2006: 2). This indicates that peripheral location and a lesser degree of settlement hierarchy do not necessarily imply political dependence or subordination to centres of power in other areas. Also, Underhill et al. (2006: 6-11) interpret differences in settlement dynamics, such as those between areas with a high level of settlement nucleation and those with more dispersed settlement, as evidence for differences in strategies of control by elites in specific areas rather than political subordination of one to another.

Nevertheless, in numerous cases the relationship between settlement nucleation and hierarchy can be directly tied to the emergence of socio-political hierarchy – not merely through the assumption of such a relationship, but with specific archaeological evidence. Among such examples is the dominant position of the Bronze Age settlements of Phylakopi on Melos and Aya Irini on Keos, interpreted as a result of the integration of these sites into Minoan trade networks (Cosmopoulos 1998: 141-142). In this case, external influence can be shown to be a factor which led to the rise of the socio-economic power of specific settlements. Similar reasons have been identified behind the increase of settlement nucleation and hierarchy in Bronze Age Cyprus. According to Knapp (1997: 48), the rise of centres of

power such as Hala Sultan Tekke and Enkomi was due to their maritime location, political alliances and connection to international trade (see 2.2) rather than their success in exploitation and competition for resources. However, the Aegean islands were much more integrated into Mediterranean trade networks than Sardinia during the Bronze Age – the Nuragic societies remained largely isolated until the Early Iron Age. Thus, assessing the possibility of a relationship between settlement hierarchy and socio- political stratification through evidence of trade and political alliances as a potential factor leading to the emergence of centres of power is of limited value in this case, forcing us to look for other interpretative scenarios.

3.1.2. Other approaches to settlement dynamics

A different approach, placing more emphasis on competition for natural resources as a key factor in shaping settlement dynamics, is Carneiro's (1970) circumscription theory. According to it, population pressure results in competition for resources which in turn leads to warfare. Carneiro argues that in zones circumscribed geographically (by natural barriers) or environmentally (by the inferior economic quality of surrounding areas) such competition and the resulting warfare led to an increase of power for some groups and loss of autonomy by others, and the formation of territorial units of larger size and more complex organization. Carneiro (1970: 735- 736) illustrated this with the example of coastal valleys in Peru, where territories transcending the village in their extent and organization emerged as a result of warfare and competition for resources, eventually becoming chiefdoms. This interpretation of settlement dynamics ought to work well in the case of Nuragic Sardinia. Both geographic circumscription (an island) and environmental circumscription (good quality soils present only in certain areas of western Sardinia) occur, thus the conditions for Carneiro's model of emergence of territorial units with complex organization are met. It is not surprising therefore that circumscription theory has already been successfully tested in relation to Nuragic

archaeology. An example is Navarra's (1997) research in the area of Isili (central Sardinia), the explicit purpose of which was to test Carneiro's theory in the conditions of Nuragic Sardinia. On the basis of available archaeological, geo-pedological and territorial data, Navarra concluded that circumscription theory is convincing as an explanation for the emergence of Nuragic territoriality in the area of Isili, and that nothing in the results of his research discouraged him from concluding that a complex chiefdom existed in this part of Sardinia (Navarra 1997: 348-349).

However, the analysis and discussion of settlement dynamics should not be limited to economic and environmental factors, even though their impact on Nuragic settlement is likely to have been significant. The social aspects of this process, including the significance of religion and ritual, must also be considered. An example is provided by the results of Stek's (2015) research into the Classical and Hellenistic settlement in Samnium (central Italy), where surveys conducted for over a decade demonstrated a non-urban settlement nucleation around rural sanctuaries in that area. Moreover, it has been shown that at least some of these cult sites were linked to earlier Iron Age sites, founded before the development of non-urban settlement which occurred from the 2nd century BC (Stek 2015: 402-404). Thus, settlement dynamics were influenced by the distribution of pre-existing sanctuaries, demonstrating the influence of the ritual sphere on the development and nucleation of settlement in that area. The key role of religious thought in the development of settlement and social communication has also been demonstrated by Wendling (2013: 482) in his study of Iron Age settlement dynamics in Manching (Upper Bavaria).

Burial and other ritual sites can also contribute to our understanding of settlement dynamics by informing us about the size and population of specific settlements, provided there is evidence suggesting a direct link between both sites, such as closeness of their locations or specific artefacts. Giraud (2009: 748), in her study of Neolithic and Early Bronze Age settlement dynamics in eastern Oman, used cemetery size and the number of graves to

determine the size of Early Bronze Age settlements in the area. In Sardinia the situation is more complicated, as the relationship between burial sites and specific settlement sites is by no means clear (Blake 2001), and thus has to be demonstrated from data obtained through landscape surveys rather than assumed.

Another important aspect of settlement dynamics approaches is appropriate consideration of regional variability. Contemporary settlements in closely neighbouring areas might have followed different developmental trajectories with different factors influencing their dynamics. For example, Middle and Late Bronze Age settlement patterns in two major centres of the Acco plain (Western Galilee) have been found to be significantly different. At the site of Acco and in settlements around it we see a gradual rise in complexity during the Middle Bronze Age and the continuity of that trend in the Late Bronze Age, while in Kabri (15km away) development and decline are very rapid, occurring within a relatively short time (Middle Bronze Age II), apparently without clearly distinguishable external influence (Yasur-Landau et al. 2008: 61). Similarly, different settlement patterns and development trajectories have been distinguished in Nuragic settlements in the western part of Sardinia, often within relatively short distances, even though interpretations of the development of Nuragic settlement have been applied to the island as a whole, often overlooking regional patterns (e.g. Araque Gonzalez 2014).

In some cases, study of the present geographical and environmental situation might prove more beneficial than in others. Giraud (2009: 740) emphasizes that in arid areas the study of present conditions can be key to understanding both environmental and human dynamics in the area. In her methodology, the study of landscape and settlement dynamics is coupled with a study of the history of the societies and vanished landscapes (including reconstruction of the coastal geography) in the area and periods in question. Such an approach allows us to define a model of the interaction which took place between people and environment in an arid area (Giraud 2009: 743). This is an important aspect of studies of settlement dynamics in Sardinia,

especially considering how the environmental changes such as deforestation and degradation of soil are interpreted as a significant factor influencing settlement dynamics (Lewthwaite 1984, Webster 1996, Perra 2009: 363).

Finally, our understanding of settlement dynamics in various research areas can be improved by insights into their demography in specific periods, Sardinia being no exception. In many cases the level of site preservation permits for assessment of their extent (including settlements associated with nuraghi), which then enables at least approximate demographic calculations to be made for different periods in both sample areas. This may be done with the use of Schacht's model (1981), already employed by the author in research on the Gesico-Mandas territory. In this model the number of sites is multiplied by an average household size. The estimation of household sizes can be made on the basis of architectural typology and Webster's (1996) estimations of populations inhabiting different classes of settlement (see Chapter 2) – 5-40 people in a class I settlement, 75 people in a class II settlement, and up to a few hundred people in a class III settlement. Other more sophisticated models, such as Narroll's (1962) constant (10 m² as an average living area per person in each household) are difficult to use, as they require knowledge about the exact extent of the living area in each of the nuraghi and settlements, which is often impossible to obtain due to the poor condition of the surveyed structures, especially in the case of Sardinian nuraghi.

3.1.3. The significance of maps in the analysis of settlement dynamics

Finally, it is necessary to discuss the use of cartographic representation in the analysis of settlement dynamics. A very common approach is to assign sites to specific periods and on that basis to create phase maps reflecting the distribution and development of sites in consecutive periods. As Casana (2007: 197) points out, this approach carries significant problems, such as the treatment of sites as isolated entities which can be easily dated and mapped, without their proper consideration as parts of larger settlement systems with specific

relationships between the sites and land use strategies. Also, creating phase maps and drawing conclusions from them creates a danger of oversimplification of histories of settlement structures, since the development of these is a product of settlement decision making, the variety of which is difficult to capture through phase maps alone. Another obvious problem is the limited potential to recognize sites from some periods. Among the examples is the inaccurate representation of prehistoric sites in Greek landscapes. In his criticism of phase maps, Bintliff (2000: 3-5) goes as far as to conclude that our count of prehistoric sites in Lowland Greece is completely unrealistic, even considering the results of intensive surveys, due to the poor preservation of prehistoric pottery. Likewise, there are only limited possibilities for the identification of Late Bronze Age sites in the Amuq Valley (northern Levant), as they can be identified mainly on the basis of rare Mycenaean and Cypriot imports (Casana 2007: 195). This is also relevant to Sardinia, since the Early Iron Age (c. 900-750 BC) Nuragic occupation is more difficult to detect than the Middle and Late Bronze Age one, primarily due to lesser degree of architectural development in this period. Hence, cartographic representation can be of different value in illustrating settlement dynamics in specific periods. However, as Casana admits, very few alternatives to a dots-on-a-map approach that can be considered viable have been developed so far. One of the ways to tackle these shortcomings is to study the excavation results from survey areas, which offer far more insight into the development of settlement sites and differences in their dynamics than the results of surveys.

3.2. Settlement networks

Network archaeology has developed significantly since 2000. It has become particularly effective in recognizing the connections between specific sites and their inhabitants, as well as in understanding the nature of these interactions. The methodologies employed by specific scholars vary, sometimes even within the same regions. In the case of the Aegean, some scholars rely mostly on mathematical analysis (Knappett et al. 2008), while others employ

approaches which pay closer attention to the social and landscape aspect of the sites in question and surrounding areas (Broodbank 2000, Tartaron 2013). In an attempt to review the major theoretical trends in the archaeology of networks, I consider especially case studies from the Mediterranean area, beginning with mathematical models (Proximal Point Analysis, core-periphery, imperfect optimisation), before moving on to methodologies which involve more of a subjective and less quantitative approach (e.g. phenomenology) which, while not primarily used to analyse the networks, can make a valuable contribution to this field through informing us about relationships between specific sites.

3.2.1. Mathematical approaches

The understanding of interactions between known sites is one of the keys to understanding the nature and dynamics of the networks in question. The main factor defining connections between specific sites and thus the networks which they form is movement (both influx and outflux) of people, resources and ideas from each site. They can be partly distinguished on the basis of archaeological evidence and site distribution, but usually their complete assessment is impossible due to factors such as poor preservation of certain types of resources or limited possibilities of assessing the scale of movement of people between the sites. Influx is more important than outflux, as the importance of the outfluxing sites (i.e. the ones primarily sending rather than receiving people, resources and ideas) determines the rank of the receiving site (Rivers at al. 2013: 128). Broodbank (2000) proposed a simpler model based upon Proximal Point Analysis (PPA) in analysing Bronze Age Aegean networks. This model explores only the links between specific sites without recognizing differences between influx and outflux. Despite the simplicity of this model in comparison with other methodologies employed for studies of Aegean networks, such as the *Ariadne* model (Rivers et al. 2013) or the imperfect optimisation model (see below), PPA can bring results which do not merely reproduce the major geographic networks. A significant example is that of the Dodecanese

Islands, which – according to Broodbank's model – could have been relatively isolated from other parts of the Aegean networks (Knappett et al. 2008: 1019), despite the presence of important sites, such as Rhodes (see Fig. 17), influenced by Crete since the fourth millenium BC (Nowicki 2008: 202). The major advantage of this model is that it allows us to distinguish probable connections between sites where the differentiation between the influx and outflux cannot be made, for example, due to lack of excavation or insufficient differences in material culture and local resources.

The PPA method is particularly suitable for the study of Nuragic networks of the east coast of Sardinia. Most of the sites in this area have not been excavated, including the large complex nuraghi such as S'Acqua Seccis – Muravera and S'Omu 'e S'Orcu – Castiadas (Ledda 1985). This lack of archaeological material does not allow us to recognize influx and outflux (including artefacts and resources) for specific sites, which makes the PPA analysis method more useful as it allows us to use primarily local geography and landscape observations to distinguish probable connections between the sites, rather than archaeological material obtainable mainly through excavations. Moreover, I highly doubt whether the influx and outflux between the specific Nuragic sites could be distinguished on a large scale anywhere in Sardinia, not only because of the very limited percentage of excavated and dated nuraghi – about 100 out of 7000 (Webster 2015: 7) – but also due to the relative isolation of the island in the Bronze Age which resulted in a shared material culture with only very general regional differences (in contrast to very significant regional differences in distribution patterns of settlements and different forms of material culture) such as *pettine* pottery in the north and *metopale* pottery in the south during the Middle Bronze Age (Webster 2015: 44-45). This makes the PPA method very useful for studies of Nuragic networks in other parts of the island as well.

One of the criticisms of the PPA method was delivered by Dawson (2016: 324-325) who points out that while this methodology might allow us to explain why the largest settlement

sites emerged where they did, it fails to capture the actual experience of interaction and meaning of geography as experienced by prehistoric people. This criticism, although certainly valid, does not invalidate the PPA method, rather it indicates the necessity of supplementing it with the use of other approaches to network studies in archaeology. Also, it must be kept in mind that the networks established through PPA do not always reflect actual connections which occurred between specific sites (Brughmans 2013: 646).

Fig. 17. The network of Aegean sites created on the basis of PPA method (after Knappett et al. 2008). No. 16 is Rhodes, which does not receive any influx – it indicates its minor rank despite its seemingly important geographic location.

The use of PPA does not exclude the possibility of using the gathered data in an attempt to create a centrality ranking, the concept of which is supported by Newman (2010). It can result in distinguishing major and peripheral areas. This approach derives from the more general, non-archaeological and socio-economic core- periphery model proposed by Frank (1966) and supported by Wallerstein (1974). As with the theory of networks in archaeology in general, the

core-periphery model has been greatly developed in recent years, allowing us to distinguish the variability between specific cores and peripheries, not necessarily assuming the direct control of the core area over the periphery area. Another important development of the core-periphery system and its theory of radial connections in recent decades is the creation of specific models which are more appropriate to prehistoric networks (Jennings 2006: 349).

Likewise, Sindbaek (2007) researched early Viking age (8th – 9th century AD) coastal trade networks in Scandinavia and proposed a model distinguishing particularly important sites, referred to as nodal points. Significantly, he points out that the identification of a site as a trade centre can be done also on the basis of topographical criteria (Sindbaek 2007: 120). This approach can be useful in studies of Sardinian networks because – as is the case with PPA analysis – it does not necessarily require sites to be excavated to suggest a relationship between them.

On the other hand, the core-periphery model has been significantly criticized by some scholars. Knappett (2011) pointed out that it ignores interpersonal relationships within the groups in favour of the larger picture of interactions between more global institutions. Another criticism comes from Harding (2013) who argues that the core-periphery model does not deal with the issue of identity. This criticism is valid, as it is possible for two areas with different levels of economic development and interaction to share the same identity. Instead, Harding proposes a micro-scale analysis of networks which makes it easier to deal with diverse sets of data.

Another significant approach used in the analysis of networks is the imperfect optimisation model. It requires a selection of major sites in the research area. Each site receives a specific “Si” value which reflects its local resources, while the “Vi” value shows the site’s relative importance. This model has been employed by Knappett et al. (2008) in the analysis of Bronze Age Aegean networks. The authors proposed the following equation:

$H = -\kappa R - \lambda E + jP + \mu T$

H – social potential of a specific configuration of site; P – costs of supporting local population;
R – benefits of exploiting local resources; T – costs of maintaining links;
E – benefits of maintaining links

Without putting into question the results of the Bronze Age Aegean research based upon this methodology, two issues have to be considered. Firstly, the imperfect optimisation model has been employed to study the interaction between large sites in different areas of the Aegean (Knappett et al. 2008: 1018). Thus, ascertaining such values as the benefits of exploiting local resources (R) or the costs of maintaining links (T) is much easier due to sites' large size, relatively large distance to other sites in question, and often also the results of extensive archaeological excavations. In the case of smaller unexcavated sites which are located close to each other, the costs of maintaining the links will be more or less similar in different configurations, while the possibilities of figuring out other values can be limited.

Secondly, one can question whether the mathematical analysis employed in the imperfect optimisation model can capture the key factors which influence the shape of the networks and the relationships between the sites. An example is political relations: very difficult to track down archaeologically, but partly recognizable through patterns of territorial organization – in the case of Sardinia, through distinguishing semi-independent territories established through the construction of clusters of nuraghi with buffer zones around them, such as the ones around Borore (Webster 2001) or Sedilo (Bonzani 1992). As pointed out by Skeates (2009b: 557), the analysis of connectivity must not focus solely on mobility and economy, but also include its ideological and social aspects. Whether the imperfect optimisation model is a suitable tool to do that is questionable due to its mathematical-based approach to networks.

Fig. 18. The Middle Uruk period connections between the sites and ceramic workshops on Susiana Plains (after Rothman 1987). Notably, this model represents only a specific aspect of the interconnections in the networks and requires the data from archaeological excavations.

Some of the methodologies used to analyse networks in archaeology rely on mathematics to a more significant degree than others. One of them is graph theory, which – as Peeples and Roberts (2013: 3001) point out – has so far not gained much popularity among archaeologists. One of its main proponents was Rothman (1987), who argued that the use of graphs can be useful as a mathematical method to describe the kind and directions of connections between specific sites which represent nodes of activity of different groups or individuals. This method assumes the mathematical combination of different kinds of connectivity which results in a system which depicts different aspects (trade, power, demography etc.) and levels of interactions between the sites. However, as in the case of the imperfect optimisation model, not all of the factors which influence relationships between sites can be distinguished without archaeological excavations (see Fig. 18), therefore an attempt to employ graph theory might require partial simplification of the graphs.

Furthermore, Peeples and Roberts (2013) point out that even though graphs are an

effective way to visualise researched networks, non-binarized (weighted) ways to analyse the networks can capture more of their features. Again, as a mathematically- based model they might fail to capture such important factors as social demand for particular kinds of goods or possibilities to replace them with alternatives (Skeates 2009b: 566). Also, we have to bear in mind that graphs representing specific networks can vary according to the criteria of the binary ties defined on the basis of the data. Thus, binarization should not necessarily be used as the only means to reconstruct and analyse networks in archaeology.

Another model used in analysis of networks which relies heavily on mathematics is the model of least-cost pathways. It deals with hypothetical routes of travelling over long distances between sites rather than with the nature of interactions between specific sites. Nevertheless, it might improve our understanding of the network. The goal of the least cost pathway method is to find out the route which allows the traveller to move between two points with as low a cost (i.e. spent energy and resources) as possible – doing this requires both cultural and environmental data (Evans and White 2012: 4). In some cases this method has proved to be successful. An example is the Iron Age hillforts on the Ridgeway in Oxfordshire, which are likely to have been built to establish relationships with travellers (Bell and Lock 2000). This method might help to avoid the danger pointed out by Harris (2000: 116), which is to analyse the landscape as if it was an isotropic surface easily accessible from any point or direction.

However, as Evans and White (2012: 5) point out, the motivation of travellers can be determined by factors other than least-cost – factors that are often difficult to track down archaeologically. Some of these motivations could be shaped by ritual practices (eg. pilgrimage) or the distribution of centres of power. Therefore, assessment of the usefulness of the least-cost pathway model for a specific network should include determining the locations of sites and distinguishing the archaeologically detectable non-utilitarian practices which require movement not determined by the least cost (i.e. include deliberate higher cost). Ritual sites often fall into this category, so the employment of a least-cost pathways model should at

least partly depend on the number of such sites recorded in the surveyed areas.

Another issue is the need to distinguish which types of cost were most important for the people inhabiting a specific area. For example, in the case of Native Americans living alongside the Mississipi river the travel time was a priority over the straight-line distance and the caloric cost of the journey (Livingood 2012: 177). In Bronze Age South-East Sardinia priorities could have been different – the distances between Nuragic sites were relatively small (often less than 1km), therefore time of travel was probably less important than its caloric cost, especially considering the mountainous topography of the coastal areas near Muravera, Castiadas and Villasimius (sample area 1).

3.2.2. Non-mathematical approaches

In contrast to mathematical approaches to the issue of networks we might consider phenomenology. While many phenomenological observations are difficult or impossible to replicate, being specific to individual researcher, they can provide additional insights allowing us to better understand the results obtained from the mathematical models. This is because the phenomenological approach, developed mostly after Tilley's research (1994), introduced a new way of seeing archaeological landscapes based on personal experience \of a landscape, without involving any abstract representation. This approach has been particularly significant in research on the British Neolithic (Cummings et al. 2002), but there are also examples of its use in studies of Mediterranean prehistory (Hamilton and Whitehouse 2006). Although criticized (Fleming 1999, Brück 2005), phenomenology has contributed to our understanding of the relationships between archaeological sites in the landscape, especially through observations of their intervisibility, as in the case of Dorset cursus (Tilley 1994), among other aspects such as the use and perception of colour (Tilley 2004: 12) or experiencing sound (Hamilton and Whitehouse 2006: 46-52). Thus, although phenomenology has not primarily been used for the analysis of networks so far, it can potentially contribute to this field of

research – Dawson (2016: 326) argues that place-making theories, such as phenomenology, and methodologies of network analysis can benefit from each other. Some of the proponents of the phenomenological approach, most notably Tilley (2004: 218) and Thomas (2004), reject the use of maps or modern technologies such as GIS, considering them as biased and misrepresenting the perception of the landscape by prehistoric people. However, as argued by Llobera (2012), it is possible to employ elements of subjective approaches together with technologies such as GIS or aerial photography (e.g. scaffolding models advocated by Llobera for studies of specific aspects of landscape, such as co-presence of specific features or prediction of missing sites, on the basis of both field observations and GIS analysis).

The use of phenomenology (not necessarily as the main, but as a supporting methodology) for the east coast of Sardinia can potentially be fruitful due to good preservation of the prehistoric landscape. It is therefore very likely that the current distribution patterns of the sites reflect the original settlement patterns to a very significant degree, even though vegetation and communication networks have changed considerably.

On the other hand, an obstacle in applying the phenomenological approach to the study of prehistoric networks in Sardinia is that this methodology has been used mainly to study ritual and symbolic landscapes, especially in Neolithic Britain (Cummings et al. 2002, Tilley 2004) where monuments dominate over the limited number of known domestic sites, while the employment of phenomenology in research of settlement sites remains limited – one of the few attempts being Hamilton and Whitehouse's (2006) research on the Neolithic enclosures of the Tavoliere plain. This insufficient degree of testing of the phenomenological approach in relation to domestic sites raises questions about its reliability in the Sardinian landscape which is dominated by defended (nuraghi) and open settlements.

With all the advantages and pitfalls of phenomenology, its use should not exclude the use of Geographical Information Systems (GIS). Although some scholars have criticized the use of GIS due to incompatibility of the results with ground-level experience (Cummings 2008), this

conclusion should by no means be universally applied to every archaeological landscape.

One of the main advantages of using GIS for the analysis of networks is the possibility of including sites which are completely destroyed or visible only as crop- marks (see also 2.1), thus only researchable through fieldwork to a very limited extent (Llobera 2012). However, considering the fact that GIS analysis is rather divorced from human context (Thomas 2004: 200) and does not represent the perception of prehistoric landscapes and networks from the point of view of the individual (viewsheds are about the closest to it among the feature of GIS), it can be benefitial to combine its results with field observations, especially in the case of ritual landscapes, peoples' perception of which would have been particularly important in prehistory (Tilley 1994). Use of GIS to analyse prehistoric networks raises the obvious issue of missing sites (see the discussion in Sections 3.1 and 3.1.3), but in Sardinia the distribution of Bronze Age Nuragic sites is likely to be relatively close to the original patterns due to the limited impact of agriculture and urbanization, as well as the prevalence of monumental architecture among settlements. As pointed out by Broodbank (2013: 345), the Bronze Age Mediterranean offers a rare convergence of different types of data. Therefore I think there is sufficient ground for a critical evaluation of the outcome of GIS analysis, with phenomenology being one of potential tools to achieve this.

Finally, it is necessary to look at specific cases of the analysis of coastal networks from different parts of Europe, in an attempt to compare their positive and negative features with regard to coastal networks in Nuragic Sardinia. Extensive studies of coastal networks have been done in the Aegean (Broodbank 2000, Knappett et al. 2008, Tartaron 2013). These have revealed changes in coastlines which resulted in the submerging of several sites, such as the harbour of Kencherai on the Saronic Gulf (Tartaron 2013: 148). Furthermore, these changes limit the possibility gaining complete evidence from surveys – an example is the possible, but unverified, artificial harbour at Romanou near Pylos (Zangger et al. 1997: 619-23). Thus, the possibility of coastline changes on the east coast of Sardinia cannot be ruled out, especially

considering the example of Nora (South-West coast of Sardinia), a Phoenician city, part of which is currently submerged (van Dommelen 1998: 81). Such changes can occur in the Mediterranean even over a short period of time. For example, Ekercin's (2007) research revealed that coastline movements of over 200m occurred on the Turkish Aegean Sea coast in a period of little over 25 years.

The place of the coastline in Nuragic networks of the eastern part of Sardinia will be particularly important considering our limited understanding of the use of coast. This is due to insufficient research in the northern part of the island, too few field surveys, significant changes introduced to the central part of the southern coast by industrial development around Cagliari, and enclosure of a significant part of the South-West coast within the Capo Teulada military training area (the second largest in Italy). One of the few well-surveyed parts of the Sardinian coast is the area near Sinis and Cabras (Castangia 2012, Usai 2014a). In this situation, studies of the use of the coastline can be particularly beneficial for our knowledge of the Bronze Age and Iron Age in Sardinia, since the Nuragic occupation in this type of landscape is not very well recognized, and neither are its implications for the Nuragic economy.

3.3. Conclusions

These different approaches to settlement dynamics and networks can complement each other, although the degree of synergy between them depends on the particular characteristics of the surveyed landscape areas. As we have seen, in some areas settlement dynamics can be influenced primarily by environmental and demographic factors (Carneiro's circumscription theory), while in the others by connections of sites to trade networks and external influence (Bronze Age settlements on Melos and Keos). Furthermore, it is necessary to go beyond an assumption of settlement hierarchy reflecting social stratification, paying greater attention to regional patterns and even identifiable differences between histories of sites located in same

area, and considering the influence of religion on settlement dynamics. Theoretical approaches to networks, although some of them certainly applicable to Nuragic Sardinia (especially the PPA method), are likely to be of different value for specific periods, their role certainly being more limited in analysis of the Middle Bronze Age settlements, while increasing in studies of the Late Bronze Age and Iron Age, when the complexity of settlements increased, as did contacts between Nuragic Sardinia and other parts of the Mediterranean.

To conclude, some of the key insights and methodological aspects derived from this discussion which are used in the project are: consideration of different social, economic and environmental factors shaping Nuragic settlement dynamics in Eastern Sardinia in consecutive periods, and approach to settlement hierarchy that extends beyond the assumption that it mirrors social hierarchy, as well as the use of PPA method in relevant case-studies (see Section 6.2.1).

Chapter 4. Research methodology

Summary. *The core of this research project was a series of site-based landscape surveys conducted in two sample areas of the east coast of Sardinia selected on the basis of the limited impact of urbanization and agriculture, the diversity of landscape, the current state of research, and the distance between them. All the archaeological sites were assessed in terms of their architectural typology, landscape context, relationship to other sites and location in relation to the coastline. In addition to extensive photographic documentation, some of the sites were surveyed with the use of a Total Station in order to accurately illustrate different types of Nuragic structures recorded during the surveys. This fieldwork was supplemented by desktop studies of publications and grey literature, as well as by the use of Geographical Information Systems (GIS) which were used to create Digital Elevation Models (DEM) of selected areas and to process those site plans prepared with the use of Total Station.*

This research project follows two previous projects conducted by the author in Sardinia. The first one (Namirski 2012, BA dissertation at the University of Reading) was a study of a possible architectural transition from corridor nuraghi to tholos nuraghi and involved elements of landscape archaeology, such as comparison of distribution patterns of both types of monuments in the area of Bortigali (Marghine, Western Sardinia). The second project (Namirski 2013, MA dissertation at the University of Durham) was a study of a cluster of nuraghi around Gesico and Mandas (Trexenta, Central Sardinia) and was based on a series of site-based surveys conducted in this area. This resulted in a better understanding of the phenomenon of clusters of nuraghi that emerged in the western part of the island in the Middle Bronze Age, as well as the development of Nuragic territoriality. This project constitutes a continuation of the authors' research interest in Nuragic landscape archaeology, and its methodology draws upon experiences gained primarily during the Gesico-Mandas project, particularly in terms of defining a survey area, site recording, and cooperation with local

authorities – these and other methodological aspects of the project will be discussed in this chapter. Some of the observations made in this thesis were based also on author's numerous visits to Nuragic sites in different parts of Sardinia which were not included in this project (Crabia – Bauladu, Toroleo – Paulilatino, Majore – Perfugas, Murciu – Flussio, see Chapter 2).

Fig. 19. Map of Sardinia (source: worldmapfinder.com) with extent of sample areas 1 and 2 marked.

4.1. Survey methodology

The core of my research was a series of site-based landscape surveys conducted in the years 2013-2015 in two selected areas of the east coast of Sardinia (Fig. 19). The first one (sample area 1) is in Sarrabus (South-East Sardinia) and covers the communes of Castiadas and Muravera, as well as the eastern parts of the communes of Villasimius and San Vito – in total over 240 km². The second one (sample area 2) is in the communes of Barisardo and Cardedu (Ogliastra, east- central Sardinia), as well as the eastern fringes of the communes of Lanusei, Elini and Loceri (in total over 70 km²).

Sample area 1						
Comune	*Protonuraghi/ nuraghi*	*Open settlements*	*Walls*	*Giants' Tombs*	*Sacred wells*	*Total*
Castiadas	39	–	–	4	–	**43**
Muravera	43	2	1	5	–	**51**
San Vito	18	1	–	1	–	**20**
Villasimius	11	–	–	–	–	**11**
Total	**111**	**3**	**1**	**10**	**–**	**125**
Sample area 2						
Comune	*Protonuraghi/ nuraghi*	*Open settlements*	*Walls*	*Giants' Tombs*	*Sacred wells*	*Total*
Barisardo	14	2	1	4	–	**21**
Cardedu	11	–	1	1	1	**14**
Elini	1	–	–	–	–	**1**
Lanusei	2	–	–	–	–	**2**
Loceri	2	–	–	–	–	**2**
Osini	1	–	–	–	–	**1**
Tortoli	7	–	1	1	–	**9**
Total	**38**	**2**	**3**	**6**	**1**	**50**

Table 4. Number of sites recorded during the project divided into types of sites and municipalities.

The surveys resulted in recording 125 sites in sample area 1 and 50 sites in sample area 2 (see Table 4, Appendices 1 and 2 include 138 and 57 site entries for the respective areas, since settlements associated with the nuraghi received separate entries, and negatively verified, dubious and completely destroyed sites were included as well). The documentation

includes photographic material, accurate coordinates (in decimal degrees), description of landscape location and visibility of other sites, detailed description of architecture, in selected cases also Total Station plans.

The selection of sample areas for this research included consideration of different factors. Among them were:

1. The limited impact of urbanization and agriculture affecting preservation of the prehistoric landscape and, thus, the possibility of reconstructing Nuragic settlement patterns. Both selected sample areas are mostly free from uncultivated and have little urbanization, which increases the likelihood of more complex preservation of the original Nuragic settlement network.

2. The presence of diverse types of landscape within a sample area enabling the study of distribution patterns of Nuragic sites in different landscape contexts and their potential differences.

3. The current state of research. Whilst the east coast of Sardinia remains largely overlooked in research on Bronze Age and Early Iron Age in Sardinia, some of its areas, such as those around Arzachena (Antona Ruju and Ferarese Ceruti 1992) and Dorgali (Moravetti 1998b) have been relatively well studied (see Chapter 5). Neither of the selected study areas have previously received much archaeological attention. Although some of the monuments have been previously recorded before (Archeosystem 1990, Nieddu 2006), very little effort has been made to contextualize them by analyzing and interpreting the Nuragic settlement patterns around Barisardo and Muravera-Castiadas. Therefore, the current project not only fills a significant gap in our knowledge of Nuragic settlement systems on a local scale, but also contributes to understanding of similarities and differences in the Nuragic settlement dynamics in different parts of the island..

4. The distance between both sample areas (circa 40 km between the northern edge of sample area 1 and the southern edge of sample area 2). The selection of areas which are

located in some distance each other increases the likelihood of discovering different settlement patterns and thus offers more significant prospects for a meaningful comparative study.

As already mentioned, the surveys were site-based rather than extensive, similarly to those done by Moravetti (1998, 2000, Marghine and Planargia in central- western Sardinia) or Ciccilloni and Migaleddu (2008, Teulada in south-eastern Sardinia) which focused on recording specific Nuragic sites in the landscape rather than more systematic coverage through fieldwalking. Successful studies of Nuragic settlement dynamics done on the basis of site-based surveys were carried out by Puggioni (2009, Gallura) and Maisola (2012, Oristanense in central-western Sardinia). The reliability of data from these site-based surveys is assured by the fact that the majority of the Nuragic sites include architectural remains and are visible in the landscape, while fieldwalking in search of pottery and lithics is unlikely to reveal any previously unknown sites (especially given the paucity of agricultural zones in the surveyed areas).

The information about sites in both sample areas was gathered from a variety of sources, including publications (Archeosystem 1990, Valtan 2003, Nieddu 2006), IGM (Isituto Geografico Militare) maps, as well as grey literature. The significance of the latter, often available only locally, has already been proven in the Gesico-Mandas project (Namirski 2013). The technical offices (*uffici technici*) of the communes of Gesico and Mandas, as well as most of the ones bordering it, were in possession of archaeological maps of their areas, which often included sites which were not mentioned, let alone described, in other sources. The accuracy, technical quality and design of these maps varied in different communes, but overall they were very useful in locating the Nuragic sites in the Gesico-Mandas cluster.

With this experience in mind, significant effort was made to establish contact and cooperation with the local authorities from the communes in both sample areas. This turned out to be particularly fruitful in the Comune di Castiadas (the central and southern part of

sample area 1), where the unpublished materials in possession of the *ufficio technico* included not only an archaeological map of the area but also records of the known prehistoric sites in Castiadas, some of them not mentioned in other sources, including the official archaeological archives of the Soprintendenza per i Beni Archeologici per le province di Cagliari e Oristano in Cagliari. This was the case especially with the highest-located sites within the massif of Monte Minniminni (Nuraghe Nuraxeddu, Protonuraghe Liuru Ganudu), which presumably escaped initial detection by archaeologists due to their remote location, heavy vegetation cover and relatively poor state of preservation.

The process of identification of sites on the basis of available publications, maps and grey literature was supplemented by a search for new sites based on previosuly recognized patterns of their distribution which allowed for the prediction of possible locations of unknown sites. For example, in sample area 1 the majority (102 out of 111, 92%, see Chapter 6) of the recorded protonuraghi and nuraghe are located on hilltops and promontories. Thus, such locations were the ones primarily targeted in the search for possible new sites. This was done both through analysis of satellite imagery and surveys of possible locations of new sites. This led to the discovery of an unrecorded protonuraghe at top of Monte Idda (Castiadas), about 300m NE of Protonuraghe Bruncu Ottixeddu (see Appendix 1). The site was covered in heavy vegetation and remains of the masonry were not visible at distance, which explains how the monument escaped previous detection. Such a strategy of targeted searching for new sites allowed also to relocate sites which were incorrectly marked in available sources, or precise location of which was unknown. This methodology draws upon the approaches of landscape surveys from adopted parts of the Mediterranean, most notably Cyprus, where survey results were used as predictors of settlement and cemetery locations from different phases of the Cypriot Bronze Age (Sneddon 2015: 153).

The surveys were conducted usually by 1-2 people, depending on needs. The surveys with the use of the Total Station were always performed by two people, since more than one

person is required to work with the computer and prism. Occasionally help was provided by local people and, in sample area 2, by members of the Gruppo Archeologico di Barisardo, who provided significant help in locating previously unrecorded monuments and the sites of destroyed ones. This was the case, especially, on the plateau of Teccu (Barisardo), where the help of Roberto Pilia and Michele Castoldi facilitated the location of the destroyed *tombe di giganti* near nuraghi Iba Manna and Niedda Puliga. The rate at which the sites were surveyed ranged from 1 to 4-5 per day, depending on their state of preservation (and, thus, amount of information necessary to record), as well as their location and accessibility (many surveyed sites are located on rocky hilltops away from any footpaths, which makes them more difficult and time-consuming to reach). In total, five campaigns (April 2013, October 2013, April 2014, September/October 2014, October 2015) were necessary to complete the survey. The preferred period of the year was autumn, due to the less extensive vegetation creating better conditions for surveying and recording sites. Nevertheless, in many cases, some clearance of vegetation around the structures was necessary for proper assessment of the sites and their architecture, photographic documentation and/or preparation of plans with the use of the Leica Total Station.

The main objective of the surveys conducted in both sample areas was to record all identifiable Nuragic sites. Although covering the entirety of the study areas through walkover survey was not possible, and therefore there is a theoretical possibility that some sites with architectural remains have escaped detection, the use of measures described above makes it very unlikely. The sites were assessed primarily in the following aspects, partly based on the 2012-2013 project in Gesico and Mandas (Namirski 2013), but extended and adjusted to the needs of this project:

1. Architectural typology

Considering the shortage of excavated sites (none in sample area 1, only one in sample area

2) the typology of monuments remains one of the main means of estimating their date and thus establishing the chronological development of Nuragic networks in the various periods. In the case of the nuraghi, this means distinguishing between protonuraghi (corridor nuraghi), which can be attributed to the Early and Middle Bronze Age, nuraghi-*capanne* (simple structures constituting massive roundhouses without tholos chambers rather than towers, the dates of which can range from the Early to Middle Bronze Age), single-towered nuraghi (Middle Bronze Age), and complex nuraghi (Late Bronze Age, usually with a Middle Bronze Age earliest phase). The possibility of complex nuraghi reaching their final form already in the Middle Bronze Age, as documented in other parts of the island (Lo Schiavo and Sanges 1994, Cossu and Perra 1998) has not been overlooked. In the case of protonuraghi, the typologies by Manca Demurtas and S. Demurtas (1991), and Ugas (2005) were not the primary criteria of assessment, as they do not say much about differences in chronology and functions of sites, with many types being distinguished rather artificially (see Chapter 2).

Furthermore, *tombe di giganti* can be divided into distinctive types which date to specific periods of the Sardinian Bronze Age (Blake 2001, Contu 2006b, see Table 5). Tombs with stele are of Early and Middle Bronze Age origin, tombs with forecourt walls and portals are mostly Middle Bronze Age structures, while the ones with ashlar masonry and/or dentiled friezes are a Late Bronze Age development.

Period	*Typology of tombs*	*Examples*
Nuragic I/II	Tombs of dolmenic construction with a stele	Goronna (Paulilatino), Li Lolghi (Arzachena)
Nuragic II	Tombs with portal and walled façade	Is Concias (Quartucciu), S'Om 'e Nannis (Esterzili)
Nuragic III	Tombs with ashlar masonry	Biristeddi (Dorgali), Madau (Fonni)

Table 5. Chronology of tombe di giganti *based on their architectural typology* (*based on Contu 2006b: 654-656 and Lilliu 1999b).*

Ritual monuments such as sacred wells (*pozzi sacri*), megaron temples and rotundas

(circular structures with vertical walls) are further types of Nuragic structure which are invaluable in terms of establishing the chronology of the research area, as these monuments developed in the Late Bronze Age and were also built in the Early Iron Age. The difference between Late Bronze Age and Early Iron Age ritual monuments can often be recognized on the basis of masonry type – earlier sacred wells were built with coursed cyclopean masonry, while the Iron Age ones have ashlar masonry (Webster 1996: 181). An evaluation of the typology of masonry was successfully undertaken by Russu (1998) in studies of complex nuraghi, confirming the usefulness of this method in establishing a relative chronology for Nuragic monuments.

The approach emphasizing typology certainly has its limitations, as it might lead to simplistic understanding of settlement patterns and does not always guarantee an accurate attribution of each site to a specific period. A good example are complex nuraghi – most of them were extended in the Late Bronze Age, but some of them reached their final shape already in the Middle Bronze Age. A similar problem is observable in Scotland, where the typological division of the Iron Age broch towers into ground-galleried and solid-based ones turned out to be not as clear-cut as originally believed, which led Harding to conclusion that "its significance should therefore not be overrated" (2004: 118). However, considering that almost none of the sites in both study areas being excavated and thus dated, and that the rate of preservation of pottery is very low (especially in sample area 1, were most of the monuments are located on rocky hilltops where pottery hardly survives on the surface), the emphasis on architectural typology is necessary. To minimize the impact of problems flowing from the emphasis on typology, only those typologies which are likely to reflect chronological differences between sites were considered. On the other hand, typologies which are unlikely to reflect any real difference in chronology and/or usage of different monuments were rejected. An example is M. Demurtas and S. Demurtas (1991) typology of protonuraghi, which divides them into nine types, differences between which are in many cases minor and unlikely

to reflect a chronological development of this category of structures.

The form of different monuments was recorded with the use of a Leica Total Station, which was used to prepare ground plans of the selected sites. The selection of sites took place after much of the survey was already completed, so as to choose sites most representative of the architecture of the surveyed area, and technically suitable for the Total Station survey (i.e. the outline of their walls was clearly distinguishable and they were not covered in particularly dense vegetation). Among the six sites surveyed with the Total Station are protonuraghi (Comideddu – San Vito, Pispisa – Muravera), single-towered nuraghi (Domu de S'Orcu – Muravera, Porceddus – Villasimius) and complex nuraghi (Santoru – Muravera, Baccu 'e Gattus – Villasimius), providing an overview of different types of Nuragic structures, particularly in sample area 1. In each case the data used to create the site-plans was recorded with the Leica Total Station, exported in .dxf files (these included raw data – points and lines), and subsequently edited in ArcMap 10.3.1 which allowed the addition of colours, symbols and (if possible) the reconstruction of missing parts of the monuments surveyed.

2. Landscape location and context

This aspect can shed light at the functions of different sites, primarily through their relationship to areas of economic importance (such as watercourses, springs and areas of fertile soils), and the defensive potential of each location. This is particularly important in the case of complex nuraghi, as criteria for selection of nuraghi which were extended in the Late Bronze Age can reveal the reasons and processes behind the settlement nucleation which occurred in this period in Sardinia. For example, a focus on extending the nuraghi in the most defensible position could point towards military activity as the factor driving Late Bronze Age settlement nucleation, while an emphasis on sites near watercourses or other areas of economic significance could alternatively suggest environmental or economic factors for extending the nuraghi into complex structures. However, the role of the nuraghi will not be examined only in

terms of their utilitarian functions, but also from perspectives related to their significance as possible expressions of prestige or landscape markers.

3. Location in relation to other sites and intervisibility

This aspect of Nuragic settlement patterns is particularly important in cases where there is evidence for territoriality, since the relationship between the sites points to their function and significance within a territory, sometimes when architectural typology does not display a significant difference. It can also inform us about the role of ritual and religion in settlement dynamics – for example, any possible relationship between the distribution of settlement and ritual sites, or a division of landscape into sacred and profane, such as contrasts between landscapes of the living and of the dead in Early Bronze Age Britain suggested by the distribution of stone and timber circles (Parker Pearson and Ramilisonina 2008).

4. Location in relation to the coastline

Our knowledge about use of the coastline in the Nuragic period is very limited, mainly due to an insufficient number of landscape surveys and the low number of sites with monumental architecture located directly on the coast. One should not rule out the significance of the coast in the Nuragic economy, especially considering: evidence for contacts with the Aegean in the Late Bronze Age (see Chapter 2), representations of boats among the *bronzetti* suggesting the existence of three types of boats (Lilliu 1956, Melis (2003: 59), one of which was sea-going), and the presence of open settlements with artefacts related to fishing, such as fishing weights (Sa Osa – Cabras, Castangia 2012). The possibility of contributing to our knowledge of the use of the coastline in the Nuragic period is one of the most significant potential outcomes of this project.

5. Location in relation to pre-Nuragic sites

Another aspect of Nuragic sites which was taken into account was their spatial relationship to pre-Nuragic sites. This was analyzed in order to find out whether the distribution of Bronze Age and Iron Age sites follows that from earlier periods. The main factors which were considered were the distances to the closest pre-Nuragic site and the topographical relationship between them (e.g. being located in the same mountain massif or along the same valley). The data about pre-Nuragic sites was obtained from Ledda's (1985) publication, as well as sources such as the aforementioned Piano Paesaggistico Regionale and sources obtained from *uffici tecnici* of local municipalities. Most of the pre-Nuragic sites in both sample areas are Late Neolithic rock-cut tombs (*domus de janas*) and Late Neolithic/Chalcolithic standing stones, but also several Late Neolithic settlements of the Ozieri culture – an example from sample area 1 is the settlement of S'Enni (Muravera), which includes the remains of numerous huts, and surface finds which included Ozieri culture pottery and obsidian tools (Ledda 1985: 85-86). The association between pre-Nuragic and Nuragic sites has been defined in two categories (see Appendix 3): probable and possible association. Probable association was asserted in the case of pre-Nuragic sites which are located within 200m of each other, and/or are located within the same topographic feature (same valley, mountain or massif). Possible association is attributed to those sites which are located within 200-400m of each other, some of them also sharing a topographic connection similar to the ones in the "probable connection" category. These criteria are to a certain extent arbitrary, therefore in individual cases exceptions from them are made.

Recognition of patterns emerging from the data obtained using this methodology allows us to predict where further, previously unrecorded, sites might be located (as the author's earlier research in Gesico and Mandas reveals, it is still possible to discover previously unrecorded sites with architectural remains).

4.2. Geographical Information Systems (GIS)

The use of Geographical Information Systems (GIS) is used to analyze the results and fieldwork observations. The programmes used were ArcMap 10 and ArcMap 10.3.1, while the data were obtained from the SardegnaGeoportale webpage. The data includes primarily DTM (Digital Terrain Models) of the terrain in both sample areas, accurate up to 1m. The maps prepared with the use of DTM models illustrate the major distribution patterns of the Nuragic settlements recorded in both sample areas, providing their topographic context and information on the relationships between sites of different types. In current project a particular emphasis is placed on illustrating specific case studies which are most representative of patterns occurring in the surveyed areas.

The design of the maps varies according to their purpose and circumstances. In some cases a black-and-white colour range is more useful to display the topography, in other cases a wider ranger of colours is used. Such flexibility in designing maps is maintained to ensure that the design of each map is optimal for displaying the pattern and area in question. Similar level of flexibility was applied to categories used for marking the sites – in maps of sample area 1 the protonuraghi and single-towered nuraghi were marked with a separate symbol as one group, because their architecture is so similar that the typological distinction is not representative as indicator of differences in their chronology or function (see Chapter 6), and therefore does not warrant a separate treatment of these two types of sites in the GIS analysis. On the other hand, in sample area 2 the protonuraghi are quite distinct from the classic tholos nuraghi (as in most of Sardinia), and therefore are marked as separate categories of sites. The term „settlement" used in the maps refers to Nuragic settlements with huts, usually circular ones. Some of which are located around the nuraghi, but they are not necessarily of the same date – thus, they are marked on the maps and recorded separately, as in many examples of Sardinian literature (Campus and Leonelli 2008, Maisola 2012).

Other activities were also undertaken with the use of GIS, some of them depending on the results of the surveys. One is the creation of viewsheds – they are employed to investigate the distribution of Nuragic sites and their location in relation to each other, which might indicate if they were built with consideration of each other for defensive, territorial, economic, ritual or other reasons. The results of any possible viewsheds were compared to field observations, as the visibility of one site from another does not guarantee that the structure itself is distinguishable in the landscape. The main factor limiting the usefulness of viewsheds was lack of evidence for connections between the sites other than intervisibility. Without such evidence (especially in sample area 1, dominated by single Nuragic farmsteads), visibility of site A from site B alone is insufficient to establish a convincing connection between them (see Chapter 6.1.1. for further discussion of this issue). A similar problem has arisen in the case of least-cost pathway analysis – determining a least-cost pathway between two sites is not meaningful in the absence of convincing evidence for a possible relationship between the two sites. An example of a study where such evidence is present is provided by Soro (2008), who applied a least-cost pathway analysis to Nuragic sites that have produced Mycenanean finds – this suggests that the sites could have formed part of a trade network, which makes the analysis of least-cost paths between them potentially useful. Similar examples come from other research areas in southern Europe, such as Rissetto's (2012) least-cost pathway analysis of possible connections between Magdalenian sites in Northern Spain and the areas from which chert was obtained. In this study, macroscopic, petrographic and trace element analyses of lithic material provides evidence for connections between the sites and the areas in question, which then serve as the basis and justification for the use of least-cost-pathway analysis. No comparably convincing evidence – which would justify the suggestion of explicit connections between the sites (and thus the significance least-cost pathway analysis) – is currently available in both sample areas investigated in this thesis, which significantly limits the usefulness of the least-cost pathway analysis in these sample areas. This is because

without evidence for connections between specific sites on other grounds (artefacts, distribution patterns, evidence for territoriality), the least-cost pathway analysis itself cannot determine whether such connections existed at all. The method is, then, useful primarily as an explanatory tool when providing additional information about connections which have been determined on other grounds. Nonetheless, considering that the least-cost pathway analysis has yield interesting results in different research areas around the world, and it can potentially open up future research prospects (such as verification of possible results of analysis by searching for necessary corroborating evidence for connections between the sites on other grounds), the method was tested and used as one of the GIS tools in this project (see Chapters 6 and 7, and Figs. 54, 59, 64). To conclude, the use of GIS and its extent, as well as documentation of this work, was determined largely by local circumstances.

4.3. Published excavation reports

The author previously used excavation reports and grey literature to supplement the survey results in the Gesico-Mandas project. In that case the number of excavated sites (three) and published ones (two) was sufficient to support inferences about the chronological development of the Nuragic territory gained from the surveys, particularly through the specific results of excavations.

Unfortunately, in both present study areas only one site has been excavated – Nuraghe Cea (Loceri, Cossu 1997) in sample area 2. However, this monument is particularly important, since it is a small complex nuraghe consisting of a main tower and bastion without lateral towers. Structures of this type are very difficult to date on the basis of architectural typology, as the structure consisting of the tower and relatively limited associated additions might have been built as a single project in the Middle Bronze Age, rather than in two phases (the Middle Bronze Age and Late Bronze Age ones) as in the case of the majority of complex nuraghi. Thus, the excavation results from Nuraghe Cea are helpful in establishing the chronology of

other smaller complex nuraghi, which are common in sample area 2 (Nuraghe Arbu – Cardedu, Nuraghe Giba ‘e Scorka – Barisardo, Nuraghe Su Angedu – Cardedu).

4.4. Identification of methodological difficulties and limitations

To complete this discussion of the methodological aspects of this project I will outline some of the difficulties encountered during research in the study areas. Some of them were expected from the outset, being predicted on the basis of the current state of research and nature of the Bronze Age and Iron Age sites preserved in the landscape, while others are peculiar to the surveyed areas. Responses to these problems are offered below.

1. Difficulty in recognizing and interpreting the Iron Age evidence through landscape surveys. This is directly connected to the fact that there is no evidence for the construction of new nuraghi or *tombe di giganti* after 900 BC. As Webster (2015: 143-144) points out, only a few per cent of the nuraghi have been excavated, therefore we cannot rule out such a possibility. Nevertheless currently there is no means of distinguishing possible Iron Age nuraghi on the basis of the remains alone. The main focus of Iron Age Nuragic architectural activity was on the extension and re-modeling of the largest existing settlements, turning them into “proto-urban” centres. Among the examples are the Nuragic complexes of Genna Maria (Villanovaforru) and Su Nuraxi (Barumini). In addition to these, several new sanctuaries with *pozzi sacri* have been identified, most of them built with the use of ashlar masonry. This relatively limited Iron Age architectural activity makes it more difficult to recognize the Nuragic occupation from this period, as in many cases the re-use of already existing monuments can only be identified through archaeological excavation. In some areas there are ritual monuments built with ashlar masonry (like the rotunda of Gutturu Caddi – Guasila in the case of the Gesico-Mandas cluster, Nieddu 2012: 379) or large settlements with typically Iron Age multi-roomed houses, as well as surface pottery finds with geometric decorations, but in their

absence substantiating the extent of the Iron Age activity in a surveyed area is difficult.

2. The relatively minor differences in architecture between protonuraghi, single-towered nuraghi and nuraghi-*capanne* in sample area 1.

As correctly pointed out by Usai (1990: 121) these differences in ground plans are often so minor that they cannot be treated as indicators of a different chronology or function of specific monuments. In several cases the typological classification of the structures has been rather arbitrary, either due to their architecture or poor state of preservation (sometimes both). Therefore, although the division between protonuraghi, single-towered nuraghi and nuraghi-*capanne* in sample area 1 will be maintained here in the appendices and site descriptions, they are treated as just one group in the analysis and discussion of the Nuragic settlement patterns of this area.

3. Uncertain chronology of small complex nuraghi.

Different phases of construction (the latest ones associated with Late Bronze Age settlement nucleation) are obvious in some of the largest of the complex nuraghi, and have been proven through excavation – as in the case of Nuraghe Alvu (Pozzomaggiore, Boninu et al. 2013) and Nuraghe Cuccurada (Mogoro, Atzeni et al. 2015: 24-25). However, complex nuraghi with smaller additions (such as a bastion without lateral towers) could have been built as a single project in the Middle Bronze Age rather than as a result of Late Bronze Age settlement nucleation. In sample area 2 this problem has been partly resolved by the excavation results from Nuraghe Cea (Loceri), which confirm that the bastion associated with the main tower is likely to be an addition built in the final phases of Middle Bronze Age or in Late Bronze Age (Cossu 1997). In other cases the assessment of chronology and possibility of different phases of construction can be made through comparison of the masonry structure of different parts of the nuraghe (usually the main tower against the bastion or lateral towers), as well as use of space on a hilltop, which could indicate whether the structure was designed as a single project

or not.

4. Some of the observations, especially regarding the intervisibility of sites, might have been affected by changes in the landscape occurring since the Nuragic period. This problem is often pointed out in criticisms of the phenomenological approach introduced to archaeology by Tilley (1994, 2004), but is relevant also to other methodological approaches in landscape archaeology which include studies of intervisibility. This is especially relevant since we know from palaeopalinological evidence that significant parts of Central Sardinia were covered by forests in the Bronze Age, the majority of which have disappeared (Depalmas and Melis 2010: 175-176). However, the location of many of the sites on rocky hilltops (especially in sample area 1) makes it possible that the extent of the views from the nuraghi could have been similar even with vegetation, especially considering the height of the tholos nuraghi which reached up to 15-20m (Balmuth 1984: 25).

5. The overall incompatibility of different sources regarding sites from both sample areas.
Some sites are marked in different locations in different sources, and sometimes different sites are identified as the same one. There are also several nuraghi marked on the IGM (Istituto Geografico Militare) maps which never existed and are probably errors of the military cartographers (the examples from sample area 1 are Nuraghe Sinzias – Castiadas and Nuraghe Mannu II – Muravera, see Appendix 1), but are cited frequently in later sources. Most of these inaccuracies were verified through the landscape surveys (see Appendices 1 and 2).

Overall, the methodology employed in this project has been shaped with consideration of such factors as the current state of Nuragic landscape archaeology, author's previous experience, and specific local circumstances in both study areas. This ensures obtaining as complete dataset as possible, as well as optimal methods to analyze it.

Chapter 5. The Nuragic east coast of Sardinia: research context

Summary. *A strong bias towards on conducting excavations and surveys in western Sardinia is evident in the history of Nuragic archaeology. This is primarily due to the largest complex nuraghi and areas of greatest density of Nuragic settlement being located in the western part of the island. The east coast has remained largely overlooked, with the exception of eastern Gallura (the North-East of Sardinia), where important sites such as La Prisciona, Coddu Vecchiu and Malchittu (Arzachena) are located (Antona Ruju and Ferrarese Ceruti 1992). The most significant research in sample areas 1 and 2 has been undertaken by Ledda (1985) and Archeosystem (1990), but in both cases the resulting publications were focused on documenting the Nuragic sites in Sarrabus and Ogliastra respectively, rather than analysing settlement dynamics and their implications for the Nuragic societies in these areas.*

Although the Nuragic culture is the best-known prehistoric culture of Sardinia, the majority of our knowledge about it comes from the research done in the western part of the island. Numerous excavated sites (Atzeni 1966, Moravetti 1986, Fiori 1997, Balzano and Atzeni 2013) and primarily site-based surveys (Moravetti 1998a, 2000, Melis 2007) have provided valuable information about the chronology of the Nuragic culture, its settlement patterns and, to some extent, ritual practices. Much less attention has been paid to the eastern coast of the island were the Nuragic occupation was sparser and its archaeological remains less monumental than in the western part of Sardinia. The only sectors of the eastern coast to have been exhaustively researched are the NE coast (part of Gallura) and the Gulf of Orosei, where both excavations (Sanciu 1986, Petrioli 1999) and surveys (Antona Ruju 2005) have been conducted. This chapter seeks to review the research undertaken on the Nuragic sites of the east coast of Sardinia, with particular emphasis on the two zones which I have selected as the study areas for my research – Sarrabus (sample area 1, South-East Sardinia:

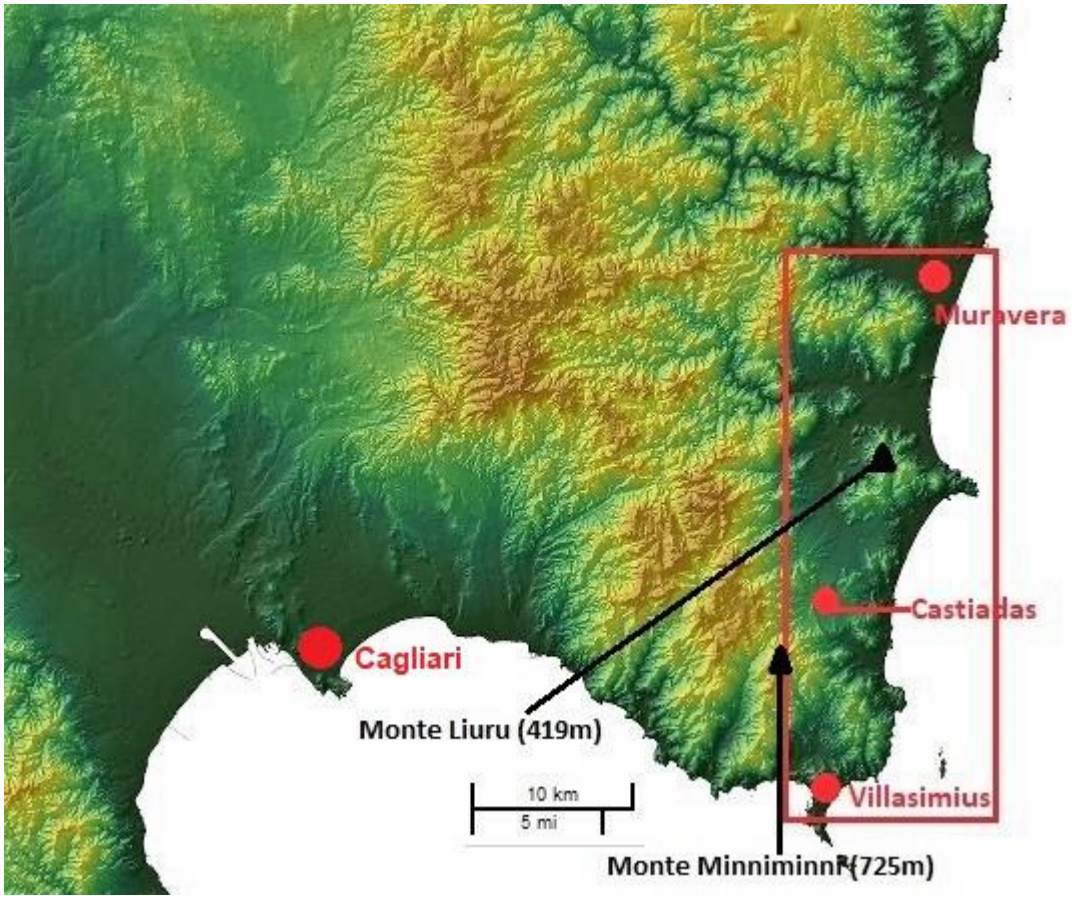


Fig. 20. Topography of South-East Sardinia with sample area 1 marked (source of data: sardegnageoportale.it).

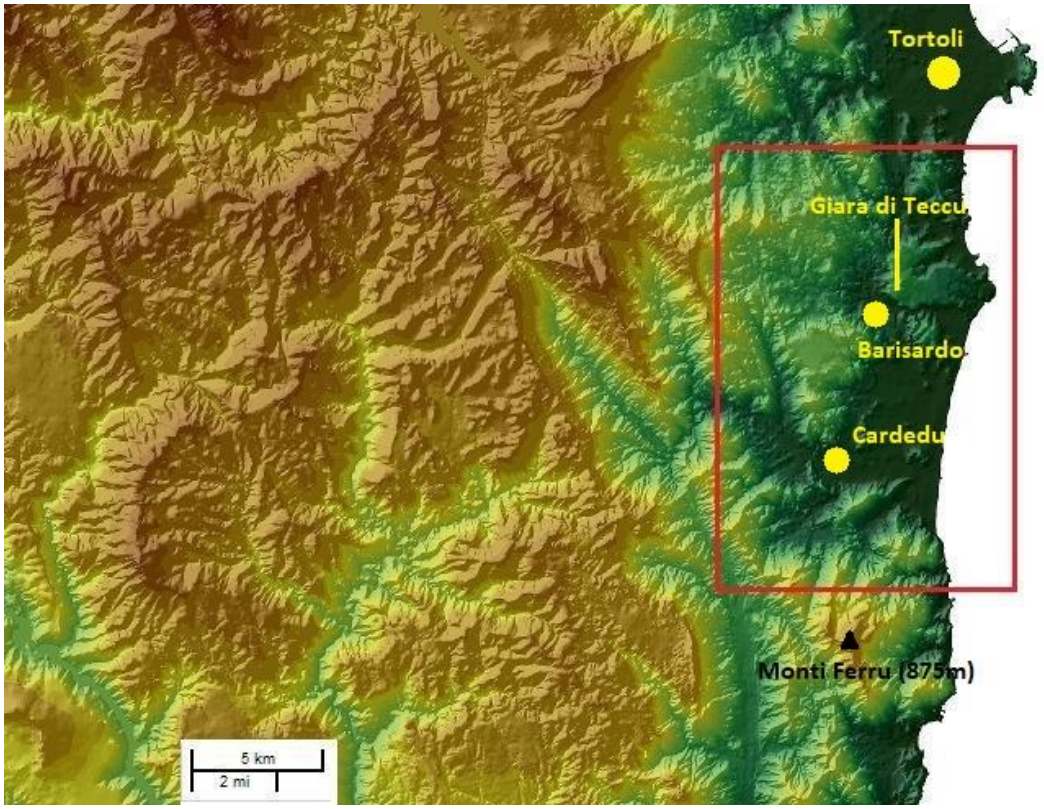


Fig. 21. Topography of central-eastern Sardinia with sample area 2 marked (source of data: sardegnageoportale.it)

Muravera, Castiadas, Villasimius) and Barisardo-Cardedu (sample area 2, Ogliastra, Central-Eastern Sardinia) – preceeded by a presentation of their geographical context.

5.1. Sample areas: a geographical context

As already explained in the discussion of methodology, one of the reasons for selecting both sample areas for this research project is a relatively low degree of agricultural activity, urbanization and other factors significantly altering the prehistoric landscape and obscuring the shape and extent of original settlement networks.

The South-East coast of Sardinia near Muravera, Castiadas and Villasimius (sample area 1, Fig. 20) is about 35km long. The coastline with many small bays varies between beaches and rock outcrops descending directly into the sea. Several small islands, including Isola di Serpentara, Isole Variglioni and Isola dei Cavoli, are within few hundred meters to a few kilometers distance from the coast. The geology dates back to the Palaeozoic era and the topography is dominated by rocky hills and mountains, many of which reach between 100 and 200m altitude or more. Among the major summits located in the central part of sample area 1 are Monte Cannas (260m), Monte Liuru (419m) and Bruncu Perda Sub'e Pari (344m). The western border of the sample area is delimited by mountain massifs, including the massif of Monte Minniminni (725m), Bruncu Su Adulu (782m) and the massif of Monti dei Sette Fratelli (the highest point is Punta Sa Ceraxa – 1016m, Melis et al. 2017: 360) There is also an area of coastal plains, especially in the northern part of the research zone. The hydrological network of this area is very limited, most of the rivers and streams being seasonal. Among the major ones are Rio Senni, Rio Perdosu and Rio Accu Nius.

The study area of the coast near Barisardo and Cardedu (sample area 2, see Fig. 21) is 20km long. The coastline itself is dominated by beaches, while most of the inland area is characterized by lowland coastal plains intersected by chains of hills. The major exception is the plateau of Teccu which rises NE of Barisardo and consists of basaltic rocks of volcanic

origin. Of particular note is the massif of Serra ‘e Ladamini in the northern part of sample area 2, which constitute two parallel rocky ridges. The main type of rock in this area is red porphyry, which is rare in other parts of sample area 2. To the north the area of research is limited by the city of Tortoli, and to the south by the mountain massif of Monte Ferru (875m). Just as in the case of sample area 1, rivers and streams are few and usually seasonal, and there are no natural lakes.

5.2. Sarrabus (sample area 1): history and current state of research

The Nuragic sites of Sarrabus (South-East Sardinia) have so far received only limited attention. A general paper on the prehistoric occupation of Sarrabus was published by Salvi (2008), who admitted that archaeological research in this area is notably underdeveloped, identifying the communes of San Vito, Villaputzu, Muravera and Castiadas as areas with particularly significant potential for future projects (Salvi 2008: 405). Her paper is valuable as an introduction to the prehistory of Sarrabus, focusing on particularly important sites such as *pozzo sacro* Is Pirois (Villaputzu), the Nuragic complex of San Priamo (San Vito) and the standing stones of Cuili Piras (Muravera). However, the publication does not address the wider context of the prehistoric settlement in Sarrabus and its relationship with evidence from other parts of Sardinia, as this was clearly not the purpose of the article.

None of the Nuragic sites near the coast of Villasimius, Castiadas nor Muravera have ever been excavated. In the 1980s, excavations were conducted at the site of Cuccureddus (Villasimius), but were focused on the Phoenician and Roman sanctuary (Marras 1997), not Nuragic settlement.

The major survey in this area was carried out by R. Ledda (1985) who documented the archaeological sites (not only Nuragic) of the old commune of Muravera – its past extent included most of the current commune of Castiadas. He surveyed 71 Nuragic sites, including 54 monuments classified as protonuraghi, five pseudonuraghi, two complex nuraghi and 10

Fig. 22. Two examples of monuments classified as protonuraghi by Ledda (1985) which do not display any typical architectural elements of a corridor nuraghe – Nuraghe Mumosa (left) and Nuraghe Mannu I (right).



Fig. 23. Nuraghe Nicola Podda (Muravera) – a single-towered nuraghe not included in R. Ledda's (1985) survey.



Fig. 24. Nuraghe Porceddus (Villasimius), one of the Nuragic sites not included in Valtan's (2003) publication on the nuraghi in Villasimius.

tombe di giganti. The publication included descriptions of the structures, their plans and photographic documentation. One of the major shortcomings of Ledda's survey was its restriction to the administrative area of the commune of Muravera which limited the possibilities to observe local settlement patterns. Furthermore, Ledda's typology of monuments is now questionable. He classified all the nuraghi without tholos chambers as protonuraghi, while currently this term is used exclusively in relation to the corridor nuraghi – the Early and Middle Bronze Age structures of rectangular (Fronte Mola – Thiesi), oval (Peppe Gallu – Uri) or irregular (Monte Sara – Macomer) shape with a corridor being their main architectural feature. In his survey, Ledda does not distinguish between typical protonuraghi, nuraghi-*capanne* (nuraghe-huts – archaic circular towers without a tholos chamber) and more complex structures without a tholos. As a result, monuments of very diverse architecture (and potentially of different function and period of use) are included in the same category (see Fig. 22). Ledda also missed a number of Nuragic sites in the surveyed territory (including

Nuraghe Nicola Podda – see Fig. 23, Nuraghe Bruncu Su Predi and Protonuraghe Genna Spina). He also paid very little attention to discussion of Nuragic settlement patterns and relations between different types of sites, focusing mainly on the documentation of monuments. Finally, Ledda did not have a chance to employ some of the research tools which have become widely used in landscape archaeology during the last decade, especially GIS, thus his research is partly outdated. Similar issues can be seen in Ledda's later (1989) survey of the Villaputzu commune (north of Muravera), but the quality of photographic documentation and descriptions are better, making this survey more valuable as a potential comparison with the results from the Muravera, Castiadas and Villasimius areas.

The prehistoric sites in the commune of Castiadas were also documented in the unpublished materials compiled and stored in the archive of the Comune di Castiadas. Each site is described, defined in terms of architectural typology, marked on a topographic map and illustrated with at least one photograph. Many of the entries rely heavily upon the results of Ledda's (1985) survey, but some of the recorded sites are not mentioned in any other sources (nuraghi Liuru Ganudu, Baccu Sa Figu and Nuraxeddu, *tomba di giganti* Cuili Camisa, as well as some of the pre- Nuragic sites). Unfortunately, the authorship of these records is unknown.

The state of research on the Nuragic occupation in the area of Villasimius is even poorer. The only publication is a short work by E. Valtan (2003) who described the major nuraghi, mainly the complex ones (Nuraghe Baccu 'e Gattus, Nuraghe Manunzas). The other nuraghi were mentioned in passing and some of them (Nuraghe Porceddus – see Fig. 24, Nuraghe Punta Molentis) completely omitted. Besides general assertions about the strategic distribution of the nuraghi and a possibility that they could have controlled the Foxi river and the coastline (Valtan 2003: 19), no sustained discussion of their distribution patterns nor possible models of interactions between the sites in this area were offered.

An important non-academic contribution to our knowledge about the Nuragic sites of Sarrabus was the Piano Paesaggistico Regionale (Regional Landscape Plan, 2006), a large

scale project, the results of which were published on the government- sponsored Regione Sardegna website. The historical and archeological monuments marked on the maps include sites and structures from all periods of prehistory and history, which are also listed in a catalogue covering the vast majority of the Nuragic sites in Sarrabus.

5.3. Barisardo-Cardedu (sample area 2): history and current state of research

Despite the number of complex nuraghi located near Barisardo and Cardedu, the area has only been surveyed once and never discussed in terms of its settlement networks. The only major survey project which was undertaken in this area resulted in a publication entitled *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio* (Archeosystem 1990). As in the case of Ledda's (1985, 1989) surveys in Sarrabus, the major focus of the project was the documentation of sites rather than their discussion or the analysis of settlement patterns. The records from the communes of Barisardo, Cardedu, Tortoli, Elini, Lanusei and Loceri include site descriptions, coordinates and, in many cases, site plans and photographs. Unfortunately, the maps are of poor quality and suffer from occasional inaccuracies. A particularly important aspect of this survey is the inclusion of several sites preserved only as pottery scatters, as well as records of structures of unsure age, which might be Nuragic (mainly walled structures such as fortifications on Monte Arista, Punta Cea and Baccu Ludurru).

Only one site from sample area 2 has been excavated, Nuraghe Cea (Loceri), and only the preliminary report from this project has been published (Cossu 1997). Since Nuraghe Cea is a complex structure (most of which underwent extension and/or remodeling in the Late Bronze Age), these results are particularly important in terms of establishing the chronology of the Nuragic structures near Barisardo and Cardedu and their temporal sequence. Cossu's excavations were conducted in the area of a bastion, revealing Late Bronze Age material and, thus, allowing interpretation of the bastion as a Late Bronze Age addition, confirming the

chronology of complex nuraghi known from other parts of Sardinia (for more detailed discussion of this issue see Chapter 7).

Lilliu has recorded nuraghi Giba ‘e Scorka and Mindeddu (Barisardo) in his book *I nuraghi: torri preistoriche di Sardegna* (2005: 114, 137), including very detailed descriptions of their architecture, as well as floor plans. However, these monuments were analysed only as examples of specific architectural solutions and plans, serving a wider discussion of Nuragic architecture, and thus were not placed in their regional context.



Fig. 25. The main tower of Nuraghe Sellersu (Barisardo), one of the complex nuraghi in sample area 2.

Pitzalis (2008) has written a chapter on the prehistory of Ogliastra for the edited volume *Ogliastra: storia e societa (vol. 1)*. Besides presenting a general outline of the chronology of Ogliastra’s prehistory (including sample area 2), the author also looked at some sites in sample area 2 in more detail, among them pozzo sacro Su Presoni (Cardedu) and Nuraghe

Puliga (Loceri, Pitzalis 2008: 26-29). Although rather general in approach, this publication helps to place the Nuragic archaeology of sample area 2 in the wider context of the later prehistory of Ogliastra. Pozzo sacro Su Presoni and its architecture were also discussed by Manunza (2000: 126-127) and more recently by M. Webster (2014: 84).

Nieddu's (2006) work *Siti archeologici d'Ogliastra* is another general publication, although it is more site-oriented than Pitzalis' article. It covers the main prehistoric sites in all communes of Ogliastra. Sample area 2 is represented by Nuraghe Nurta (Elini), Nuraghe Cea (Loceri) and the pre-Nuragic rock-cut tombs at Funtana Su Rettore (Barisardo) and Monte Arista (Cardedu). Although an outline of Sardinian prehistory and its chronology is provided, there is no attempt to offer regional contextualization in relation to the described sites.

Bagella (1998) has included two monuments from the commune of Barisardo (protonuraghi Geperarci and Foxi) in her catalogue of the corridor nuraghi in Sardinia (nowadays in much need of an update).

In recent years the efforts of the Gruppo Archaeologico di Barisardo, including M. Castoldi and R. Pilia, have contributed tremendously to our knowledge of prehistoric remains in the commune of Barisardo. Locally conducted surveys have been able to locate and record several previously unknown *domus de janas* (pre-Nuragic, mostly Late Neolithic rock-cut tombs), the probable remains of a protonuraghe and open settlement at Baccu Argiolaisi, as well as the approximate positions of two destroyed *tombe di giganti* on the plateau of Teccu. The activity of the Gruppo Archaeologico di Barisardo is not limited to surveys, but includes also site conservation and raising public awareness about the archaeological heritage of this area. As a result, Nuraghe Sellersu (Barisardo, see Fig. 25), one of the best preserved complex nuraghi in sample area 2, was cleared of thick vegetation (including the surrounding Bronze Age settlement) and made accessible for the public in 2014. A similar project is planned for Nuraghe Iba Manna and its surrounding settlement. Unfortunately, Nuraghe Moru, the best preserved complex nuraghe in the commune of Barisardo, cannot undergo such

cleaning and restoration due to the fact that the roots of the vegetation have deeply penetrated the walls of the structure and their removal would threaten its stability (Pilia, personal communication). Nevertheless, further assessment and revitalization of the Nuragic monuments on the plateau of Teccu has the potential to contribute to our understanding of the Nuragic settlement in this area.

5.4. Other parts of the east coast of Sardinia

Some other areas of the east coast of Sardinia have received more attention both in terms of excavations and surveys. The distribution patterns of the sites on the Gulf of Orosei (north of Barisardo and Cardedu) are relatively well recognized, which has allowed not only understanding of the Nuragic occupation in this area (Moravetti 1998b), but also the significance of pre-Nuragic ritual monuments and their territorial function, which may have partly continued into the Nuragic period (Spanedda and Camara Serrano 2009). The excavations carried out at Nuraghe Bau Nuraxi (Trieri, Sanges 2009) provide evidence for Late Bronze Age occupation of this site, confirming that the widely documented pattern of settlement nucleation in this period occurred at least in some of areas of the east coast. The excavated Nuragic village of Serra Orrios (Dorgali) remains one of the most important open settlements in Sardinia and provides valuable insight into the chronology and functions of large sites without nuraghi. The excavations revealed that the settlement was constructed over several phases, with the rectangular megaron temples being a Late Bronze Age development preceded by some of the archaic buildings such as hut 49 (Moravetti 1998b: 53). Among the finds from Serra Orrios of particular significance are the lithic assemblages from the Nuragic period, primarily due to ornamentation on one of them and relative scarcity of stone tools in the Nuragic material (Usai 1980: 141).

The other relatively well researched area of the east coast of Sardinia is the NE coast near Arzachena (Costa Smeralda) which is part of the Gallura region. The Nuragic occupation in

this area is not particularly dense, but with excavated sites such as Nuraghe Albucciu, well-preserved ritual monuments of clearly distinguishable typology (*tomba di giganti* Coddu Vecchiu, *tomba di giganti* Li Lolghi) and regional studies (Antona Ruju and Ferrarese Ceruti 1992), the patterns of Nuragic occupation in this area are relatively clear. The presence of *tafoni* tombs and their use in the Bronze Age (Antona Ruju and Ferrarese Ceruti 1992: 18) provides valuable information about the structure of Nuragic societies, confirming their stratification towards the Later Bronze Age and Iron Age. This phenomenon is clearly manifested in the western part of the island through large complex nuraghi (Webster 1996: 117-121) and sculpture (Lilliu 1956) and in differences in diet, general health and types of injury revealed by bones from *tafoni* compared with those from contemporary *tombe di giganti*, revealing that the people buried in tafoni were probably of lower social status (Depalmas and Melis 2010: 179).

Another relatively well-researched area of the east coast of Sardinia is around Santa Teresa Gallura (Antona Ruju 2005), in the North-Easternmost most part of Sardinia. The Nuragic occupation here is dispersed and of low density – only six unquestionably Nuragic sites were recorded (Antona Ruju 2005: 8-9) – although some of the monuments are in particularly good condition, such as the *tomba di giganti* and settlement of Lu Brandali (Antona Ruju 2005: 39) and *tomba di giganti* La Testa (Antona Ruju 1991: 115). The area does not show any signs of the emergence of territoriality, even though some of the nuraghi are complex in structure. This suggests that at least some of the nuraghi were extended into complex structures for reasons other than social differentiation and the expression of power in the Late Bronze Age. The site of Monte Sajacciu (south of Santa Teresa di Gallura) has been excavated and turned out to be an exedra (similar to those in *tombe di giganti*), but without any traces of a burial chamber (Solinas 1991: 92) – it is one of many examples of atypical forms of Nuragic architecture in the northern part of Sardinia.

Some of the sites near Olbia attracted the particular attention of archaeologists, mainly due

to their good state of preservation. The sacred well of Sa Testa (Olbia) being among the best preserved in Sardinia, has mainly produced finds from the Late Bronze Age (Depalmas 2005: 40), but was used also in the Punic and Roman periods. It consists of an oval courtyard of 8.30 x 7.40m diameter with a bench running around its inner perimeter, a stairwell with 17 steps and a tholos chamber of 5.25m in height. Contu (1999: 136) suggests the existence of a small circular tower directly over the chamber would have made the well a visible feature in the landscape. Among the finds were numerous types of bronze artifacts (Lo Schiavo 2004: 34). Another important site near Olbia is Nuraghe Cabu Abbas (Olbia), which consists of the main tower located on a rocky summit, as well as two adjacent walls and an antemural enclosing the area below the hilltop. The site is particularly important, as it produced evidence of being transformed into a sanctuary in the later phases of the Nuragic culture (Petrioli 1999).

Moving south of Olbia, P. Mancini (2010) has studied the prehistoric occupation in Gallura di San Teodoro, which includes the coastline north of the town of San Teodoro. Among the recorded sites are nuraghi Ottiolu, Moru, Lu Naracheddu and Lu Monti Lisciu, as well as several tafoni. An interesting observation made by Mancini (2010: 84) are the cases of use of small rock shelters as integral parts of Nuragic settlements in this area, conveniently using the natural topography of the rocky area near the east coast.

15km south of San Teodoro there is Nuraghe San Pietro (Torpe), one the best preserved complex nuraghi in this part of Sardinia. In a disturbed context inside the main tower, a fragmented male clay figurine was discovered together with several small vases with comb-impressed ornaments and bronzes, dateable to the Late Bronze Age or Early Iron Age (Babbi 2012: 1541). Another important find from the same nuraghe is a bronze mirror with a pierced handle decorated with zoomorphic and geometric motifs (Lo Schiavo 2005a: 352). The Nuragic monuments in the commune of Torpe were documented by Pala (2012), who recorded several previously unknown nuraghi, such as Nuraghe San Giovanni and Nuraghe Sa Sedda de Sas Crejuras (Pala 2012: 63-66).

The Nuragic complex of Sa Linnarta (Onifai, south of Thorpe and over 60km north of the northern edge of sample area 2) was excavated in 1997. It consists of a sacred well, nuraghe and settlement and was re-used and extended in the Roman period. The site proved to be important in terms of architectural typology, as the floor plan of the sacred well does not match any other pozzo sacro in Sardinia, constituting a hybrid between the sacred well and a Nuragic spring – two major types of monuments associated with a water cult in the Late Bronze Age and Iron Age. Unfortunately, the stratigraphic sequence inside the well turned out to be completely lost, thus the chronology of this unique monument remains unclear (Massetti 1997: 201).

Closer to both sample areas covered in this project, significant research has been done in the commune of Tertenia, primarily in two of its best preserved complex nuraghi Nastasi and Aleri. V. Cannas' (1972) extensive work on both of these sites includes their detailed descriptions, plans and discussion of the assemblages, particularly the ones from Nuraghe Aleri. Among these is pottery, including shallow pans (tegami), bowls (ciotole) and carinated cups (tazze carenate), as well as metal objects including weapons (Cannas 1972: 26). Later, Nuraghe Nastasi received attention from Basoli (1980), who published the results of excavation and architectural analysis of the monument. Unfortunately, the excavations failed to identify any area with well-preserved stratigraphy, but they produced finds which include pieces of a probable Cypriot oxhide ingot (further evidence for contacts between Sardinia and the Aegean), as well as numerous tegami and bowls of several different types, including carinated and globular ones (Basoli 1980: 431-434).

Directly north of sample area 2, south of the city of Tortoli, there is the Nuragic complex of Ortali 'e Su Monte (Tortoli), which includes two complex nuraghi, a settlement and *tombe di giganti*. The main nuraghe consists of the central tower and antemural. The results of its excavation were published by Cabras (1992). The trenches opened near the antemural unearthed pottery assemblages dateable to the Late Bronze Age and Early Iron Age, as well

as silos with associated large storage jars and traces of cereals (Cabras 1992: 182-183). These finds not only provide a valuable insight into the Late Bronze Age and Early Iron Age economy, but also confirm that settlement nucleation on the east coast was, in fact, a Late Bronze Age phenomenon, just as in the western part of the island. A more extensive publication on the complex of Ortali ‘e Su Monte was recently published by M.A. Fadda (2012).

An important work of more general scope was published by M.R. Manunza. Her article “I nuraghe della valle del Golgo e altri monumenti nascosti dell’Ogliastra” in the edited volume *Ogliastra: identita storica di una provincia* (2000, edited by M.G. Meloni and S. Nocco) covers the Nuragic sites primarily in the area of Baunei, but also Tortoli and Cardedu.

5.5. Conclusions

The east coast of Sardinia has received much less attention than the western part of the island. Study of this area has significant potential not only due to the insufficiency of earlier research, but also due to the great diversity of Nuragic settlement patterns in different areas of Sardinia (Depalmas and Melis 2010). So far the research done in both sample areas chosen for this project has focused mainly on documentation of the Nuragic sites without much discussion of the complexity of the prehistoric landscape and interactions between different types of sites. Likewise, no elements of contemporary theories of networks have yet been employed. Moreover, the documentation of sites done in the 1980s and 1990s remains incomplete and in some areas greatly oversimplified. This is significant in the context of the monuments’ typology, which is one of the means of establishing the archaeological chronology of the researched areas. These circumstances emphasized the need for a new in-depth survey of both sample areas.

The more extensive research projects undertaken in such areas of the east coast as the

Gulf of Orosei and the Costa Smeralda provide opportunities for a comparative study and an attempt to build a wider picture of Nuragic occupation and its potential diversity in this part of the island, as well as its comparison with the better understood Nuragic patterns of the western coast. The main challenge is the general underemployment of new interpretetive approaches in Sardinian archaeology, evident in the history of research on the Nuragic east coast, which has so far limited possibilities to compare social aspects of the settlement dynamics and networks in different parts of the island.

Chapter 6. The Early and Middle Bronze Age (2000-1200 BC)

Summary. *The Early and Middle Bronze Age evidence from both sample areas of the east coast of Sardinia reveals similarities and differences between the Nuragic occupation of Ogliastra and Sarrabus during the periods in question. The results of the surveys of sample area 1 indicate a close relationship between the distribution of pre-Nuragic and Nuragic sites, suggesting that in this area the Chalcolithic to Early Bronze Age transition might have occurred with a significant degree of continuity. Furthermore, the evidence for Middle Bronze Age occupation in this area consists primarily of protonuraghi and archaic single-towered nuraghi without tholos chambers, usually located on hilltops and in other defensive locations. Lack of evidence for territoriality here supports the common interpretation of single-towered nuraghi as belonging to individual households. In sample area 2 we see very archaic Nuragic architecture in the massif of Serra 'e Ladamini (possibly representing the earliest Nuragic occupation in this area), but the overall percentage of single-towered nuraghi in this area is remarkably low (16%). There is significant evidence which might indicate the emergence of territoriality on the plateau of Teccu, which could be a result of either cooperation between several families or clans resulting in the emergence of a territorial unit, or a consistent strategy of building the nuraghi on the edges of this plateau over centuries, presumably to use it as a natural territorial boundary. In both sample areas we see significant variability in the distribution of the megalithic tombs, some of them being paired with specific nuraghi, while others seem to have been used by inhabitants of diverse settlements. This might indicate that various* tombe di giganti *in both sample areas were built in different periods, or that their social significance differed on a case-by-case basis.*

Discussion of the Early (1800-1500 BC) and Middle (1500-1200 BC) Bronze Age of the east coast of Sardinia raises particular problems in terms of the chronology of these two periods.

These difficulties are observable on two levels: firstly, there are the overall limitations in understanding the early Nuragic chronology, secondly there are the specific local problems characteristic for the sample areas. The former issues have been discussed in detail in Chapter 2 and include the insufficient number of radiocarbon determinations for the protonuraghi and early tholos nuraghi, chronological overlaps between these two types of structures, insufficient understanding of the Early Bronze Age societies and the significance of the Bell Beaker phenomenon in Sardinia, as well as limited knowledge about the first centuries after the collapse of the Chalcolithic Monte Claro culture which occurred about 2300 BC. On the local level the problems arise mainly from the lack of archaeological excavations and radiocarbon determinations from both sample areas, as well as in relation to the traditional typology of the preserved monuments. The latter problem particularly concerns sample area 1, where possibilities of distinguishing between the Early and Middle Bronze Age monuments on the basis of their typology are extremely limited. Thus, I have decided to discuss both periods in just one chapter. This decision was also influenced by the fact that the Sardinian Middle Bronze Age developments in the areas of pottery, social structure and architecture seem to be a direct continuation of these seen in the later phase of the Early Bronze Age.

In this chapter I seek to analyse the Early/Middle Bronze Age landscape of both sample area 1 (the coast near Muravera, Castiadas and Villasimius) and sample area 2 (the coast near Barisardo and Cardedu). I will discuss the settlement patterns (including possible evidence for territoriality or lack of thereof, and the use of the coastline), the relationship between domestic and burial/ritual sites, as well as the relationship between the pre-Nuragic and Nuragic sites in the context of the Chalcolithic to Early Bronze Age transition. In all these aspects the results from my research on the east coast will be compared to the patterns from other parts of the island. Attention will also be paid to the contrasts and similarities between the results from both sample areas.

6.1. The Early and Middle Bronze Age in sample area 1

The earliest chronological aspect of the Nuragic occupation of Sardinia is the Chalcolithic to Early Bronze Age transition, a process which is still very poorly understood, both in terms of its nature and chronology. There is little doubt that around 2300 BC the settlement system of the Monte Claro culture, based mainly on fortified settlements, such as Monte Baranta (Moravetti 2000a) or Monte Ossoni (Melis 2007: 20-21), and the occupation of the Campidano (South-West Sardinia), collapsed through abandonment. As I have already stated, the first few hundred years following this event which eventually lead to the emergence of the Nuragic culture remain extremely unclear. We know that during this period elements of the Bell Beaker package reached Sardinia, but this was probably the result of the movement of ideas rather than of the flow or migration of people. This is indicated by the absence of Bell Beaker settlements founded ex novo, with the presence of Beaker pottery limited mainly to burial contexts – 67% of them are re-used Neolithic rock-cut tombs (*domus de janas*) and 12% are natural caves (Pau 2010: 122). Much more important for the emergence of the Nuragic culture was the Early Bronze Age Bonnanaro culture, the pottery of which is known mainly from burial contexts, such as the hypogeum at Cuccuru Craboni (Maracalagonis) – a re-used tomb dating back to the Chalcolithic period (Lilliu 1999b: 20). The presence of Bonnanaro pottery in the earliest nuraghi (Trobas – Lunamatrona, Lilliu 1999b: 24) and poor recognition of Bonnanaro settlement patterns and social relations raise further questions about the nature and chronology of the Chalcolithic to Early Bronze Age transition. How big was the time gap between the Monte Claro culture and the earliest protonuraghi? Was there any connection between the Late Neolithic and Chalcolithic settlement patterns and those of the Nuragic culture? To what extent were pre-Nuragic sites re- used in the Early and Middle Bronze Age? Certainly, landscape archaeology cannot answer all these questions, but comparison of the distribution of pre-Nuragic and Nuragic sites on the east coast might contribute to the

understanding of this insufficiently researched period of Sardinian prehistory.

In sample area 1 (the area around Muravera, Castiadas and Villasimius on the South-East coast of Sardinia) I have identified 46 pre-Nuragic sites, most of which were previously recorded by Ledda (1985). In this number there are 8 *domus de janas*, pre-Nuragic rock-cut tombs associated mainly with the Ozieri culture and attributed to the Late Neolithic. Some 27 sites with standing stones or stone rows can be attributed to the Late Neolithic or Chalcolithic period. Among the other 11 sites there are Late Neolithic settlements of the Ozieri culture and *allèe couverte* megalithic tombs with elongated chambers. 34 out of 46 (74%) of these pre-Nuragic sites have Early or Middle Bronze Age ones associated with them (see Table 6 and Appendix 3). In particular, there are some nuraghi built on hilltops directly over earlier rock-cut tombs (*domus de janas*) – examples include nuraghe and *domus de janas* Monte Nai (Muravera), nuraghe and *domus de janas* Monti Ferru (Muravera, see Fig. 27), and nuraghe and *domus de janas* San Priamo (San Vito). The difference in function between these two types of sites does not rule out the Bronze Age re-use of the rock-cut tombs by inhabitants of the nuraghi – a clear relationship between domestic and funerary architecture was visible already in pre-Nuragic times (Meloni 1998), and we know examples of *domus de janas* re-used in the Nuragic period, for example Sa Figu – Ittiri (Melis 2002: 10). Also, there are several cases of nuraghi built next to pre-Nuragic (Late Neolithic or Chalcolithic) stone rows. Such a relationship exists, for example, between Nuraghe S'Omu S'Orcu and the stone rows of Santa Giusta (Castiadas), as well as between the standing stones of Scalas (Muravera) and protonuraghe of the same name. It is difficult to distinguish a precise time gap between the construction of the stone rows/standing stones and the Early and Middle Bronze Age sites, since the dating of the Sardinian standing stones is not clear. The monumental menhirs found commonly in the western part of the island, such as Curru Tundu – Villa Sant' Antonio or Giorgia Rajosa – Noragugume (Moravetti 1998a: 709) are commonly associated with the Ozieri culture, while the statue-menhirs are attributed to the Chalcolithic period (Atzeni 2004,

Robb 2009: 165), but were sometimes found in association with the stone rows (Perda Iddocca and Corte Noa – Laconi) or re-used in Nuragic contexts, such as *tombe di giganti* (Moravetti 1984) and nuraghi (Orrubiu – Laconi, Cicilloni 2008: 214-217). Finally, it is worth mentioning the necropolis of Monte Crobu (Castiadas), where next to two Nuragic *tombe di giganti* there are further remains of megalithic tombs, possibly more than one Late Neolithic *allée couverte* (although it is possible that these are further *tombe di giganti* preserved in a worse condition – without the exedra). A similar example is found at Bau S'Arena (Muravera), where a few meters from the *tomba di giganti* and below Protonuraghe Sa Ridroxi there is a megalithic tomb which Ledda (1985) interprets as an *allée couverte.* Lack of any distinguishable remains of an exedra supports this interpretation, although scarcity of known dolmens in Southern Sardinia, (Cicilloni 2009: 207) suggest it might be a *tomba di giganti* without exedra. These cases (see Fig. 26) indicate a continuity of burial sites from the pre-Nuragic to Nuragic period, they will be discussed in more detail in this chapter in the analysis of the relationship between settlement and funerary sites.

Such a high percentage of pre-Nuragic sites associated with Early or Middle Bronze Age sites might indicate that the Chalcolithic to Early Bronze Age transition on the South-East coast of Sardinia was not necessarily the result of a complete collapse of the pre-Nuragic societies, as happened in other parts of the island. It is widely asserted that the demise of the Monte Claro culture was caused by climate change and overuse of land (Lewthwaite 1986, Webster 1996: 61). This is plausible, since over 65% of the Monte Claro settlements were located in the fertile areas of the Campidano. However, due to the relatively poor soils of the South-East coast and mountains covering much of the coastal zone, it is reasonable to suggest that the basis of the pre-Nuragic economy in this area was not crop cultivation. In this case the local societies would have been less affected in terms of economy and subsistence

Name of site	***Type of site***	***Chronology***	***Associated Nuragic site(s)***
Annunziata	standing stone	Neolithic / Chalcolithic	–
Arcu Prumareddu	standing stones (stone row)	Neolithic / Chalcolithic	–
Arcu S'Accile	standing stones (stone row)	Neolithic / Chalcolithic	–
Baccu di Monte Nai	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Baccu di Monte Nai
Baracca Su Entu	standing stones (stone row)	Neolithic / Chalcolithic	Protonuraghe Baracca Su Entu
Bau S'Arena	*allée couverte*	Neolithic / Chalcolithic	*Tomba di giganti* Bau S'Arena
Bau S'Arena	menhir	Neolithic/ Chalcolithic	*Tomba di giganti* Bau S'Arena
Brai Loi	natural cave	Neolithic	Nuraghe Nicola Podda
Brai Loi	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Nicola Podda
Cala Pira	standing stones (stone row)	Neolithic / Chalcolithic	–
Costa Sa Perdera	Ozieri settlement	Neolithic	Nuraghe Monti Ferru (Loc. Costa Sa Perdera)
Costa Sa Perdera	*domus de janas*	Neolithic / Chalcolithic	Nuraghe Monti Ferru (Loc. Costa Sa Perdera)
Cristolaxeddu	megalithic complex	Neolithic / Chalcolithic	Antoni Peppi settlement
Cuili Becciu	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Monte Gruttas
Cuili Piras	standing stones (stone row)	Neolithic / Chalcolithic	Protonuraghe Monte Crobu
Don Giovanni Mattaciolu	*domus de janas*	Neolithic / Chalcolithic	Nuraghe Don Giovanni Mattaciolu
Don Giovanni Mattaciolu	pre-Nuragic settlement	Neolithic / Chalcolithic	Nuraghe Don Giovanni Mattaciolu
Foresta Acqua Callenti	standing stones (stone row)	Neolithic / Chalcolithic	–
Ibba Sa Crescia	standing stones (stone row)	Neolithic / Chalcolithic	–
Mont'Arbu	standing stones (stone row)	Neolithic / Chalcolithic	*Tomba di giganti* Mont'Arbu
Monte Crobu	Ozieri settlement	Neolithic	Protonuraghe Monte Crobu
Monte Crobu	*allée couverte*	Neolithic / Chalcolithic	Protonuraghe Monte Crobu, *tomba di giganti* Monte Crobu
Monte de Sirbonis	*domus de janas*	Neolithic / Chalcolithic	–
Monte Madau (Is Pilastrus)	Ozieri settlement	Neolithic	–

Monte Madau	*domus de janas*	Neolithic / Chalcolithic	–
Monte Nai	*domus de janas*	Neolithic / Chalcolithic	Nuraghe Monte Nai
Monte Zippiri	*domus de janas*	Neolithic / Chalcolithic	Nuraghe Monte Zippiri, *tomba di giganti* Monte Zippiri
Monte Zippiri	*tafoni*	Neolithic / Chalcolithic	Nuraghe Monte Zippiri, *tomba di giganti* Monte Zippiri
Monti di Villa Castiadas	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Idda
Ottixeddus	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Bruncu Ottixeddu
Perda Diana	natural cave	Neolithic	–
Piscina Rei	standing stones (stone row)	Neolithic / Chalcolithic	–
Pranu Ontroxiu	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Monte Ontroxiu
Pranu Sa Siliqua	standing stones (stone row)	Neolithic/ Chalcolithic	–
S'Enni	Ozieri settlement	Neolithic	Nuraghe Cuili S'Enni
S'Enni	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Cuili S'Enni
Sa Iba S'Arridelu	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Piscareddu
Sa Ridroxi	standing stones (stone row)	Neolithic / Chalcolithic	Protonuraghe Sa Ridroxi
Sa Ridroxi	*allée couverte*	Neolithic / Chalcolithic	Protonuraghe Sa Ridroxi
San Priamo	*domus de janas*	Neolithic / Chalcolithic	Nuraghe San Priamo II
Santa Giusta	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe S'Omu 'e S'Orcu
Scalas	standing stones (stone row)	Neolithic / Chalcolithic	Protonuraghe Scalas
Stagno di Santa Giusta	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Tersilia
Su Braccu	standing stones (stone row)	Neolithic / Chalcolithic	Nuraghe Domu de S'Orcu
Su Sciusciu	standing stones (stone row)	Neolithic / Chalcolithic	Protonuraghi Su Sciusciu I and II
Su Tasuru	*domus de janas*	Neolithic / Chalcolithic	Nuraghe Su Tasuru I

Table 6. The Pre-Nuragic sites in sample area 1 with the associated Nuragic sites.

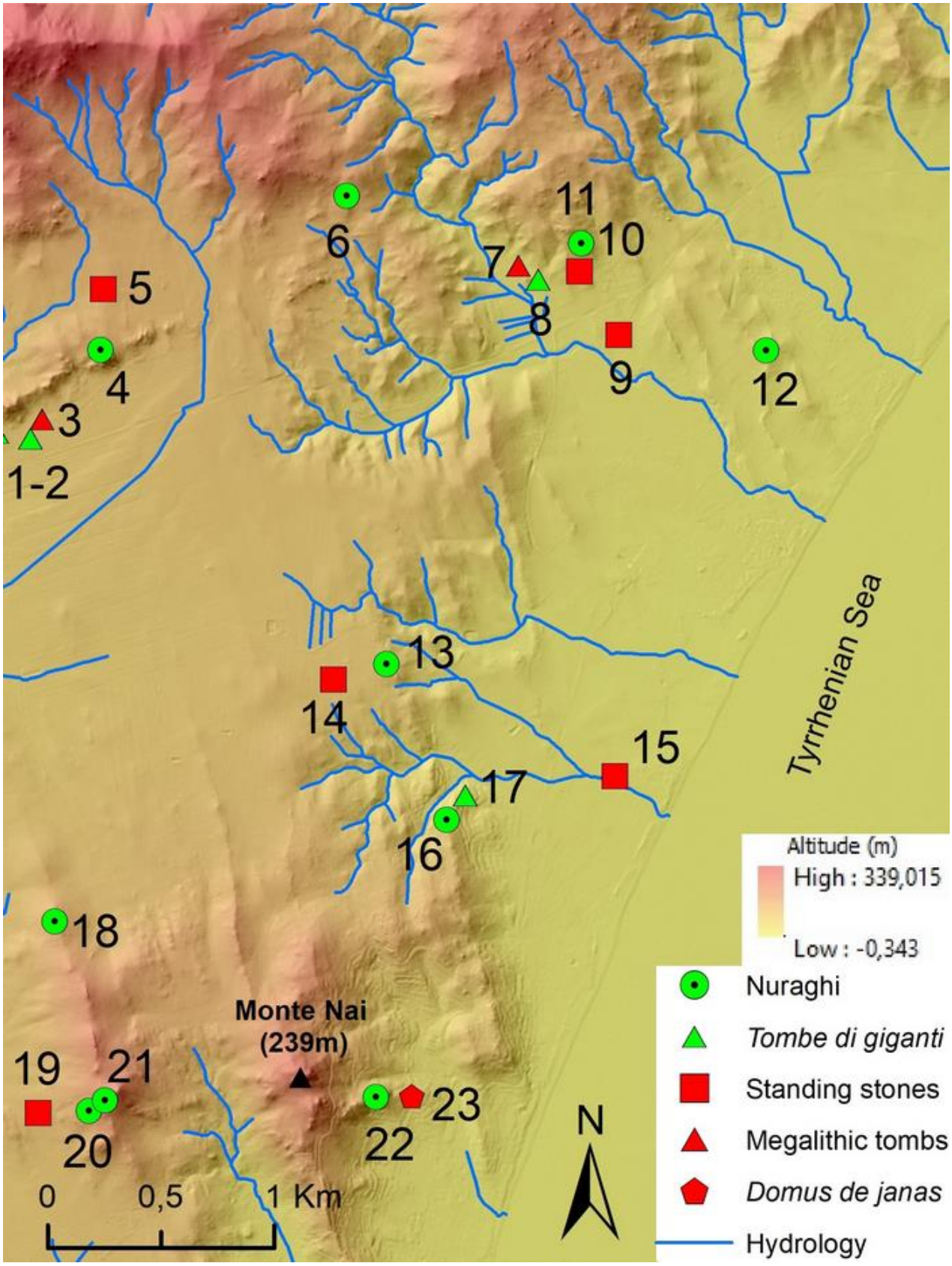


Fig. 26. Distribution of pre-Nuragic (red) and Nuragic (green) sites near Costa Rei (in the northern part of the Muravera commune and southern part of the Castiadas commune). 1-4 – Monte Crobu, 5 – Cuili Piras, 6 – Arrubiu, 7-9 – Bau S'Arena, 10-11 – Sa Ridroxi, 12 – Sa Iba de Ziu Franciscu, 13-14 – Scalas, 15 – Piscina Rei, 16-17 – Mitza Sa Granaccia, 18 – Su Modditzi, 19 – Su Sciusciu, 20-21 – Su Sciusciu I and II, 22-23 – Monte Nai.



Fig. 27. Domus de janas *Monti Ferru (Muravera) – a rock-cut tomb with three chambers, probably associated with the Ozieri culture.*

by any overuse of land and climate change occurring in the second half of the third millenium BC. Thus, partial survival of the earlier societies at least into the unclear first phase of the Early Bronze Age seems more plausible here than in the western part of the island, and is supported by the pattern of clear association between the pre-Nuragic and Nuragic sites which I have demonstrated. This does not mean that social changes did not occur – a dominance of ritual sites (standing stones, stone rows) and their absence in the Early and Middle Bronze Age might indicate decline of an upper class of priests as suggested by Webster (1996: 81), marking a change towards early Nuragic non-hierarchical societies.

6.1.1. Settlement patterns and territoriality

In sample area 1 I have recorded 124 sites (see Appendix 1), the majority of which can be associated with the first two phases of the Nuragic culture – 1800-1200 BC in G. Lilliu's (1999:

12) chronological model. 76 of these I have identified as protonuraghi, single-towered nuraghi or nuraghi-*capanne* (six of them with settlements). Due to very subtle architectural differences between many structures falling into these three categories (in many cases limited to length of the corridor, extent of the chamber and overall plan), differences that are in most cases insufficient to draw a clear distinction between the monuments in terms of their chronology or function, I decided to analyze them as a single category of site. A further 20 monuments are complex nuraghi of different forms (three of them with settlements), 15 being nuraghi of undefinable typology (in most cases likely to fall into the category of protonuraghi / single-towered nuraghi / nuraghi-*capanne*) and three being open settlements without a nuraghe. In addition there are 10 sites of *tombe di giganti* (three of them completely destroyed). Three sites of nuraghi reported in the past did not produce any evidence for existence of a Nuragic structure.



Fig. 28. Corridor of Protonuraghe Is Laccus (Castiadas), a typical example of a corridor-type nuraghe (protonuraghe).

The protonuraghi (see Figs. 1 and 28) have been considered for a long time to be typical Early Bronze Age structures (Webster 1996: 68-69, Lilliu 1999b: 12), but more recent research, most notably the excavations of Protonuraghe Serbine (Borore, Webster 2001: 6), indicate that at least some of them were constructed in the Middle Bronze Age and inhabited even until the Iron Age and after the Punic conquest of the island. Moreover, there is a group of mixed-type nuraghi (*nuraghi misti*) which display architectural elements of both protonuraghe and tholos nuraghe (Usai 1990, Ugas 2005: 83, Puggioni 2009: 57-61, Dore 2010, Namirski 2012). This indicates a gradual development between these two types of structures (at least in some parts of Sardinia), which introduces a further complication into the chronological relationship between them. Thus, considering the protonuraghi preserved between Muravera and Villasimius as clear evidence for an Early Bronze Age presence in this area would be an oversimplification. Nevertheless, the protonuraghi can be considered with confidence as part of the Early or Middle Bronze Age settlement network – no evidence is known for their construction in later phases of the Nuragic culture in any part of Sardinia. It should be noted that the monuments which I have identified as protonuraghi differ in terms of their typological clarity – some of them are very obvious corridor structures (Is Laccus – Castiadas, Mortus – Muravera), while I have identified others only with caution (mostly due to severe damage including the complete collapse of internal spaces) on the basis of their overall plan and use of natural rocks as integral parts of the structure (Su Tasuru II – Muravera, Perdiaxiu – Muravera). A good number of these monuments could instead be interpreted as nuraghi-*capanne* (Fig. 35). Due to this poor state of preservation of many structures, it is difficult to attribute them to the specific types of protonuraghi defined by Ugas (2005: 72-77), although it is possible in isolated cases – for example Protonuraghe Is Laccus (Castiadas) is a clear example of a type C protonuraghe (with a closed corridor). It is necessary to bear in mind, however, that given the limited number of excavated and radiocarbon-dated nuraghi this typology can have very limited significance for our

understanding of the chronology and different functions of these monuments. A clear characteristic of the protonuraghi between Muravera and Castiadas is the use of natural rock outcrops as integral parts of the structure (see Fig. 31 and Appendix 1) – this is observable in 23 out of 32 monuments (72%), which is another example of primitive construction of the Nuragic monuments in this area.

The second major type of Early/Middle Bronze Age site in sample area 1 is the single-towered nuraghe (*monotorre*, see Figs. 29, 33 and 34), which include both typical tholos-chambered towers and so called nuraghi-huts (nuraghi-*capanne*). It is difficult to distinguish between them for the same reason as in case of the protonuraghi – namely their poor state of preservation. The single-towered nuraghi (*monotorri*) are typical Middle Bronze Age structures with tholos chambers and intra-mural staircases. By contrast, nuraghi-*capanne* are less sophisticated structures – they reached only a limited height and had small chambers without a tholos dome and most likely did not have an upper floor (unless it was constructed of wood). One of the most extensively researched structures of this type in Sardinia is Nuraghe Sa Corona – Villagreca (Atzeni 1966, Lilliu 1999b: 13-14) where sherds of the Chalcolithic Monte Claro pottery were discovered, suggesting an early origin of these structures. However, currently this interpretation is questionable due to the poor stratigraphic recording of the site. Nevertheless, at Duos Nuraghes (Borore) the archaic single-towered nuraghe without a staircase was proved to date back to circa 1800 BC (Webster 2001: 19). Thus, just as in case of the protonuraghi, there is no clear-cut line between nuraghi-*capanne* (these constitute the majority among the 44 single-towered sites which I recorded in sample area 1) which can be attributed to the Early Bronze Age and those of Middle Bronze Age origin. This difficulty provides further support to the idea of including the protonuraghi, single-towered nuraghi and nuraghi-*capanne* in one site category in the analysis of Early and Middle Bronze Age settlement networks in this region. Among the most obvious examples of nuraghi- *capanne* in sample area 1 are Monte Turno (Castiadas), Cruxi (Castiadas) and Garrabosu (Muravera). A

few better preserved single-towered nuraghi with tholos chambers in sample area 1 (Idda – Castiadas, Monte S'Ollastinu – Castiadas) can be more firmly attributed to the Middle Bronze Age due to their more advanced construction and the general sequence of architectural development in Nuragic Sardinia. Amongst the 44 single-towered nuraghi I have included some single- towered structures with a small bastion (Monte Zippiri – Muravera, Brabudu – Castiadas). Each bastion is likely to have been built together with the tower as a single project rather than being a Late Bronze Age addition.

The complex nuraghi are generally a Late Bronze Age development in Sardinia, with the largest examples such as Su Nuraxi (Barumini, Lilliu and Zucca 2005), Seruci (Gonnesa, Santoni 2010) and Santa Barbara (Macomer, Moravetti 1986) located in the western part of the island. Between Muravera and Villasimius I recorded 20 complex nuraghi of various plans, some of which are typical Late Bronze Age multi-towered nuraghi (S'Acqua Seccis – Muravera, S'Omu S'Orcu – Castiadas), which I will discuss in Chapter 7, but there are also complex structures of very archaic construction with small towers lacking a tholos chamber. These could have been built as a single project in the Middle Bronze Age. A striking example here is Nuraghe Corritta (Muravera). This complex nuraghe is located on the narrow ridge of a hill, and the enlongated structure consists of three towers connected by a bastion. None of the towers has traces of a tholos chamber, which indicates an archaic construction similar to those of the EBA-MBA nuraghi-*capanne*, while a very efficient use of space on the ridge of a hill indicates that the nuraghe was built as a single project. Thus, such a structure is likely to date back to the Middle Bronze Age. This idea is supported by the examples of complex nuraghi from the central part of the island which were built as a single project in the Middle Bronze Age, such as the central bastion of Nuraghe Arrubiu (Lo Schiavo and Sanges 1994) and Nuraghe Nolza (Cossu and Perra 1998). Only seven out of 20 complex nuraghi display clear evidence for the existence of a tholos chamber, but even those could have originated from the Middle Bronze Age single-towered structures which were extended in the Late

Bronze Age.

The precise forms of 15 nuraghi in sample area 1 cannot be distinguished due to their very poor state of preservation. Nevertheless, in most of these cases, distinguishable remains allow us to assess the structures as being, like the majority of the nuraghi in sample area 1, of rather archaic construction (Sa Iba de Ziu Franciscu – Muravera has a diameter of just 7.10m and thus probably lacked tholos, while Sa Figu – Castiadas was constructed with use of the polygonal cyclopean masonry). Therefore, their Middle Bronze Age origin is plausible and I include them in my analysis of EBA-MBA Nuragic settlement networks.

102 out of 111 (92%) protonuraghi and nuraghi in sample area 1 are located on hilltops or promontories (see Fig. 36, 37), thus in very defensible locations which control the surrounding area. This points the military significance of the nuraghi, supporting Trump's (1992: 199) conclusion that the military function of complex nuraghi cannot be doubted. Recently, the defensive function of the nuraghi was questioned by Araque Gonzalez (2014: 147), but there are many areas in the western part of the island where the distribution patterns (for example, nuraghi being located on hilltops or edges of highland plateaus) strongly support it, such as Isili (Navarra 1997), large parts of Gallura (Puggioni 2009), and Gesico-Mandas (Namirski 2013). Of course, that does not necessarily mean that the nuraghi had a primarily military function, but certainly indicates consideration of this aspect by the Early and Middle Bronze Age Nuragic builders. This clear site distribution pattern might, indeed, indicate a certain degree of warfare occurring already in the Middle Bronze Age in this area, which could in part be explained by the poor soils of South- East Sardinia and thus limited resources causing increased competition over them. This perspective is also supported by the fact that some of the single-towered nuraghi (Su Modditzi – Castiadas, Sa Iba de Ziu Franciscu – Muravera, Garrabosu – Muravera, Su Tasuru I – San Vito) are protected by a separate cyclopean wall intersecting the slope of a hill at the easiest approach to the tower (in the case of Su Tasuru I the wall cuts the neck of a promontory, see Fig. 30). A hit-and-run type of warfare has been

suggested for the Late Bronze Age in Sardinia (Webster 1996: 133) and the increasing significance of this aspect of life is visible in the Iron Age *bronzetti* (Lilliu 1956, Stary 1991), as well as in the monumental warrior sculptures from Monte Prama (Tronchetti 1986). Further examples of a pattern of single-towered nuraghi distributed primarily in defensive locations in different parts of the island, such as the nuraghi around Gerrei (Forci 2008: 420-422) and Bortigali (Moravetti 1998a: 212, Namirski 2012), again suggest that military activity occurred already in the Middle Bronze Age. This does not necessarily contradict the idea of a non-hierarchical structure to Early and Middle Bronze Age societies (by non-hierarchical I understand a society where the head of a family was the highest level of power and where no clear settlement hierarchy nor elite burials are visible). This model of the earliest Nuragic societies was chosen by Webster (1996: 77) and also recently by Broodbank (2013: 424). It does not contradict the possibility of local warfare in the Early to Middle Bronze Age; we know from the clusters of single-towered nuraghi – such as the ones around Sedilo (Bonzani 1992) and Borore (Webster 2001) – that the communities of Middle Bronze Age Sardinia were probably capable of forming loose confederations or alliances at the level of specific families or clans.

The distribution of the protonuraghi, single-towered nuraghi and nuraghi-*capanne* does not reveal a particular emphasis on the control of the coastline. Only six out of 111 protonuraghi and nuraghi (5%) are located directly on the coast, far from forming a continuous chain of monuments and thus leaving much of the coast near Castiadas, Muravera and Villasimius lacking in settlement sites. This is consistent with the general Sardinian pattern of Nuragic occupation of the coast. Even on the Sinis peninsula (Central-West Sardinia), which has a great density of Bronze Age and Early Iron Age settlement (Depalmas 2008), the vast majority of nuraghi are located in its centre rather than on the coast. That does not necessarily mean that the sea and its resources did not play a role in the Nuragic economy of the South- East Sardinia. From other parts of the island we know that coastal settlements such as Sa Osa



Fig. 29. Nuraghe Domu de S'Orcu (Muravera) – an example of a single-towered nuraghe.



Fig. 30. Cyclopean wall which cuts the neck of a promontory with Nuraghe Su Tasuru I (San Vito).



Fig. 31. Protonuraghe Comideddu (San Vito) – a natural outcrop used as an integral part of the Nuragic wall.

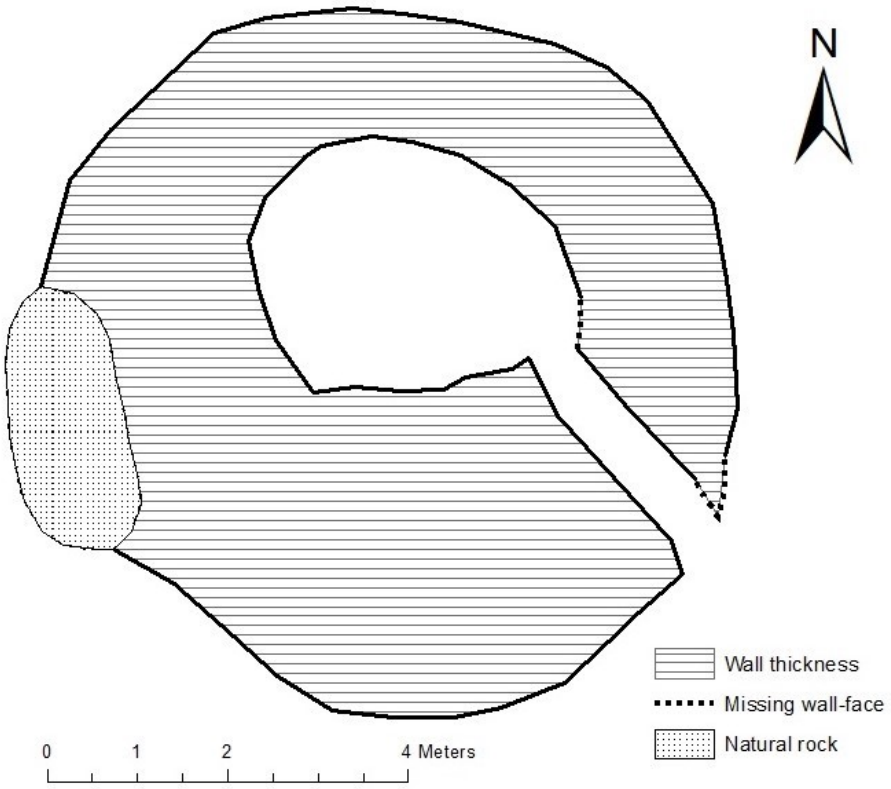


Fig. 32. Plan of Protonuraghe Comideddu (San Vito), an example of a type D protonuraghe (with a corridor and chamber), prepared with the use of Total Station.

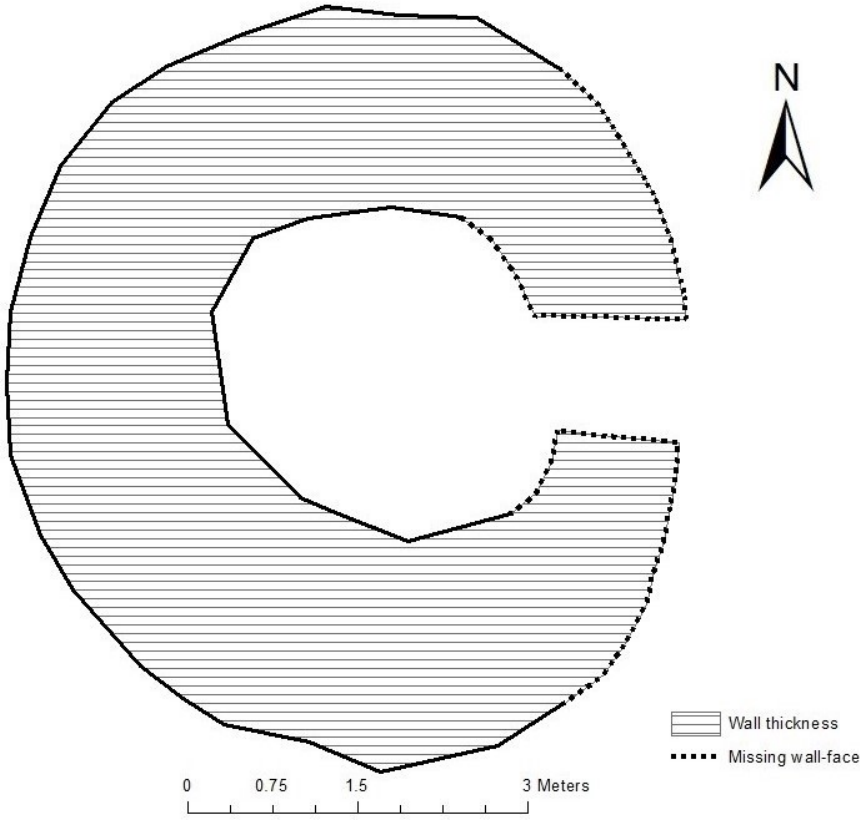


Fig. 33. Plan of Nuraghe Domu de S'Orcu (Muravera) prepared with use of the Leica Total Station.

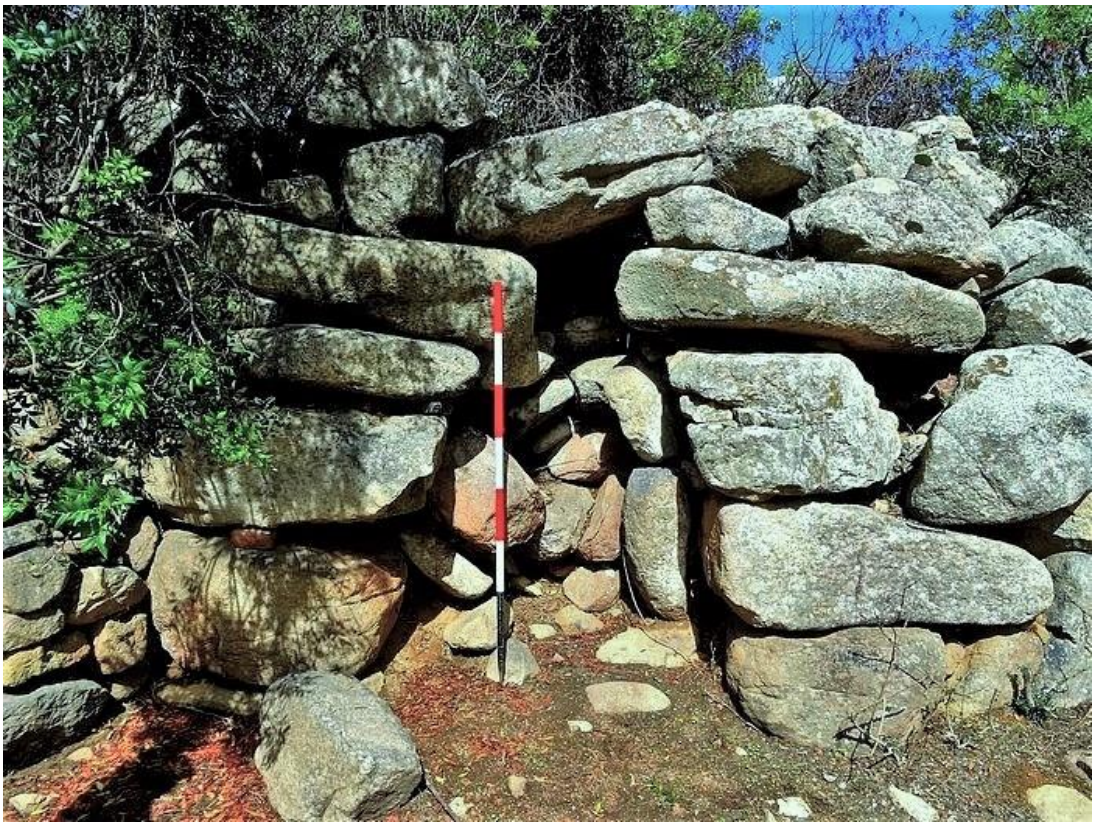


Fig. 34. The entrance to Nuraghe Piras (Castiadas) – viewed from the south.

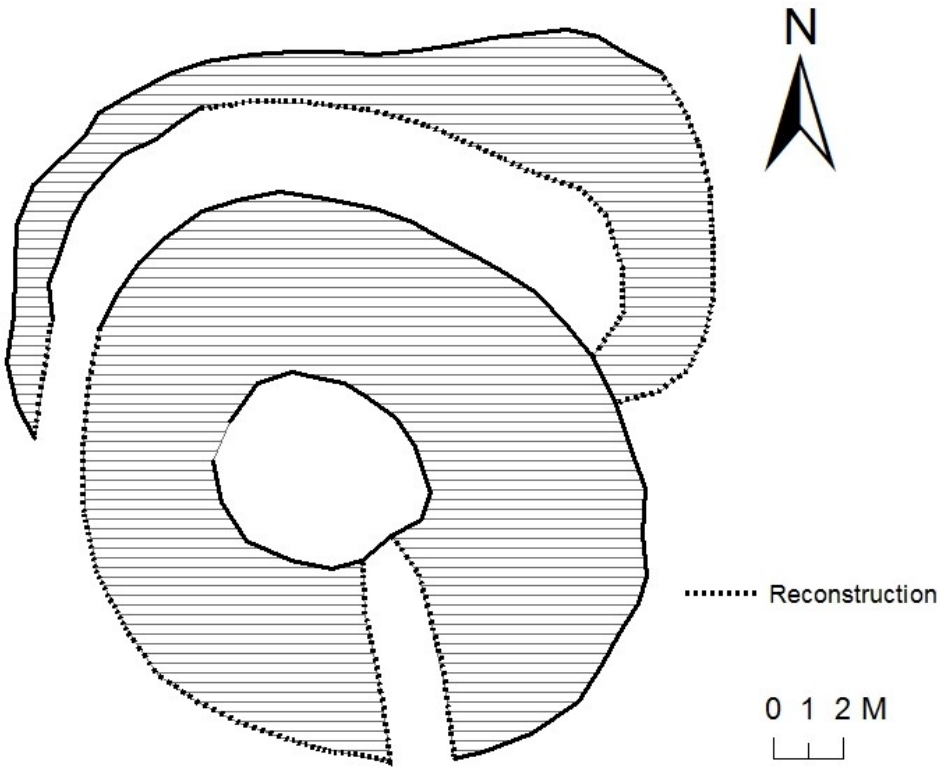


Fig. 35. Protonuraghe Pispisa (Muravera), a structure which can be typologically classified as a corridor nuraghe with a chamber (type D) or a single-towered nuraghe with a bastion (plan prepared by the author with use of the Leica Total Station).



Fig. 36. Protonuraghe Arrubiu (Muravera, summit to the right) in its landscape context.

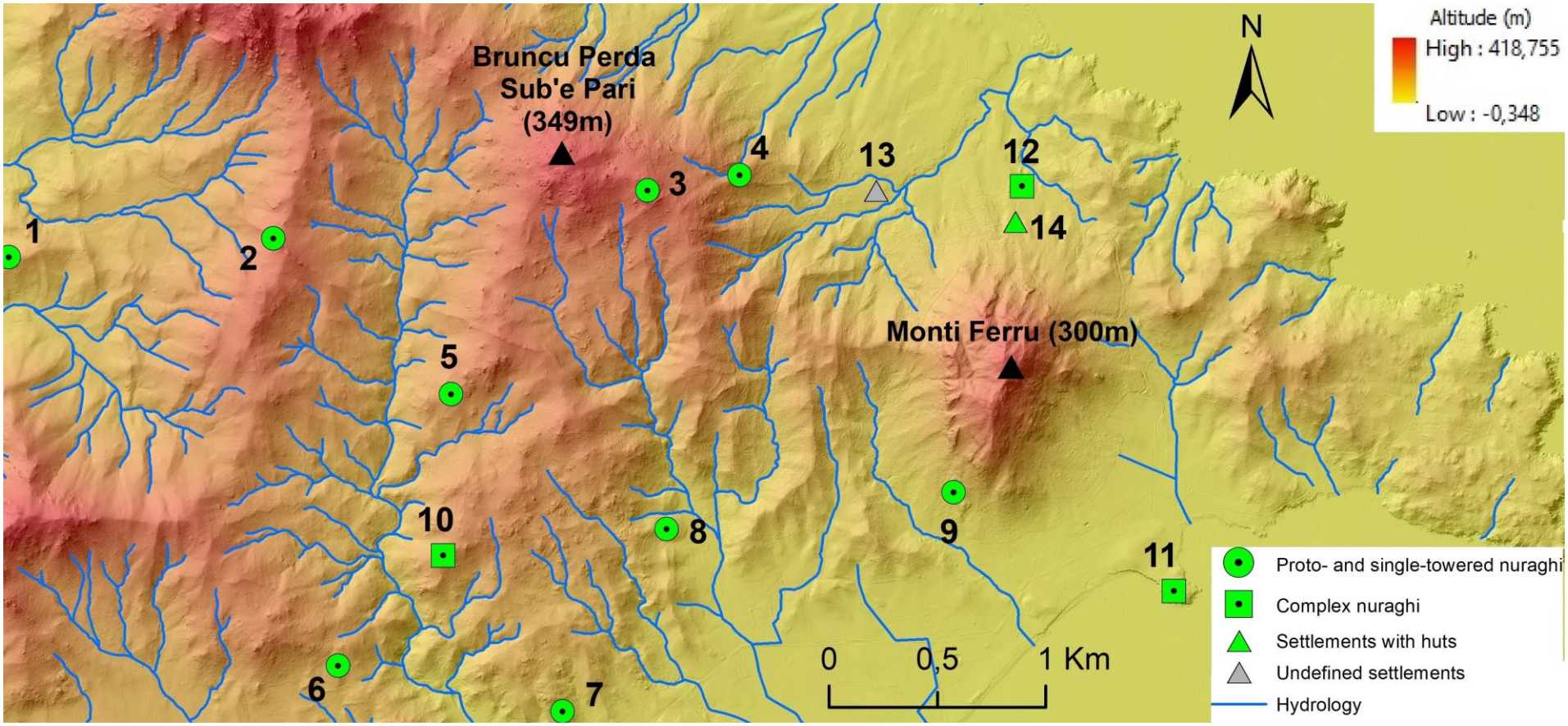

Bruncu Perda
Sub'e Pari
(349m)
Monti Ferru (300m)
N
Altitude (m)
High : 418,755
Low : -0,348
1
2
3
4
5
6
7
8
9
10
11
12
13
14
0
0,5
1 Km
Proto- and single-towered nuraghi
Complex nuraghi
Settlements with huts
Undefined settlements
Hydrology

Fig. 37. Distribution of Nuragic sites in the massif of Monti Ferru and Bruncu Perda Sub'e Pari (Muravera). 1 – S'Ortu, 2 – Mortus, 3 – Garrabosu, 4 – Baracca Su Entu, 5 – Perdiaxiu, 6 – Arrubiu, 7 – Sa Ridroxi, 8 – Piscareddu, 9 – Monti Ferru, 10 – Mannu, 11 – Porto Pirastu, 12, 14 – Don Giovanni Mattaciolu, 13 – Feraxi.

(Cabras) have provided evidence of fishing in the form of net weights (Castangia 2012: 114).

The area of Sarrabus does not reveal evidence for territoriality, such as clusters of nuraghi with buffer zones around them which are observable in the western part of the island (Gallin 1989, Usai 2014a). The only clustered group of nuraghi in sample area 1 is located west of Villasimius: nuraghi S'Argalla I, S'Argalla II, Bruncu Campulongu and Accu Sa Pira are located on four hills immediately neighbouring each other. This group of nuraghi is very small in comparison with the 55 nuraghi around Sedilo (Bonzani 1992: 215), 90 nuraghi around Gesico and Mandas, or over 150 Nuragic sites on the Sinis peninsula (Depalmas 2008: 532-533), which makes it unlikely to be an independent sub-regional polity like the ones in the western part of the island. However, it might represent a smaller territorial microsystem similar to the ones identified on the plateau of Pran 'e Muru (Central Sardinia), for example the microsystems near Nurri and Orroli (Leonelli 2008: 111-112), which often consists of three or four nuraghi. The Nuragic occupation between Muravera and Villasimius is dispersed, even though many hills form chains with several summits connected by ridges, on a few of which there is more than one nuraghe. Thus, the distribution of settlements here indicates their relatively high degree of autonomy.

The Proximal Point Analysis (PPA) method advocated by Broodbank (2000), which I find to be particularly suitable for the analysis of Sardinian settlement networks (see Chapter 3) does not reveal any Early/Middle Bronze Age sites in sample area 1 which could be distinguished as more significant than others in economic or social terms. This is partly due to the limitations of the dataset: without excavations and due to the poor state of preservation of many structures, it is difficult to specify what outflux (goods, resources, people) each site could offer the others. It is also partly because of genuine patterns emerging from the data: distances

between the nuraghi are similar, locations of sites offer similar economic and military potential, and only in a very few cases are the sites located on the coastline which could potentially have been a factor increasing their economic significance (control over the coast, immediate access to marine resources). A good example is the area near the massif Bruncu Su Tidori, where none of the sites (including the only complex nuraghe in this area) has more than three connections (see Fig. 38 and Table 7). Furthermore, significant degree of architectural uniformity among the nuraghi in sample area 1 does not indicate differences in their usage.

Intervisibility between Nuragic sites occurs frequently in sample area 1 (see Fig. 39, 40). However, considering the aforementioned lack of evidence for relationships between nuraghi, or their construction with consideration of each other, the mere fact of visibility of one site to another is insignificant in itself. This is also due to the fact that the majority of nuraghi (92%) are located on hilltops, therefore their intervisibility is very common due to the topography of the area itself, and there is no evidence allowing interpretation of this phenomenon as a deliberate strategy of building nuraghi to ensure intervisibility between them. This issue is pointed out by De Montis and Caschili (2016: 315) who analyzed the distribution of nuraghi on the plateau of Pran'e Muru using cumulative viewsheds, reaching the conclusion that intervisibility could not have been the sole factor influencing the selection of locations for the nuraghi. Rather, they were built in order to maintain social relationships, the nature of which remains uncertain (De Montis and Caschili 2016: 322), with intervisibility being a consequence which was not necessarily explicitly intended.

There is also substantial, but not widespread evidence for cave occupation in the Nuragic period. The cave of Bruncu Brailoi (Muravera) has a Nuragic wall blocking its entrance, while access to the area in the vicinity of the cave is protected by a system of cyclopean walls which fill gaps between the natural rock outcrops (pre-Nuragic origin of these structures cannot be ruled out). It is possible that the cave was used for storage purposes – a notable parallel example from the eastern part of Sardinia is Grotta di Serbissi located below Nuraghe

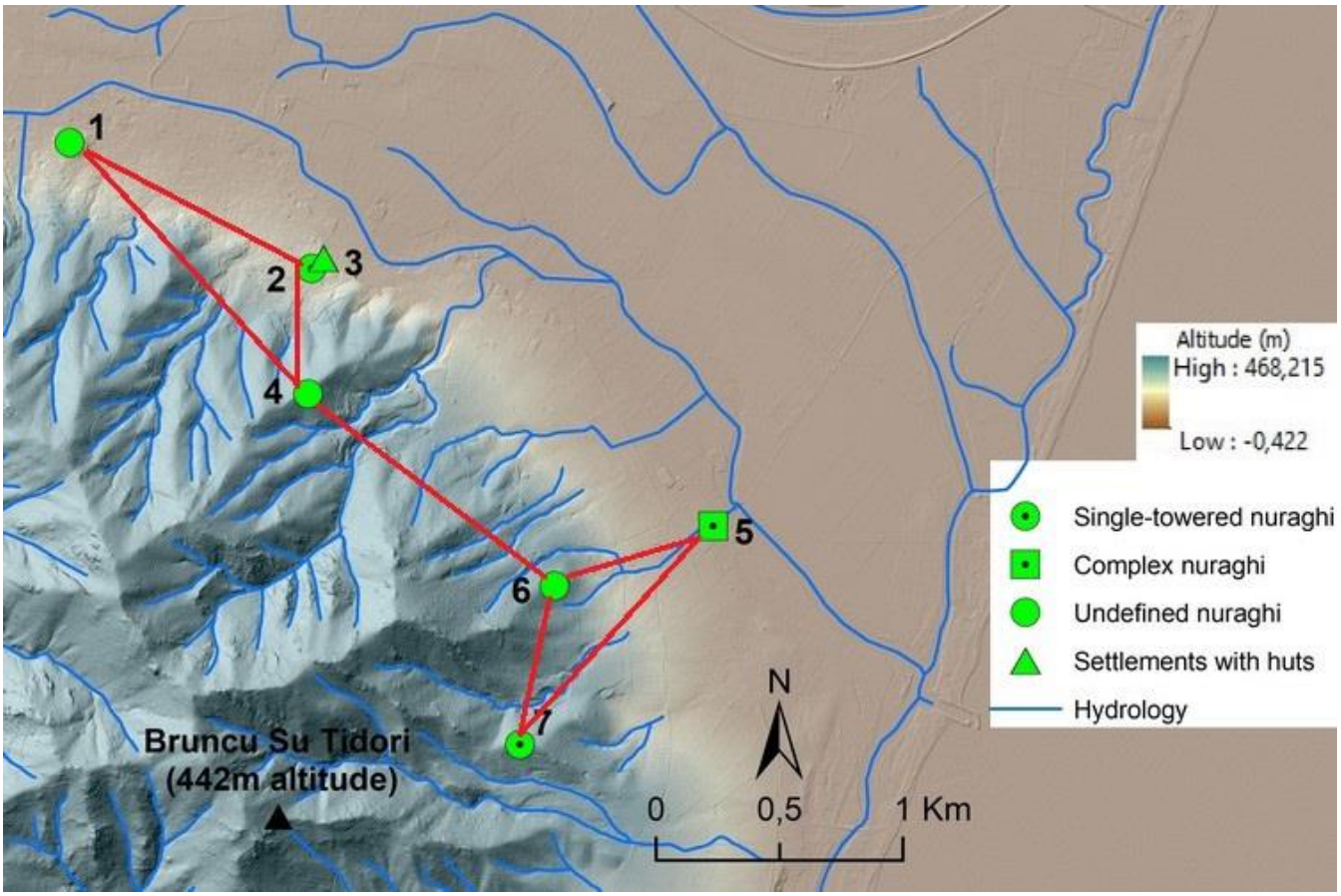


Fig. 38. Proximal Point Analysis (PPA) of the Nuragic sites near the massif of Bruncu Su Tidori (Muravera).1 – Su Nuraxi, 2-3 – Su Cunventu, 4 – Santa Matta, 5 – Murtas, 6 – Puncilioni, 7 – Riu Molas.

Site name (no. on Fig. 38)	Site type	Number of connections
Su Nuraxi (1)	Undefined nuraghe	2
Su Cunventu (2, 3)	Single-towered nuraghe with settlement	2
Santa Matta (4)	Undefined nuraghe	3
Murtas (5)	Complex nuraghe	2
Puncilioni (6)	Undefined nuraghe	3
Riu Molas (7)	Single-towered nuraghe	2

Table 7. Data from the Proximal Point Analysis of the area near the massif of Bruncu Su Tidori – number of connections for each site.

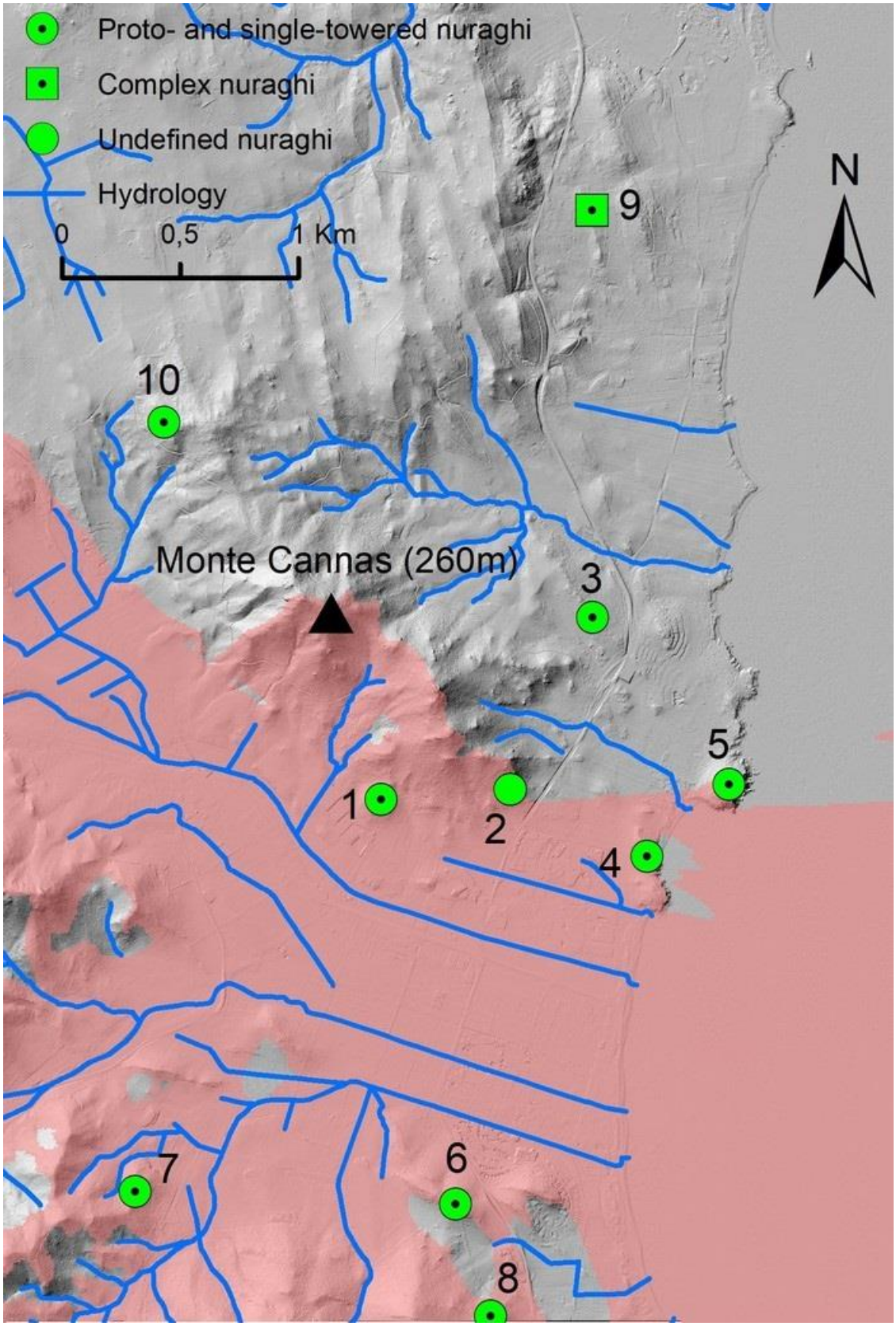


Fig. 39. Viewshed showing visibility from Nuraghe San Pietro (1), visible area in red. 1 – Nuraghe San Pietro, 2 – Nuraghe Sa Figu, 3 – Protonuraghe Su Cannisoni, 4 – Nuraghe Gibe Truttiri, 5 – Nuraghe Monte Turno, 6 – Nuraghe Brabudu, 7 – Protonuraghe Is Laccus, 8 – Nuraghe Monte S'Ollastinu, 9 – Nuraghe S'Omu 'e S'Orcu, 10 – Protonuraghe Brebeis.

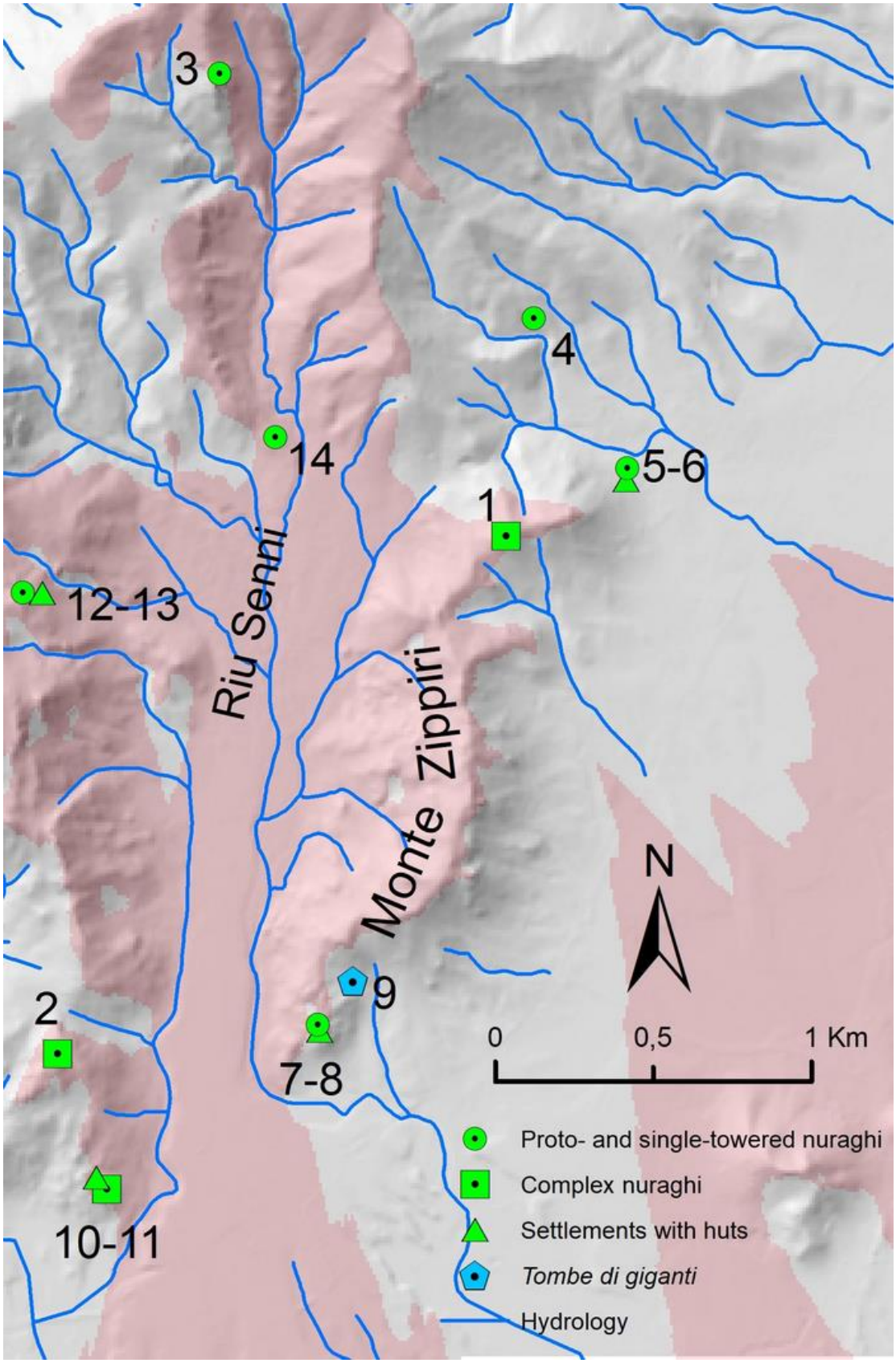


Fig. 40. Viewshed showing visibility (in red) from Nuraghe Ponzianu (3), encompassing nuraghi Cuili Senni and S'Acqua Seccis, as well as view of the valley of river Senni. 1 – S'Acqua Seccis, 2 – Santoru, 3 – Ponzianu, 4 – Su Braccu, 5-6 – Domu de S'Orcu, 7-9 – Monte Zippiri, 10-11 – Sa Spadula, 12-13 – Marongiu, 14 – Cuili Senni.

Viewshed from:	***Sites visible***	***Sites not visible (up to 3.5km)***	***Map reference***
Nuraghe San Pietro (Castiadas)	6 (Nuraghe Monte Turno, Nuraghe Gibe Truttiri, Nuraghe Sa Figu, Nuraghe Brabudu, Nuraghe Monte S'Ollastinu, Protonuraghe Is Laccus)	3 (Nuraghe S'Omu 'e S'Orcu, Protonuraghe Brebeis, Protonuraghe Su Cannisoni)	Fig. 39
Protonuraghe Ponzianu (Muravera)	6 (Nuraghe Cuili Senni, Nuraghe and settlement of Monte Zippiri, Nuraghe and settlement of Sa Spadula, Nuraghe Santoru, Nuraghe and settlement of Marongiu, Nuraghe S'Acqua Seccis)	3 (Nuraghe Su Braccu, Nuraghe Domu de S'Orcu, *tomba di giganti* Monte Zippiri)	Fig. 40
Nuraghe Baccu 'e Gattus (Villasimius)	3 (Nuraghe Bruncu Campulongu, Nuraghe S'Argalla I, Nuraghe Accu Sa Pira)	1 (Nuraghe S'Argalla II)	Fig. 61
Protonuraghe Muxieddu (Tortoli)	1 (Fortification at Punta Cea)	2 (Protonuraghe Baccu Arzula, Protonuraghe Serra 'e Ladamini)	Fig. 50

Table 8. Quantification of the results of viewshed analysis run from selected Nuragic sites in sample areas 1 and 2.

Serbissi (Osini), which was used as a storage space by the inhabitants of this trilobate nuraghe and associated settlement (Nieddu 2006: 44-45). Notably, not far from the Bruncu Brailoi, there are rock shelters which produced pre-Nuragic materials (including Riparo Perda Diana and Sa Grutta de S'Ollastinu, Ledda 1985), so it is possible that the Nuragic cave occupation, at least to some extent, echoed the earlier pattern in the same area.

Thus, it is safe to state that the settlement patterns of the South-East coast of Sardinia are substantially different from the ones observable in the western part of the island, even though some similarities – such as the defensive locations of sites and the lack of emphasis on the control of the coast – do exist. The domination of protonuraghi and nuraghi-*capanne*, the archaic architecture of the majority of single-towered nuraghi, and the dispersed settlement without evidence for territoriality offer an important basis for conclusions regarding the area's economy and significance in a wider Sardinian context.

6.1.2. Relations between domestic and funerary sites

In sample area 1 I identified and surveyed 10 sites of *tombe di giganti* (the Nuragic megalithic tombs), three of which are completely destroyed. Their distribution offers an insight into the relationship between domestic and funerary sites in this part of Sardinia in the Early and Middle Bronze Age. Just as in the case of the nuraghi, the main means of establishing the chronology of these monuments is their typology. None of the surveyed tombs revealed remains of a central stele, which would allow them to be attributed to the Early Bronze Age (Blake 2001: 154) or early phase of the Middle Bronze Age. Six out of seven preserved tombs include remains of either a forecourt wall forming an exedra or its base – in at least one case (Monte Zippiri – Muravera) with a preserved portal entrance with an architrave. There are no obvious remains of mounds which could have covered the burial chambers. These architectural details allow us to classify the majority of the tombs in sample area 1 as Middle Bronze Age (1500-1200 BC) type C tombs. This dating has important implications for the



Fig. 41. Northern wing of the exedra in tomba di giganti *Monte Zippiri (Muravera).*



Fig. 42. Tomba di giganti *Mont' Arbu (Muravera) – the chamber seen from the north.*

chronology of the Early/Middle Bronze Age protonuraghi and nuraghi-*capannne*, suggesting that many of them might have been built closer to the Middle rather than the Early Bronze Age. Another possibility is that some of the tombs were built in the Early Bronze Age and included stele, but were modified in the Middle Bronze Age. Vidili (2012: 1032) suggests such a possibility in the case of the Late Bronze Age *tombe di giganti* located close to the Early/Middle Bronze Age protonuraghi near Aidomaggiore.

Two of the tombs (Monte Crobu I and II) are located close to each other, not far from the remains of another tomb which Ledda (1985: 294) interprets as an earlier *allée couverte*, which suggests a continuity of use of this site as a necropolis from the Neolithic or Chalcolithic to the Bronze Age (this idea could be supported by the proximity of other pre-Nuragic burial sites – *domus de janas* Monte Sirbonis and *domus de janas* Punta Madau to the west). However, interpretation of the third tomb as an *allée couverte* is based on the lack of an exedra – it is possible that it is another *tomba di giganti*, albeit with a completely destroyed exedra. This possibility cannot be dismissed given the mediocre state of preservation of the monuments. At any rate, the site of Monte Crobu represents a clear example of a necropolis of *tombe di giganti*. Such concentrations of Nuragic megalithic tombs are present in other parts of the eastern coast, with *tombe di giganti* Seleni (Lanusei, Perra 2000: 222-223) and S'Arena (Urzulei, Nieddu 2006: 60-61) among the most significant ones. The closest settlement site to *tombe di giganti* Monte Crobu I and II is protonuraghe Monte Crobu, which is located 500m to the NE, on the northern slope of Monte Crobu mountain. The slopes and summit prevent intervisibility between the tombs and the protonuraghe, with the latter being a small monument without traces of a settlement around it. Thus, is seems highly unlikely that the necropolis was used exclusively by the inhabitants of Protonuraghe Monte Crobu. Such a large burial site could have been used by the inhabitants of other protonuraghi and nuraghi in this area, such as Arrubiu and Piscareddu to the NE, Pispisa and Figu Niedda to the north, and Su Modditzi to the south (this one, despite the 2.2km distance, is intervisible with *tombe di*

giganti Monte Crobu).

Other tombs are isolated from each other, in three cases being located very close to specific nuraghe. Among the examples are nuraghe and *tomba di giganti* Monte Zippiri (Muravera, Fig. 41), both located on the same promontory, the tomb slightly below the nuraghe and 200m to its NE. *Tomba di giganti* Mitza Sa Granaccia is located 200m NE of the nuraghe of the same name, but at a significantly lower altitude. Finally, both nuraghe and the almost completely destroyed *tomba di giganti* Sant'Aleni are located on a flat area some 250m apart (precise measurement is difficult due to destruction, poor documentation and relocation of the tombs' remains). These cases are consistent with Blake's (2001: 153) suggestion that some of the tombs could have been paired with a specific nuraghe and used primarily (if not exclusively) by its inhabitants. They are also consistent with the author's observations from the area around Gesico and Mandas in Trexenta (Namirski 2013). Furthermore, locating these tombs close to the nuraghi strongly suggests that there was no clear division between domestic and ritual landscape in the Early and Middle Bronze Age in this area. Thus, it is possible that the religious and domestic aspects of life were very closely related.

Finally, there are two examples of tombs located in isolation from any other Nuragic sites. *Tomba di giganti* Mont'Arbu (see Fig. 42) is located in the bottom of a valley, in a place which offers very poor visibility of the area around it. *Tomba di giganti* Masone Pardu is located on a gentle slope close to the plateau of a hill, without close relationship to any other known Nuragic site. In these cases its seems possible that the tombs were used by the inhabitants of multiple nuraghi, possibly even as places of communal gatherings uniting people of different family units (like the Late Bronze Age sacred wells located between territorial boundaries, which could have served as ritual meeting places for people from different territories – see Chapter 7).

This plurality of distribution patterns and contexts in which *tombe di giganti* occur in sample area 1 may reflect a different use of the monuments by the inhabitants of different Early and

Middle Bronze Age settlements. One can also speculate about differences in the chronology of the tombs on the basis of differences in their distribution, the same way that Bonzani (1992: 215) argued for possible differences in the chronology of the nuraghi in Sedilo on the basis of their distribution in relations to the main cluster of sites in that area. Excavation projects would be necessary to investigate such a possibility.

6.2. The Early and Middle Bronze Age in sample area 2

As in the case of sample area 1, the previously discussed difficulties in understanding the Chalcolithic to Early Bronze Age transition in Sardinia require careful consideration in relation to the area around Barisardo and Cardedu. The primary means of achieving this goal was through comparative analysis of the distribution of the pre-Nuragic and Nuragic sites and comparison of these results with those from sample area 1.

I identified 15 pre-Nuragic sites in the second sample area – nine of them comprise *domus de janas* (the Late Neolithic rock-cut tombs), two are settings of standing stones, one is a single menhir and one is a rock shelter. However, unlike in sample area 1, there is no clear pattern of association between the pre-Nuragic and Nuragic sites, such a relationship occurs only in four out of 15 (27%) cases. None of the largest necropolis of *domus de janas* in this area, such as Funtana Su Rettore (Barisardo, Nieddu 2006: 22-23) or Pirarba (Barisardo, Archeosystem 1990: 124-25) fall within this group. This indicates that the most important features of the pre-Nuragic cultural landscape were probably no longer focal points in the Early and Middle Bronze Age in this area, although one cannot exclude the possibility of re-use of some of *domus de janas* by the Nuragic people. Possible evidence for this is represented by the Nuragic finds from the vicinity of *domus de janas* Pizzu ‘e Monti – Barisardo (Archeosystem 1990: 135). However, it must be noted that while in sample area 1 pre-Nuragic settlement sites were identified, around Barisardo and Cardedu none have been discovered so far except for a few sites with stone walls of very dubious chronology, as well

as Cuile Sa Tappara rock shelter where a few sherds of pre- Nuragic pottery were found (Archeosystem 1990: 172). Therefore, it is possible that the full extent of the pre-Nuragic occupation of this area is yet to be discerned.

The archaeological evidence preserved in the landscape of sample area 2 does not, then, reveal any close relationship between the distribution of the pre-Nuragic and Nuragic sites. It is therefore probable that the Chalcolithic to Early Bronze Age transition in this area occurred in a similar way to western Sardinia, where the Monte Claro societies appear to have collapsed in the second half of the 3rd millenium BC, starting a period which led to the emergence of the Nuragic culture – a process which remains very unclear, especially in terms of chronology.

6.2.1. Settlement patterns and territoriality

In sample area 2 I recorded a total of 48 Nuragic sites (see Appendix 2), which represent a much wider variety of monuments than the sites in sample area 1. Among these 48 are seven protonuraghi (corridor nuraghi), three of them with clear remains of the main corridor, which makes them typical structures of this type. Furthermore, there is one example of a mixed-type nuraghe (a hybrid monument with elements typical of both protonuraghe and nuraghe), and six single-towered nuraghi. As many as 24 nuraghi are complex structures, revealing a wide variety of floorplans (seven of them are surrounded by remains of a Nuragic settlement). In addition there are two probable sites of open settlements, three fortifications of possible Nuragic origin, as well as four *tombe di giganti* and one sacred well (*pozzo sacro*). Furthermore, on one reported site of a nuraghe and one of a *tomba di giganti* no traces of any structure were identified. The other two completely destroyed *tombe di giganti* were reported by the local researchers (Castoldi and Pilia, pers. comm., 2015).

The limited number of protonuraghi certainly makes their distribution patterns less significant and representative, but it is worth noting that all seven structures of this type in the

second sample area are located on hilltops, promontories or ridges. This indicates that the emphasis on the selection of elevated locations for settlements emerged in the earliest phases of the Nuragic culture. However, in the case of the protonuraghi this does not necessarily warrant their interpretation as defensive structures, as pointed out by several studies (Trump 1992, Namirski 2012), primarily because of their architecture which is devoid of architectural features which could indicate their defensive role. Considering how dispersed the protonuraghi in sample area 2 are (except for Serra ‘e Ladamini massif, see below), it is reasonable to agree with their most common interpretation as the households of single families.

It is worth elaborating on the presence of a mixed-type nuraghe in study area 2, since this type of structure is considered to be a transitional form between the prototonuraghi and the tholos nuraghi (Ugas 1999, 2005), suggesting indigenous development of Nuragic architecture in Sardinia. Nuraghe Murcu is located on a flat lowland east of Cardedu, and it is a structure with architectural elements typical of both protonuraghe and tholos nuraghe. Its south-oriented entrance is followed by a narrow corridor (a typical feature of the protonuraghi) of 5.30m length which leads to a circular chamber, originally probably closed with a tholos dome. The mixed type nuraghi are known also from other parts of Sardinia, among the most significant examples are Nuraghe Serra Crastula A (Bonarcado), Nuraghe Izzana (Aggius, Ugas 1999: 60), Nuraghe Laicheddu (Calangianus, Puggioni 2009: 221-222) and Nuraghe Crapianu (Chiaramonti, Dore 2010). The presence of monuments which are transitional forms between protonuraghi and tholos nuraghi clearly shows that the development of Nuragic architecture was an indigenous process and that the emergence of the Middle Bronze Age single-towered nuraghi with tholos chambers was not a result of Aegean influence. Nuraghe Murcu provides further evidence for this development of the Bronze Age architecture in Sardinia.

The percentage of single-towered nuraghi in the area around Barisardo and Cardedu is atypically small – six out of 38 nuraghi (16%) is well below the Sardinian average of around

70% (Lilliu 1996: 38), making the proportions of single-towered nuraghi to complex nuraghi almost inversely proportional to the rest of the island. However, it is possible that some of the complex nuraghi in this area could have originated from the single-towered nuraghi which were extended in the Late Bronze Age. Such a developmental sequence has been recorded at many of the excavated complex nuraghi in Sardinia. Also, some of the complex nuraghi reached their final shape already in the Middle Bronze Age (Cossu and Perra 1998: 97). This could be true especially in the case of the smaller complex nuraghi, where the additions are relatively limited and closely connected to the main tower. Examples are Nuraghe Giba 'e Scorka (Barisardo) with a small courtyard adjacent to the tower and Nuraghe Su Angedu (Cardedu), where a small tower with a bastion utilizes the space on a rocky summit very efficiently (see Fig. 43), indicating the construction of the monument as a single project. Thus, it is possible that the number of Middle Bronze Age settlement sites in sample area 2 is larger than the number of single-towered nuraghi suggests.

It has to be emphasized that the architecture of the nuraghi in sample area 2 is very different from that found in sample area 1, more closely tying in with the typical Middle Bronze Age Nuragic architecture known from most of the island. Unlike the archaic nuraghi-*capanne* found around Castiadas and Muravera, the towers near Barisardo and Cardedu have corbelled tholos chambers, in some cases very well- preserved (the main tower of Nuraghe Moru – Barisardo has an almost completely preserved tholos chamber with three niches, the chambers in Nuraghe Turuddis – Tortoli and Nuraghe Sellersu – Barisardo and Nuraghe Mindeddu – Barisardo also survived in decent condition). Other typical architectural features of nuraghi are present as well, such as the intra-mural staircases (Nuraghe Genna Masoni – Cardedu) and niches in the walls of the chambers (Nuraghe Iba Manna – Barisardo, Nuraghe Moru – Barisardo, see Fig. 44).

The first major observation relating to the Middle Bronze Age (possibly also the Early Bronze Age) occupation in sample area 2 is the concentration of the most archaic



Fig. 43. Nuraghe Su Angedu (Cardedu) – view from the west.



Fig. 44. Niches in the tholos chamber of Nuraghe Moru (Barisardo).

protonuraghi in the massif of hills around Serra ‘e Ladamini, which consists of several rocky ridges. Each of the four protonuraghi in this area (Serra ‘e Ladamini, Serras Interazzas, Baccu Arzula and Muxieddu) represents a very archaic architecture, incorporating natural outcrops as integral parts of their structure (see Figs. 46-47). In fact, in the case of Protonuraghe Serras Interazzas (Tortoli) the Nuragic masonry merely fills the gaps between two large rock outcrops. Considering the archaic architectural style of these protonuraghi, its uniqueness (it is not present anywhere else in sample area 2, even in the other three protonuraghi) and the concentration of these structures within the same chain of hills (see Fig. 45), it is not unreasonable to suggest that the area around Serra ‘e Ladamini is the zone of the earliest Nuragic occupation in sample area 2. This hypothesis, although plausible in the light of landscape archaeology, would require excavations to be confirmed. Outside of the massif of Serra ‘e Ladamini the distribution of the protonuraghi is rather dispersed, which (as already mentioned) supports their interpretation as single households.

The second major observation related to the Middle Bronze Age Nuragic settlement patterns in sample area 2 is the concentration of settlements on the edges of Giara di Teccu (Barisardo) – a highland plateau consisting mostly of basalt rocks. Two single-towered nuraghi are located on its edges: Nuraghe Su Ziniburu near the North-Eastern corner and Nuraghe Niedda Puliga near the southern edge, as well as one protonuraghe (Baccu Argiolasi) near the north-central edge. There are also three complex nuraghi (Sellersu near the North-Eastern edge, Giba ‘e Scorka near the South-Eastern edge and Moru near the southern edge) which could have potentially originated from single-towered nuraghi later extended in the Late Bronze Age. Only one nuraghe (Iba Manna) is located in the centre of Giara di Teccu. Also, it is noticeable that the valley located just south of Giara di Teccu could have been completely controlled, since Nuraghe Su Crastu occupies the edge of a hilltop right opposite Giara di Teccu. This pattern of settlements emerging on the edges of highland plateaus is consistent with the Nuragic occupation in the central and western part of the island – other examples of

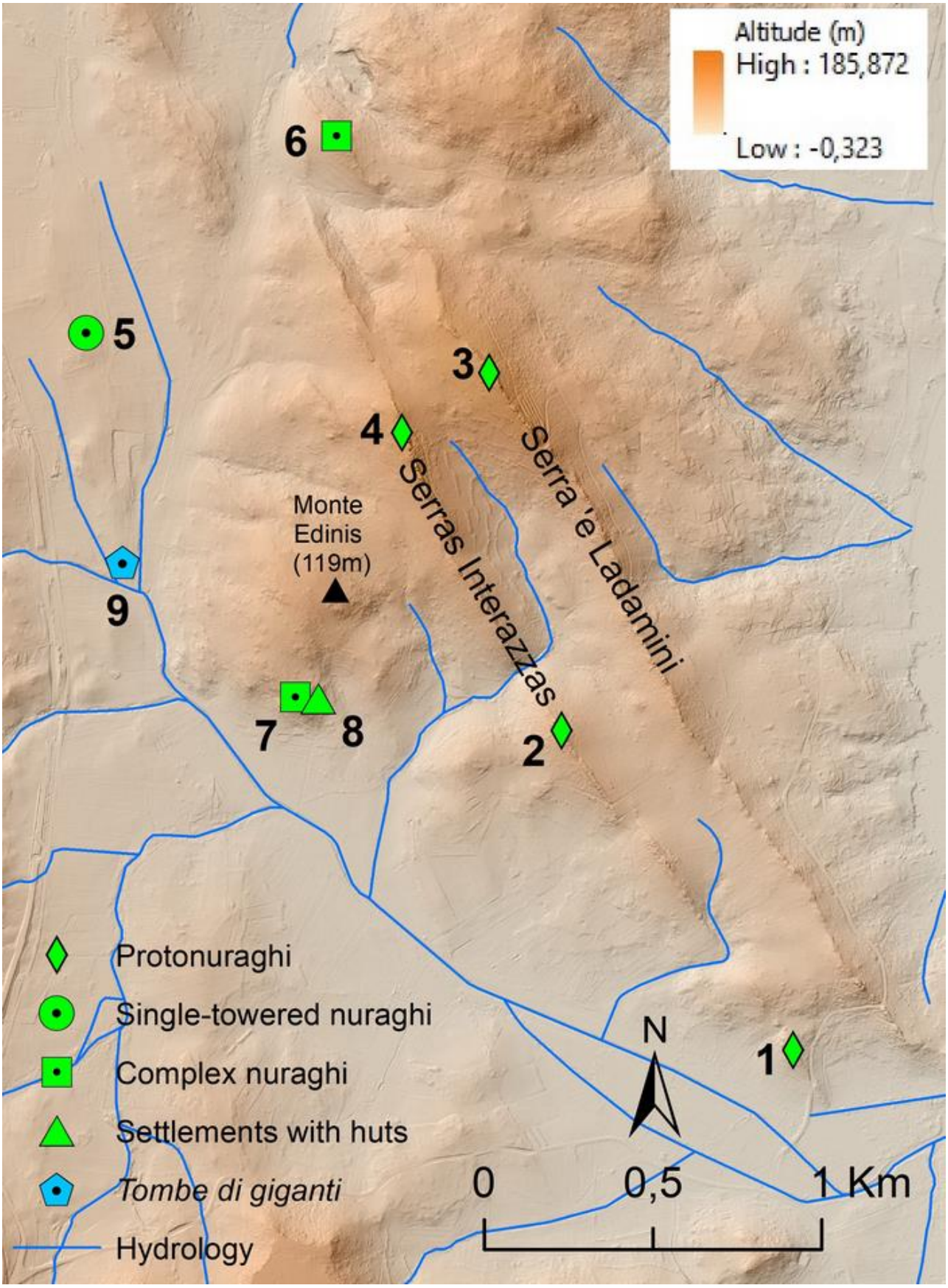


Fig. 45. The Nuragic occupation in the massif of Serra 'e Ladamini (Tortoli). 1 – Muxieddu, 2 – Baccu Arzula, 3 – Serra 'e Ladamini, 4 – Serras Interazzas, 5 – Nuraxeddu, 6 – Corti Accas, 7-8 – Turuddis, 9 – Preda Longa.





Figs. 46-47. Typical architectural features of the protonuraghi in the Serra 'e Ladamini massif: a corridor (Protonuraghe Serra 'e Ladamini, above) and utilization of natural rocks (Protonuraghe Serras Interazzas, below).

highland plateaus with that pattern are Giara di Serri (Puddu 2001: 91-92), Giara di Gesturi, Taccu ‘e Idda (Campus and Leonelli 2008: 45), Su Pranu Nuragheddus (Depalmas 2008) and Taccu ‘e Ticci (Perra 2001, Skeates 2009). It is tempting to interpret this pattern as another way of forming territorial boundares, similar to the ones around the clusters of nuraghi near Sedilo or Borore, with the buffer zone being replaced by the steep-sided edge of the highland plateau forming a natural boundary. Thus, the presence of this pattern among the Middle Bronze Age sites might suggest the possibility that the first form the Nuragic territoriality emerged in this area already in the Middle Bronze Age, being roughly contemporary with the clusters of nuraghi with buffer zones in the western part of the island. However, this does not indicate the emergence of social stratification as early as the Middle Bronze Age, since these forms of Nuragic territoriality could easily have resulted from agreements or loose alliances between individual households (Webster 1996: 99).

Two major scenarios can be proposed to explain the emergence of this very clear pattern of Nuragic occupation on the edges of Giara di Teccu and other highland plateaus in Sardinia:

1. Agreements between relatively small human groups (possibly families or clans) resulting in a strategy of building independent settlements on the edges of a plateau. Such a strategy, probably involving emergence of already mentioned loose alliances between families, would bring benefits for all of the involved groups (families or clans), providing them with a possibility of defense in case of danger and/or mutual help, without necessarily leading to the emergence of any social hierarchy. This scenario is supported by the fact that the distribution of the Nuragic settlements around the edges of the plateau of Teccu is fairly balanced with similar distances between them, which indicates that the nuraghi might have been built with consideration of each other. The obvious weakness of the theory is the assumption that all of the sites in question were occupied simultaneously, which could only be confirmed through excavations and absolute dating. Another argument against this theory is provided by the

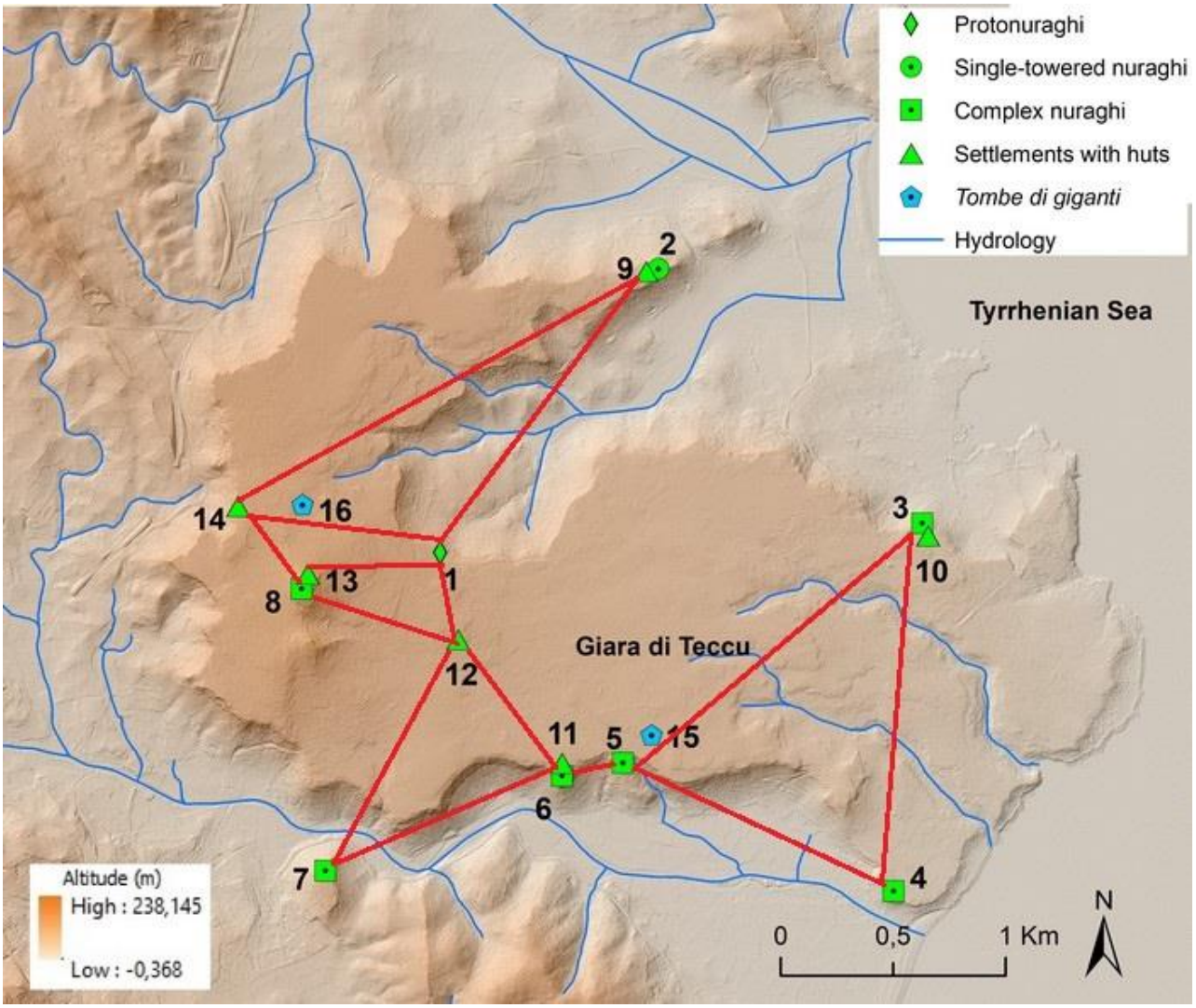


Fig. 48. The PPA analysis of connectivity between settlement sites on the plateau of Teccu. Each site is linked to its two closest neighbors. 1 – Baccu Argiolasi, 2 – Su Ziniburu, 3 – Sellersu, 4 – Giba 'e Scorka, 5 – Niedda Puliga, 6 – Moru, 7 – Su Crastu, 8 – Iba Manna, 9 – Su Ziniburu, 10 – Sellersu, 11 – Moru, 12 – Baccu Argiolasi, 13 – Iba Manna, 14 – Teccu, 15 – Niedda Puliga, 16 – Iba Manna.

Site name (no. on fig. 48)	Site type	Number of connections
Baccu Argiolasi (1)	Protonuraghe	4
Su Ziniburu (2, 9)	Single-towered nuraghe with settlement	2
Sellersu (3, 10)	Complex nuraghe with settlement	2
Giba 'e Scorka (4)	Complex nuraghe	2
Niedda Puliga (5)	Complex nuraghe	3
Moru (6, 11)	Complex nuraghe with settlement	3
Su Crastu (7)	Complex nuraghe	2
Iba Manna (13, 16)	Complex nuraghe with settlement	3
Baccu Argiolasi (12)	Open settlement without nuraghe	4
Teccu (14)	Open settlement without nuraghe	3

Table 9. Data from the PPA analysis of the plateau of Teccu – number of connections for each site.

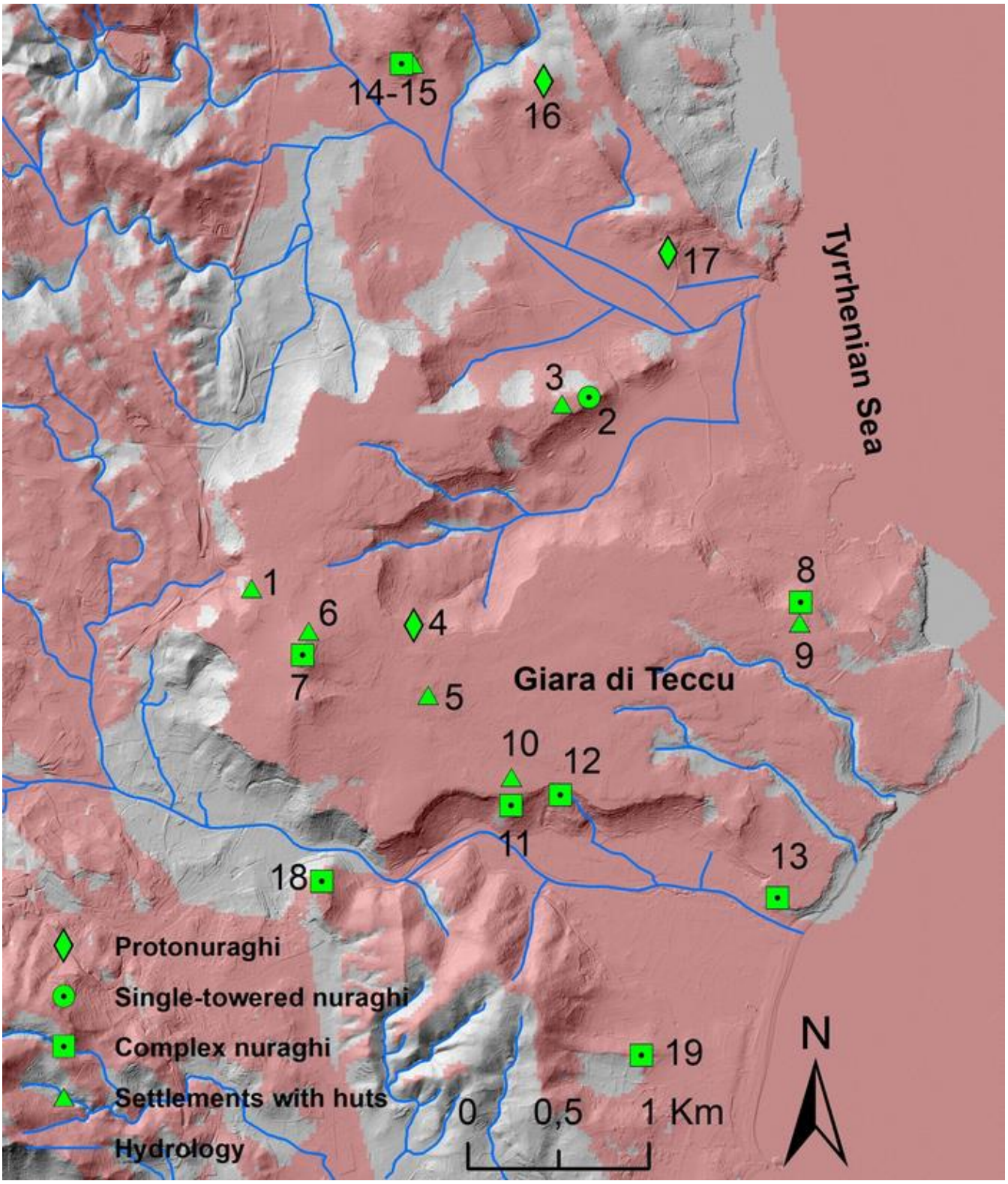


Fig. 49. A cumulative viewshed from all the nuraghi and settlement sites on the plateau of Teccu (visible area in red). The areas immediately SW and NW of the plateau are not visible from any of the sites. 1 – Teccu, 2-3 – Su Ziniburu, 4-5 – Baccu Argiolasi, 6-7 – Iba Manna, 8-9 – Sellersu, 10-11 – Moru, 12 – Niedda Puliga, 13 – Giba 'e Scorka, 14-15 – Turuddis, 16 – Baccu Arzula, 17 – Muxieddu, 18 – Su Crastu, 19 – Boschinu.

results of viewshed analysis (see Fig. 49). It reveals that there are several areas around the plateau of Teccu which are not visible from any of the sites on its edges. If nuraghi were built with consideration of each other as a defensive system, one could expect that they would visually control the whole area around the plateau in order to spot danger and control possible trails, but that is not the case.

2. A continuous strategy of building settlements on the edges of a plateau employed by different groups independently over longer periods of time. The argument in favour of this interpretation is a wide variety in the typology of the monuments constructed on the edges of Giara di Teccu (protonuraghe, single-towered nuraghi, complex nuraghi). Such a similarity of settlement strategies in consecutive periods could suggest a relatively continuous development of the Nuragic settlement in this area. Possible explanations for the insistence on the strategy of building nuraghi on the edges of plateaus might be defensive purposes or usage the centre of the plateau for pasture.

Whichever of these two scenarios occurred, it is necessary to emphasize the significance of Nuraghe Iba Manna, the only nuraghe located in the central part of the plateau of Teccu. It is one of the sites which emerges as a major point in the settlement network using the Proximal Point Analysis (PPA) method. In the analysis connecting each settlement site with its two closest neighbours, Nuraghe Iba Manna (Fig. 48, Table 9, no. 8) has connections with three sites (Protonuraghe Baccu Argiolasi and two nearby open settlements). Unsurprisingly, Iba Manna is a complex nuraghe with a large settlement around it, but excavations would be necessary to learn whether it had already reached its complex form in the Middle Bronze Age, or was a result of Late Bronze Age settlement nucleation. Another site with a large number of connections (four) is the settlement of Baccu Argiolasi, but it is an open settlement without a nuraghe located relatively close to the complex of Iba Manna, which suggests it could have been closely related to it.

Among the five single-towered nuraghi located outside of Giara di Teccu (Genna Masoni –

Cardedu, Su Fraii – Cardedu, Trunconi – Cardedu, Nurta – Elini, Nuraxeddu – Tortoli) four are located on elevated hilltops (the only exception is Nuraghe Nuraxeddu, which is located on a slight rise). As in sample area 1, they do not form a cluster that could be interpreted as a territorial unit (even taking into account the complex nuraghi which are likely to originate from the Middle Bronze Age single-towered structures). The only remarkable area which could be interpreted as a possible territorial boundary is a 3.5km wide gap between the southernmost nuraghi near Barisardo (Foxi, Lurcuri, Mindeddu) and the northernmost nuraghi near Cardedu (Sa Perda ‘e S’Obiga, Trunconi and others). However, even if this zone is to be interpreted as a buffer zone similar to those in Sedilo (Bonzani 1992) and Borore (Webster 2001), lack of evidence for the spatial organization of the Nuragic occupation both north and south of this boundary (except for Giara di Teccu) suggests that the first Nuragic territories were based mainly on loose alliances and agreements and that the social order likely remained egalitarian (Webster 1996, Broodbank 2013). However, that does not contradict nor exclude the possibility of the nuraghi being means of demonstrating the prestige of specific families (Lilliu 1999b: 42), which could have influenced (together with their defensive purposes) selection of elevated and highly visible locations for their construction, which we can clearly see near Barisardo and Cardedu. Despite this emphasis on utilizing prominent points in the landscape, Nuragic occupation ceases in the mountains of Monte Ferru (875m altitude, they constitute the southern limit of sample area 2) massif. In then re- emerges past them, circa 5.50km to the south (Nuraghe Genna Didu – Tertenia). That does not necessarily mean that this mountainous area was completely free from Bronze Age occupation or utilization, but perhaps it was seasonal, as in the massif of Monte Gennargentu (1834m altitude, the highest peak of Sardinia), where the excavations of Nuraghe Ruinas (Arzana) showed it to have been occupied only seasonally, which is visible in stratigraphic sequence within all parts of the monument (Salis and Fadda 2012: 756).

Similar to sample area 1, the Nuragic settlements are rarely located directly on the

coastline. Only two nuraghi and one fortification are directly associated with the coast (Su Angedu – Cardedu, see Fig. 43, Perd'e Pera – Cardedu, Punta Cea – Tortoli), while Protonuraghe Foxi – Barisardo and Nuraghe Mindeddu – Barisardo are located a few hundred meters from the coastline with an extensive view of it. Thus, the majority of the coastline is free of any Nuragic sites, suggesting its relatively low level of importance in the Early and Middle Bronze Age economy in this area, or the existence of small coastal outposts without monumental architecture which are difficult to detect in the present-day landscape. Moreover, even some of the sites located close to the coastline do not offer a particularly extensive view of it. An example is Protonuraghe Muxieddu (Tortoli), located in a position where the view of the coastline towards the east and north is blocked (see Fig. 50), which indicates that control of the coastline was probably not the main reason for its construction. Furthermore, one cannot exclude the possibility that scarcity of the nuraghi in immediate vincinity of the coastline is due to deliberate attempt to create a buffer zone between the coast and the settled area (much like buffer zones around clusters of the nuraghi in Western Sardinia, albeit without emphasis on creating a territorial unit), perhaps due to danger from the sea.

Finally, it is necessary to mention the presence and significance of several fortifications of possible Nuragic origin. Their dating remains problematic throughout the whole of Sardinia, since their architecture is similar to that of the Chalcolithic fortifications of the Monte Claro culture. This problem is emphasized by Mancini (2011: 74-75) in her study of the megalithic wall of Monti Pinu (Telti), the chronology of which remains uncertain. A similar concern was raised by Massetti and Sanciu (2013: 10) regarding the megalithic walls of Monte S'Elighe (Irgoli) which could be of either pre-Nuragic or Nuragic origin. These structures consist of megalithic walls without towers or internal spaces, thus they are unlikely to have been settlement sites. Such fortifications usually occupy very important points in the landscape: the wall at Punta Cea (Tortoli) controls a significant part of the coastline near Tortoli, while the wall at the top of Monte Arista (Cardedu, see Fig. 51) is one of the highest located Nuragic

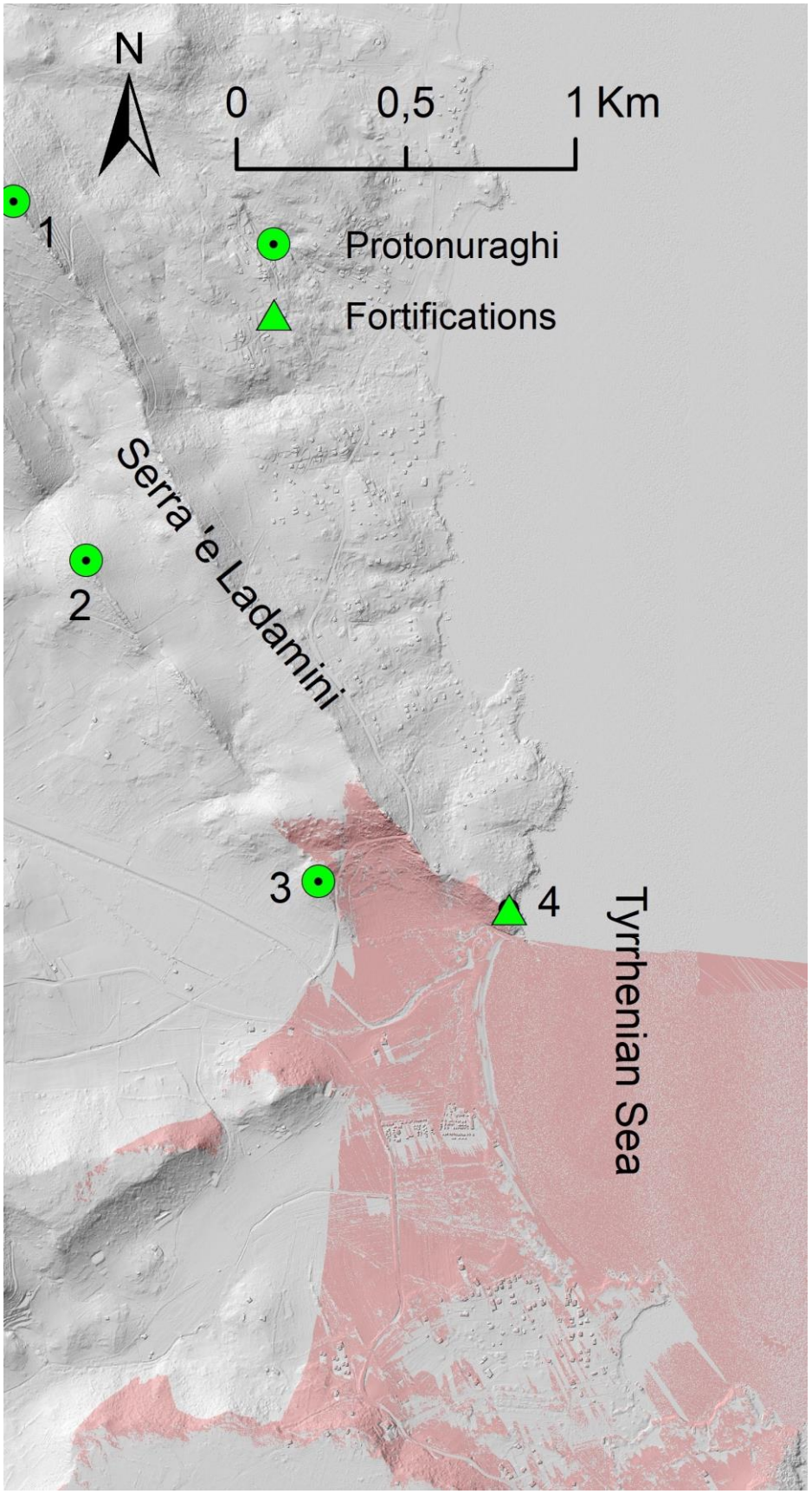


Fig. 50. A viewshed illustrating visibility (visible area in red) from Protonuraghe Muxieddu (Tortoli). 1 – Serra 'e Ladamini, 2 – Baccu Arzula, 3 – Muxieddu, 4 – Punta Cea.

sites in sample area 2 (380m altitude), controlling the nearby area. Both sites are rather archaic in their architecture, which suggests their Early or Middle Bronze Age origin. Such a distribution of fortifications suggests that the Nuragic people made efforts to utilize and control significant points in the landscape without necessarily settling at them.



Fig. 51. The Nuragic wall with an entrance at the top of Monte Arista (Cardedu).

6.2.2. Relations between domestic and funerary sites

In sample area 2 I identified four *tombe di giganti* (Fragori – Barisardo, Brocca – Cardedu, Bellisceddu – Barisardo and Preda Longa – Tortoli). Two other *tombe di giganti* were located on the plateau of Teccu, one of them north of Nuraghe Iba Manna, the other NE of Nuraghe Niedda Puliga – both are completely destroyed (Pilia and Castoldi, pers. comm. 2015). A reference to *tomba di giganti* near Nuraghe Cea (Loceri) made by Nieddu (2006: 41) is probably an error and refers to the nearby *tomba di giganti* Bellisceddu (Castoldi, pers.

comm., 2015). This is consistent with the Sardinian average of about seven nuraghi per one megalithic tomb – in this case we have six tombs and thirty-four nuraghi.

None of the tombs display any traces of stele which could possibly indicate their Early Bronze Age origin. However, the presence of stele cannot be entirely excluded due to the poor state of preservation of some of the tombs. A Middle Bronze Age origin is clearly indicated by the construction technique of a well-preserved burial chamber in *tomba di giganti* Bellisceddu. It is not covered by flat slabs (i.e. flat arch construction, typical for early *tombe di giganti*, and well-preserved in the tomb of Coddu Vecchiu – Arzachena, Antona Ruju and Ceruti 1992: 83), rather it is trapezoidal in section and both of its walls meet to form a vault (Fig. 52). This more technologically advanced technique of building and the distribution of tombs, all of which are located away from the suggested earliest zone of Nuragic occupation (protonuraghi in the massif of Serra ‘e Ladamini) suggest that *tombe di giganti* in sample area 2 are not among the very earliest Bronze Age structures around Barisardo and Cardedu. Perhaps their emergence was a result of the increasing Nuragic occupation of this area throughout the Middle Bronze Age. This possibility is suggested by the fact that sites of two destroyed *tombe di giganti* on the plateau of Teccu (near nuraghi Iba Manna and Niedda Puliga) are located well within the plateau rather than on its edges (like almost all of the nuraghi), which indicates the spatial selection and organization of different locations for settlement and funerary locales.

Outside of Giara di Teccu the distribution of *tombe di giganti* in relation to the nuraghi varies. Nuraghe and *tomba di giganti* Brocca (Cardedu) are located just 100m away and there are no other Nuragic settlements in the radius of more than 1.5km. This is a clear example of a megalithic tomb paired with a specific nuraghe, possibly used exclusively by its inhabitants. This is also suggested by the fact that Nuraghe Brocca is a complex structure, but quite homogenous in its construction (its bastion/lateral tower is well-integrated with the main tower), so it could have reached its full complex shape already in the Middle Bronze Age,

requiring a paired tomb to satisfy the burial and ritual needs of its inhabitants. Other tombs are located away from the nuraghi. Examples are *tomba di giganti* Fragori with no nuraghi in a radius of 800m around it, as well as *tomba di giganti* Bellisceddu located at a similar distance (circa 1.1km) from both Nuraghe Ursu (to the north) and Nuraghe Arbu (to the south), and possibly used by the inhabitants of both (see Chapter 9).



Fig. 52. The chamber of tomba di giganti *Bellisceddu is trapezoidal in section.*

This diversity of distribution patterns of Nuragic megalithic tombs is similar to the situation in sample area 1. It might indicate that the tombs were constructed in different periods of time, but it could also mean that the nature and significance of mortuary and ritual practices varied between different families or groups. This would be consistent with the idea of an egalitarian structure to the Middle Bronze Age societies in Sardinia.

6.3. The Early and Middle Bronze Age of the Sardinian east coast in a Central Mediterranean context

One of the most important observations regarding the Early and Middle Bronze Age occupation in sample area 1, namely the significant evidence for a degree of continuity between the Chalcolithic and Bronze Age (see Chapter 6.1), has implications also in the Central Mediterranean context. While the Chalcolithic to Early Bronze Age transition in Sardinia is traditionally seen as a discontinuous process marked by collapse of the Chalcolithic settlement systems, it contrasts with the situation in Sicily, Corsica and at least some regions of mainland Italy, which are characterized by a significant degree of continuity between the Chalcolithic and Early Bronze Age evidence (Webster 2015: 13). Thus, the Chalcolithic to Early Bronze Age transition in sample area 1 seems to be more similar to that known from other Central Mediterranean islands and mainland Italy rather than that in western Sardinia. However, this argument is based mostly upon settlement evidence gathered through surveys undertaken during this project. To assess the complete picture of the Chalcolithic to Early Bronze Age transition in sample area 1 one would also need to have a representative sample of Early Bronze Age mortuary remains, which are scarcely known from eastern Sardinia (primarily due to the insufficient amount of research), but very common in western part of the island, primarily in the Campidano and the North-West (Webster 2015: 21). Examples include the sites of Pranu ‘e Idda (Villanovafranca, Ugas and Lami 2014: 19) and Is Calitas (Soleminis, Webster 2015: 24-25). However, obtaining such data would require excavation of burial sites in both research sample areas.

It is difficult to estimate the extent of cultural and demographic Bell Beaker influence in both sample areas of the east coast of Sardinia. This is mostly due to the fact that over 90% of Beaker finds in Sardinia come from burial contexts (Pau 2010: 122), while there are almost no Beaker sites founded ex novo in the wider landscape, which supports the idea that the Bell Beaker associated assemblage reached Sardinia through the movement of ideas rather than

through migration (see Chapter 6.1). Potentially, Beaker materials could be unearthed in the future in *domus de janas*, since re-used Late Neolithic rock-cut tombs constitute the main context in which Sardinian Bell Beakers have been found, and they are present in both sample areas. Among the examples are *domus de janas* Pizzu ‘e Monti (Barisardo), Punta Madau (Castiadas) and Spiaggia del Riso (Villasimius). The latter one seems particularly promising, as it has a megalithic corridor built of stone slabs leading to an entrance (Valtan 2003: 4), which is interpreted as a Bronze Age extension.

Finally, the main features of social relations in the Early and Middle Bronze Age which are observable in both sample areas and in other parts of Sardinia, such as the limited degree of settlement and social hierarchy with the head of a family as the highest level of power, are not unique to Sardinia. The Early Minoan (c. 3000-2000 BC) funerary practices reveal the emergence of communal identities within specific clans or families. Despite differences in wealth deposition in specific tombs, Chapman (2005: 90) concludes that interpreting this as evidence for social stratification and chiefdoms is unwarranted and compares it instead to communal ideologies centred around nucleated families in South-East Spain. Likewise, there is no significant evidence for social stratification in Middle Bronze Age Corsica where megalithic towers known as *torri*, in many aspects similar to the nuraghi, emerged in the southern part of the island (Peche-Quilichini 2011). Thus, despite the relative isolation of Sardinia in the Middle Bronze Age, the process of shaping social relations in this period shows similarities to other parts of the Mediterranean.

6.4. Conclusions

The Early and Middle Bronze Age evidence from sample areas 1 and 2 reveals similarities, but also significant differences between them. In both cases, the nuraghi are located primarily in easily defensible positions (hilltops, promontories, etc.), but rarely on the coastline. In both areas visible traces of Nuragic occupation mostly cease in the higher mountains (over 500m

altitude). These similarities indicate that subsistence strategies could have been very similar for the Nuragic societies in both areas. In both cases the evidence which can be interpreted to indicate territoriality is very limited, and the PPA method reveals very few sites which stand out as possibly more important than others. It seems, instead, to confirm the idea of an egalitarian structure to Middle Bronze Age Nuragic societies (Webster 1996, Broodbank 2013). One possible exception is the plateau of Teccu, where the nuraghi were built around its edges, matching the pattern seen in other parts of Sardinia. However, lack of similar highland plateau in sample area 1 makes the comparison between the areas impossible in this respect. Also, in both sample areas we observe a wide variety of patterns in the distribution of the megalithic tombs in relation to the nuraghi, which could indicate differences in chronology between *tombe di giganti*, but also the different significance of burial practices and places for different families in Early and Middle Bronze Age societies.

The major difference observable between sample areas 1 and 2 is in the typology of the Nuragic architecture. Around Barisardo and Cardedu we can see a predominance of typical nuraghi with corbelled tholos chambers. On the other hand, around Muravera, Castiadas and Villasimius most of the structures are archaic in construction, they often do not have a tholos chamber nor intra-mural staircases, there is also a significant percentage of protonuraghi (corridor nuraghi). This suggests that the core of the Nuragic settlement network in sample area 1 could have been earlier. However, this could equally represent a contemporary regional architectural tradition – we see such local traditions in other parts of the island, such as the nuraghi with two staircases and *mezzanini* (small rooms between two tholos chambers) in Anglona (Dore 2006). The argument in favour of the earlier origin of the Nuragic network in sample area 1 is supported by its close connection to the distribution of pre-Nuragic sites, which is absent in sample area 2. Another significant difference is the percentage of complex nuraghi – 20 out of 111 (18%) in sample area 1 and 24 out of 38 (63%) in sample area 2. This might indicate a more dynamic demographic development in Ogliastra, but we have to be

cautious here due to the limited possibility of distinguishing between the complex nuraghi which reached their final shape in the Middle Bronze Age and those which came into existence through extension in the Late Bronze Age (see Section 7.2).

The differences between the Early/Middle Bronze Age settlement patterns in sample areas 1 and 2 confirm that the organization of Nuragic networks differed over relatively small distances (about 40km between the northern limit of sample area 1 and the southern limit of sample area 2), which once again reveals the importance of landscape archaeology in Sardinia and a significant potential for expanding our knowledge of Nuragic settlement dynamics through landscape surveys.

7. The Late Bronze Age (1200-900 BC)

Summary. *The Late Bronze Age in Sardinia, in some chronological models divided into "recent" (c. 1350-1100 BC) and "final" (c. 1100-900 BC) phases, is a key period in the development of Nuragic culture. It is marked by the emergence of nucleated settlements (complex nuraghi, often with associated villages consisting of circular huts), settlement hierarchy and increasing complexity of society, probably involving a more significant degree of inequality and stratification than in the Middle Bronze Age. Another characteristic of the Sardinian Late Bronze Age is the rise of sanctuaries with monuments such as sacred wells, springs and megaron temples. The evidence from the two study areas presents very different pictures of Nuragic settlement dynamics and society in this period. In sample area 1 we can observe a low degree of settlement nucleation and a complete lack of sanctuaries, suggestive of a low degree of social differentiation and complexity. By contrats, 63% of the nuraghi in sample area 2 are complex structures, some of them with associated extensive settlements. There is also a sanctuary with a sacred well. This indicates significant differences in Late Bronze Age settlement dynamcs in the two study areas. In sample area 1 there is a continued pattern of dispersed settlement and little evidence for settlement and social hierarchy, while in sample area 2 there is greater evidence of settlement nucleation and emergence of the centres of power.*

The final phases of the Bronze Age in Sardinia saw numerous significant social and cultural transformations, the nature and chronology of which remains debatable. The major process which manifests itself in evidence gathered through landscape archaeology is settlement nucleation, which resulted in the extension of about 30% of the nuraghi (Lilliu 1996: 38) into complex structures with lateral towers, bastions, courtyards, and – in some cases – curtain walls. Among the major examples are Nuraghe Alvu (Pozzomaggiore), where a courtyard with

an enclosing wall was added to the main structure in the Late Bronze Age (Boninu et al. 2013: 88), and Nuraghe Santu Antine (Torralba), where a bastion was added to the main tower (Contu 1988: 29). In addition to that, settlements comprising up to 150-200 circular huts (Nuraghe Palmavera – Alghero, Moravetti 1992) emerged around the complex nuraghi and some of the single-towered ones. The main reason for the settlement nucleation in Late Bronze Age Sardinia was probably demographic growth and greater competition for resources leading to warfare and the emergence of social hierarchy. This process has been defined by Carneiro's (1970) circumscription theory (see Chapter 3). It has been successfully applied by Navarra (1997) to the Nuragic settlement evidence in the area of Isili (central Sardinia), indicating that the Late Bronze Age changes in settlement patterns are likely to reflect the rise of social hierarchy, probably manifesting itself through the emergence of chiefdoms. As Webster concludes, "(…) most scholars agree that by the middle of the [LBA] period, if not earlier, sufficient differences have developed within and between settlements to characterize LBA society as hierarchically structured" (2015: 110). An unlikely alternative is the development of more complex societies without elites, where groups of people could maintain close relationships without centralized power and large projects accomplished through mutual aid (Araque Gonzalez 2014: 153).

In this chapter I examine the evidence of Late Bronze Age occupation and ritual activity in both of the selected sample areas, with a particular focus on examining possible evidence for settlement nucleation and the development of ritual sites, as well as their implications for understanding the nature of social relations in this period. I will also evaluate the degree of continuity and discontinuity between the Middle and Late Bronze Age practices in light of the evidence obtained through landscape archaeology.

7.1. The Late Bronze Age in sample area 1

The archaeological evidence for Late Bronze Age activity in Sarrabus is relatively limited. The

scarcity of monuments whose typology reflects the major architectural forms of this period does not necessarily reflect the extent of the Nuragic occupation in this area, since at least some of the Middle Bronze Age monuments could still have been occupied. This seems particularly probable considering the fact that increasing competition for resources resulted in occupation of areas with relatively poor economic potential by sizeable Nuragic groups, such as the highland plateau of Pran'e Muru, where Nuragic occupation thrived in the Late Bronze Age despite its domination by woodland (Depalmas and Melis 2010).

7.1.1. Settlement patterns and territoriality

Complex nuraghi constitute a minority of the Nuragic settlements in the south-east part of the island. Only 20 out of 111 (18%) recorded nuraghi are complex structures; moreover, just 7 of them (Monte Narbeddu – San Vito, Asoru – San Vito, Don Giovanni Mattaciolu – Muravera, S'Acqua Seccis – Muravera, Baccu 'e Gattus – Villasimius, Fig. 62, Baccu Sa Figu – Castiadas, and S'Omu S'Orcu – Castiadas) have tholos chambers or lateral towers with tholos chambers which allow us to plausibly classify them as structures extended in the Late Bronze Age. In addition, three other complex nuraghi and six single-towered nuraghi or protonuraghi have associated settlements and one has an antemural, typologically indicating their Late Bronze Age occupation. There are also three open settlement sites. Thus, the total number of settlement sites in this area that can be attributed to Late Bronze Age on the basis of their typology is 20 (see Table 11).

The major Early/Middle Bronze Age settlement pattern – the dispersal of settlement and limited evidence for territoriality – is seen also in the Late Bronze Age evidence. One might expect that, considering the settlement network of this period probably included Middle Bronze Age protonuraghi and nuraghi-*capanne*, in case of settlement nucleation and development of chiefdoms according to circumscription theory the re-used Middle Bronze Age sites would have been located near the main complex nuraghi. This would have been necessary in order

to create a territorial unit with a boundary, and to easily exercise control over it by the local elites. That is not the case. Most of the single-towered nuraghi and protonuraghi with associated settlements are located away from the major complex nuraghi. Also, among the complex nuraghi, only five (S'Omu S'Orcu – Castiadas, Asoru – San Vito, S'Acqua Seccis – Muravera, Santoru – Muravera and Monte Narbeddu – San Vito, see Fig. 56-58) are particularly large, multi-towered structures that could plausibly be interpreted as potential Late Bronze Age centres of power. Two scenarios (not mutually exclusive) can be suggested on the basis of this observation (and their likelihood will be further examined in context of the ritual sites in sample area 1):

First, in the Late Bronze Age the south-east coast of Sardinia remained a relatively insignificant and peripheral area of Sardinia, and the Nuragic centres located therein did not rise to a significant political nor economic power in this period of increasing settlement nucleation, remaining in the shadow of territories and more complex societies emerging in the central and western parts of the island.

Second, the Late Bronze Age settlement nucleation in this area was not driven primarily by political, social and economic factors such as population pressure resulting in the emergence of hierarchical society and chiefdoms, as traditionally argued (Navarra 1997, Lilliu 1999b, Russell 2010). This would suggest that the reasons behind the phenomenon of settlement nucleation could have been different in specific parts of the island, not necessarily being primarily of a defensive or political nature. This is indicated also by the locations of the largest complex nuraghi, which are of poor defensive potential – Nuraghe Asoru (San Vito) is located in the middle of Basoru plain, while Nuraghe S'Omu S'Orcu (Castiadas, see Fig. 57) is located on a low hill in a lowland area near the coast. In contrast, in the area of Bortigali (Central-Western Sardinia) the nuraghi which were extended in the Late Bronze Age were primarily those located in defensive positions (Namirski 2012). Thus, the criteria of selecting sites to be

extended in the Late Bronze Age were likely to be different on the south-east coast of the island compared with the western part of Sardinia. A further fact supporting these conclusions is that six of the Late Bronze Age sites overlook the Senni river valley, but are spread over different parts of it (see Fig. 53), indicating that the Nuragic occupation in this period focused on areas of economic significance (in this case, near the water course), but without particular emphasis on territoriality. This point could potentially be supported by the fact that the least-cost pathway between the two largest nuraghi in this area (S'Acqua Seccis and Santoru) runs through the valley, which could have constituted the main communication route between them (see Fig. 54). However, this would have to be confirmed by evidence on other grounds demonstrating that these sites maintained some sort of communication (see Chapter 4.2) – a lack of other known sites located along the least-cost path could potentially be interpreted as evidence against such a conclusion – therefore, this point remains a speculation, albeit with a potential to be tested by excavations. Further support for this hypothesis comes from the Proximal Point Analysis (PPA), which reveals that complex nuraghi in sample area 2 do not necessarily have more connections than smaller sites. An example is Nuraghe S'Omu S'Orcu (Castiadas), which has only two connections and does not stand out from its neighbours (see Fig. 55, Table 10), and the least-cost pathway analysis revealed that the easiest route between this site and a possible landing site near Nuraghe Monte Turno (see Chapter 10.3) involves crossing a bay rather than an overland route (Fig. 59), potentially making this connection less likely. This could, again, be explained by low level of social differentiation and political inferiority of this area in the Late Bronze Age – in such a scenario it would be understandable that any expansion of the nuraghi was driven by economic rather than political purposes.

The only zone within sample area 1 with potential evidence for territoriality is, just as in the case of the Middle Bronze Age settlement network, the area around the current town of Villasimius. Both single-towered nuraghi and complex nuraghi form a small cluster with a

significant zone without nuraghi around them (see Fig. 60). However, the explanation for this pattern lies not necessarily in territoriality, but in the topography of the area around this small cluster – north of it there is the massif of Monte Minniminni which exceeds the altitude on which the nuraghi in Sarrabus were usually built. Thus, it is possible that the "buffer zone" around the cluster of nuraghi near Villasimius was due to topography rather than the deliberate creation of a territorial boundary. This interpretation is further supported by the fact that almost all of the Nuragic sites near Villasimius are located in defensive positions, indicating a need for the separate protection for each site. It is different to other clusters of nuraghi with buffer zones in Sardinia, where different monuments were built in other types of locations (Bonzani 1992, Depalmas 2008, Namirski 2013), with the sites inside the territory not necessarily needing a defensive location for protection. These patterns are also likely to reflect various aspects of usage of specific sites in the period of settlement nucleation. This is not observable in the aforementioned cluster of nuraghi near Villasimius, making its interpretation as evidence for the existence of a sub-regional polity in this area unlikely. Intervisibility occurs between three nuraghi in the cluster (S'Argalla I, Bruncu Campulongu and Accu Sa Pira) and the complex nuraghe of Baccu 'e Gattus located to the east (see Fig. 61), indicating a possibility of a relationship between them. However, considering how common the intervisibility between the sites is in sample area 1 (see Figs. 39, 40, and Table 8), and the lack of more explicit indication of connections between Nuraghe Baccu 'e Gattus and the cluster of four nuraghi west of Villiasimius, it is difficult to draw further conclusions based on the available data.

Another important observation for sample area 1 is the presence of several open settlement sites which are likely to be of Late Bronze Age origin (see Fig. 63). The presence of open settlements without nuraghi can be associated with specialized production (Sa Osa – Cabras, Castangia 2012), or ritual activity (Serra Orrios – Dorgali, Moravetti 1998b). A limited number of open settlements without a nuraghe (Riu Mannu – San Vito, Monte Antoni Peppi –

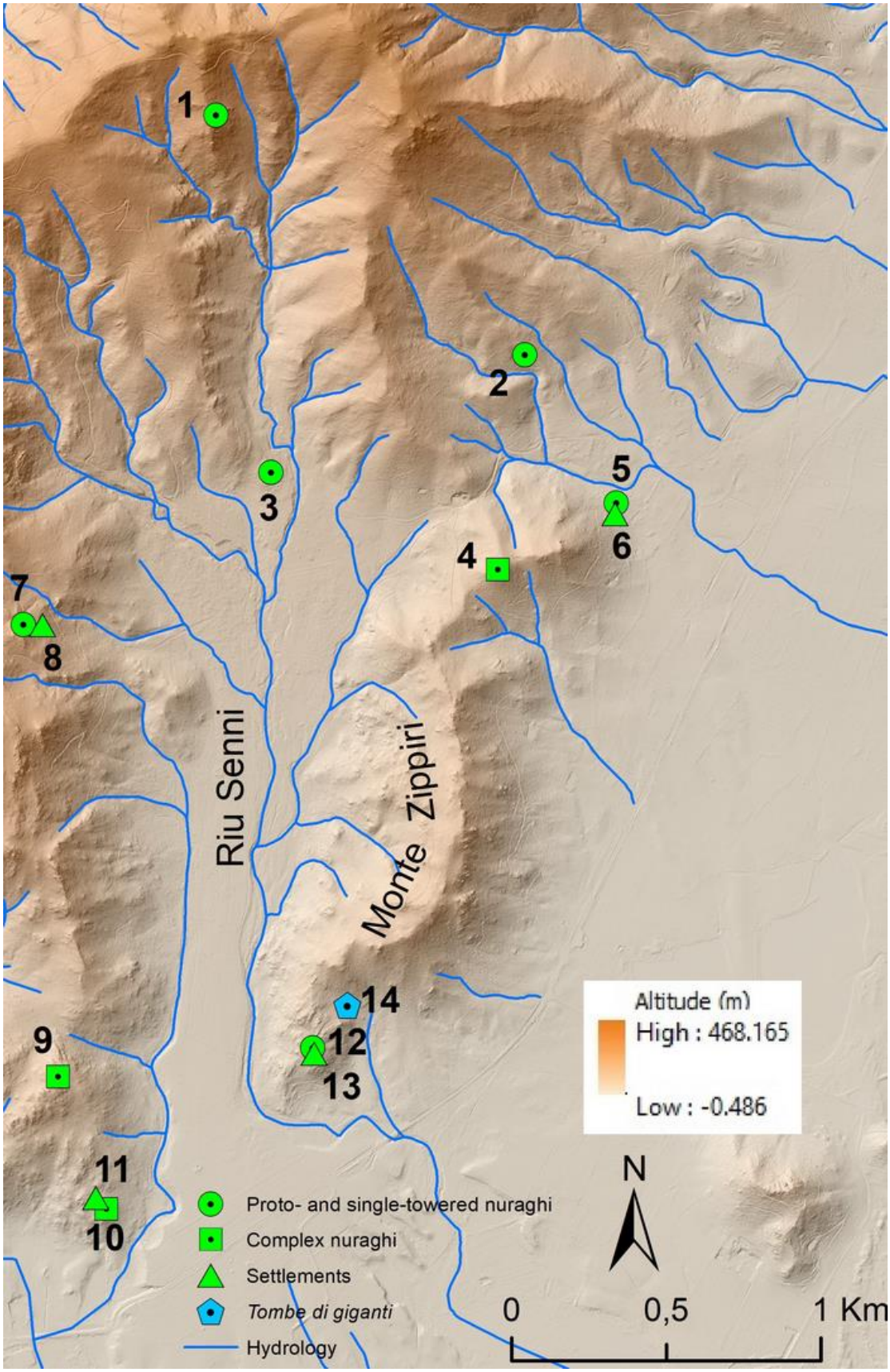


Fig. 53. The Nuragic occupation around Riu Senni valley including the Late Bronze Age sites (single-towered nuraghi with settlements and complex nuraghi). 1 – Ponzianu, 2 – Su Braccu, 3 – Cuili Senni, 4 – S'Acqua Seccis, 5-6 – Domu de S'Orcu, 7-8 – Marongiu, 9 – Santoru, 10-11 – Sa Spadula,12-14 – Monte Zippiri.

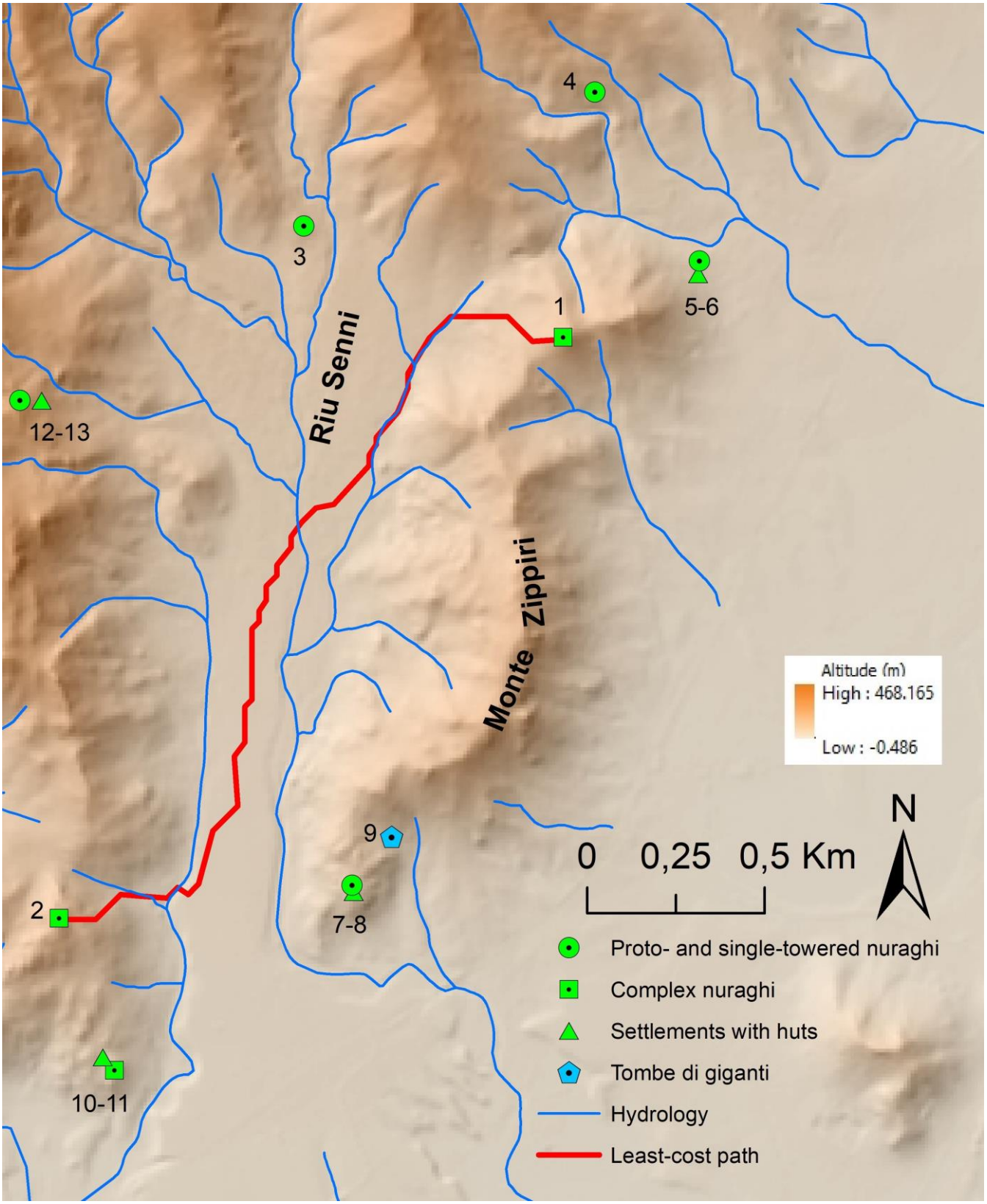


Fig. 54. The southern part of Riu Senni valley with the least-cost path between nuraghi S'Acqua Seccis (1) and Santoru (2). Other sites: 3 – Cuili Senni, 4 – Su Braccu, 5-6 – Domu de S'Orcu, 7-9 – Monte Zippiri, 10-11 – Sa Spadula, 12-13 – Marongiu.

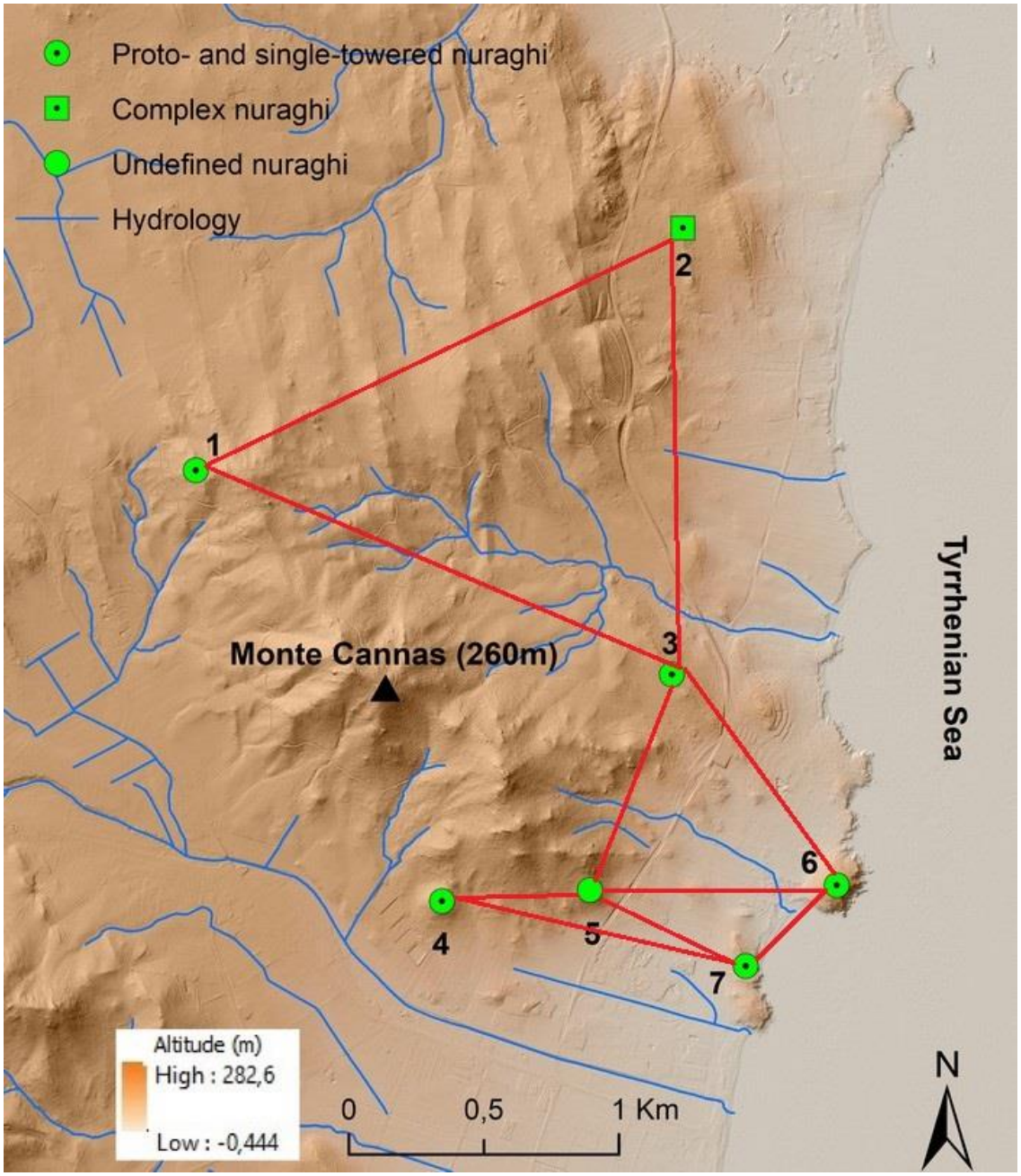


Fig. 55. Proximal Point Analysis (PPA) of the area around the massif of Monte Cannas (Castiadas). 1 – Brebeis, 2 – S'Omu S'Orcu, 3 – Su Cannisoni, 4 – San Pietro, 5 – Sa Figu, 6 – Monte Turno, 7 – Gibe Truttiri.

Site name (no. on Fig. 52)	Site type	Number of connections
Brebeis (1)	Protonuraghe	2
S'Omu S'Orcu (2)	Complex nuraghe	2
Su Cannisoni (3)	Protonuraghe	4
San Pietro (4)	Single-towered nuraghe	2
Sa Figu (5)	Undefined nuraghe	4
Monte Turno (6)	Single-towered nuraghe	3
Gibe Truttiri (7)	Single-towered nuraghe	3

Table 10. Data from the Proximal Point Analysis (PPA) in the area of Monte Cannas.



Fig. 56. Nuraghe Asoru (San Vito) in its landscape context – view from the east.



Fig. 57. The lateral tower and the antemural of Nuraghe S'Omu 'e S'Orcu (Castiadas).

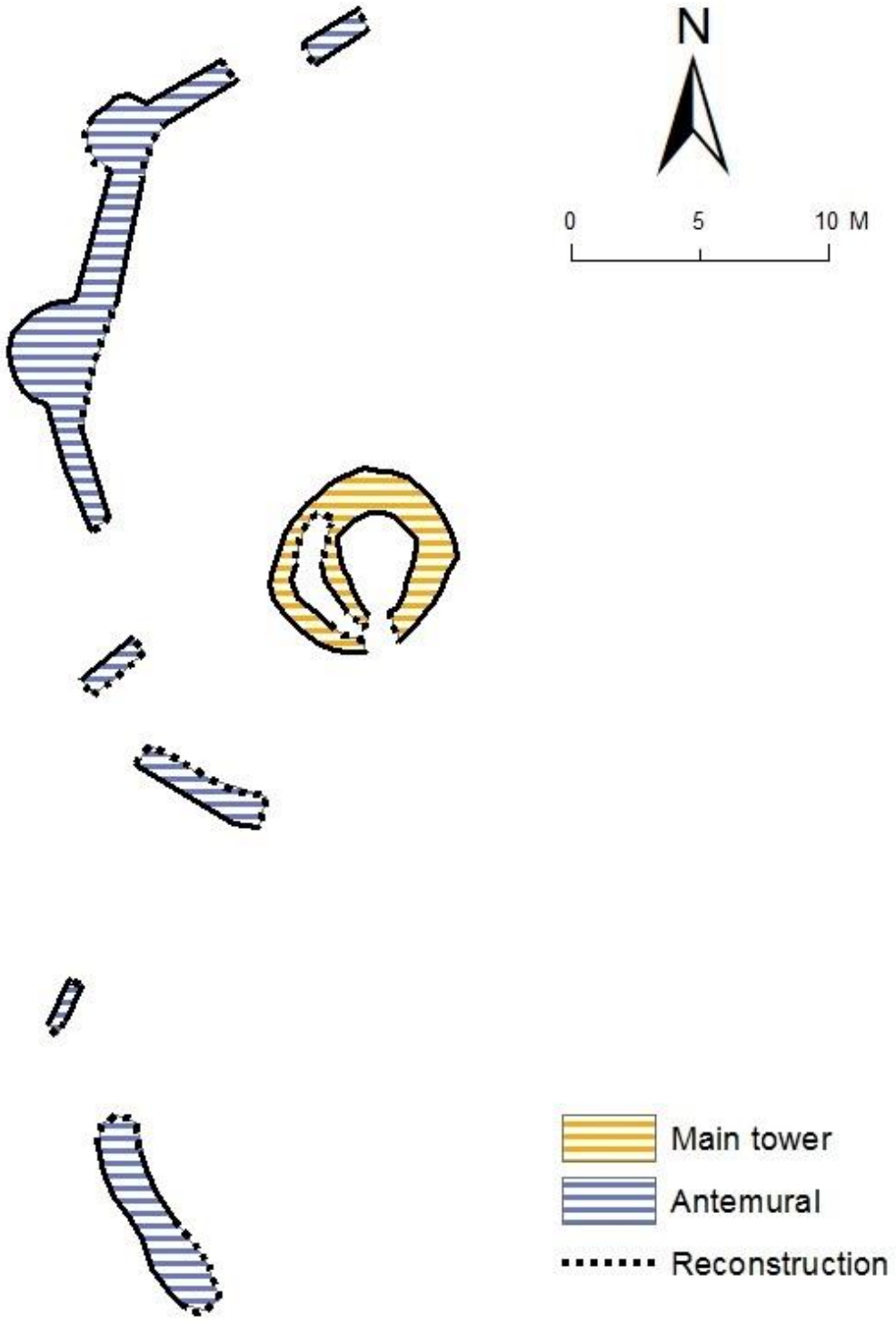


Fig. 58. Plan of the Nuragic complex of Santoru (Muravera) with the main tower and antemural (prepared by the author with use of Leica Total Station).

Site (commune)	Type of site	Characteristics
Asoru (San Vito)	Complex nuraghe with tholos chamber	Complex nuraghe with tholos chamber
Baccu ‘e Gattus (Villasimius)	Complex nuraghe with tholos chamber	Two adjacent towers with bastion
Baccu Sa Figu (Castiadas)	Complex nuraghe with tholos chamber	Two towers (the main one with tholos) and bastion
Corritta (Muravera)	Complex nuraghe with settlement	Complex nuraghe with remains of settlement on a slope below
Domu S’Orcu (Muravera)	Single-towered nuraghe with settlement	Lowland-located single-towered nuraghe with settlement
Don Giovanni Mattaciolu (Muravera)	Complex nuraghe with tholos chamber and settlement	Oval-shaped structure with tholos-chambered lateral tower and traces of settlement
Feraxi (Muravera)	Open settlement	Poorly distinguishable remains
Idda (Castiadas)	Single-towered nuraghe with settlement	Single-towered nuraghe with extensive settlement
Manunzas (Villasimius)	Complex nuraghe with settlement	Remains of huts located south of the nuraghe
Marongiu (Muravera)	Protonuraghe with settlement	At least three circular huts around the corridor nuraghe
Monte Antoni Peppi (Muravera)	Open settlement	Possible remains of a structure
Monte Narbeddu (San Vito)	Complex nuraghe with tholos chambers	Nuraghe with main tower, bastion and tholos-chambered lateral tower
Monte Zippiri (Muravera)	Single-towered nuraghe with settlement	Remains of settlement on a promontory near nuraghe
Nicola Podda (Muravera)	Single-towered nuraghe with settlement	Remains of circular huts around nuraghe
Riu Mannu (San Vito)	Open settlement	Poorly distinguishable remains
S’Acqua Seccis (Muravera)	Complex nuraghe with tholos chambers	Large complex nuraghe with three tholos towers
S’Omu S’Orcu (Castiadas)	Complex nuraghe with tholos chambers	Complex structure with bastion, lateral towers and antemural
Santoru (Muravera)	Complex nuraghe with antemural	Partly preserved main tower and antemural with at least three towers
Sa Spadula (Muravera)	Complex nuraghe with settlement	Nuraghe with two conjoined towers and extensive settlement
Su Cunventu (Muravera)	Single-towered nuraghe with settlement	Settlement with circular huts and a rectangular structure

Table 11. Late Bronze Age sites in sample area 1.

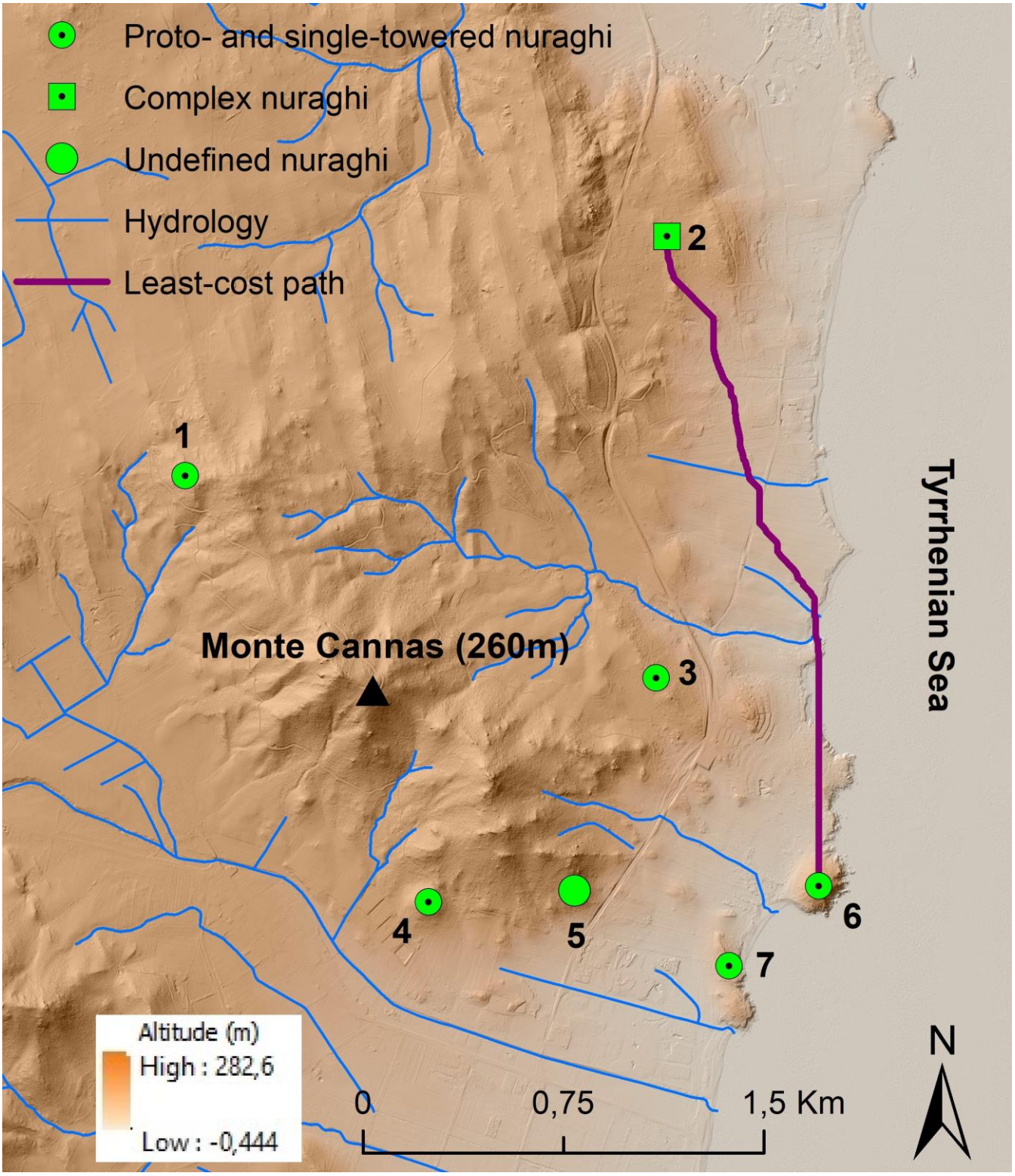


Fig. 59. The least-cost path between Nuraghe S'Omu S'Orcu (Castiadas) and Nuraghe Monte Turno located close to a bay with possible landing site.

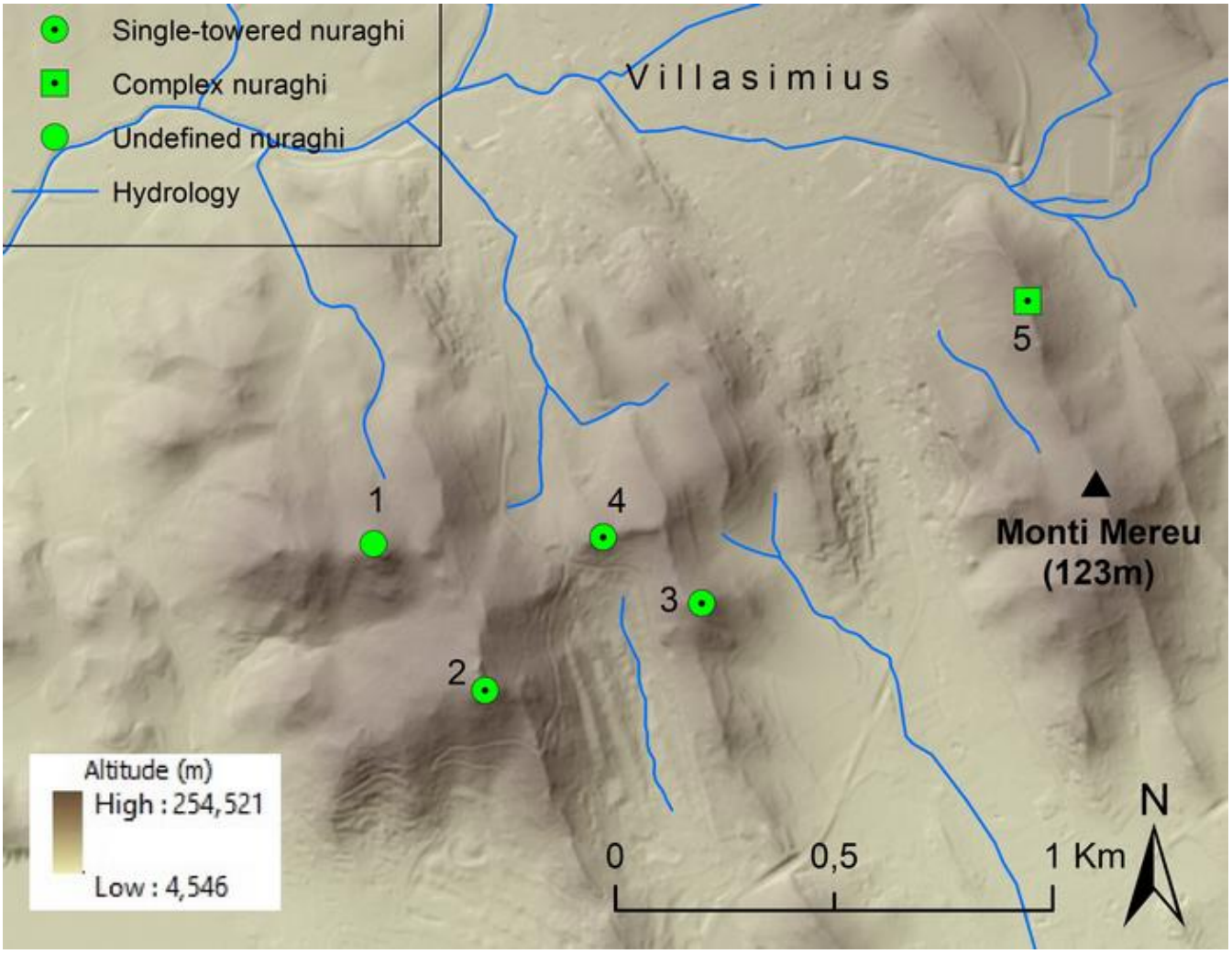


Fig. 60. Distribution of the nuraghi located in a mountain massif South-East of Villasimius. 1 – Accu Sa Pira, 2 – S'Argalla I, 3 – S'Argalla II, 4 – Bruncu Campulongu, 5 – Monti Mereu.

Muravera, Feraxi – Muravera), corresponding with the overall pattern of limited Late Bronze Age occupation in sample area 1, and lack of monumental architecture within them, strongly indicate their economic more than ritual significance. Considering the low number of Late Bronze Age settlements in sample area 1 it seems doubtful whether the open settlements could have been centres of specialized production similar to those in the western part of the island, as the needs of the areas with a low level of settlement nucleation (and presumably social differentiation) would have been less than of the emerging centres of power in western Sardinia. The primarily subsistence-based significance of open settlements is also supported by the fact that two out of three recorded open settlements without a nuraghe are located on a lowland area at the foot of hills with protonuraghi (Feraxi settlement

below Protonuraghe Baracca Su Entu and Riu Mannu settlement below Protonuraghe Comideddu), possibly being economically associated with them. This interpretation could also be supported by the fact that the Feraxi settlement is located near a least-cost path between nuraghi Mannu and Don Giovanni Mattaciolu, two major complex nuraghi in this area (see Fig. 64), which suggests possible association between those structures and the open settlement. This also provides further evidence that at least some of the protonuraghi could have been occupied in the Late Bronze Age, which is well-documented in other parts of Sardinia (Webster 1996: 112). These types of open settlements are more difficult to detect archaeologically than the monumental structures which dominate the archaeological record in Sardinia, therefore the existence of further sites which could have escaped detection or are poorly visible in the landscape cannot be ruled out.

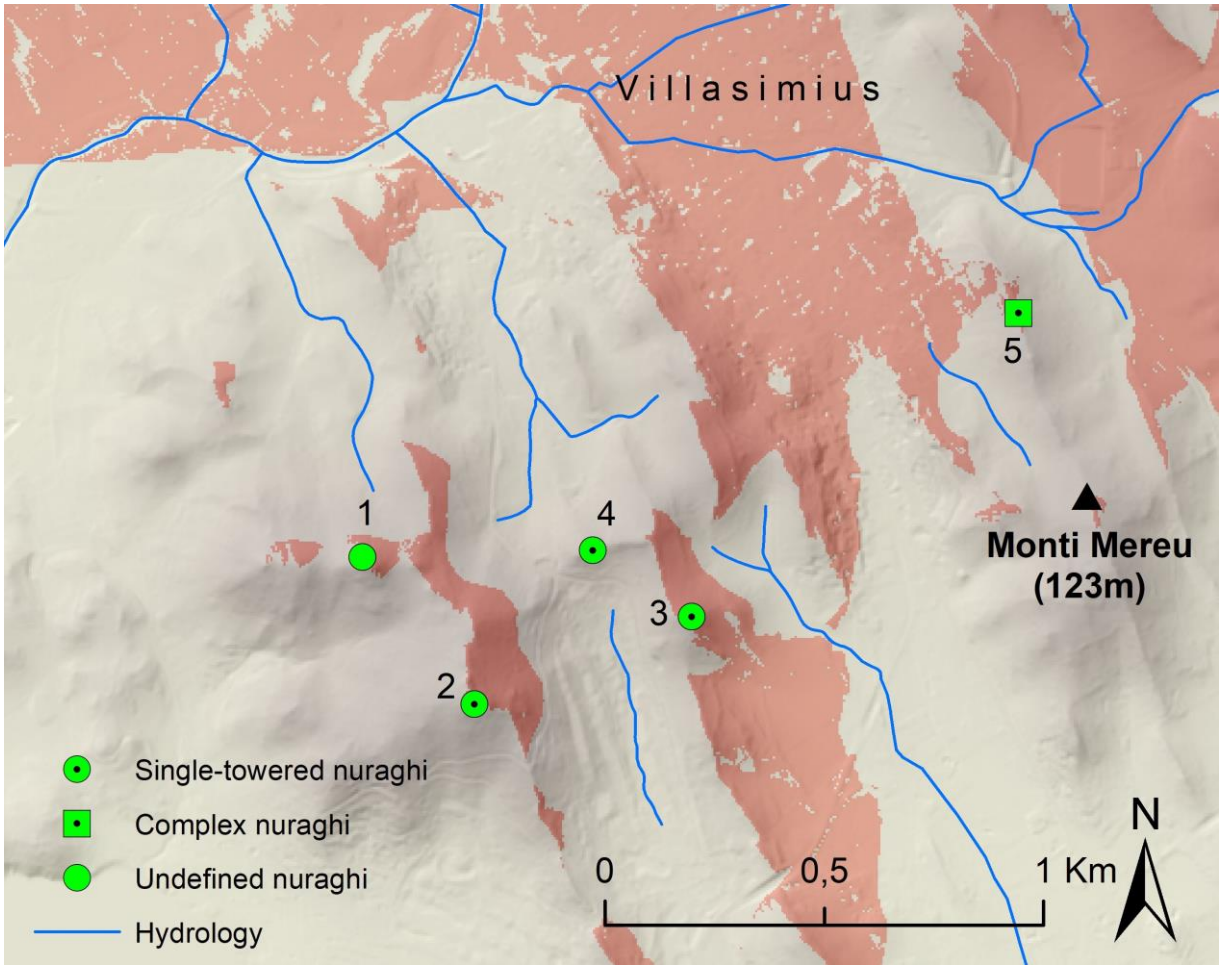


Fig. 61. Viewshed illustrating visibility from Nuraghe Baccu 'e Gattus (visible area in red). 1 – Accu Sa Pira, 2 – Bruncu Campulongu, 3 – S'Argalla I, 4 – S'Argalla II, 5 – Baccu 'e Gattus.

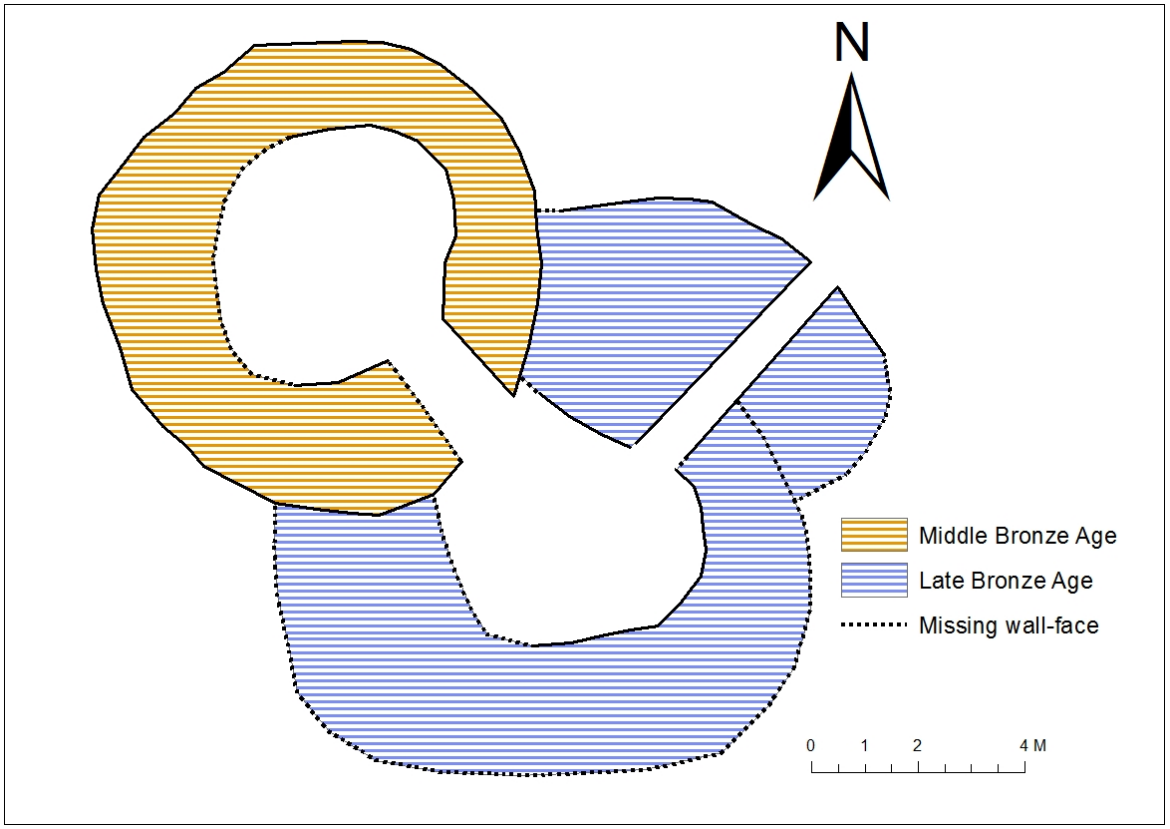


Fig. 62. Plan of Nuraghe Baccu 'e Gattus (Villasimius) prepared with use of Leica Total Station.



Fig. 63. A circular hut in the settlement near Nuraghe Su Cunventu (Muravera).

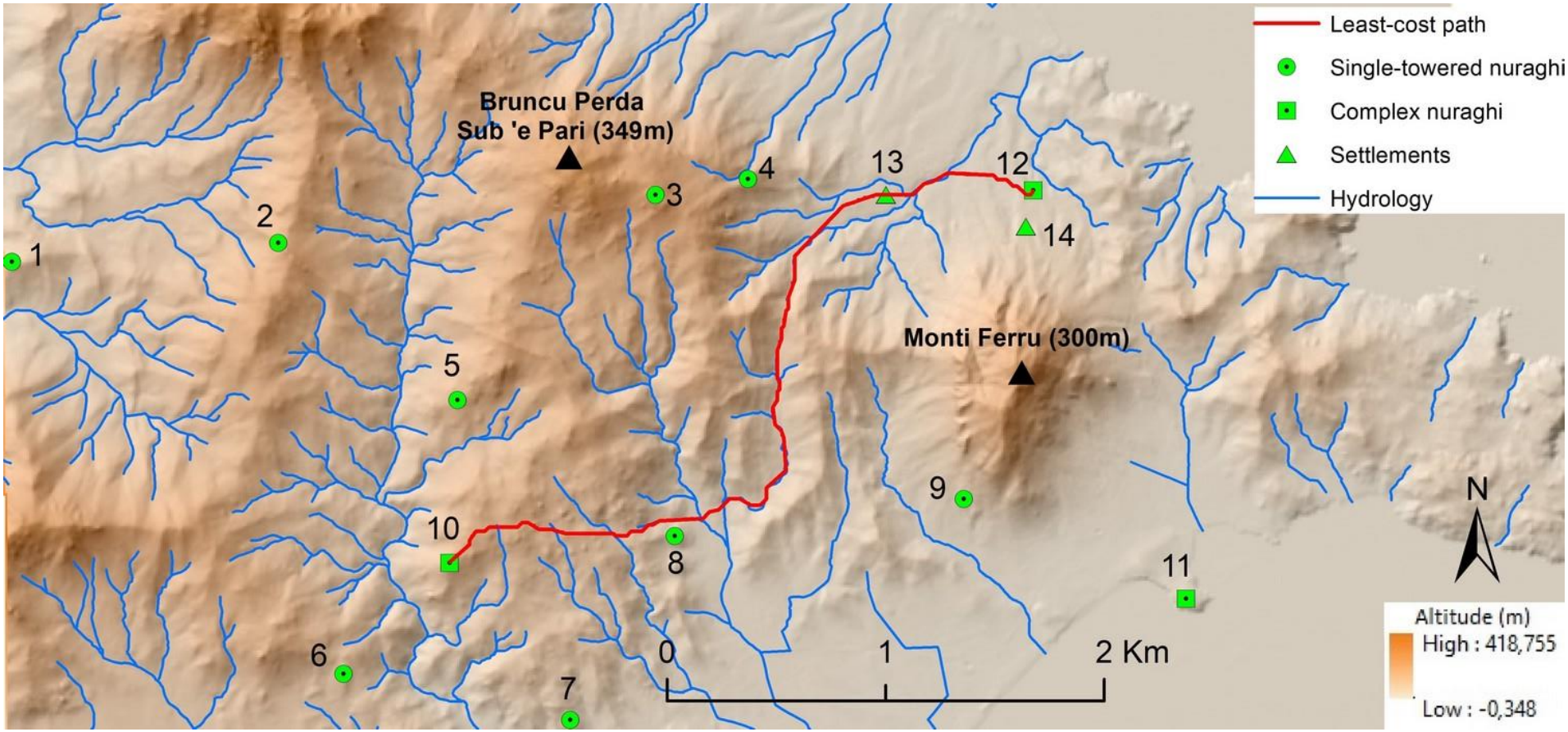

Bruncu Perda
Sub 'e Pari (349m)
Monti Ferru (300m)
Least-cost path
Single-towered nuraghi
Complex nuraghi
Settlements
Hydrology
1
2
3
4
5
6
7
8
9
10
11
12
13
14
N
0
1
2 Km
Altitude (m)
High : 418,755
Low : -0,348

Fig. 64. A least cost-pathway between nuraghi Mannu (10) and Don Giovanni Mattaciolu (12), the two major complex nuraghi near Monti Ferru. 1 – S'Ortu, 2 – Mortus, 3 – Garrabosu, 4 – Baracca Su Entu, 5 – Perdiaxiu, 6 – Arrubiu, 7 – Sa Ridroxi, 8 – Piscareddu, 9 – Monti Ferru, 10 – Mannu, 11 – Porto Pirastu, 12, 14 – Don Giovanni Mattaciolu, 13 – Feraxi.

Military factors are likely to have played a role in the Late Bronze Age settlement network: 15 out of 19 sites (79%) are located on hilltops, promontories or in other locations with defensive potential. However, the highest located nuraghi (Nuraxeddu – Castiadas at 422m altitude, Liuru Ganudu – Castiadas at 442m altitude and Garrabosu – Muravera at 307m altitude) were not extended in the Late Bronze Age and do not have associated settlements. This lack of emphasis on occupation of the most defensively located nuraghi is further indication that the south-east coast was probably a peripheral area where population pressure and competition for resources were less marked than in other parts of the island.

7.1.2. Ritual and funerary sites

No typical ritual sites attributed to the Late Bronze Age (sacred wells, megaron temples) were recorded in sample area 1. The closest one is located 16km north of the northern edge of the surveyed area – it is *pozzo sacro* Is Pirois (Villaputzu), a typical sacred well with an underground tholos chamber and a well-preserved stairwell (Ledda 1989, Salvi 2008). To the west the closest Late Bronze Age ritual site is a sacred well in the complex of Cuccuru Nuraxi (Settimo San Pietro), which was in use also in the Iron Age (Bernardini and Tore 1987). The fact that no site in sample area 1 can be compared to these structures raises several significant questions with regard to the Late Bronze Age development of the Nuragic culture in this area.

Before these questions can be addressed, it is necessary to note that the absence of *pozzi sacri* and megaron temples does not necessarily mean that no Nuragic ritual centres existed

in south-east Sardinia. Transformation of the nuraghi into ritual centres is well-documented in other parts of the island (Petrioli 1999, Madau 2002), but occurred mostly in the Early Iron Age (after 900 BC) – a topic will be addressed more closely in Chapter 8. Also, it is possible that *tombe di giganti* were a focus of ritual activity in the Late Bronze Age, although this can only be confirmed through excavations, especially of the area within the exedras (forecourt walls) of the tombs.

The absence of these typical Late Bronze Age ritual sites can be explained in several ways. Firstly, there might have been a possible difference in belief systems between the Nuragic societies in the south-east part of the island and those in other areas of Sardinia. One could speculate that the water cult, reflected by over 60 sacred wells (Webster 2014), did not develop in this part of the island, or that it emerged in a different form or to a much lesser extent. However, given the general homogeneity of the Nuragic architecture and presence of sacred wells in almost all parts of Sardinia, as well as probable shared cultural identity expressed in the material culture (Blake 1999), which was likely to have included shared belief systems (at least in part), this explanation seems unlikely.

The more likely explanation for the absence of ritual monuments typical of the Late Bronze Age might be connected the relatively limited Late Bronze Age settlement network which has already been discussed. Given the low number of complex nuraghi and other sites which could be identified as Late Bronze Age settlement sites, it further supports the idea that the south-east coast of Sardinia was a relatively insignificant and politically peripheral area in this period, being overshadowed by the western and central part of the island where the settlement networks evolved into more complex territories with a degree of settlement hierarchy (Navarra 1997, Cossu and Perra 2008, Namirski 2013). This is particularly plausible since many of the sacred wells in Sardinia form parts of larger ritual centres, such as Santa Vittoria (Serri, Zucca 1988), Santa Cristina (Paulilatino, Moravetti 2003) and Matzanni (Vallermosa, Campus et al. 2012), located away from the major complex nuraghi. This

suggests that they might have been centres of power at least partly independent from secular political influence, perhaps even supporting the idea of a separate cast of priests suggested by Lilliu (1988). Some of them were located in buffer zones between different Nuragic territories, such as the rotunda of Gutturu Caddi (Guasila, Nieddu 2012), which opens the possibility they could have served as inter-regional meeting places where people from different chiefdoms or territories gathered. Thus, the absence of these kinds of ritual sites is understandable if the south-east coast of Sardinia was a peripheral and poorly occupied area in the Late Bronze Age. This also supports the idea that the Late Bronze Age settlement nucleation in sample area 1 emerged primarily due to economic rather than socio- political circumstances, as the network of identified sites lacks a significant element representing the religious aspect of political power in this period. This suggests that the degree of social stratification in south-east Sardinia in the Late Bronze Age could have been much less than in the western part of the island, where there is stronger evidence for the existence of chiefdoms and sub-regional polities.

Finally, it is possible that the ritual sites in this area have escaped detection – *pozzi sacri* are less visible in the landscape than nuraghi. However, this seems unlikely due to the fact that sacred wells were frequently used long after the decline of Nuragic culture, and were rarely abandoned to a degree which could have resulted in their poor visibility in the landscape. Furthermore, the impact of agriculture and urbanization, both potentially damaging to ritual sites, is very limited in Sarrabus.

Few, if any, of the Nuragic megalithic tombs (*tombe di giganti*) in sample area 1 are likely to be of Late Bronze Age origin. The most characteristic features of *tombe di giganti* from this period are ashlar masonry and a dentiled frieze above the entrance. Most of the monuments of this type are located in the central part of the island, among them *tomba di giganti* Bidistili (Fonni, Lilliu 2010) and *tombe di giganti* Madau (Fonni, Fadda and Posi 2008). None of the *tombe di giganti* in sample area 1 have ashlar masonry, and none of them revealed evidence

for a dentiled frieze. Although the latter could have been present in some of the poorly preserved tombs, it is unlikely since we know only of one example of this type of feature in the southern part of Sardinia (*tomba di giganti* Su Niu ‘e Su Crobu – Sant’Antioco, Lilliu 1996: 51). Thus, it is quite clear that the vast majority of the burial sites which could have been used in the Late Bronze Age were built earlier. There is no particular association between the distribution of the Late Bronze Age settlement sites and earlier *tombe di giganti*. This implies that not all of the tombs were used in the Late Bronze Age, or that they were not associated with specific settlement sites.

In these aspects one of the few parallels to sample area 1 can be found in north-east Sardinia, in the area near Santa Teresa di Gallura. This area is likewise devoid of typical Late Bronze Age ritual sites, and the Nuragic occupation is not extensive, being limited to occasional single-towered nuraghi (Vignamarina, La Colba), protonuraghi (Stirritoggju), and settlements (Lu Brandali) which do not reveal evidence for any form of territoriality (Antona 2005). The only type of monuments here which might have been associated with organized ritual practices are *tombe di giganti* Lu Brandali and La Testa – at the former, some of the pottery sherds have been dated to 1000-900 BC, while the latter was abandoned after 1100 BC (Antona 2005: 62, 70), confirming a Nuragic presence and ritual activity despite the very limited degree of settlement nucleation in the Late Bronze Age. Considering the similarities in the settlement patterns, types of ritual sites and economic potential of north-east Gallura and Sarrabus (sample area 1) it is probable that the extent and form of the Late Bronze Age development in both these areas was very similar.

To conclude, it seems unlikely that the ritual and religious aspects of life in south-east Sardinia in the Late Bronze Age were associated with social stratification and political power. Rather, they probably maintained a degree of continuity with Middle Bronze Age traditions, being focused around preexisting monuments. This confirms the interpretation of sample area 1 as a relatively peripheral area of limited economic and political importance in the Late

Bronze Age, which remained in the shadow of the centres of power developing in the central and western parts of Sardinia.

7.2. The Late Bronze Age in sample area 2

The following analysis of the Late Bronze Age Nuragic network in sample area 2 will be closely connected to the previous discussion of Middle Bronze Age settlement patterns (see Chapter 6), since a significant degree of settlement nucleation and probable extension of the majority of the single-towered nuraghi (exceeding the Sardinian average of 30%) do not allow us to clearly distinguish between Middle Bronze Age and Late Bronze Age settlement networks in this area. Of particular significance here are the preliminary results of excavations at Nuraghe Cea (Loceri, Cossu 1997), which offer an insight into the chronology of complex Nuragic structures in sample area 2. Given the presence of sites with structures which can be explicitly identified as Late Bronze Age ritual and/or burial monuments, much attention will be paid to this aspect of the Nuragic cultural landscape and its relationship with settlement networks.

7.2.1. Settlement patterns

As established in the previous chapter, the proportion of complex nuraghi in sample area 2 is much higher than in other parts of the island – 24 out of 38 recorded Late Bronze Age structures (63%, in comparison to Sardinian average of around 30%) are complex nuraghi of different floor-plans, ranging from a tower with an adjacent courtyard (Nuraghe Giba ‘e Scorka – Barisardo) to multi-towered structures (Nuraghe Ursu – Lanusei, Nuraghe Boschinu – Barisardo), some of them with antemurals (Nuraghe Perd’e Pera – Cardedu, Nuraghe Puliga – Loceri) and associated extensive settlements (Nuraghe Sellersu – Barisardo). Considering the traditional interpretation of complex nuraghi as Late Bronze Age centres of power which emerged due to population pressure and competition for resources, this high percentage of

complex nuraghi is highly unusual. Interpretation of all the recorded complex nuraghi as centres of power is questionable, since it would mean that higher ranked settlements significantly outnumbered the lower ranked ones in the Late Bronze Age. This consideration invites us to look for explanations of the phenomenon of Late Bronze Age settlement nucleation in sample area 2 beyond that of circumscription theory. Three possibilities can be put forward (again, they are not mutually exclusive):

1. The Middle Bronze Age Nuragic settlement network in sample area 2, consisting mostly of single-towered nuraghi, was relatively limited. As a result, most of the Middle Bronze Age sites were incorporated in the Late Bronze Age settlement network through extension of the single-towered nuraghi into complex structures. This means that a significant part of the recorded complex nuraghi originated from the single-towered structures.

2. Some of the complex nuraghi could have reached their final forms in the Middle Bronze Age. Among known examples of nuraghi which were built as complex structures in the Middle Bronze Age are Nuraghe Nolza (Meana Sardo, Cossu and Perra 1998) and Nuraghe Arrubiu (Orroli, Lo Schiavo and Sanges 1994). Considering that the chronological sequence of the Middle Bronze Age single-towered nuraghi being extended in the Late Bronze Age has been reliably recorded in the western part of the island (Moravetti 1992, Webster 2001, Boninu et al. 2013), this scenario would mean that the Middle Bronze Age settlement networks in eastern Sardinia were more developed than those in the western part of the island, which is unlikely.

3. It is possible that the large number of complex nuraghi was the result of changes in the settlement network during the Late Bronze Age. We cannot assume that all nuraghi were inhabited simultaneously, therefore it is possible that different structures were extended in different phases of the Late Bronze Age. This would suggest that nucleated settlements rose and fell within a few hundred years, being replaced by other centres of power. This explanation implies either significant shifts in the economic situation of Late Bronze Age

societies of the east coast of Sardinia, or increased warfare in this period (possibly both). In light of such processes it is probable that social relations in this area were fluid and characterized by tensions or local agreements between specific families or clans, shifting between periods of prosperity and crisis. These explanations are also in line with Carneiro's (1970) circumscription theory which has already been discussed.



Fig. 65. A corridor in the bastion of Nuraghe Cea (Loceri), part of the excavated Late Bronze Age phase of the monument.

The most significant difference between these explanations is that they result in different understandings of the chronology of at least parts of the complex nuraghi. This can be tested primarily through excavations. Thus, in this context, the preliminary results of the excavations at Nuraghe Cea – Loceri (Cossu 1997) are particularly important. Nuraghe Cea is a complex structure with a main tower of 9m diameter and an adjacent bastion with a partly preserved corridor in its southern part (Fig. 65). The monument is located near the western edge of

sample area 2, on top of a low hill. The excavations were conducted in 1995 in the south-west part of the nuraghe, within the area of the bastion. The material discovered included pottery similar to that from Protonuraghe Tratassi (Villanovafranca), and a *scodella* (hemispherical vessel) similar to those from the nearby *tomba di giganti* Seleni II (Lanusei). These and other artefacts can be assigned typologically to the final phases of the Middle Bronze Age and early phase of the Late Bronze Age, which led Cossu (1997: 269) to conclude that the bastion was added in this period to the pre- existing Middle Bronze Age main tower. This makes explanation 2 (above) even less likely – i.e. the chronological sequence of Nuraghe Cea confirms that the phenomenon of settlement nucleation which emerged in Sardinia occurred after 1300 BC also in sample area 2.

Another important aspect of the Late Bronze Age settlement nucleation to be considered is its impact on the occupation of the Teccu plateau. As already discussed in Chapter 6, this highland plateau displays a similar settlement pattern to plateaus in the central part of the island, with the Nuragic occupation concentrated around the edges of the plateau, leaving much of its interior unoccupied or with primarily burial or ritual sites. In the Late Bronze Age the focus of settlement activity remained on the edges of the Teccu plateau (Fig. 66). Four out of six nuraghi located on the plateau edges are complex structures with bastions and lateral towers, while three of them have associated settlements with circular huts (most likely a result of Late Bronze Age settlement nucleation, as demonstrated in other parts of the island). The centrally located Nuraghe Iba Manna, which occupies the highest point of the plateau, is also a complex structure and has an extensive associated settlement. Considering the development of the Late Bronze Age occupation in different parts of the plateau, as well as the particularly large size and pivotal location of Iba Manna complex, it is probable that the latter one became an important centre of power in the Late Bronze Age. This is also indicated by the presence of two open settlements without nuraghi near Iba Manna.

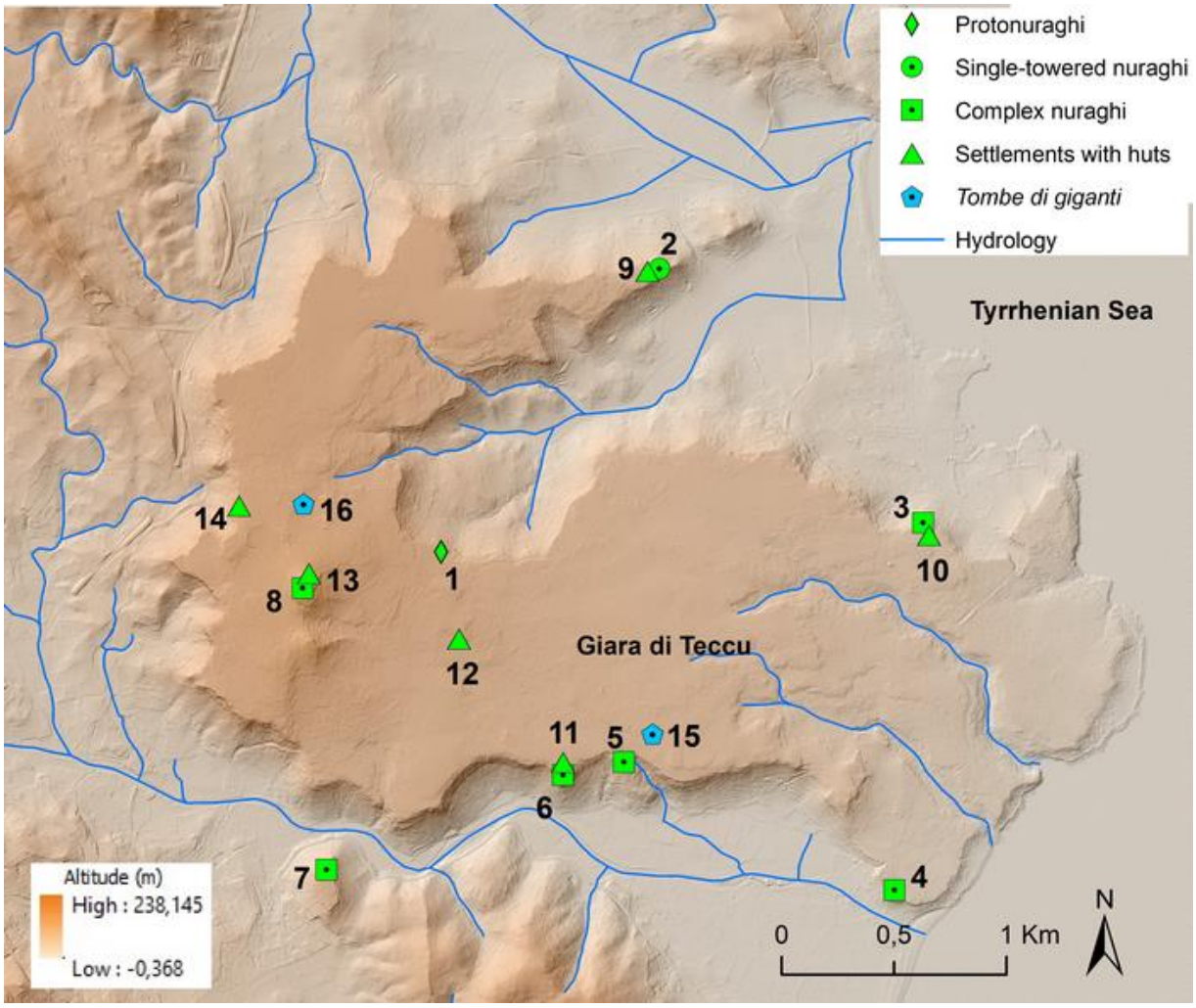


Fig. 66. The Nuragic occupation of the Teccu plateau. 1 – Baccu Argiolasi, 2 – Su Ziniburu, 3 – Sellersu, 4 – Giba 'e Scorka, 5 – Niedda Puliga, 6 – Moru, 7 – Su Crastu, 8 – Iba Manna, 9 – Su Ziniburu, 10 – Sellersu, 11 – Moru, 12 – Baccu Argiolasi, 13 – Iba Manna, 14 – Teccu, 15 – Niedda Puliga, 16 – Iba Manna.

This significant degree of continuity between Middle and Late Bronze Age settlement networks on the plateau of Teccu does not necessarily imply continuity of social relations among the groups occupying this area. While in the Middle Bronze Age the single-towered nuraghi were probably households occupied by one or a few families, and thus similar in status and function, the Late Bronze Age development could have seen the introduction of differences in the function of specific complex nuraghi. Sites of similar architecture and complexity could have played different roles in the Late Bronze Age settlement network, as demonstrated by the case of a cluster of nuraghi near Gesico and Mandas (Melis 1990,

Namirski 2013), Here, the nuraghi along the territorial boundaries are mostly complex, thus they were probably extended in the Late Bronze Age for defensive and display purposes, while the largest complex nuraghi are located in the centre of the territory, being most likely centres of power with associated nucleated settlements. Thus, in the Late Bronze Age Sardinia we see not only an emerging settlement hierarchy, but also differentiation in the functions of specific sites of the same type. This observation can be plausibly applied also to the settlement nucleation on the Teccu plateau. Nuraghe Iba Manna and other large complex nuraghi in this area (especially Sellersu, see Fig. 67, and Moru) have associated settlements, while smaller complex structures like Nuraghe Giba ‘e Scorka and Nuraghe Niedda Puliga have no associated settlements. Thus, it is possible that some of the complex nuraghi on the plateau of Teccu were extended through a process of settlement nucleation and became centres of power, while others might have been extended for military reasons – perhaps as outposts guarding the edges and peripheral zones of the plateau. Nuraghe Iba Manna with its large settlement, complex floor-plan and central location is the most obvious candidate for a Late Bronze Age centre of power. According to this model the plateau of Teccu can be interpreted as a territorial unit with the main nucleated settlement and associated open settlements in the centre, as well as lesser settlements and military outposts on the edges of the plateau.

The distribution of complex nuraghi located beyond the plateau of Teccu in sample area 2 is less patterned – they are more dispersed and only 4 out of 19 (21%) have settlements associated with them. This lack of clear evidence for territoriality in the areas around the plateau of Teccu implies a significant degree of autonomy of the territory which probably emerged on the plateau, and possibly an economic and/or political dependence or lower class (i.e. subordination to local centres of power) of the surrounding Late Bronze Age sites. Whatever the case, the Nuragic occupation of the plateau of Teccu is the most significant evidence for the emergence of territoriality in the Late Bronze Age in both sample areas.



Fig. 67. Nuraghe Sellersu (Barisardo) – one of the largest complex nuraghi in sample area 2 is located near the north-east edge of the Teccu plateau.

Another important issue, and one which can be investigated only through excavations, is a degree of continuity between the occupation in the massif of Serra ‘e Ladamini, including probably the oldest Nuragic occupation in this area (see Chapter 6.2.1), and the Late Bronze Age settlement network. None of the protonuraghi in the massif and the nearby area (Serra ‘e Ladamini, Baccu Arzula, Serras Interazzas, Muxieddu) were extended in the Late Bronze Age, but their re-use after 1200 BC cannot be excluded,given that examples of protonuraghi re-used in late phases of the Nuragic culture are known from other parts of the island (Sanciu 1986, Vidili 2012: 1032). Moreover, in the northern part of the massif, around 800m north of Protonuraghe Serra ‘e Ladamini, there is Nuraghe Corti Accas – a large complex structure with a main tower, bastion with corridor and two lateral chambers (now mostly collapsed). Thus, it is possible that this area saw a continuous Nuragic occupation from at least the Early Bronze Age to the Late Bronze Age.

It is possible that some of the fortifications without towers which are attributed to the Nuragic period (Archeosystem 1990), such as the megalithic wall at Punta Cea (Tortoli) and a fortification with an entrance on Monte Arista (Cardedu), might have been built in the Late Bronze Age. As we have already discussed, the Late Bronze Age appears to have seen a diversity in the functions of specific sites: the limited space enclosed by the aforementioned structures and lack of settlement structures associated with them point towards very specific purposes for sites like Punta Cea or Monte Arista, which is consistent with developments in the wider Late Bronze Age Nuragic cultural landscape. The lack of associated settlement evidence and very prominent landscape locations of these sites seem to indicate their role as sites controlling the nearby area, perhaps for observation (of the nearby lowland plain and possible routes leading through it in the case of Monte Arista, of the coast in the case of Punta Cea) or military purposes. This interpretation is analogous to that of stepped platforms (*turriformes escalonados*) from the Talayotic period (850-600 BC) in Mallorca, which also lack associated settlements and are located in focal points of the landscape, perhaps as territorial markers or military outposts (Calvo et al. 2005: 498).

Finally, a significant similarity with sample area 1 and other parts of Sardinia must be noted. The Late Bronze Age settlement networks near Barisardo and Cardedu do not reveal much emphasis on the use and control of the coastline – only one out of 20 complex nuraghi in sample area 1 are located on the coastline, while in sample area 2 only three (Giba ‘e Scorka – Barisardo, Su Angedu – Cardedu, Perd’e Pera – Cardedu) out of 24 (12%) complex nuraghi are located on the coastline or in its immediate proximity. As already discussed in Chapter 6, this does not necessarily mean a lack of use of the coastline, since most of the nuraghi in the Sinis Peninsula are located in its central part, while specialized production settlements dated to the Late Bronze Age are located on the coastline (Castangia 2012).

7.2.2. Relations between domestic and ritual sites

Unlike in sample area 1, near Barisardo and Cardedu there are ritual and/or funerary monuments of a type which clearly indicates their Late Bronze Age origin. Although their number is insufficient to provide the basis for a wider study of the distribution patterns of these types of sites in sample area 2, their landscape context and relationship with other sites throw light on the significance of the ritual landscape (i.e. sites and areas deliberately reserved for ritual purposes) in the Late Bronze Age and the development of the Nuragic culture in this period in comparison with sample area 1.

The first major Late Bronze Age site in sample area 2 is the sacred well (*pozzo sacro*) of Su Presoni (Cardedu), known also as Cuccuddaddas (see Fig. 68). This well-preserved monument is located on a gentle slope north of the mountain massif of Monte Arista, near the southern edge of sample area 2 (see Appendix 2). The sacred well consists of a tholos chamber and a stairwell, as well as a rectangular atrium (still clearly distinguishable). The masonry consists of well-worked granite and porphyry stones laid in courses. However, it is not an ashlar masonry. This allows us to plausibly interpret the sacred well of Su Presoni as a Late Bronze Age structure. Webster (2014: 84) mentions the remains of a settlement around the monument, although it has been completely obliterated by the surrounding plantations and no traces of it were recorded during the current survey. On the architrave of the entrance to the stairwell there is a series of carvings (at least one of them anthropomorphic) of indeterminate date.

The landscape context of *pozzo sacro* Su Presoni is very different from the majority of nuraghi in sample area 2 – the site is located on a gentle slope close to the bottom of a valley. Without a doubt the selection of this location must have been made with consideration of natural conditions, primarily the hydrology of the area. However, the area does not appear to have been a particular focus for Nuragic occupation. Assuming the possible existence of a

settlement around the sacred well, this observation supports the interpretation of ritual sites as centres independent from the main nuraghi. The closest Nuragic settlement site is Nuraghe Desfollas, a complex nuraghe with two towers located on a rocky ridge around 600m to the east. Interestingly, the location of the sacred well does not align with the easiest approach to Nuraghe Desfollas. Assuming an association between the sacred well of Su Presoni and Nuraghe Desfollas, the route taken to it by its inhabitants and visitors might have been determined not by the least cost pathway, but by the location of the well-temple as a place of ritual and spiritual significance. The importance of this monument is emphasized by materials obtained from it: artefacts such as amber beads, a bronze bracelet and a ring (Pitzalis 2008: 29) can be interpreted as valuable and prestigious goods, fitting into the wider pattern of ritual deposits in *pozzi sacri* in Sardinia.



Fig. 68. The atrium and entrance to the sacred well of Su Presoni (Cardedu).

Another important ritual monument which can be identified as a Late Bronze Age structure is *tomba di giganti* Fragori (Barisardo). This megalithic tomb consists of a partly preserved burial chamber and an almost completely destroyed exedra. East of it there is a dentiled frieze, a typical feature of Late Bronze Age megalithic tombs in Sardinia occurring mostly in the central part of the island (Bittichesu 1998b: 148-149). The monument is located away from the nuraghi – the closest one is Nuraghe Lurcuri, 0.8km to the north-east. Once again we see a Late Bronze Age monument of ritual significance located away from major settlements – a pattern also exhbited by the necropolis of *tombe di giganti* Madau (Fonni) North-West of sample area 2 (Fadda and Posi 2008: 51-76).

This distinction between the distribution of Late Bronze Age settlement and ritual sites can be explained twofold. The first explanation has already been hinted at – increasing social stratification could have resulted in a separation of secular and religious power in the Nuragic societies of this area, consistent with the evidence from the western part of the island and with Lilliu's (1988) model of stratified Nuragic societies. However, criticisms by Tronchetti (2012) and Araque Gonzalez (2014) rightly point out that there is little evidence of such complexity in the archaeological record. Thus, on the level of landscape archaeology this theory has to remain a speculation (but, for its development see Chapter 9.2).

Another explanation for the isolated locations of ritual sites in sample area 2 is the possibility of a division of the landscape into areas of primarily religious (possibly with restricted access) and domestic significance. This has been argued in the case of the Late Neolithic and Early Bronze Age in southern Britain, where timber circles contain much larger quantities of debris and domestic artefacts than stone circles, suggesting a division between these as worlds of the living and the dead (Parker Pearson and Ramilisonina 2008). Although not necessarily so clear-cut, a comparable division might have emerged in the Late Bronze Age landscape of sample area 2.

7.3. The Late Bronze Age in a Central Mediterranean context

The differences observable between the Nuragic settlement patterns in sample areas 1 and 2 are not without parallels in other parts of Central Mediterranean. In certain areas of mainland Italy, Bronze Age settlement patterns differ across relatively small distances, ranging from areas dominated by small standardized settlements of unitary communities to areas with settlements focused around large, nucleated sites. Such a difference is visible, for example, between the valley of Taro and the area between the rivers Enza and Secchia (Putzolu 2016, see Chapter 10.1 for more detailed discussion). A similar observation can be made in Middle and Late Bronze Age Sicily. The settlements of the Thapsos culture are located in the south-east of the island and in the Valley of the Belice (Holloway 1999: 34-36), and their architecture with large warehouses is not found in all areas of Sicily. However, one should note that Sicily was more strongly influenced by other parts of the Mediterranean (especially the Aegean) than Sardinia in the Late Bronze Age, and thus this diversity of settlement patterns can be explained through different processes than in Sardinia, which (despite of its occasional Aegean contacts) remained mostly insular in the Late Bronze Age.

Furthermore, the interpretation of settlement dynamics on the plateau of Teccu in sample area 2 (see above) can be supported through comparison with other Central Mediterranean islands. I have interpreted the centrally located complex Nuraghe Iba Manna as a probable centre of power displaying the status of its inhabitants rather than as a structure of strictly military significance, primarily due to its location in the centre of the plateau, its relationship with other nuraghi which are located on the edges of the plateau, and the presence of the surrounding settlement – despite Trump's insistence that "there can be no reasonable doubt that these [complex nuraghi] were indeed primarily military fortresses" (1992: 199). My interpretation is supported by examples from Sicily and Malta in particular: Terranova (2015: 29-30) argues that the Bronze Age fortified sites in Malta (Borg in-Nadur) and Thapsos (Sicily)

were not only of military significance, but expressed the significance of the fortified settlement to its territory (in the case of Nuraghe Iba Manna, to the plateau of Teccu), as well as demonstrating power and status of the groups who built them.

The emergence of settlement hierarchy in sample area 2, although certainly not as explicit as in the western part of the island, is closer to the Late Bronze Age developments in Corsica than the relatively low degree of settlement nucleation and continued dispersed occupation seen in sample area 1. Peche-Quilichini (2011) has identified clear evidence for settlement hierarchy in Late Bronze Age Corsica, with some settlements being expanded by the construction of new *torri*. This can be seen as equivalent to the contemporary settlement nucleation in Sardinia, and thus allows for the extension of Carneiro's circumscription theory to Corsica as well, even though no complex, multi-towered *torri* were built (Webster 2015: 135). This similarity of settlement dynamics between Corsica and Sardinia (including sample area 2) gives more credence to the claim that the two islands were in direct relationship in the Bronze Age (see Chapter 6.3).

7.4. Conclusions

In concluding this discussion of Late Bronze Age sites in both sample areas, it is necessary to emphasize that the differences which we see in the Middle Bronze Age Nuragic networks of these two areas continue to a significant extent in the Late Bronze Age. The settlement network in south-east Sardinia (sample area 1) continues to represent a pattern of dispersal, while evidence for settlement nucleation is limited. Also, the distribution of the Late Bronze Age settlements indicates economic more than political and social reasons for the emergence of relatively few nucleated settlements in this area. The striking lack of ritual and funerary monuments, which are generally typical of Late Bronze Age architecture in Sardinia, is a further indication of the lack of significant cultual elaboration in this area after 1200 BC. It is therefore plausible that sample area 1 continued to be a relatively peripheral region of

Sardinia in the Late Bronze Age.

On the other hand, in sample area 2 we observe a significant degree of Late Bronze Age settlement nucleation and development in comparison to the Middle Bronze Age. The settlement patterns on the plateau of Teccu follow the Middle Bronze Age ones, with complex nuraghi and open settlements located on the edge of the plateau. However, a significant development of the Nuragic network led to the emergence of a continuous chain of settlements around the edges of the plateau of Teccu, with the largest site (the nuraghe and settlement of Iba Manna) located in the central and highest point of the plateau. This indicates that the plateau of Teccu could have become a territorial unit or centre of a sub-regional polity. Likewise, the presence of ritual and funerary monuments is much more substantial in sample area 2. Both *pozzo sacro* Su Presoni and *tomba di giganti* Fragori are located away from the settlement sites, which implies a possibile division between domestic and ritual domains in this area.

Thus, we can see that socio-economic differences between areas located relatively close to each other may not only have been significant but also lasted for consecutive periods despite general changes in society and material culture. Similar examples of such patterns on islands come from Menorca, where the north-central part of the island remained scarcely occupied from the Early Bronze Age to the Talayotic period (Benejam 1993), as well as Britain, where in many areas differences in social and economic development observable in the Mesolithic continued in the Early Neolithic (Telford 2002). This realization contributes to the debate about the structure of the Late Nuragic societies in Sardinia: the traditional view of hierarchical societies (Lilliu 1988, Asole et al. 1995, Navarra 1997) and the alternative view of increasingly complex societies without elites (Tronchetti 2012, Araque Gonzalez 2014) do not need to be seen as mutually exclusive, as both scenarios could have occurred in different parts of the island. Current state of research and available data do not allow to interpret this issue in further with the use of post-processual perspective on agency and personhood. As

pointed out by Johnson (2009: 120), the best post-processual case studies were done in historic archaeology and in the cases where plenty of contextual data of various sorts. Unfortunately, this context is still rather patchy in the case of the east coast of Sardinia, especially giving lack of mortuary material which led to some of the most successful post-processual studies emphasizing agency, personhood and emotions of an individual in later prehistoric societies, such as Harris' (2010) study of a child burial at Hambledon Hill (Dorset, England). Obtaining such material would almost certainly require excavation of a specific site. Thus, methods of interpretation which place more emphasis on the community rather than individual are employed (see Chapter 10.1 and discussion of vertical vs. horizontal complexity of the society).

Chapter 8. The Iron Age (900-500 BC)

Summary. *The extent and nature of Iron Age occupation in both of the sample areas is difficult to assess without excavations, since very few new architectural structures were built in this period, thus architectural typology is insufficient to recognize most of the sites which were occupied between 900 and 750 BC. In sample area 1 there are neither ritual sites nor structures with ashlar masonry which could be interpreted as Iron Age structures. This corresponds to the limited degree of settlement nucleation observed in this area in the Late Bronze Age. It is, thus, probable that this area remained politically and economically marginal to the centres of power which have developed in the west of Sardinia. In sample area 2 the Iron Age occupation was probably more extensive, as indicated by the presence of the sacred well of Su Presoni (Cardedu) – site biographies of* pozzi sacri *indicate that most of these structures were either built in the Early Iron Age, or were Late Bronze Age structures, still in use in the Iron Age. Also, the presence of extensive settlements around complex nuraghi such as Sellersu (Barisardo) or Perd'e Pera (Cardedu) point towards the possibility of significant Iron Age occupation in this area.*

The Iron Age is one of the most hotly debated periods in the Sardinian prehistory, particularly due to controversies regarding changes in the social structure which occurred in this period, as well as the relationship between the Nuragic culture and the Phoenician colonists who founded their cities on the southern and western coasts of Sardinia in the 8th-7th century BC. The most important theories put forward in this debate have been outlined in Chapter 2, but a brief reminder helps to lay out the ground for the discussion of the Iron Age in both sample areas. The Early Iron Age (900-750 BC), known also as Geometric period due to the characteristic decoration on pottery, has usually been seen (Lilliu 1988, Asole et al. 1995, Webster 1996) as a period of increasing social hierarchy in which an aristocracy inhabiting the

major complex nuraghi rose to power, most likely together with an independent caste of priests, leaving commoners and artisans in the lower stratum of society. This view has been challenged recently (Tronchetti 2012, Araque Gonzalez 2014) on the grounds of insufficient evidence for such a complex structure to the Iron Age societies. As already discussed in Chapter 2, I believe that both positions make strong arguments, but this creates a false dichotomy between aristocratic-ruled stratified society and egalitarianism. The evidence for social differentiation, taking the form of human representations in *bronzetti* and changes in settlements around the largest nuraghi is indeed substantial, but there is not enough evidence to support a complete model of the Nuragic societies with specific separate classes.

These debates are rarely placed within regional contexts, risking over- generalization, and ignoring the diversity of the Nuragic networks and settlement patterns which might reflect differences in social organization in different areas of the island, even though a general pan-Sardinian identity could have been maintained (Blake 1999). Therefore, this chapter will not only comprise an attempt to evaluate the Iron Age evidence from sample areas 1 and 2, but, also, to place it in the context of the debate about the structure of Iron Age Nuragic societies of Sardinia.

8.1. The Iron Age in sample area 1

As emphasized in Chapters 2 and 4, one of the major difficulties in the landscape archaeology of prehistoric Sardinia is the limited possibility of identifying the Iron Age evidence. This is mainly due to the fact that few nuraghi and *tombe di giganti* were built in that period; the major focus of architectural activity was on extending the pre-existing largest complex nuraghi and on construction of new sanctuaries with sacred wells, built usually in ashlar masonry. In some areas of Sardinia monuments of this type are present, which provides substantial evidence for Iron Age activity. For example, in the Gesico-Mandas cluster of nuraghi, previously surveyed by the author, the Nuragic rotunda of Gutturu Caddi (Guasila) is present. Built with ashlar

masonry, its location in the buffer zone around the territory confirms that the tradition of using buffer zones for ritual purposes continued into the Iron Age. However, in the absence of ritual monuments with ashlar masonry, the only ways to detect Iron Age occupation in the area through landscape archaeology are to try to distinguish the Iron Age phases of the complex nuraghi and settlements through their architecture (which is often difficult without excavations, and is possible mostly in the largest Nuragic settlements in the western part of the island, such as Su Nuraxi – Barumini and Genna Maria – Villanovaforru), and alsoto search for the typical Iron Age Nuragic pottery (with geometric decoration).

None of these types of Iron Age evidence are substantially present in sample area 1. This is consistent with the scarcity of evidence for Late Bronze Age settlement nucleation, discussed in Chapter 7. The distribution of only a few multi-towered complex nuraghi and sites with settlements that can be attributed to the Late Bronze Age makes it more likely that they emerged for economic rather than socio-political reasons (this is primarily due to lack of evidence for territoriality and their distribution along water courses, see Chapter 7.2.1). Taken together with the lack of sanctuaries and ritual monuments, this suggests that, in the Late Bronze Age, the South-East of Sardinia was a rather poorly inhabited and economically marginal area. It is therefore not surprising that the Iron Age evidence in this area is very limited. Considering the fact that the Late Bronze Age was a period of the emergence of major centres of power which continued to gain importance in the Iron Age, continued demographic and political marginalization of Sarrabus in favour of large proto-urban centres in the central and western part of the island is understandable. This phenomenon could be compared to the emergence of proto-urban settlements in the Late Iron Age of the Balearic Islands. An example is Talati de Dalt (Menorca, Pons Machado 2005), where a post-Talayotic (500-123 BC) proto-urban centre emerged as a development of already existing Talayotic settlement, which involved significant changes in the architecture and functions of the site.

This does not exclude the possibility of continued occupation, at least of the complex

nuraghi and some of the single-towered nuraghi, although it is likely that the latter underwent population decrease as a result of the decline of Nuragic social and settlement systems. In the other parts of the island there are examples of nuraghi which were abandoned in the final phases of the Late Bronze Age or in the Iron Age (sometimes being re-occupied after a hiatus). This was, presumably, due to movement of people to the aforementioned proto-urban centres, or a social and demographic crisis resulting in emergence of new patterns in social relations and settlement, as suggested by Ialongo (2017). In the Late Iron Age (750-500 BC) we observe a pan-Sardinian phenomenon of decline in occupation of the nuraghi (Usai 2007), and no evidence recorded during the surveys indicates a different pattern in sample area 1. None of the largest complex nuraghi or settlements include any features which could be plausibly identified as Iron Age developments, and certainly none reached the proto-urban form of the largest settlements in the western part of Sardinia. Thus, even if some of the nuraghi were still occupied or re-occupied in the Iron Age, it is likely that patterns of Nuragic occupation in that period remained substantially different from those in the west of Sardinia.

No discussion of the Iron Age in any area of Sardinia would be complete without consideration of the issue of interaction between the indigenous populations and the Phoenicians and later Punic settlers. There is no doubt that the main focus of Phoenician and Punic activity in Sardinia was on the western and southern coast of Sardinia, resulting in the emergence of cities such as Nora (Tronchetti 1986), Sulcis, Bithia (Moscati 2005) and Monte Sirai (Bartoloni 2004). However, it is possible that the relative paucity of evidence for Phoenician and Punic occupation of the east coast of Sardinia is a result of insufficient landscape surveying in this area. In fact, two significant Phoenician centres are located close to sample area 1 – the sanctuary of Cuccureddus (Villasimius), located just east of the surveyed area, while Sarcapos, probably founded in the 7th century BC (Barreca 1988: 25), is located north of sample area 1. However, the nature and extent of influence of these centres on the South-East of Sardinia is debatable. As pointed out by Barreca (1988: 90), these

centres emerged for economic reasons and were associated with specific natural resources, rather than being motivated by the goal of political expansion. In the case of Sarcapos, the settlement is part of a chain of sites which continue towards the central part of Sardinia, probably including the copper mine of Funtana Raminosa (Gadoni). Another indication of the significance of Sarcapos as a trade centre is the presence of pottery from different parts of the ancient Mediterranean, including Ionic and Attic imports, and Etruscan *bucchero* pottery (Santocchini 2011: 99-100). Furthermore, Santocchini (2011: 15) points out that Sarcapos is a settlement in which the Phoenician and Punic presence and influences are not easily distinguishable from one another.Therefore assessment of its relationship to other Phoenician and Punic sites, as well as its influence on the surrounding areas (including sample area 1), would require a separate complex study.

It is necessary to emphasize that an exhaustive and detailed documentation, investigation and analysis of the extent of Phoenician and Punic occupation in both sample areas lies beyond the scope of this work for several reasons. First, while in the Late Iron Age (a period of increasing Phoenician colonization) and Punic period significant elements of the material culture characteristic of the Nuragic period are still present, resulting in hybridization of the Sardinian culture and indicating integration of the indigenous and Phoenico-Punic communities (van Dommelen 1997), in a discussion of these periods we can no longer talk about Nuragic networks. By the Late Iron Age, the settlement networks and associated structures of Nuragic society were already in decline, as is manifested through the abandonment of the majority of the Nuragic settlements. Usai (2007: 57) points out that resistance against the Punic conquest of Sardinia was already devoid of any Nuragic element, since the Nuragic settlement system and society were already in decline well before the 6th century BC. Furthermore, the survey methodology employed in this project (see Chapter 4) was suited specifically to the characteristics of the Nuragic sites in Sardinia. The majority of these include architectural remains, thus site-based survey is the most suitable method to

record Nuragic presence in the landscape. By contrast, Phoenician and Punic sites are often preserved as pottery scatters, thus requiring a walkover survey to identify and record them. Further research potential related to the issue of the Phoenician and Punic presence and its relationship to the Nuragic settlements will be discussed in Chapter 11.

8.2. The Iron Age in sample area 2

Most of the problems in distinguishing the evidence for the Iron Age occupation in sample area 2 are similar to those encountered in sample area 1. There are no sites with architectural features which explicitly indicate their Iron Age origin. However, this does not rule out continued occupation or re-use of already existing Nuragic sites. The antemurals (circuit walls with towers) around settlements associated with the nuraghi were interpreted by Webster (1996: 159) as Iron Age structures belonging to the final phase of development of the Nuragic settlements. Although they certainly represent a relatively late development in Nuragic architecture, we know that at least some of them were built in the Late Bronze Age (Nuraghe Arrubiu – Orroli, Lo Schiavo and Sanges 1994). Of particular interest is the case of Nuraghe Su Nuraxi (Barumini), where two antemurals were built, the first in the Late Bronze Age, while the second, with seven towers, was constructed in the early phase of the Iron Age (9th-8th century BC, Moravetti 2002: 25-26). Therefore, the antemurals constituting parts of the Nuragic complexes in sample area 2 (Nuraghe Puliga – Loceri, Nuraghe Sellersu – Barisardo, Nuraghe Perd'e Pera – Cardedu) might be of Iron Age origin, but cannot be treated as a clear indicator of the Iron Age occupation at any specific site. At least some of them could well be earlier, especially in the case of Nuraghe Puliga (Fig. 69), where the antemural is well-integrated with the main structure, making it more likely that both were built in a single episode. A comparison can be made to the site of Coppa Nevigata (Manfredonia, Puglia), which was occupied till the Iron Age, and its fortifications were built in several phases during the Bronze Age. In some cases the fortifications were constructed directly over remains of

previous defensive walls (Cazzella et al. 2004: 179), therefore three different phases of their construction became clear only after the 2012 excavations – as Cazzella and Recchia (2013: 117-118) point out, before this campaign the modifications of the fortifications were difficult to observe at the Talayotic complex of Cornia Nou (Menorca) underwent a number of changes which cannot be situated chronologically and are difficult to recognize (Ferrer et al. 2014: 13). This can be the case also with a site as complex as Nuraghe Puliga.

Considering the firm evidence for the Late Bronze Age occupation of this area, there is no reason to doubt that at least some of the nuraghi continued to be inhabited in the Early Iron Age. While it is true that complexes in the western part of Sardinia such as Nuraghe Palmavera (Alghero, Moravetti 1992: 120) and S'Urbale (Teti, Webster 1996: 158) were destroyed by fire in the Early Iron Age, these events can be associated with the Phoenician expansion and local conflicts between emerging centres of power in that particular part of Sardinia. These factors probably played a much weaker role in the East, primarily due to the lesser extent of Phoenician influence and lower density of settlement, implying a reduced scale of warfare. Thus, Webster's (2015: 143) assertion that the majority of the nuraghi continued to support settlement in more remote regions of the island is very probable and can be applied to sample area 2, especially in light of the substantial activity seen there in the preceding period, both in terms of settlement and ritual.

The sites in study area 2 which are most likely to have been occupied in the Iron Age are the Nuragic complexes of Sellersu (Barisardo) and Perd'e Pera (Cardedu). The former is a large settlement with a complex nuraghe and an antemural without towers. The large extent of the settlement and presence of the antemural indicate the possibility of Iron Age occupation here. This is particularly plausible considering the fact that the site is located near the northern edge of the Teccu plateau, the only area displaying substantial evidence for territoriality in the Late Bronze Age. Therefore, it is feasible that Nuragic occupation survived into the Iron Age in the area which was probably most important in terms of settlement hierarchy and power in



Fig. 69. The antemural of Nuraghe Puliga (Loceri).



Fig. 70. Remains of a circular hut with Nuraghe Perd'e Pera (Cardedu) in the background.

the preceding period. This is consistent with Lilliu's (1999) view that the Early Iron Age was a period of continuity in relation to the Late Bronze Age, rather than a period of discontinuity and decline of the Nuragic culture (Perra 2012). Another significant site, Nuraghe Perd'e Pera (Cardedu), is a small single-towered structure located on top of a low rocky hill. The area around the hill is covered by an extensive settlement (Fig. 70), the eastern part of which has been obliterated by a modern road. The settlement is enclosed by an antemural, the western part of which has survived in reasonable condition. Another argument supporting Iron Age occupation of this site is its closeness to the coastline; the evidence for contacts between Sardinia and mainland Italy in the Iron Age favours the idea of the use of coastal sites in association with maritime trade.

The presence of the sacred well of Su Presoni (Cardedu) is also of significance. Although the monument is likely to be of Late Bronze Age origin (see Chapter 7.2.2), we know from other sites that *pozzi sacri* were usually used well into the Iron Age, and in many cases also in the Punic and Roman periods. Among the examples from other parts of Sardinia are the sacred wells of Cuccuru Nuraxi (Settimo San Pietro, Phoenician pottery and Etruscan bucchero from the 8th-6th century BC, Atzeni 1987: 286), Orri (Arborea, with finds from the Late Bronze Age to the early medieval period, Usai and Zucca 2015: 27-28) and San Salvatore (Gonnosno, with Early Iron Age pottery and possible 7th century material, Ciccone and Usai 2011: 439-440, 442). However, it should not be assumed that the social significance of the well-temple necessarily remained the same as in the Late Bronze Age. Ialongo's (2013) research on metalwork deposition in Late Bronze Age and Early Iron Age Sardinia revealed a significant shift in the deposition of metal artefacts from the nuraghi to the sanctuaries. This suggests that sanctuaries (including *pozzi sacri*) became increasingly associated with control of the economy and wealth in general, perhaps reflecting the rise to power of priests as an important social class, as suggested by Lilliu (1988). These clear changes in patterns of metalwork deposition in the Early Iron Age coincide with a scarcity of known Iron Age burials

throughout the island (no burial sites with explicit evidence of Iron Age use were recorded in sample area 2), which makes Ialongo's (2013: 199) suggestion that ritual sites were used for the celebration of individuals' status and authority rather than for burials reasonable. Ialongo's suggestion that the development of sanctuaries in the Iron Age was a result of elites' attempt to remain in power through control over the ritual sphere and associated economy also has solid support in that most of the Iron Age metalwork was deposited in sanctuaries rather than complex nuraghi (in contrast to the Late Bronze Age). Excavations would be necessary to confirm whether *pozzo sacro* Su Presoni fits into this pattern.

Also, the possibility of some nuraghi being transformed into sanctuaries cannot be excluded, since such examples are known from other parts of Sardinia. In some cases such a transformation is clearly visible in the architecture. An example is Nuraghe Nurdole (Orani), which was occupied well into the Late Iron Age and Punic period (Madau 2002: 339). A well-temple (*pozzo sacro*) was built in its bastion, and a bench and altar were erected in the tholos chamber of the main tower (Webster 2015: 195-196). However, in other cases, the ritual use of the nuraghi is less obvious, either due to a lack of substantial changes in architecture, or due to poor preservation. An example is provided by Nuraghe Cabu Abbas (Olbia) – Antona (1994) suggests a change in its function from a military to a ritual one, while Petrioli (1999: 167), who agrees with the idea of Late Bronze Age/Early Iron Age ritual activity in the nuraghe, points out that only excavation and removal of existing collapses could confirm that theory. Thus, it is possible that some nuraghi in sample area 2 were transformed into temples in the Early Iron Age, but this can only be verified only through excavations.

This possible plurality of functions of the nuraghi finds parallels in other areas of the Central Mediterranean – one of the examples are Bronze Age *specchia* in Puglia (South-Eastern Italy), which were originally interpreted (primarily on the basis of their architecture) as observation and military outposts controlled by larger settlements (Neglia 1970, Pawlak 2012: 30). Comparisons were made between *specchia* and the Iron Age *talayots* (circular and

rectangular towers) in the Balearic Islands (Giovanni 1956: 76). However, currently we know at least ten examples of *specchia* which were used as burials between 1500 and 900 BC (Pawlak 2012: 27). Overall, their chronology and function remain a topic of debate (Neglia 1970, Pawlak 2012), leaving a strong possibility that certain structures of this type were used for different purposes, despite their architectural similarity. This could be the case also with the nuraghi in Iron Age, with some of the structures used for ritual purposes, while others remained occupied as settlements. Such a diversity of functions of the nuraghi could have occurred in sample area 2 during the Iron Age due to social and religious transformations which resulted in the emergence of sanctuaries such as Su Presoni (Cardedu).

8.3. Conclusions

The extent and nature of Iron Age occupation in both sample areas is difficult to assess, primarily due to the relatively limited architectural developments occurring in this period of Sardinian prehistory. The nature of the Iron Age evidence requires excavations to identify the major Iron Age settlements; landscape archaeology is much less effective here than for the Middle and Late Bronze Age periods. However, this does not mean that Early Iron Age Nuragic activity was insignificant, especially in sample area 2 which has revealed ample evidence for Late Bronze Age settlement nucleation and ritual activity, both of which often continue elsewhere in Sardinia into the Early Iron Age. However, despite these limitations in identifying Iron Age remains, the contrast between both sample areas is still visible, implying continuation of differences in social complexity identified in the Late Bronze Age. This demonstrates again the necessity for close study of regional patterns in settlement and ritual activity, rather than assuming the validity of patterns and conclusions based on evidence from the best researched areas of the western part of the island.

Chapter 9. Site biographies: selected case-studies

Summary. *The settlement dynamics documented in the two study areas of the east coast of Sardinia can also be demonstrated through the reconstruction of the biographies of specific sites taking into account both the development of the sites themselves, and their relationship with the surrounding cultural landscape through consecutive phases of the Nuragic culture. Nuraghe Cea (Loceri) and nearby sites are examples of Middle Bronze Age farmsteads which shared a specific area without establishing relations leading to formation of a clearly defined territorial unit. They also show that the Late Bronze Age phenomenon of nuraghi being extended into complex structures was not necessarily associated with the emergence of centres of power in all cases. In contrast, the sacred well of Su Presoni (Cardedu) is interpreted as evidence of increasing social complexity in the Late Bronze Age. It might have been either a meeting place for inhabitants of different nuraghi, or a new centre of religious power independent of the largest nuraghi.*

The foregoing discussion of Nuragic settlement dynamics and their changes from the Early Bronze Age to the Iron Age revealed specific patterns characteristic for both sample areas which constitute further evidence that the development of Nuragic settlement varied significantly in different parts of Sardinia. Before moving on to place these patterns in the wider context of the Nuragic settlement dynamics in Sardinia and later prehistoric settlement dynamics in the Mediterranean, they will be illustrated through selected case studies of specific sites from the research areas. The criteria for the selection of sites here were their complexity, the amount of information available on their chronology (gained from survey and/or excavation reports), as well as their typology (the aim being to analyze different types of sites). Each biographical case study explores the site's architectural development, its changing relationship with other sites, potential changes in its use, and possible reasons for

and circumstances of its abandonment, in order to provide a more in-depth illustration of Nuragic settlement dynamics along the east coast of Sardinia.

9.1. Nuraghe Cea (Loceri)

The first site to be discussed is Nuraghe Cea (Loceri). This structure is located in the central part of the highland plateau of Loceri (Taccu di Loceri), at an altitude of 244m, circa 5 km South-East of the town of Loceri. The area is suitable both for agriculture and pastoralism. Two water courses run along the edges of the plateau, few hundred metres from the nuraghe. The nuraghe itself is complex in plan. Its main part is the main tower (Fig. 71) which has a diameter of 9m in its highest preserved part and an entrance which opens to the South-West. All internal spaces, including the tholos chamber, are collapsed and a bastion with a 6m long corridor (preserved over distance of 5.1m) which is 1.7m high and 1.2m wide. The excavations by Cossu (1997) covered the area of the bastion, primarily the corridor, which was identified as a Late Bronze Age structure (see Chapter 7.2).

The highland plateau of Loceri did not support as dense a Nuragic occupation as the plateau of Teccu (Barisardo), nevertheless there are several other significant Nuragic sites on it and in its surroundings. Near the eastern edge of the plateau there is Nuraghe Puliga, a complex structure which includes two towers and an antemural. On the top of a hill overlooking the southern edge of the plateau there is Nuraghe Ursu, another complex structure with at least two towers. However, there are no identifiable Nuragic sites near the western and northern edges of the plateau. Thus, unlike case of the plateau of Teccu, there was no continuous chain of Nuragic settlement around the edges of this plateau (Fig. 72).

As already mentioned, Nuraghe Cea was probably built in at least two phases, with the bastion being a Late Bronze Age addition. From this we can infer that the nuraghe in its initial phase, probably dating to the Middle Bronze Age, was a single- towered structure typical of the Nuragic architecture of this period (see Section 2.3). It was most likely a single household



71. The entrance to the main tower of Nuraghe Cea (Loceri).

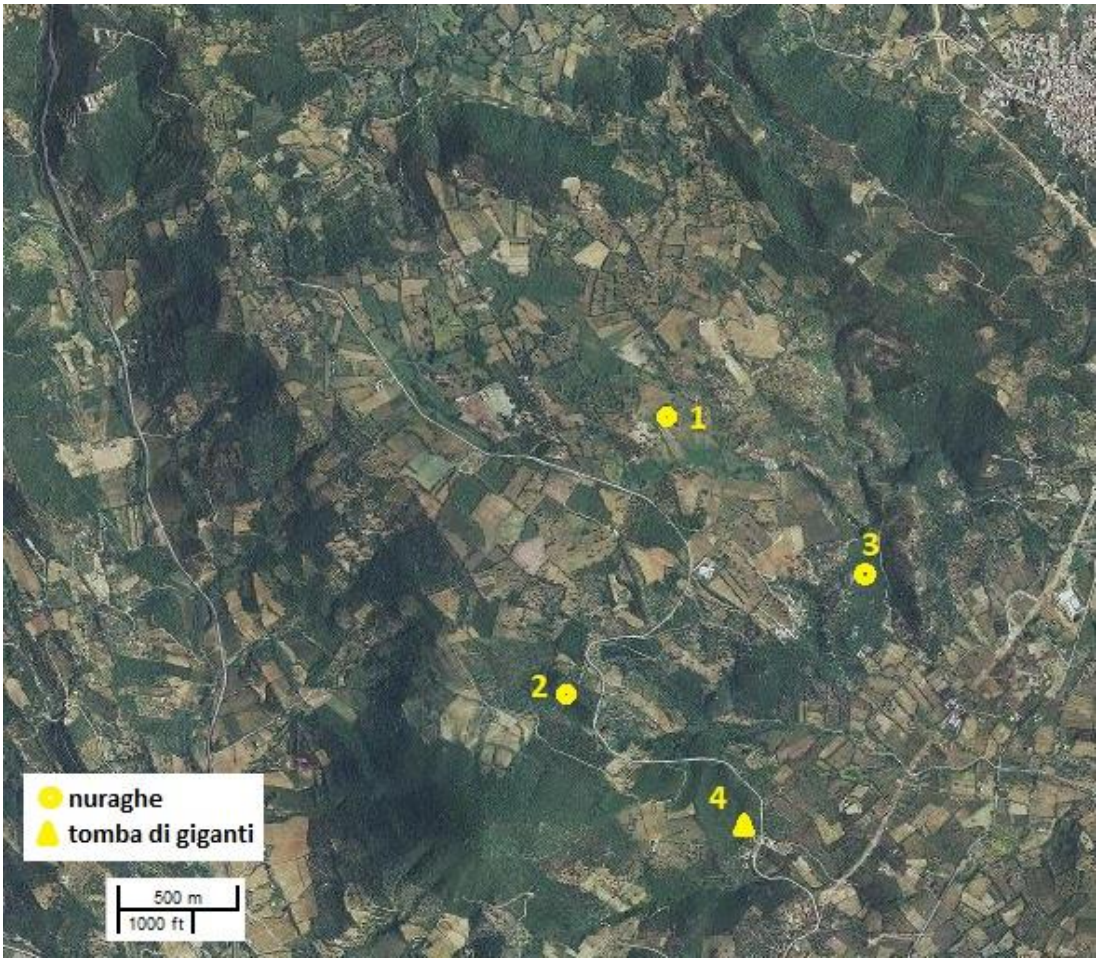


Fig. 72. The Nuragic occupation of the plateau of Loceri (source: SardegnaMappe.it). 1 – Nuraghe Cea, 2 – Nuraghe Urzu, 3 – Nuraghe Puliga, 4 – tomba di giganti Bellisceddu.

inhabited by one or a couple of families which probably used the area of the plateau of Loceri for pasture, which explains the decision to build the nuraghe in the centre of the plateau. The inhabitants of Nuraghe Cea probably maintained relatively peaceful contacts with the families inhabiting the nearby nuraghi Puliga and Ursu. We might infer this from the fact that these three nuraghi are located together on the plateau of Loceri or just above it – therefore, if they were occupied simultaneously, their inhabitants would have shared the same area for subsistence, which would have been impossible in a context of significant hostility between them. A similar observation was made with regard to Mycenaean settlements in Late Helladic III period by Dickinson (1994: 81-82), who argued that the wide distribution of small settlements indicated stability and a feeling of security. Furthermore, the distribution of the Nuragic sites on the plateau of Loceri does not offer any evidence for as the spatially ordered building of nuraghi with consideration of each other as means to create a territorial unit similar to the clusters of nuraghi with buffer zones seen in the western part of the island (Sedilo cluster, Borore cluster, see Section 2.3) or the chain of Nuragic settlement around the edges of the plateau of Teccu (see Sections 6.2.1 and 7.2.1). This suggests that the relationship between families inhabiting the plateau of Loceri probably did not result in any closer confederation or territorial/political grouping of the kind suggested by Webster (2015: 62) in relation to the clusters of nuraghi in the western part of Sardinia. The Nuragic settlement on the plateau of Loceri might instead be compared to the settlement microsystems (geographically separate groups of 4-6 nuraghi) identified by Perra (2008: 103-104) on the plateau of Pran'e Muru (central Sardinia). In both cases we see small groups of settlements without clear evidence for territorial organization.

The late phases of the Middle Bronze Age and the early phases of the Late Bronze Age saw what was probably the second phase of construction of Nuraghe Cea, in which the aforementioned bastion with a corridor was added to the main tower, so that the bastion is adjacent to the South-Western part of the tower. This could have served practical purposes

Fig. 73. Middle/Late Bronze Age Nuragic pottery from stratum 1 in the bastion of Nuraghe Cea (after Cossu 1997).

(corridors of protonuraghi were probably used to keep livestock, and the long corridor in a bastion could have served a similar purpose), but it could have been also a display of status through more monumental architecture, or heavier fortification of the entrance in response to military threats. The earliest pottery found in stratum 1 inside the bastion dates to the late phases of the Middle Bronze Age and early phases of the Late Bronze Age (*Bronzo recente*, c. 1300-1100 BC). Among the identified pottery forms is a shallow tray (*teglia,* Fig. 73.1), a bowl with a handle attached to the rim (*scodella con presina,* Fig. 73.2), as well as large jars

(*olle,* Fig. 73.4). Some of the trays and bowls could date back to the Middle Bronze Age, given their similarity to Middle Bronze Age pottery from *tombe di giganti* Oridda (Sennori) and Li Lolghi (Arzachena), especially the bowls found in the exedra of the former and in the burial chamber of the latter (Cossu 1997: 266). This dominance of pottery forms of typically utilitarian function suggests that the nuraghe served as a dwelling place. There is no evidence for the ritual re-use which was observed at other nuraghi in central and eastern Sardinia in the Early Iron Age (Petrioli 1999, Campus 2012: 229).

Other nuraghi on the plateau of Loceri and in its vincinity are also complex in shape and are likely to have been extended in the Late Bronze Age, since their floorplans are complex enough to indicate more than one phase of construction. Nuraghe Urzu has at least one lateral tower and a heavily damaged bastion, while Nuraghe Puliga has a lateral tower and an antemural (see Chapter 8.2). However, these developments do not necessary indicate that all of these structures became centres of power in the Late Bronze Age, since over 60% of the nuraghi in sample area 2 are complex in shape (see Chapter 7.2.1), and thus it is unlikely that all of them were high-status settlements. Their architectural similarity does not necessary indicate similar status and functions. As I have argued in the analysis of the Nuragic settlement patterns around Gesico and Mandas (Trexenta, central Sardinia), some of the the complex nuraghi could have been utilized in a different way to others (Namirski 2013). It is also worth nothing that other nuraghi in the vicinity (Nuraghe Ursu, Nuraghe Puliga) reached more complex shapes than Nuraghe Cea, perhaps as a consequence of their locations being superior both in terms of defence and access to the coastline.

It is possible that the inhabitants of Nuraghe Cea utilized the Giant's Tomb (*tomba di giganti*), which is located 1.8km south of the nuraghe, on the edge of a plateau constituting part of the massif of Monte Astili. The architecture of *tomba di giganti* Bellisceddu indicates that it is a Middle Bronze Age construction (see Chapter 6.2.2), and is thus roughly contemporary with the main tower of Nuraghe Cea and other nearby nuraghi. Furthermore,

the tomb is located above the nearby nuraghi and is not paired with any specific settlement. Therefore, it is possible that it was used by the inhabitants of several nuraghi, including Nuraghe Cea. In that case, sharing the tomb and religious ceremonies performed in its vincinity could have contributed to the maintenance of the aforementioned relatively peaceful relationships between the inhabitants of different nuraghi on and around the plateau of Loceri.

9.2. *Pozzo sacro* Su Presoni (Cardedu)

The sacred well (*pozzo sacro*) of Su Presoni (known also as Cuccuddaddas or Cuguddadas) is located in sample area 2, at the bottom of a valley with the mountain massifs of Monte Arista to the south and Monte Perdu Pili to the north. The site is overlooked by the mountain with Nuraghe Desfollas which lies about 500m east of the sacred well. The well is typical of the Late Bronze Age Nuragic architecture associated with water cult. It has a 1.95m wide vestibule with an entrance (2m high, 1m wide) to the staircase which leads to the intact underground tholos chamber of 1.65m diameter and 6m height (Figs. 74, 75). The site has never been excavated, but some the surface finds, which include amber beads, a bronze bracelet and a ring (Pitzalis 2008: 29) belong to the Final Bronze Age (c. 1100-900 BC, final phase of the Late Bronze Age) and Early Iron Age (Webster 2014: 84). Unlike some of the sacred wells and springs in central and western Sardinia (Santa Cristina – Paulilatino, Su Lumarzu – Bonorva), the well of Su Presoni does not have ashlar masonry, which (together with the surface finds) allows us to date it to the Late Bronze Age rather than Early Iron Age, as in general the structures with ashlar masonry tend to be of later date (Webster 1996: 181). Webster (2014: 84) mentions the remains of a settlement around the sacred well, now destroyed by the surrounding plantations.

This attempt to recreate the site biography of *pozzo sacro* Su Presoni allows us to expand upon the hypothesis presented in Chapter 7.2.2, in which the presence of a sanctuary in sample area 2 is interpreted as evidence of increasing social differentiation. In many cases

the sacred wells are located away from the nuraghi (Matzanni – Vallermosa, Predio Canopoli – Perfugas, Funtana Coberta – Ballao), and in some cases even replaced nuraghi, as in the case of Santa Vittoria (Serri), a sanctuary where the complex nuraghe was partly dismantled towards the end of the Late Bronze Age in order to make space for the ritual structures associated with the sacred well. This might indicate the emergence of a caste of priests at least partially independent from the elites inhabiting the complex nuraghi, although – as pointed out in Chapter 7.2.2 – Lilliu's (1988) detailed model of hierarchical society with four social classes can hardly be supported even by the Early Iron Age evidence, let alone that of the Early Bronze Age, and is rightly criticized (Tronchetti 2012, Araque Gonzalez 2014). Nevertheless, despite Lilliu's model being too detailed to find support in the archaeological evidence, there is little doubt that the Late Bronze Age in Sardinia saw an increasing degree of social complexity, as evidenced by the rise of sanctuaries. As pointed out by Webster (1996: 147), the Late Bronze Age ritual sites are often located in the buffer zones between territories, which means that at least some of them could have been sites where people of different groups (perhaps sub- regional polities) gathered. The Early Iron Age saw a further increase in the significance of the sanctuaries, which became places where the majority of metalwork deposition took place, suggesting a new strategy of control of power and the economy through the ritual sphere by the emerging elites (Ialongo 2013).

Considering these circumstances, *pozzo sacro* Su Presoni with its surrounding settlement can be considered as evidence for an increase in social complexity in sample area 2. Its location away from the largest complex nuraghi and presence of the surrounding settlement can be explained in two ways, in accordance with different interpretations of the phenomenon of sanctuaries discussed above.

1. The sacred well of Su Presoni and its associated complex were a meeting place for inhabitants of different nuraghi, not associated with any specific centre of power (thus its

location at the bottom of a valley away from the largest complex nuraghi). Considering the limited evidence for territoriality and the emergence of centres of power and social complexity in sample area 2 (except for on the plateau of Teccu, see Chapter 7.2.1), these meetings were not necessarily associated with the control and expression of power through ritual.

2. The santuary of Su Presoni could have been occupied by members of an emerging class of priests, as in Lilliu's (1988) model of emerging social stratification. In this case it could have been a centre of power either competing with or controlled by the inhabitants of the major complex nuraghi, especially those on the plateau of Teccu which reveal evidence for territoriality and the emergence of centres of power. This significance of the sanctuary as a centre of religious power could have increased in the Early Iron Age when the focus of metalwork deposition moved from nuraghi to *pozzi sacri*, indicating an attempt to control power and the economy through ritual. Although the sacred well of Su Presoni was not excavated, the surface finds of bronze objects (Pitzalis 2008: 29) make this hypothesis plausible. The sanctuary could, more specifically, have been a site of pilgrimage from the surrounding area and other regions of Sardinia, and its control by local elites might have legitimized their power and perhaps allowed them to profit from it. The appearence of the well itself, especially its monumental architecture and aesthetic qualities (such as probable tower-like structure built over the tholos, identified in other sacred wells, Contu 1999: 134), could have served as a way to demonstrate the prestige of the local elites. Such a use of *pozzi sacri* is indicated by the fact that some of the monuments of this type in central and western Sardinia (Gremanu – Fonni, Su Lidone – Orune) were built with the use of rocks transported over significant distances (up to 35km), perhaps – as argued by Fadda et al. (1992: 261) – to visibly enhance the political and religious importance or significance of these structures.

However, it would be a mistake to consider the significance of the site solely in terms of ritual and power. Other Nuragic complexes including sanctuaries with surrounding settlements provided evidence for multiple functions of such centres. An example is the settlement of

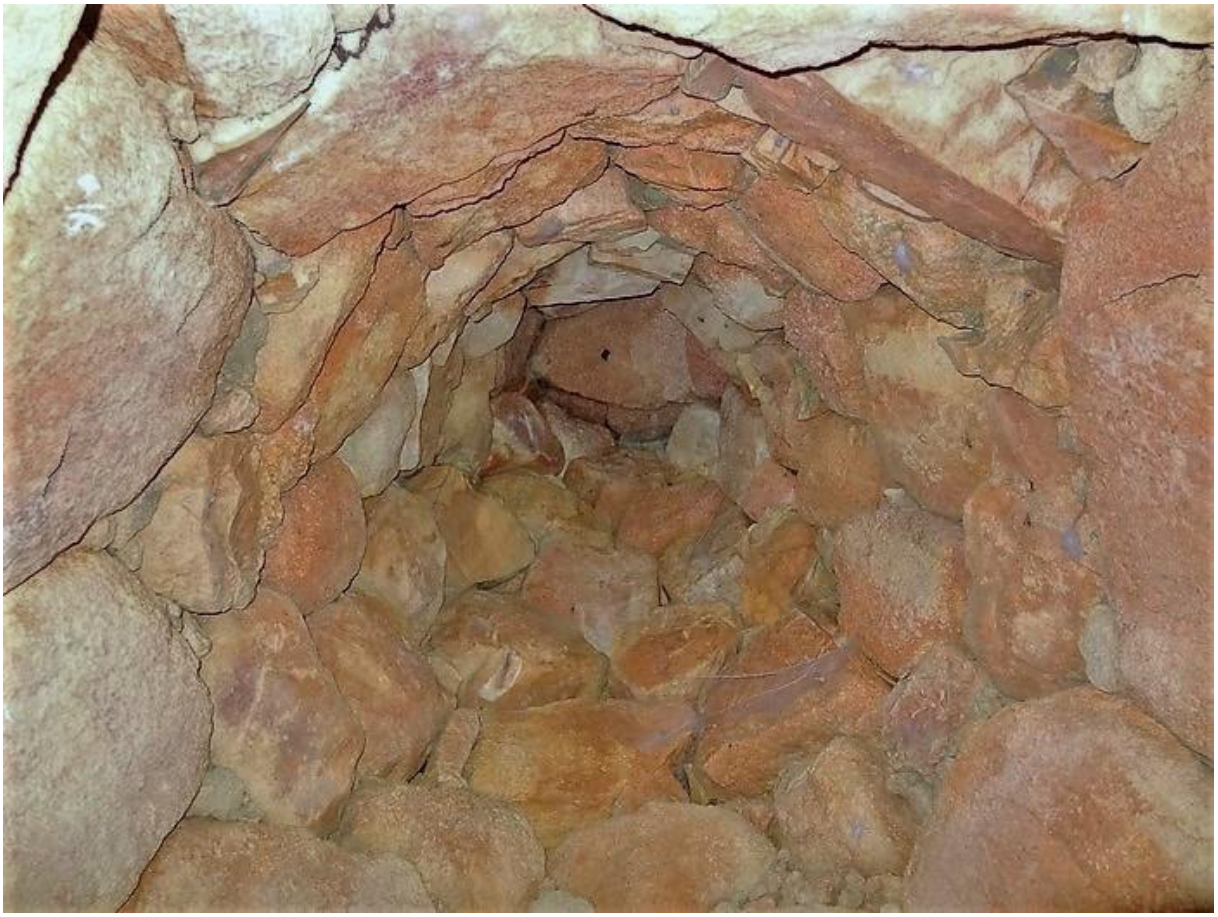


Fig. 74. The tholos dome in pozzo sacro *Su Presoni (Cardedu).*

Fig. 75. Section of the sacred well of Su Presoni (after Pitzalis 2008).



Fig. 76. Carvings on the architrave of pozzo sacro *Su Presoni (Cardedu).*

Serra Orrios (Dorgali), which includes two rectangular megaron temples, but also many circular huts, at least some of which served domestic and storage purposes. It is possible that the site was used for different purposes in various periods, as Moravetti (1998b) identifies several phases of its construction. For example, the "meeting hut" (*capanna delle riunioni*) was probably built before the megaron temples (Moravetti 1998b: 53). However, according to Fadda (1993) some of the material found in temple A allows to date it as early as final phases of the Middle Bronze Age (with possible Early Bronze Age activity), which could mean that the site was used for both domestic and ritual purposes simultaneously. Another significant example is provided by the sanctuary of Abini (Teti). Its ritual function is obvious not only from its architecture, but also from the character of deposits inside the temenos (stone wall enclosing the sanctuary). However, Fadda (2014: 46-47) notices a significant similarity of almost all materials to the ones from the nearby settlement of S'Urbale, which was used

primarily for domestic purposes (Fadda 2014: 55). Therefore, it is possible that the use of sanctuaries such as Su Presoni included many aspects, both domestic and ritual, rather than being limited to religious ceremonies and metalwork deposition.

Like in the case of many other sacred wells in Sardinia (Sa Testa – Olbia, Serra Niedda – Sorso, Cuccuru Nuraxi – Settimo San Pietro), activity at the sanctuary of Su Presoni continued after the decline of the Nuragic culture. This is confirmed by the finds of 27 amber and glass beads, probably of Punic date, unearthed during illegal excavations (Archeosystem 1990: 169). In absence of formal archaeological excavations these finds do not allow us to assesshow the well was used in the Punic period, but it is likely that it was still used for ritual purposes. The first argument to support this hypothesis is the fact that votive artefacts have been found at many other sacred wells and springs in Punic Sardinia — examples include *pozzi sacri* Cuccuru Is Arrius (Cabras), Santa Cristina (Paulilatino), Sa Mitza Salamu (Dolianova) and others (Canella and Rassu 2015: 14-15). Another argument is the presence of carvings on the architrave of the well (Fig. 76), which include a bell-shaped motif and an anthropomorphic figure, which Pitzalis (2008: 29) interprets as Phoenico-Punic. This chronological attribution is plausible given the fact that no similar examples of art are known from the Nuragic period. Although the topic of the relationship of the Phoenicians and Carthaginians with the indigenous populations of Sardinia falls outside the scope of this work, it is one of the important potential future paths of research deriving from this project (see Chapter 11).

Chapter 10. East and West: comparison

Summary. *The conclusions drawn from the analysis of the Nuragic settlement dynamics in sample areas 1 and 2 enable us to compare the Bronze Age and Early Iron Age occupation in the eastern part of the island with that of western Sardinia. The overall evidence for territoriality (defined as the emergence of spatially organized territorial units, not necessarily constituting sub-regional polities) in Muravera- Castiadas and Barisardo-Cardedu is certainly much less significant than in the western regions. However, I argue that this does not necessarily indicate political subordination of these areas to western centres of power in the Late Bronze Age and Early Iron Age. Furthermore, some of the settlement patterns recorded on the east coast (such as occupation of the edges of highland plateaus and dispersed occupation with single-towered nuraghi serving as individual farmsteads) are represented also in central and western Sardinia. There is no clear difference between the use of the coastline in the eastern and western parts of the island, although the evidence from the Sinis peninsula demonstrates that some forms of Nuragic coastal settlement are difficult to observe in the landscape and might still await discovery on the east coast.*

In Chapters 6-8 we looked at the development of Nuragic settlement patterns, the relationship between domestic and ritual sites and evidence for territoriality and patterns of land use in two selected sample areas of the east coast of Sardinia. As emphasized in Chapter 4, the reason for focusing on the east coast of the island is the relatively limited attention it has received from a landscape perspective, especially in comparison with the western part of the island. Some of the differences and similarities observed between the east and west have already been noted and discussed in earlier chapters. The purpose of this chapter is to offer a direct and sustained comparison between the two parts of the island. Settlement patterns, territoriality and the relationship between ritual and settlement sites will be examined, with an

attempt to treat them as parts of a cultural system which were interdependent and related to one another,in line with processual archaeological thought (Johnson 2009: 73). This discussion will be followed by conclusions which paint a wider picture of Nuragic culture in both sectors of the island will be drawn. These observations will also be placed in the wider context of the Central Mediterranean Bronze and Iron Ages.

10.1. Settlement patterns and territoriality

The extensive research undertaken in the western part of Sardinia, including landscape surveys in Marghine and Planargia (Moravetti 1998a, 2000b), Sedilo (Gallin 1989), Villamassargia (Canino 1998), Teulada (Cicilloni and Migaleddu 2008), Castelardo (Melis 2007) and other areas, enables us to recognize and understand the diversity of settlement patterns occurring in those areas of Sardinia where the density of Nuragic occupation was particularly high between the Middle Bronze Age to the Early Iron Age. This is important for our understanding of not only Nuragic settlement dynamics but also social relations in Sardinia in these periods. These patterns carry significant implications for the Nuragic economy. Thus, their systematic presentation and discussion is necessary in order to make a proper comparison with the results obtained from the east coast of Sardinia. The following patterns will be discussed below:

1. Clusters of nuraghi
2. Small groups of settlements
3. Occupation of highland plateaus
4. Dispersed occupation
5. Centralized territories
6. Occupation of islands

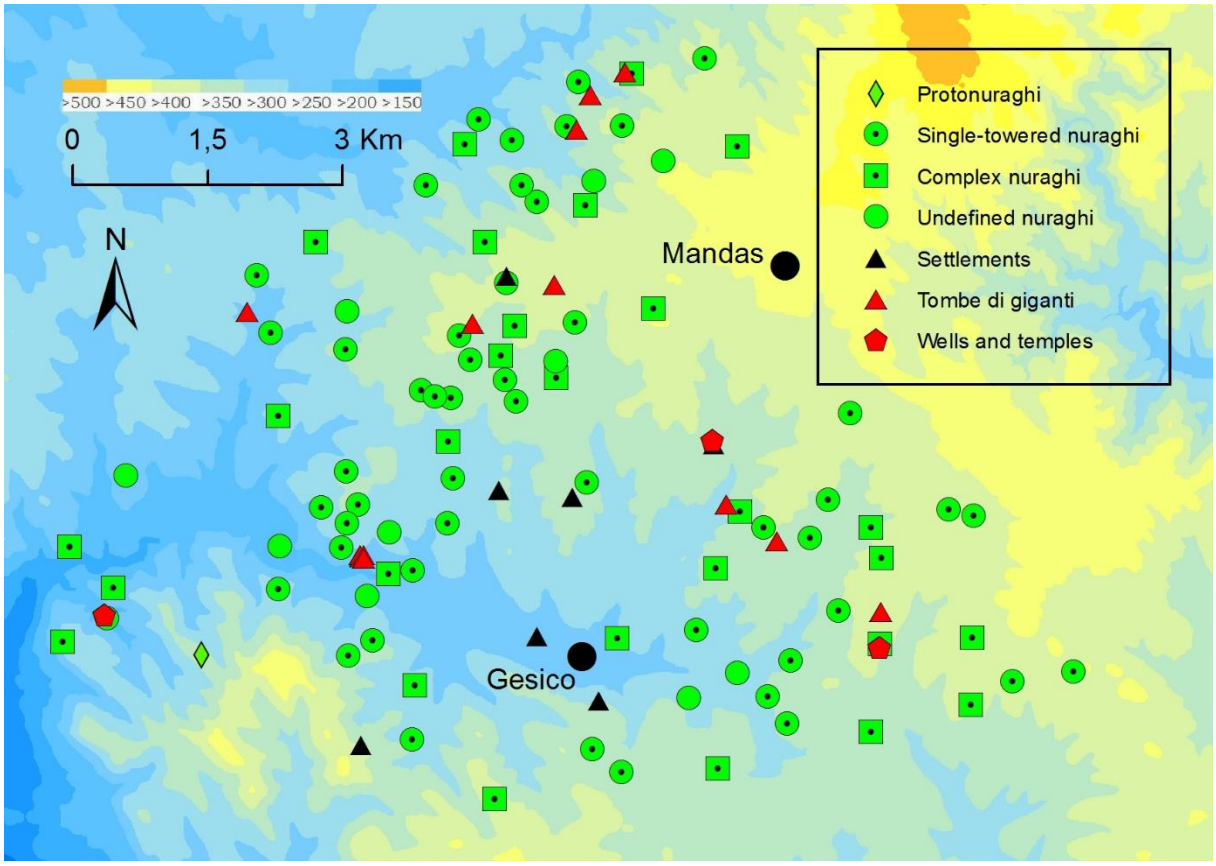


Fig. 77. Cluster of nuraghi around Gesico and Mandas (Trexenta).

Clusters of nuraghi. This type of settlement pattern includes concentrations of Nuragic settlements which consist of over 40 (Borore, 40km², Webster 2001: 4), 50 (Sedilo, 41km², Bonzani 1992: 215) or even 80 (Gesico and Mandas, 60km², Namirski 2013) nuraghi and protonuraghi. Around them is a buffer zone, an area where no nuraghi were built, presumably in order to maintain the territorial boundary (see Chapter 2.3). This type of territorial unit emerged already in the Middle Bronze Age, as evidenced by the fact that the single-towered nuraghi (typical Middle Bronze Age structures) constitute the core of the clusters in Sedilo and Gesico-Mandas (Fig. 77). This indicates that the emergence of territorial units and boundaries in Nuragic Sardinia was not associated (at least not initially) with any significant increase in social stratification, since Middle Bronze Age societies are widely recognized as having lacked a significant degree of social hierarchy (Webster 1996, 2015, Broodbank 2013, Araque Gonzalez 2014). Rather, a scenario of cooperation, with groups of families coordinating their

efforts towards maintaining a territorial boundary, is more likely. Not only could such a boundary serve as a protection from external danger (in Gesico and Mandas the nuraghi on the edge of the cluster are located in strategic positions overlooking the buffer zone, Namirski 2013) but, also, such loose alliances and/or confederations between families might have been essential in maintaining peaceful coexistence in a small area (in some parts of Sardinia the density of nuraghi exceeds 0.6 per sq. km, Guido 1963). Some level of cooperation between the inhabitants of adjacent nuraghi would have been necessary for herding and agriculture. It is probable that the clusters of nuraghi survived as territorial units into the Late Bronze Age, since in several cases the settlement nucleation of that period (extension of nuraghi to complex structures, emergence of settlements with circular huts) occurred consistently within the boundaries of preexisting clusters of nuraghi.

Small groups of settlements. These occur primarily in the central part of the island, one example being the area of Pran'e Muru (Campus 2008) and the plains of Nurri-Orroli and Isili (Leonelli 2008). The groups of a few (up to 10) nuraghi, sometimes with associated settlement or ritual sites, are often located at regular distances from each other (in the case of the plateau of Pran'e Muru, 400-500m from each other, Campus 2008: 104), constituting separate settlement microsystems, that is relatively small (up to 11) groups of settlements forming clusters which are separated from each other, usually by few kilometers (Campus 2008: 103-105). That does not necessarily mean the distribution and development of these groups of settlements was entirely independent from one another, as noticed by Campus (2008: 100). In the area of Pran'e Muru the nuraghi located on the eastern margin of different groups of settlements form a double line of sites located at strategic points overlooking the valley of Flumendosa. Just as in the case of clusters of nuraghi with buffer zones, this indicates a certain level of cooperation between families or clans for the mutual benefit of optimising land use and perhaps protection from danger, but without visible evidence of social differentation.

Some of these territorial units could have provided the basis for the later development of more extensive territories with more developed social relations focused around emerging centres of power. Such interpretation is consistent with our impression of the social relations in Middle Bronze Age Sardinia (strong evidence for low degree of social stratification, see Chapter 2.3.), as well as Late Bronze Age social developments in this matter, where increasing social differentiation (see Chapter 2.4.) might have been the result of demographic growth and resulting in competition for resources, according to the application of the circumscription theory to research on Nuragic settlement dynamics and arguments for the emergence of elites in Late Bronze Age and Early Iron Age Sardinia (Navarra 1997, Ugas 2005, 2014, Ialongo 2013, Antona 2016: 23).

Occupation of highland plateaus. This pattern is particularly common in the Barbagia (the mountainous central part of Sardinia), and the Campidano (South-West Sardinia). The nuraghi were usually built on the edges of highland plateaus, while the majority of the centre remained free of domestic sites. The nuraghi do not always form a continuous chain around the edge of a plateau, which suggests either that they were not of primarily military function, even though their locations are often very prominent and offer wide views of the surrounding area, or that they were not built in the same period and without consideration of each other (see Section 6.2.1 for the discussion of these two scenarios on the example of the plateau of Teccu). Another possibility is that they were built in relation to each other, but without a goal to create a continuous chain of structures around the edges of a plateau, or such a project was not finished. Sometimes *tombe di giganti* were situated in the centre (Sa Domu ‘e S‘Orku – Siddi), implying a division of space within the plateau between settlement sites on the edges and ritual sites in the centre, perhaps as a means of separating the sacred and the profane and restricting or emphasizing access to the former for ritual reasons. However, sometimes both nuraghi and megalithic tombs are located near the edges of a plateau (Taccu ‘e Ticci –

Seulo). It is possible that this focus on occupying the edges of highland plateaus was partially modified or abandoned in the Late Bronze Age and Early Iron Age, since several open settlements, usually interpreted as a Late Bronze Age development, are located closer to the centre of the plateaus. Among the examples of highland plateaus occupied in accordance with this pattern are Giara di Gesturi (Lilliu et al. 1985), Giara di Siddi, Taccu ‘e Ticci (Skeates 2009) and Giara di Serri (Puddu 2001). Occasionally, the occupation of lower-lying plateaus near the coastline also follows the same pattern. An example is the plateau of Pranu Nuragheddus (Fig. 78) at the Sinis peninsula (Usai 2014a).

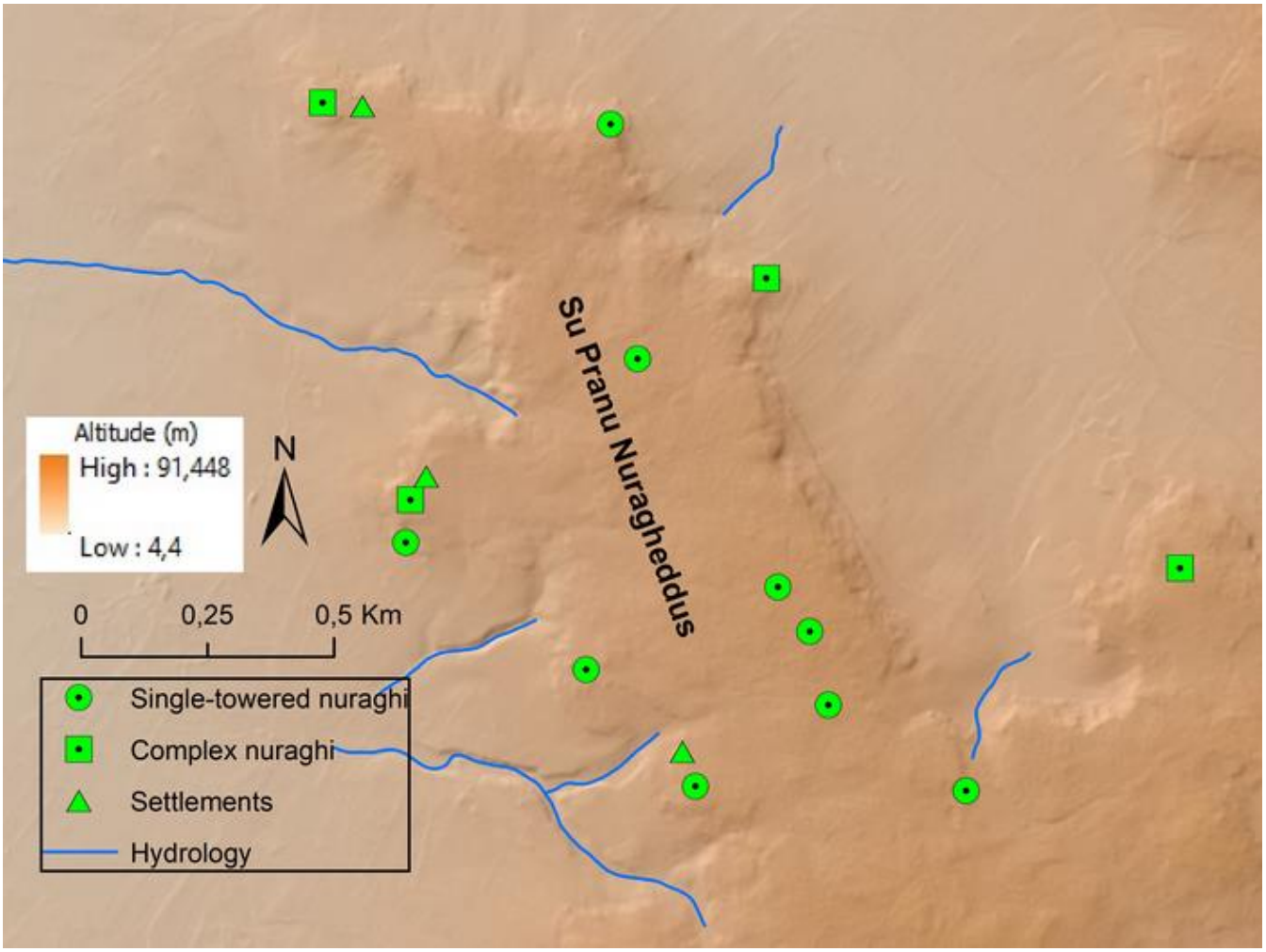


Fig. 78. The Nuragic occupation of the plateau of Su Pranu Nuragheddus (Cabras) on the Sinis peninsula.

Dispersed occupation. A number of dispersed Nuragic settlements occur in different parts of the island. We can see them in the north-western part of Sardinia, where only occasional scattered nuraghi can be identified (Unia, Casteddu, Cuili Ercoli and Monte Atene are the only ones located in the coastal commune of Stintino which occupies 58 km² in the North-West corner of the island). They can be plausibly identified as single households due to lack evidence for territoriality (no clusters of nuraghi with buffer zones or any other distinguishable territorial boundaries) and the fact that the majority are usually single-towered structures rather than nucleated settlements. The fact that this pattern of occupation rarely occurs in an area of economic importance (with fertile soils or other important natural resources) indicates that dispersed occupation occurred primarily in areas of secondary economic significance.

Occupation of islands. Some islands of varying size near the coast of Sardinia were occupied by Nuragic groups. In several cases these are small islets with a single Nuragic structure. Examples include Isola Municca, Isola Rossa and Isola Mal di Ventre (Depalmas 2008), and the islands of Sant'Antioco and San Pietro (Namirski 2016: 102). The settlements on the latter do not reveal any obvious territorial pattern (perhaps for the same reasons as in the case of sparsely occupied areas – see above – that is, their limited economic potential resulting in the secondary importance of these areas for the Nuragic people), instead, the nuraghi occupy focal points in the landscape, and thus their distribution is determined by topography rather than their relationship to one another. A good example is Sant'Antioco island (108 km²), where most nuraghi are located in the mountainous southern part of the island on hilltops and ridges, while in the northern part of the island, which provides fewer elevated points or defensible locations, occupation is scarce.

Centralized territories. The evidence for independent territories with obvious settlement hierarchy is discussed last, since chronologically they emerged later than the previously described patterns of occupation, probably in the Late Bronze Age. Originally their existence

was argued with the use of Thiessen polygons (Webster 1996), but Carneiro's (1970) circumscription theory (see Chapter 3) has also been applied in the analysis of the Nuragic occupation of the territory of Isili (Navarra 1997). In accordance with this theory, the large Late Bronze Age nucleated settlements (nuraghi with up to 12 towers) were centres of power which emerged due to competition for resources and population pressure, resulting in the rise to power of specific groups or clans. We can infer this from demographic calculations which point to increasing population pressure in the Late Bronze Age, and from the architecture of complex nuraghi and associated settlements – multitowered structures and clusters of rooms are interpreted by Webster (2015: 109-110) as evidence for social inequalities reflecting the relationship between Nuragic elites and consenting groups (some of the smaller Nuragic settlements were still in use, but were probably subordinated to the emerging centres of power). Further evidence of this is the distribution of settlements around the largest nuraghi (Navarra 1997, Namirski 2013), and locations of nuraghi at points controlling natural resources (Canino 1998: 115) and probable routeways (Massetti and Sanciu 2013: 10). The clearest evidence of Late Bronze Age territoriality centred upon the largest complex nuraghi is seen in the west-south-west part of the island. The development of a Nuragic territory around Gesico and Mandas indicates that, in some cases, Late Bronze Age territories at least partly followed the pattern of the Middle Bronze Age clusters of nuraghi, using natural features as parts of territorial boundaries.

The first major observation and similarity between the western and eastern parts of the island is that, in both areas, we observe a diversity of settlement patterns. Near the western coast and in the Barbagia, the patterns discussed above occur within relatively short distances. Likewise, in both surveyed sample areas of the east coast the settlement patterns are very different. Thus, it is not possible to speak of general contrasts between eastern and western Sardinia. Rather, emphasis must be placed on continuous regional variability within

Nuragic settlement patterns and dynamics. This is also the case for the transitional period between the Chalcolithic and the Early Bronze Age, as seen in the evidence from sample area 1. This process could have taken an entirely different form in specific areas of Sardinia, and does not support the idea of a rapid collapse of Chalcolithic societies, which has been the assumption for the whole island.

Another significant similarity between western and eastern Sardinia is the pattern of occupation of highland plateaus. Nuragic occupation on the plateau of Teccu follows the same pattern as the areas in the western part of the island, with occupation focused on the edges of the plateau and its central part left largely free of settlement sites. Just as in cases from the western part of the island (Taccu ‘e Ticci, Giara di Siddi, Pranu Nuragheddus), also on the Teccu plateau the sites of different periods (assuming a chronological difference between protonuraghi, single-towered nuraghi and complex nuraghi, which is usually, but not always, the case) follow this pattern. This indicates that this specific settlement strategy was not only geographically widespread in Sardinia, but also consistently maintained through consecutive periods. As argued in previous chapters, when discussing the plateau of Teccu, there is sufficient evidence to argue for spatial organization within it, including the distribution of the nuraghi at similar distances (1.4-1.8km from each other) on the edges of the plateau and the presence of a centrally located nuraghe with a large settlement, to suggest that the area of a plateau could have constituted a territorial unit – possibly already in the Middle Bronze Age and developing significantly in the Late Bronze Age. The presence of this settlement pattern in both the east and west of the island has implications for understanding social relations in Nuragic period. It suggests that at least partly independent loose alliances or confederations of families (represented also by clusters of nuraghi with buffer zones) were not merely a local phenomenon, but were present in different parts of the island, and that the territorial units which emerged as a result of their existence were, at least partly, the basis for the emergence of Late Bronze Age territoriality with associated settlement nucleation and

increasing social differentiation.

A key question concerns the extent of the above-mentioned territoriality on the east coast of Sardinia in comparison with the western part of the island. Even though the settlement patterns of both sample areas are very different, with the exception of the plateau of Teccu (see above), they are both characterized by a limited degree of spatial organization visible in the distribution of the settlement sites. This contrasts with the western part of the island, where the settlement patterns reveal evidence for the construction of nuraghi with consideration of other ones (seen in the occupation of highland plateaus, and in clusters of nuraghi with buffer zones around them), often to form territorial units (Bonzani 1992, Navarra 1997, Campus 2008). However, this lesser degree of evidence for territoriality and the emergence of centres of power does not necessarily indicate a political subordination of the east to the Late Bronze Age and Early Iron Age territories which emerged in the western part of Sardinia. Here it is worth recalling once again the case of south-eastern China in the Neolithic and Early Bronze Age (see Chapter 3). According to Wright (1986), the areas beyond modern Henan were peripheral and subordinate to the centralized power during the Longshan period, but surveys have revealed that they did not come under the control of the emerging state until the Late Bronze Age, despite their inferior level of development seen in little evidence for settlement nucleation and hierarchy (Underhill et al. 2006). A similar scenario is very probable in the case of Sardinia. The eastern part of the island could have come under the control of the emerging western centres of power very late, or even not at all, remaining on a lower level of settlement and social complexity, but being at least semi-independent. This is indicated by the aforementioned scarcity of evidence for spatial organization in the distribution of settlements, as well as by the significant differences between both sample areas (and even within sample area 2). If eastern Sardinia did indeed come under the political influence of the emerging Nuragic centres of power from the western part of the island and became subordinate to them, more evidence for spatial organization and

territoriality (perhaps with lesser degrees of settlement hierarchy and complexity due to political and economic underdevelopment) might be expected. As argued by Steponaitis (1981), in the case of larger centres of power extracting resources from smaller settlements, there should be clearly distinguishable differences between the settlement patterns of politically and economically superior centres and the areas subordinated to them. No such clear settlement patterns could be distinguished in most of the surveyed areas. Such a diversity of occupation strategies reflected in the distribution and architecture of Nuragic sites of the east coast of Sardinia indicates, instead, rather small and semi-independent groups inhabiting this area in the Bronze Age.

In light of this discussion, it is necessary to ask the question, to what extent can settlement patterns inform us about the degree of complexity of Nuragic societies of the east coast of the island, and help us compare it with evidence from the west? The issue of social differentiation and political relations with centres of power from the west of Sardinia discussed above does not answer this question fully, since social complexity, as Chapman (1990: 169) explains, can be vertical ("rank differences among functionally diverse parts"), but also horizontal ("functional differentiation among parts of equivalent rank in a system"). Thus, a society with small, semi- independent groups occasionally forming territorial units based on loose alliances and confederations could have a lower degree of vertical complexity but a higher horizontal one. Such horizontal complexity (i.e. functional differentiation among specific parts of society) could be visible in landscape archaeology through sites of different function and/or specialization.

One of the ways to distinguish these differences is to analyze the distribution of sites in relation to areas rich in resources. For example, Lull (1984) analyzed the distribution of Argaric Bronze Age settlements (in South-East Spain) in relation to ore deposits, in an attempt to distinguish between economic roles and the possible specialization of specific sites. Combined with the results of excavations, this spatial analysis proved that four settlements

were used for both smelting and casting of metal artefacts, while others were more specialised in specific stages of the metalworking process. Furthermore, at some of the Copper Age sites, evidence for spatially restricted production areas was discovered (Chapman 1990: 171). This can be taken to indicate horizontal complexity of the society, comprising a functional differentiation between parts of the society which does not necessarily correspond to social stratification.

A different example comes from the studies of Bronze Age pottery production and its relationship with social complexity on the Chengdu Plain (south-west China). Rather than having a distinct class of sites specialized in pottery production, a normal settlement or cluster of households produced pottery, lithics, textiles and bone artifacts. Lin (2013: 358-359) interprets this as evidence for people conducting different tasks without an elaborate division of labour, indicative a low degree of horizontal complexity in the society.

In many cases both vertical and horizontal complexity occurs within a society. An example is Thrace after 2400 BC, where elite burials indicate a significant level of social stratification, while evidence for the specialized production of pottery and metal artefacts (Heyd et al. 2016: 172) also suggests horizontal complexity in the society. However, one needs to be aware of and look critically at the presuppositions which often accompany such interpretations of archaeological data – Johnson (2009: 2) correctly identifies the investigation of social inequality as one of these areas of archaeological research where such presuppositions are particularly common, especially in interpretations of the burial record, where it is often assumed that social inequality will necessarily be reflected in treatment of the body. Furthermore, the social/vertical distinction in analysis of the complexity of society can be criticized from a post-processual perspective as overlooking individuals and agency (understood as the active strategies and behaviours of an individual). However, Johnson (2009: 120) points out that many of the best case studies in postprocessual archaeology have been done in the field of historic archaeology due to availability of historical sources and

ethnographic data, which emphasizes the need for a wide variety of contextual information. Since the dataset gathered during this particular project does not provide sufficiently detailed evidence for the analysis of the complexity of the Nuragic societies of the east coast of Sardinia (see Chapter 7.4 for more detailed discussion of this issue), the use of a relatively simple vertical/horizontal complexity model, is deemed justifiable, if somewhat unsophisticated.

In sample area 1 there is no clear evidence indicating the horizontal complexity of Nuragic society. As already discussed (see Chapter 6) the majority of settlements are protonuraghi and archaic single-towered nuraghe which do not display any evidence of possible differences in their use (such as being specialized production sites which had a different economic significance for the society). Rather, their distribution and landscape context (preference for hilltop locations) warrants their interpretation as single farmsteads without a complex division of labour. The situation is different in sample area 2 where a significant percentage of complex nuraghi and large settlements surrounding the largest of them (Moru – Barisardo, Sellersu – Barisardo) increase the likelihood of functional and labour differentiation between specific settlements and their populations, as well as within settlements themselves (although more specific conclusions would need to be drawn from excavation results). This is more consistent with patterns observable in the west of Sardinia, where we find evidence for both vertical complexity (social stratification indicated by the settlement hierarchy, the emergence of sanctuaries and the Early Iron Age art) and horizontal complexity of the society – the latter represented in large settlements such as Su Nuraxi where different huts served specific production purposes, such as the production of mastic oil (Lilliu and Zucca 2005), as well as specialized production settlements such as Sa Osa (Castangia 2012).

Here one must note important limitations in the assessment of the social complexity of the east coast of Sardinia in the Nuragic period. The major one is the lack of excavated burial sites, which does not allow for investigation of possible differences in treatment of the dead

(which can sometimes be an indicator of both horizontal and vertical complexity). Also, landscape archaeology does not necessarily allow us to distinguish all types of burial sites. The evidence from other parts of Sardinia indicates that the Middle and Late Bronze Age periods saw the use of natural caves and rock shelters as places of burial (Skeates 2012). Furthermore, evidence from the Chacolithic sites in South-Western Spain has revealed that some individuals were buried outside the megalithic tombs but in their vincinity, which is interpreted as an indication of social differentiation (Diaz-Zorita Bonilla 2017: 22). Therefore, it is possible that the ritual and burial activity associated with megalithic tombs in the Mediterranean, which can be an indicator of social complexity, was not limited to the megalithic structure itself and thus can hardly be distinguished through survey data alone.

Considering these differences in social complexity, one should ask the question, to what extent were they result of adaptation to environmental conditions. As Johnson points out, "there is no *a priori* theoretical reason why more complex forms of society are better adapted to the natural environment than less complex forms" (2009: 151). Thus, each case (including the two sample areas of the east coast of Sardinia and their comparison to the western part of the island) must be studied individually. As we will see (Chapter 10.4), there is no significant difference in the use of the coast between sample areas 1 and 2, and there is no evidence for a difference in the degree of reliance on maritime resources in the Nuragic economy between the study areas (although the possibilities for studying this issue without excavations are limited).

Finally, it is possible to draw parallels between specific aspects of Nuragic settlement patterns on the east coast of Sardinia and other areas of the Central Mediterranean in the Bronze Age (see Chapters 6.3 and 7.3). One example is the Middle Bronze Age settlement in the Taro river valley, and between the rivers Secchia and Enza (in Northern Italy). In the valley of Taro we see a predominance of regularly distributed and highly standardized sites, while between the Secchia and Enza we observe smaller settlements grouped around larger ones

(La Braglia, Case Cocconi). Putzolu (2016: 34-35) interprets this as evidence for occupation of the former area by a unitary (i.e. with little degree of social differentiation) community and of the latter as evidence for the coexistence of different groups concentrated around hegemonic sites. This is similar to the differences seen between sample areas 1 and 2; in the former we see a pattern of, primarily, single-towered nuraghi as individual households with a limited degree of settlement nucleation in the Late Bronze Age and Early Iron Age while, in the latter, we observe large nucleated settlements concentrated around complex nuraghi.

10.2. Ritual sites and their relationship with settlement sites

Our understanding of the relationships between settlement and ritual sites in western Sardinia varies for different periods. In the case of the Middle Bronze Age, the main problem is that the relationship between the number of nuraghi and *tombe di giganti* cannot be calculated precisely (Depalmas and Melis 2010: 170). Our knowledge of the distribution of megalithic tombs is less than for the nuraghi, due to the relatively poor degree of preservation and recognition of *tombe di giganti*. Nevertheless, some general observations can be made on the basis of those areas which have been most extensively surveyed.

As Bittichesu et al. (2006: 55-56) point out, in some regions of Sardinia the Nuragic megalithic tombs tend to be associated with the Neolithic and Chalcolithic dolmens and other burial sites, especially in the Gallura and Barbagia. This might indicate that the Chalcolithic to Early Bronze Age transition was not a complete break, as suggested by the collapse of the Chalcolithic settlement system and abandonment of the large fortified settlements of the Monte Claro culture (Monte Baranta, Moravetti 2000a), but regionally could have maintained a degree of continuity, especially in terms of ritual practices. This is, supported by similarities in construction between pre-Nuragic *allée couverte* tombs and early *tombe di giganti* (Moravetti 1998c), the presence of *tombe di giganti* at the sites of Chalcolithic burials (Su Cuaddu ‘e Nixias – Lunamatrona) and the suggestion that the stele of Early/Middle Bronze Age *tombe di*

giganti developed from holed portal slabs such as that of dolmen Sa Coveccada (Mores, Moravetti 1990: 134). This relationship between the distribution of pre-Nuragic and Nuragic burial sites is visible also in sample area 1 (see Chapter 6 and Appendix 3), and includes not only *allée couverte* tombs (Bau S'Arena – Muravera), but also *tafoni* (small rock cavities, Monte Zippiri – Muravera) and *domus de janas* (Costa Sa Perdera – Muravera), with Nuragic burial or settlement sites located in the near vicinity, or in direct association with them. Furthermore, just as in the Gallura (Puggioni 2009) where such a relationship between pre-Nuragic and Nuragic burial sites also occurs, in sample area 1 the architecture of the nuraghi is very archaic, with a dominance of corridor nuraghi and nuraghi-*capanne* without tholos chambers. Another similarity between both regions is their topography (extensive areas of mountains and rocky hills) and poor soils. These are further indications that, in areas like Sarrabus and Gallura, the development of Nuragic culture occurred with a more significant degree of continuity with the Chalcolithic than in other parts of the island (see Chapter 6).

The most important study of the relationship between *tombe di giganti* and settlements was undertaken by Blake (2001). She looked at an area of 818 km² in the northern part of the island with 190 nuraghi and 13 *tombe di giganti* in order to investigate the relationship between the distributions of these two types of monuments. To make the sample of *tombe di giganti* more representative, Blake included data from about 108 tombs from other parts of the island where the distance to the nearest nuraghe is known (Blake 2001: 152). She discovered evidence both for the megalithic tombs being paired with a specific nuraghe (most of the tombs were located 300m further from the second nearest nuraghe than from the nearest nuraghe, implying a connection of each tomb to a specific tower), and for the tombs being shared by inhabitants of several nuraghi – this was probably the case on the plateaus of Siddi and Gesturi (Blake 2001: 153).

This diversity of spatial relationship between the nuraghi and *tombe di giganti* is also visible, in both study areas. In sample area 1 there are examples of tombs paired with specific

nuraghe (Monte Zippiri – Muravera, Sa Spadula – Muravera, Bau S'Arena – Muravera), as well as isolated tombs (Masone Pardu – Castiadas) and cemeteries (Monte Crobu – Castiadas). Likewise, in sample area 2 there are clear examples of paired tombs and nuraghi (nuraghe and *tomba di giganti* Brocca are located on the same ridge), as well as tombs located in relative isolation (*tomba di giganti* Fragori – Barisardo). Whether these differences reflect chronological changes in the relationship between tombs and settlement can only be determined through excavation, since the state of preservation of most of the tombs does not allow for reliable assessment of their date. However, it can be speculated that these differences might reflect the variety of ways *tombe di giganti* were used (see Chapter 6.1.2 and 6.2.2), since their role in Nuragic societies went well beyond their function as burial sites. Rituals and gatherings would have taken place within the exedra (Moravetti 1990: 148), placing *tombe di giganti* among the most important sites in the life of a community. Such a diversity in the ritual use of similar structures within a relatively limited area is also known from Çatalhöyük (Turkey), where there is a significant differentiation in the ritual use of different houses (Düring 2013: 30-32). One indication of such a specific set of ritual practices in Nuragic Sardinia might be the use of baethyls (*betili*). These small worked standing stones of sub-conical shape sometimes have clearly female elements, and are common in the central and western parts of the island (Ugas 1999: 83), especially in association with *tombe di giganti* (Tamuli – Macomer, Pischina 'e Ainos – Tresnuraghes, Moravetti 2000b: 101), but are relatively rare in eastern Sardinia. However, during the excavations of *tomba di giganti* Selene II (Lanusei), not far from sample area 2, three pyramid-shaped stones with holes interpreted as openings for placing baethyls in them were found in the Late Bronze Age deposits within the exedra (Perra 2000: 222-223). Thus, it is possible that *betili* were placed in the exedras of at least some of the *tombe di giganti* in sample area 2, which implies that some of the ritual practices common in the western part of Sardinia were also followed near the east coast of the island. However, this hypothesis has to be investigated separately for each individual site,

given the aformenetioned diversity in their relationship to settlement sites and thus different significance for the Nuragic groups.

Furthermore, it is likely that the relative isolation of some of the tombs made them places for gatherings of people from several nuraghi, much as in the case of the *pozzi sacri* located in buffer zones between different Nuragic territories. This is the case especially in sample area 2 (*tomba di giganti* Fragori – Barisardo) where there is greater evidence for spatial organization of the landscape and differences in the distribution of settlement and ritual sites. However, both in western Sardinia and the surveyed areas of the east coast, there is no single dominant pattern of relationship between ritual and settlement sites. This implies that the wide variety of settlement patterns which can be observed in different parts of the island could have been accompanied by a similar diversity of ritual practices.

10.3. Use of the coast and trade

The evidence of Nuragic occupation in western Sardinia indicates no particular emphasis on coastal settlement. In areas like the Sinis peninsula (Depalmas 2008) and the island of Sant'Antioco, where Nuragic occupation is very dense, most of the nuraghi are located inland, with very few on the coast or in its direct vicinity. Considering the emphasis on defensive locations like hilltops and plateau edges visible in many parts of Western Sardinia, it seems that defensive aspects and the display of prestige were more important criteria in the selection of locations for the construction of nuraghi than control of the coast. This is visible also among the settlements which are primary candidates to have been involved in maritime trade. Examples include the complex nuraghi of Antigori (see Fig. 79) and Domu 'e S'Orku (Sarroch), at both of which large quantities of Mycenaean pottery were discovered (Smith 1987: 98-99). Despite being important centres, potentially involved in barter trade with Aegean merchants (Melis 2003: 71), the sites are located on rocky hilltops, 0.8-1.1km from the coastline. Even considering possible changes to the coastline since the Bronze Age, these

settlement sites were certainly located away from it since, between the nuraghi and the current coastline, there are several *tombe di giganti* (Tanca Su Foxi – Sarroch, Baracca Su Basoni – Sarroch). So far we have no evidence of harbour installations from the Nuragic period, which is similar to the Aegean, where such evidence is very scarce in the Bronze Age and limited mainly to Crete with sites such as Kommos and Gournia (Pullen 2013: 246-247).

However, that does not mean the coast was entirely devoid of Nuragic occupation. Besides occasional nuraghi (Baboe Cabitza – Cabras, Nurattolu – Alghero), different types of sites of non-monumental character were identified, primarily on the Sinis peninsula. One example is the settlement of Sa Osa (Cabras), which was a specialized production settlement with evidence of the production of wine taking the form of large storage jars and organic remains (Castangia 2012: 112). A significant number of fishing-related artefacts, such as clay fish-net weights, indicates emphasis on the exploitation of maritime resources. At least some of the Late Bronze Age buildings within the settlement were partly built with mud-bricks (Castangia 2012: 107). The use of this material, as well as the poor state of preservation of such features, suggests that more of these settlements may yet to be identified. Furthermore, a number of burial and ritual deposits have been identified on the coast of Western Sardinia. One of the examples is the Nuragic deposit at Su Pallosu (San Vero Milis), which mainly included pottery and has been interpreted as a votive deposit due to the fact that most of the pots were smashed before their deposition at the site (Castangia 2011: 135). Another Late Bronze Age/Early Iron Age pottery deposit of arguably ritual significance was identified at S'Arrocca Tunda (San Vero Milis, Usai 2014b: 188). There are also examples of burial sites, among them a unique example of a cist burial with associated stone settings on the beach of Su Bardoni (Cabras, Usai 2014b).

As can be seen, many types of Nuragic sites recorded on the western coast of the island do not include monumental architecture and are therefore much less archaeologically visible in the landscape than typical settlements dominated by nuraghi. Furthermore, some sites may

have been submerged, as discoveries of important coastal sites near natural harbours in the Aegean suggest – an example being the beach rock platforms with Early Helladic II (2700-2200 BC) and Late Helladic III (1400-1060 BC) pottery and wood charcoal fragments discovered during underwater surveys at Kalamianos (Tartaron et al. 2011). Therefore, as Andreou et al. point out (2017: 201) in their study of the loss of coastal evidence in Cyprus, the archaeological visibility of harbours and anchorages is very low, which – coupled with coastal erosion – makes the identification of coastal archaeological features rather problematic. Considering these difficulties, it is probable that our picture and understanding of Nuragic occupation of the Sardinian coastline is incomplete.

The Nuragic occupation of the east coast of Sardinia does not reveal any significant difference to the western part of the island in terms of the distribution of nuraghi in relation to the coastline. In sample area 1 very few nuraghi are located directly on the coastline, but it is notable that most of these examples were built in close proximity to possible landing sites. Among them is Nuraghe Porto Pirastu (Muravera), a complex structure located on top of a promontory enclosing a bay of the same name. Other examples are nuraghi Gibe Truttiri and Monte Turno (Castiadas) which flank the bay of Cala Marina (Fig. 80). However, these and most of the other nuraghi located near the coastline in sample area 1 (such as Nuraghe Sa Iba de Ziu Franciscu – Muravera), are merely single-towered structures. Evidently, the Late Bronze Age settlement nucleation did not result in the emergence of coastal settlements, which implies either a limited degree of maritime trade and low significance of marine resources in the Late Bronze Age economy, or the management of maritime trade and exploitation of marine resources which involved specialized sites without monumental architecture. Furthermore, one cannot rule out the possibility that maritime trade was handled by the nucleated settlements located inland from the coast. As already mentioned, evidence for such a scenario emerged in the south-west of Sardinia, where the nuraghi Antigori and Domu ‘e S’Orku (Sarroch) were probably centres of barter trade with Aegean merchants – or



Fig. 79. Nuraghe Antigori (Sarroch) where large quantities of Myceanean pottery were found.



Fig. 80. View from Nuraghe Gibre Truttiri (Castiadas) to the bay of Cala Marina and Nuraghe Monte Turno (the hilltop in the centre).

perhaps other traders offering Aegean goods, as Dickinson (1994: 252) argues – despite being located in some distance from the coast. However, such a possibility in both sample areas can only be verified through excavations.

As already discussed, the primary criteria in the selection of locations for the construction of the nuraghi in sample area 1 were defensive and possibly prestige- related through building the monuments at focal points in the landscape (see Chapter 6). It is clear that criteria such as these were more influential than direct control of the coastline. Valtan (2003: 19) argues that nuraghi on the south-east coast of Sardinia near Villasimius could have formed a defensive system controlling the coastal zone, but this claim does not stand up to scrutiny. The few nuraghi which are located on the coastline in sample area 1 are not distributed regularly within specific distances; there are long areas of coastline without any distinguishable Nuragic structure. Furthermore, the only evidence of nuraghe being built as a group with consideration of each other comes from a group of four nuraghi east of Villasimius, located inland (see Chapter 6.1). This contrasts with known examples of coastal defensive systems of towers from other parts of the Mediterranean. An example is provided by the circular stone towers built from the 6th to the 3rd century BC on the island of Sifnos (Cyclades, Greece), the earliest of which constituted a chain of watchtowers from which signals could be sent to the local settlements (Ashton 1991: 26). In this case the towers were built within more or less evenly spaced along the coast, especially in the southern part of the island where towers numbers 38, 43, 47 and 48 (at least three of which are roughly contemporary and date back to the 6th century BC, Ashton 1991: 122, 130-134) constitute the most obvious defensive chain on the island. On the South-East coast of Sardinia such a regular distribution of nuraghi which could indicate their construction as part of a defensive coastal system is absent. However, that does not mean that the coastline in sample area 1 was necessarily devoid of a more extensive Nuragic settlement. As already shown by the evidence from Western Sardinia, the types of Nuragic sites found on the coast are often non-monumental and difficult to detect through

landscape archaeology alone. Thus, it is possible that such a use of the coastline in Sarrabus is yet to be revealed.

The evidence from sample area 2 is not significantly different to that in sample area 1. Only three sites are located on the coastline (Nuraghe Perd'e Pera – Cardedu, Nuraghe Su Angedu – Cardedu, and the Nuragic wall at Punta Cea – Tortoli), with a further three located a few hundred meters away from the coastline (Nuraghe Mindeddu – Barisardo, Nuraghe Giba 'e Scorka – Barisardo, Protonuraghe Foxi – Barisardo). Just as in sample area 2 and in the western part of Sardinia, the emphasis in location was placed on defense and, possibly, demonstration of prestige (predominant hilltop and plateau locations can be interpreted in both ways, which are not mutually exclusive) rather than on control of the coastline.

How are we to understand these patterns in light of the evidence for maritime trade and the use of boats, which are one of the most common themes in the Nuragic *bronzetti*? It is necessary to point out that representations of boats in Nuragic art are of Iron Age origin, while the nuraghi were built primarily in the Middle and Late Bronze Age. Therefore, the distribution of Nuragic settlements does not necessarily reflect the use of the sea and its significance for the economy and trade after 900 BC, when we know Nuragic boats of at least three types – as argued by Melis (2003: 59) on the basis of *bronzetti* – were probably in use. Furthermore, the realism of boat representations in art is rather questionable, as many *bronzetti* include decorative elements such as animal heads (Lilliu 1966). A similar concern is raised by Wedde (2000: 32) in his analysis of Aegean Bronze Age ship imagery, which does not necessarily reflect the real technological state of the vessels. Unfortunately, lack of preserved examples of Nuragic boats prevents us from further assessing whether they were already in use in the Middle and Late Bronze Age Sardinia when the Nuragic settlement patterns distinguishable in both sample areas were emerging.

10.4. Identity

Finally, it is necessary to consider whether and how settlement dynamics can inform us about the identity of the people inhabiting the east coast of Sardinia in the Nuragic period and potential differences in comparison with the western part of the island. Blake (1999) argues for the existence of a shared Nuragic identity which was experienced “from within” the society, manifesting itself primarily through shared material culture and architecture, rather than being imposed by force externally.. According to Blake, local identities became more evident in the Early Iron Age (c. 900-750 BC), as witnessed by the diversification in pottery forms and other areas of material culture (Blake 1999: 49). A similar argument was made by McEnroe, who argues that the Minoan architecture of the Protopalatial phase (c. 1900-1750 BC) in Crete shares a distinctive set of common characteristics, such as palaces, paved streets with walkways and theatral areas, and thus “mark the beginning of a specifically Minoan identity” (2010: 67). While such an might seem plausible considering the longevity of the Nuragic culture and continuity in its architecture and many forms of material culture, Boyd argues that “the coarse replication of material and architectural forms does not in itself demonstrate conscious replication of practice, and indeed the replication of dominant meanings or ideologies” (2016: 387). Thus, considering that landscape archaeology provides us with data primarily about architecture and certain forms of material culture, one could conclude that the contribution of such research to our understanding of the identity of people inhabiting the surveyed areas is relatively limited.

While the possibilities of investigating this issue are indeed limited in the case of employing landscape archaeology only, some conclusions can be drawn on the basis of data from sample areas 1 and 2, especially in comparison with results of research from other parts of the island. The main one relates to the ritual sites, which developed into large sanctuaries in the Late Bronze Age and especially in the Early Iron Age (see Chapter 2). These are often

separated from the largest complex nuraghi and their associated settlements, and constitute the main sites of metalwork deposition in the Early Iron Age – this contrasts with earlier periods when metal artefacts were deposited primarily in the nuraghi. Ialongo (2013) interprets this shift as indicating that the redistribution of metal became a means of maintaining social control by the elites and legitimizing it through the religious sphere. It is possible that this way of legitimisation of power was achieved also in earlier periods through control over *tombe di giganti* which were not only burial sites, but also places of ceremonies (Lo Schiavo 2008: 91). However, sanctuaries are completely absent in sample area 1 – no *pozzo sacro*, megaron temple or other type of ritual structure which could be dated to the Late Bronze Age or Early Iron Age was recorded around Muravera and Castiadas. This indicates that the strategy of social control exercised through the religious legitimisation of power by elites, which is clearly visible in the western part of the island (large sanctuaries such as Santa Vittoria – Serri, Abini – Teti, Sant'Anastasia – Sardara and others), was not implemented in the south-east of Sardinia. Consequently, the role of religion in the formation of the identity of the communities inhabiting this area is likely to have been different in Sarrabus than in Logudoro, Marghine, Planargia, Oristanense and other areas of western Sardinia with significant densities of settlements and sanctuaries.

In sample area 2 there is one recorded example of a Nuragic sacred well (*pozzo sacro* Su Presoni). It has never been excavated, but site biographies of other excavated monuments of this type in Sardinia indicate that it was most likely used in the Iron Age. Furthermore, some complex nuraghi could have been transformed into sanctuaries in the Iron Age (see Chapter 8), although this hypothesiscan only be determined through excavations. Thus, the application of Ialongo's (2013) hypothesis of social control through religion and the redistribution of resources in sanctuaries is more probable for sample area 2. Combined with a more significant degree of Late Bronze Age settlement nucleation and evidence for territoriality, it indicates greater complexity (both horizontal and vertical) of the Nuragic societies inhabiting

sample area 2 in comparison to these from sample area 1 and, therefore, the greater likelihood of the emergence of a local identity there, perhaps still incorporating elements of the pan-Sardinian Nuragic identity suggested by Blake (1999).

10.5. Conclusions

This comparison of Nuragic settlement dynamics along the east and west coasts of Sardinia does not show a clear-cut difference between these two areas. Rather, different settlement patterns and relationships between domestic and ritual sites are observable in specific parts of the island, and this diversity is also seen between various areas of the east coast within relatively short distances. This supports the overall picture of Nuragic societies as perhaps maintaining an overall identity (Blake 1999), but developing very different settlement dynamics in various parts of the island. In sample area 1 we see a low degree of both settlement nucleation and horizontal social complexity, a lack of significant use of the coastline, and no attempts to legitimize power through control over sanctuaries. In sample area 2 we see a more significant degree of Late Bronze Age and possibly Early Iron Age settlement nucleation (and thus possibly both horizontal and vertical social complexity), as well as limited evidence for territoriality which is comparable to some of the patterns from the west of the island. However, none of these areas produced evidence which would indicate the degree of social complexity and hierarchy which we observe in western Sardinia in the Late Bronze Age and Early Iron Age. Thus, we cannot talk about only one model of development of Nuragic settlement and society – rather, it is necessary to pay attention to regional patterns, indicating the necessity for further landscape surveys and excavations as a means to learn more about these processes.

Chapter 11. Conclusions and future research prospects

This work has attempted to study the Nuragic settlement dynamics of the east coast of Sardinia on the basis of two selected sample areas (Muravera-Castiadas in South-Eastern Sardinia an Barisardo-Cardedu in Central-Eastern Sardinia) which were covered in a series of site-based surveys. Recorded evidence of Nuragic occupation was assessed primarily in terms of settlement patterns, relationships between ritual and settlement sites, as well as use of the coastline and relationships between pre- Nuragic and Nuragic sites. The results were placed in wider context of Nuragic settlement in Sardinia and Mediterranean prehistory, especially by comparing them to our knowledge of Nuragic settlement dynamics from the better-known western part of the island.

The results are significant for our understanding of the Chalcolithic to Early Bronze Age transition, which remains one of the least understood periods of Sardinian prehistory. The assumption that the Chalcolithic settlement system collapsed due to overuse of land and climate change (Lewthwaite 1984, Webster 1996), while probably valid for parts of the island with large Chalcolithic settlements of the Monte Claro culture, such a Monte Baranta (Moravetti 2000a) and Monte Ossoni (Melis 2007: 20-21), is challenged by the evidence from sample area 1, where a close relationship between the distribution of pre-Nuragic and Nuragic sites has been demonstrated. This suggests that in some areas of the island the Chalcolithic to Early Bronze Age transition occurred with a more significant degree of continuity than elsewhere. It is consistent with Webster's (2015: 12) suggestion that the apparent discontinuity between Chalcolithic and Early Bronze Age might simply be illusory because of our poor recognition of the Early Bronze Age evidence. The results from sample area 1, where the relationship between pre-Nuragic and Nuragic sites is clear, and from sample area 2, where such a relationship is not evident, indicate that the Chalcolithic to Early Bronze Age transition and the earliest stages of the emergence of the Nuragic culture were not a uniform

process – rather, its nature and possibly also its chronology were different in specific parts of the island.

Furthermore, the research has revealed both similarities and differences in the Middle Bronze Age occupation between both sample areas, as well as between them and the west of Sardinia. Hilltops, promontories and ridges were preferred locations in both sample areas, indicating an emphasis on defence and possibly (at least in some cases) the display of prestige. In both cases there is little evidence for territoriality in spatial organization. Coupled with the archaic architecture of the majority of the nuraghi in sample area 1 (most of them are corridor nuraghi or nuraghi-*capanne* without tholos chambers), this supports the idea of the Middle Bronze Age Nuragic occupation as dispersed single farmsteads reflecting the relavitely egalitarian structure of society in this period. The exception is the plateau of Teccu in sample area 2, where the nuraghi are distributed around its edges, revealing evidence for spatial organization comparable to that seen on highland plateaus which is observable in the central and western parts of the island (Puddu 2001, Depalmas 2008).

The two sample areas reveal very different degrees of Late Bronze Age settlement nucleation. In sample area 1 the percentage of complex nuraghi (18%) is well below the Sardinian average of about 30%. Moreover, the architecture of complex nuraghi in sample area 2 is often as that of the corridor nuraghi and single- towered nuraghi in this area, suggesting that not all of them were the result of Late Bronze Age settlement nucleation. Overall, the evidence for this phenomenon and related increase in social differentiation in South-East Sardinia during the Late Bronze Age is very scarce, which contrasts with the western part of the island. On the other hand, in sample area 2 the percentage of complex nuraghi (63%) far exceeds the Sardinian average. This can be explained by the sparse Middle Bronze Age occupation and relocation of people due to competition for resources in the Late Bronze Age, which resulted in the extension of the majority of single-towered nuraghi into complex structures. The possibility of some complex nuraghi having been built in the Middle

Bronze Age as a single project cannot be ruled out, although the results of excavations at Nuraghe Cea (Loceri) confirm the Late Bronze Age origin of the bastion (Cossu 1997). However, despite the much greater degree of settlement nucleation in sample area 2, outside of the plateau of Teccu there is no clear evidence for territoriality or the emergence of centres of power – the Nuragic occupation remains mostly dispersed. This, especially in comparison with examples from other parts of the world (Underhill et al. 2006, Yasur-Landau et al. 2008, see Chapter 3), indicates that the east of Sardinia was not necessarily under the political control of emerging Nuragic centres of power in western Sardinia; rather, local Nuragic societies are likely to have remained at least semi-independent, maintaining a lower level of social complexity than those in the west.

No dominant pattern of relationship between ritual and settlement sites was observed in either of the sample areas. This does not mean that the locations of the *tombe di giganti* and the only recorded sacred well are random – some of them are clearly coupled with specific nuraghe (*tomba di giganti* and nuraghe Brocca – Cardedu), others are concentrated forming cemeteries (*tombe di giganti* Monte Crobu – Castiadas), while others are isolated (*tomba di giganti* Masone Pardu – Castiadas). This is consistent with the results of Blake's (2001) study in western Sardinia, where she discovered evidence both for burial sites paired with specifc settlements and for use of the megalithic tombs by inhabitants of different nuraghi. As Perra (2008: 82) points out, *tombe di giganti* were much more than just burial sites, thus their diverse distribution patterns might indicate differences in their other functions (places of ceremonies, gatherings, places of restricted access, etc.). Unfortunately, the limited possibility of distinguishing the chronology of *tombe di giganti* in both sample areas (mainly due to their poor state of preservation) does not allow us to assess whether differences in the relationship between specific ritual and settlement sites are to do with changes in use of the sites which could have occurred in consecutive periods. Another important observation in regard to ritual sites near the east coast of Sardinia is the complete lack of ritual monuments in sample area

1. This suggests that the scenario of elites maintaining their status and power through the control of religion (Ialongo 2013) did not occur in this part of the island, or at least not in the same way as in the western part of Sardinia.

The results of this project open further possibilities for future research. The major problem that might be addressed through future landscape surveys is the Phoenician and Punic presence on the east coast of Sardinia and its relationship to the Nuragic culture in this area. The Punic and Phoenician evidence is certainly less substantial than in the western part of the island, but its extent might be underrated due to insufficient research – the presence of a Punic fort at Baccu di Monte Nai (Ledda 1985) and the settlement of Sarcapos (Barreca 1988: 25) indicate potential for discovering further sites which might be preserved as pottery scatters. Such potential has been demonstrated by van Dommelen's (1998) research in the valley of Riu Mannu, where he recorded numerous Punic rural settlements. The relationship between Phoenician colonization, as well as the Punic conquest of the island, and the Nuragic culture or its Late Iron Age remnants is poorly understood, even in the western part of the island where the evidence is more abundant and research has been more extensive. Thus, investigation of this issue, which would require an intensive walkover survey in search of pottery in selected sample areas, is one of the main areas of potential future research.

Another possibility is excavation, especially of sites in sample area 1, where protonuraghi and nuraghi-*capanne* predominate. Their dating could allow us to establish whether their archaic style of architecture is a result of primarily Early to Middle Bronze Age occupation with only limited degree of Late Bronze Age settlement nucleation, or whether the Late Bronze Age settlements are similar to those from earlier phases of the Nuragic culture and did not undergo developments similar to those in Western Sardinia. This is particularly important in the case of the complex nuraghi (usually associated with the Late Bronze Age settlement nucleation) which display archaic architecture (polygonal cyclopean masonry and no tholos chambers). Excavations could also help to explore the relationship between pre- Nuragic and Nuragic

sites, which is clearly visible in their distribution in sample area 1, especially in terms of the degree of re-use of pre-Nuragic sites in the Bronze Age, which could contribute in further to our understanding of the Chalcolithic to Early Bronze Age transition.

Finally, data obtained through excavation would provide important contextual data, which would allow us to employ post-processual approached and investigate the issue of agency (understood as active strategies of an individual within a society) in the Nuragic societies of the east coast of Sardinia. This issue has not been touched upon in this thesis, and the post-processual approaches were scarcely used, primarily due to the kind of dataset obtained through fieldwork – results of landscape surveys are insufficient to employ post-processual approaches emphasizing the need for consideration of personhood, emotions (Harris 2010) and agency (Owoc 2005), as surveys do not provide enough contextual information; such can be obtained only through excavation.

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Appendix 1. Nuragic sites in sample area 1

1. Protonuraghi

Arrubiu (Muravera) 293
Baracca Su Entu (Muravera).....295
Bau Travalazzu (Castiadas).....297
Birru (Castiadas).....299
Brebeis (Castiadas).....301
Bruncu Brailoi (Muravera).....303
Bruncu Ottixeddu (Castiadas).....305
Cala Sinzias (Castiadas).....307
Casteddu (Castiadas).....309
Comideddu (San Vito).....311
Genna Spina (Castiadas).....313
Is Laccus (Castiadas).....315
Liuru Ganudu (Castiadas).....317
Macionni (Castiadas).....319
Marongiu (Muravera).....321
Monte Crobu (Muravera).....323
Monte Nai (Muravera).....325
Montixeddu (Castiadas).....327
Mortus (Muravera).....329
Nuraxeddu (Castiadas).....331
Perdiaxiu (Muravera).....333
Pispisa (Muravera).....335
Ponzianu (Muravera).....337
S'Accedda (Castiadas).....339
S'Ortu (Muravera).....341
Sa Ridroxi (Muravera).....343
Scalas (Muravera).....345
Su Cannisoni (Castiadas).....347
Su Sciusciu I (Muravera).....349
Su Sciusciu II (Muravera).....351
Su Tasuru I (San Vito).....353
Su Tasuru II (San Vito).....355

2. Single-towered nuraghi and nuraghi-*capanne*

Arridelaxiu (San Vito).....357
Brabudu (Castiadas).....359
Bruncu Campulognu (Villasimius).....361
Bruncu Su Predi (Muravera).....363
Cerbinu (San Vito).....365
Corrocoi (Castiadas).....367
Cruxi (Castiadas).....369
Cuili Paliu (Castiadas).....371
Cuili Senni (Muravera).....373
Domu de S'Orcu (Muravera).....375
Forada Procaxius (San Vito).....377
Garrabosu (Muravera).....379
Gibe Truttiri (Castiadas).....381
Idda (Castiadas).....383
Masone Murtas (Castiadas).....385
Meurru (Castiadas).....387
Monte Arrubiu (Muravera).....389

Monte Gruttas (Castiadas).....391
Monte Ontroxiu (Muravera).....393
Monte S'Ollastinu (Castiadas).....395
Monte Turno (Castiadas).....397
Monte Zippiri (Muravera).....399
Moros (Castiadas).....401
Mumosa (Muravera).....403
Nicola Podda (Muravera).....405
Nuraxeddu (Castiadas).....407
Piras (Castiadas).....409
Piscareddu (Muravera).....411
Porceddus (Villasimius).....413
Priamo Orru (San Vito).....416
Riu Molas (Muravera).....418
S'Achiloni (San Vito).....420
S'Argalla I (Villasimius).....422
S'Argalla II (Villasimius).....424
S'Oxiu (Villasimius).....426
Sabadi (Castiadas).....428
San Pietro (Castiadas).....430
San Priamo I (San Vito).....432
San Priamo II (San Vito).....434
Sant' Aleni (San Vito).....436
Su Cunventu (Muravera).....438
Su Braccu (Muravera).....440
Su Modditzi (Muravera).....442
Tersilia (Muravera).....444

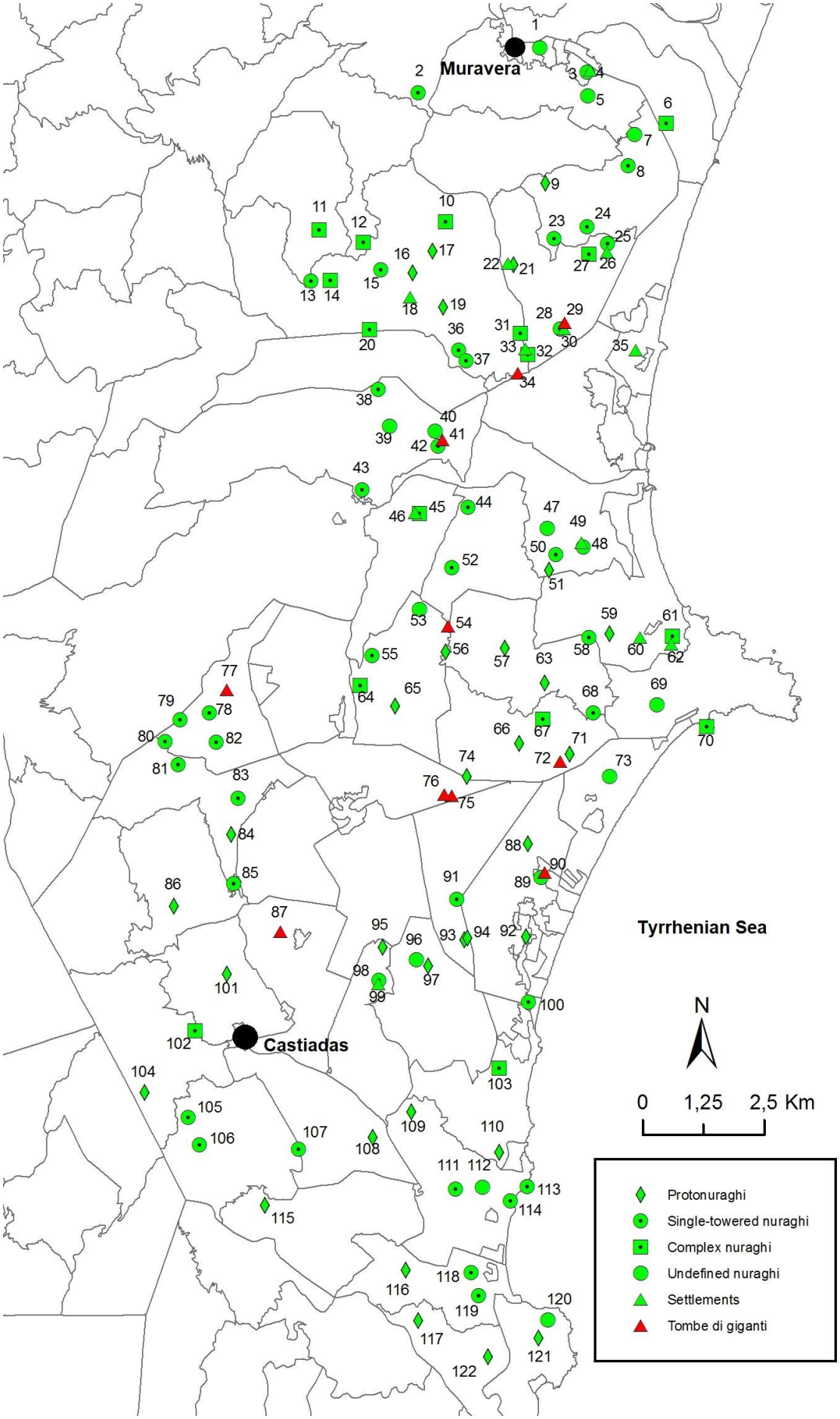
3. Complex nuraghi

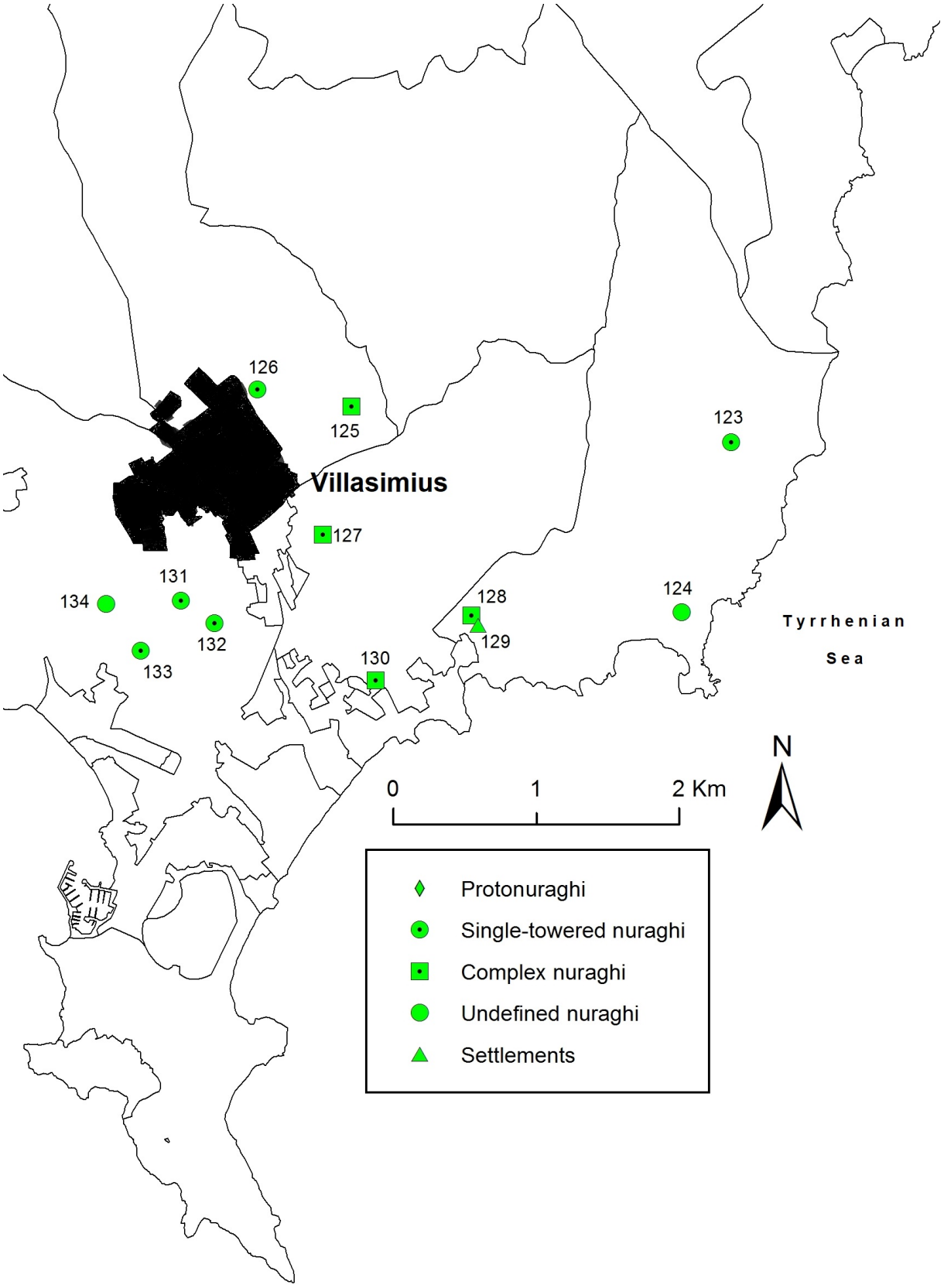
Asoru (San Vito).....446
Baccu 'e Gattus (Villasimius).....448
Baccu Sa Figu (Castiadas).....450
Cardaxiu (San Vito).....452
Corritta (Muravera).....454
Don Giovanni Mattaciolu (Muravera).....456
Figu Niedda (Muravera).....458
Is Traias (Villasimius).....460
Mannu (Muravera).....462
Manunzas (Villasimius).....464
Mont'Arbu (San Vito).....466
Monte Narbeddu (San Vito).....468
Monti Mereu (Villasimius).....470
Murtas (Muravera).....472
Porto Pirastu (Muravera).....474
S'Acqua Seccis (Muravera).....476
S'Omu 'e S'Orcu (Castiadas).....479
Sa Spadula (Muravera).....481
Santoru (Muravera).....483
Su Linnamini (San Vito).....486

4. Nuraghi of undefinable typology

Accu Sa Pira (Villasimius).....488

Cann'e Frau (Muravera).....490
Cuili Su Casteddu (San Vito).....492
Giordi (Muravera).....494
Mitza Sa Granaccia (Muravera).....496
Monte Idda (San Vito).....498
Monte Idda (Castiadas).....500
Monti Ferru (Muravera).....502
Puncilioni (Muravera).....504
Punta Molentis (Villasimius).....506
Sa Figu (Castiadas).....508
Sa Iba de Ziu Franciscu (Muravera).....510
Sa Proca (Castiadas).....512
Santa Matta (Muravera).....514
Su Nuraxi – via Castello (Muravera).....516
4. Settlements associated with the nuraghi
Corritta (Muravera).....517
Domu de S'Orcu (Muravera).....518
Don Giovanni Mattaciolu (Muravera).....519
Idda (Castiadas).....520
Manunzas (Villasimius).....521
Marongiu (Muravera).....522
Monte Zippiri (Muravera).....523
Nicola Podda (Muravera).....525
Sa Spadula (Muravera).....526
Su Cunventu (Muravera).....527
5. Open settlements
Riu Mannu (San Vito).....528
Feraxi (Muravera).....529
Monte Antoni Peppi (Muravera).....530
6. *Tombe di giganti*
Bau S'Arena (Muravera).....532
Masone Pardu (Castiadas).....534
Mitza Sa Granaccia (Muravera).....536
Mont'Arbu (Muravera).....538
Monte Crobu I (Castiadas).....539
Monte Crobu II (Castiadas).....541
Monte Zippiri (Muravera).....543
Sant' Aleni (San Vito).....545
Cuili Camisa (Castiadas).....546
Sa Spadula (Muravera).....546
7. Dubious and negatively verified sites
Baccu di Monte Nai (Muravera).....547
Mannu II (Muravera).....547
Sinzias (Castiadas).....547
Bruncu S'Arrosadu (Muravera).....549


Muravera
Castiadas
Tyrrhenian Sea
N
0 1,25 2,5 Km
Protonuraghi
Single-towered nuraghi
Complex nuraghi
Undefined nuraghi
Settlements
Tombe di giganti


126
125
123
Villasimius
127
131
134
132
133
128
129
124
130
Tyrrhenian
Sea
N
0
1
2 Km
Protonuraghi
Single-towered nuraghi
Complex nuraghi
Undefined nuraghi
Settlements

Protonuraghi: 9 – Ponzianu, 16 – Comideddu, 17 – Su Tasuru II, 19 – Su Tasuru I, 21 – Marongiu, 51 – Bruncu Brailoi, 56 – S'Ortu, 57 – Mortus, 59 – Baracca Su Entu, 63 – Perdiaxiu, 65 – Pispisa, 66 – Arrubiu, 71 – Sa Ridroxi, 74 – Monte Crobu, 84 – Birru, 86 – S'Accedda, 88 – Scalas, 92 – Monte Nai, 93 – Su Sciusciu I, 94 – Su Sciusciu II, 95 – Bau Travalazzu, 97 – Bruncu Ottixeddu, 101 – Casteddu, 104 – Liuru Ganudu, 108 – Genna Spina, 109 – Brebeis, 110 – Su Cannisoni, 115 – Nuraxeddu, 116 – Is Laccus, 117 – Maccioni, 121 – Cala Sinzias, 122 – Montixeddu

Single-towered nuraghi: 2 – S'Achiloni, 3 – Su Cunventu, 8 – Riu Molas, 13 – Forada Procaxius, 15 – Arridelaxiu, 23 – Cuili Senni, 24 – Su Braccu, 25 – Domu de S'Orcu, 28 – Monte Zippiri, 36 – San Priamo I, 37 – San Priamo II, 38 – Priamo Orru, 42 – Sant' Aleni, 43 – Cerbinu, 44 – Mumosa, 48 – Nicola Podda, 50 – Bruncu Su Predi, 52 – Monte Arrubiu, 55 – Monte Ontroxiu, 58 – Garrabosu, 68 – Piscareddu, 78 – Cruxi, 79 – Meurru, 80 – Piras, 81 – Corrocoi, 82 – Cuili Paliu, 83 – Monte Gruttas, 85 – Sabadi, 91 – Su Modditzi, 98 – Idda, 100 – Tersilia, 105 – Masone Muras, 106 – Nuraxeddu, 107 – Moros, 111 – San Pietro, 113 – Monte Turno, 114 – Gibe Truttiri, 118 – Brabudu, 119 – Monte S'Ollastinu, 123 – Porceddus, 126 – S'Oxiu, 131 – S'Argalla II, 132 – S'Argalla I, 133 – Bruncu Campulongu

Complex nuraghi: 6 – Murtas, 10 – Cardaxiu, 11 – Mont'Arbu, 12 – Su Linnamini, 14 – Monte Narbeddu, 20 – Asoru, 27 – S'Acqua Seccis, 31 – Santoru, 32 – Sa Spadula, 45 – Corritta, 61 – Don Giovanni Mattaciolu, 64 – Figu Niedda, 67 – Mannu, 70 – Porto Pirastu, 102 – Baccu Sa Figu, 103 – S'Omu 'e S'Orcu, 125 – Baccu 'e Gattus, 127 – Monti Mereu, 128 – Manunzas, 130 – Is Traias

Undefined nuraghi: 1 – Su Nuraxi, 5 – Santa Matta, 7 – Puncilioni, 39 – Monte Idda, 40 – Cuili Su Casteddu, 47 – Giordi, 53 – Cann'e Frau, 69 – Monti Ferru, 73 – Sa Iba de Ziu Franciscu, 89 – Mitza Sa Granaccia, 96 – Monte Idda, 112 – Sa Figu, 120 – Sa Proca, 124 – Punta Molentis, 134 – Accu Sa Pira

Settlements with huts: 4 – Su Cunventu, 18 – Riu Mannu, 22 – Marongiu, 26 – Domu de S'Orcu, 30 – Monte Zippiri, 33 – Sa Spadula, 35 – Monte Antoni Peppi, 46 – Corritta, 49 – Nicola Podda, 62 – Don Giovanni Mattaciolu, 99 – Idda, 129 – Manunzas

Undefined settlements: 60 – Feraxi

Tombe di giganti: 29 – Monte Zippiri, 34 – Sa Spadula, 41 – Sant' Aleni, 54 – Mont'Arbu, 72 – Bau S'Arena, 75 – Monte Crobu I, 76 – Monte Crobu II, 77 – Cuili Camisa, 87 – Masone Pardu, 90 – Mitza Sa Granaccia

1. PROTONURAGHI

Protonuraghe Arrubiu (Muravera)

Condition: heavily damaged

Location: 39.291473, 9.566826. The monument is located on the top of a small hill which is overlooked by a much higher mountain massif at the NW. Nuraghe Mannu I is visible at the east.

Description: this structure is sub-rectangular in shape – its dimensions are 4.30 (north) x 8.50 (west) x 5m (south), at the east the monument rests upon the natural rocks. Together with lack of space for the tholos chamber within the structure this shape is clear evidence allowing to interpret Arrubiu as protonuraghe, even though no obvious remains of internal corridor are visible. The walls are in best condition at the north where they reach up to 3m of height, the outline of the outer wall-face is clearly visible also in the western part of the structure.

References:
1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The northern wall of Protonuraghe Arrubiu (Muravera).



Wall-face in the western part of Protonuraghe Arrubiu – view from the west.



Protonuraghe Arrubiu in its landscape context – view from the SE.

Protonuraghe Baracca Su Entu (Muravera)

Condition: mediocre

Location: 39.311756, 9.588469. The monument is located on the top of a hill with extensive view of the coastline. The site of Nuraghe Don Giovanni Mattaciolu can be seen at the east.

Description: the structure is roughly oval in shape and has circa 12m of diameter (measured roughly on N-S axis). The best preserved parts of the walls are preserved in its northern (up to 2m of height) and western (up to 1.5m of height) part. The outline of the wall is visible on most of the structure's perimeter. In the central part of the monument there are remains of a small chamber of 1.30 x 1.10m dimensions (originally it could have been bigger as its western wall is collapsed). Adjacent at the NE there is a small construction (possibly a bastion) with walls preserved up to 1m of height – its interpretation is difficult due to poor state of preservation and thick vegetation covering this part of the monument.

References:
1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The northern part of Protonuraghe Baracca Su Entu (Muravera).



Protonuraghe Baracca Su Entu (Muravera) – view from the west.



Remains of the chamber in the central part of Protonuraghe Baracca Su Entu.

Protonuraghe Bau Travalazzu (Castiadas) (known also as S'Erba 'e Ilixi)

Condition: heavily damaged

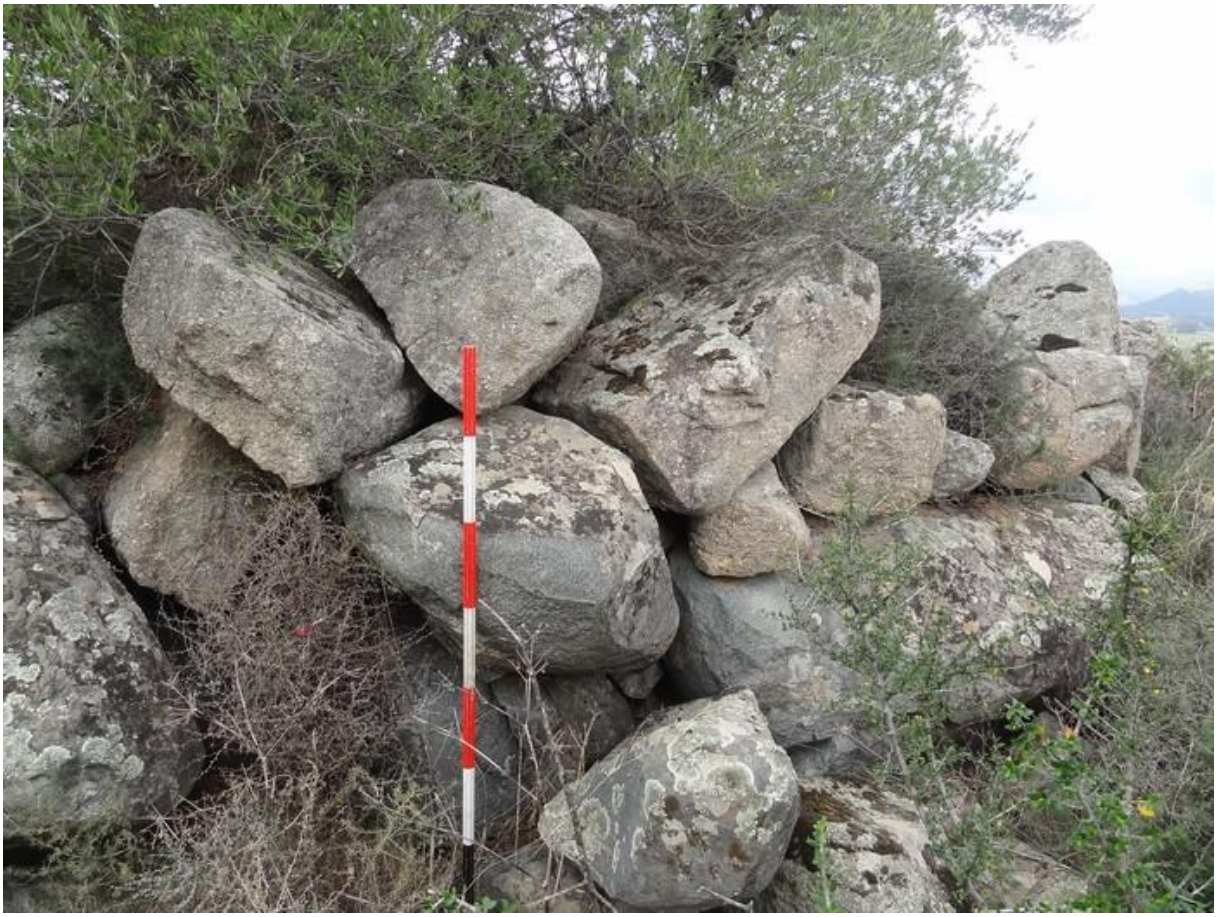
Location: 39.253788, 9.533802. The monument is located on the top of a low hill. Nuraghe Idda is visible at the south, the site of Nuraghe Bruncu Ottixeddu can be seen at the east, while the sites of nuraghi Figu Niedda and Monte Ontroxiu are visible at the NW.

Description: this oval-shaped monument is heavily damaged. No remains of internal spaces survived, the outline of the wall is clearly visible only in the eastern part of the structure. The preserved remains indicate that the monument had some 9m of diameter. The polygonal cyclopean masonry, oval shape and lack of remains of the tholos chamber allow to interpret this structure as a possible protonuraghe.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Protonuraghe Bau Travalazzu (Castiadas) – the NE part of the structure.



The hill with Protonuraghe Bau Travalazzu – view from Nuraghe Idda.



The masonry in the eastern part of Protonuraghe Bau Travalazzu (Castiadas).

Protonuraghe Birru (Castiadas)

Condition: mediocre

Location: 39.2748738, 9.4978201. The monument is located on the elongated hilltop of roughly N-S orientation. Nuraghe Monte Gruttas is visible at the north, no visibility of the coastline.

Description: this unusual monument consists of several sectors, but is far from the typical Late Bronze Age complex nuraghi. The main structure is a semi-oval construction of 11m length preserved up to 2m of height. its masonry consists of small and medium-sized stones. Adjacent to its SW part is a circular structure of 5.80m diameter preserved up to 2.80m of height – it consists mainly or large stones. Along the hilltop to the south of the main structure there are large amounts of debris indicating existence of further structures. On the southern slope of the hill there are remains of a semi-circular construction preserved up to 1.40m of height. Complex plan and differences in masonry structure observable among different parts of the nuraghe indicate that it could have been built in at least two phases.

References
1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.
2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



The main structure of Protonuraghe Birru (Castiadas) – view from the SW.



The structure adjacent to the SW part of the main structure in Protonuraghe Birru.



Remains of a structure located on the southern slope of the hill.

Protonuraghe Brebeis (Castiadas)

Condition: mediocre

Location: 39.223134, 9.540478. The monument is located on the top of a rocky hill offering view of the coastline. Protonuraghe Genna Spina is visible to the west.

Description: this circular-shaped structure rests upon the natural rocks in its western part. The best preserved parts of the outer wall-face are visible at the east (up to 3m of height) and south. The southern location of the entrance is very probable – its remains are followed by a 3m long collapsed passage, probably the main corridor. In the western part of the monument, not far from the corridor, there are possible remains of a small internal space which could have been a niche or a short passage). The monument has circa 8m in diameter.

References:
1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.
2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Protonuraghe Brebeis (Castiadas) – view from the NE.



Protonuraghe Brebeis (Castiadas) – the outer wall-face.



Probable remains of a collapsed corridor of Protonuraghe Brebeis.

Protonuraghe Bruncu Brailoi (Muravera)

Condition: partly damaged

Location: 39.3236488, 9.5742269. A rocky hilltop with the coastline visible at the SE and NE. The site of Nuraghe Bruncu Su Predi is visible at the north and the site of Nuraghe Nicola Podda at the SE.

Description: this atypical site is rather a group of walls filling spaces between the natural rocks rather than an integral structure. At the south there are small bits of masonry between the natural outcrops, the largest wall is located near the western edge of the hilltop – it rests entirely upon the natural rock. In the centre of the hilltop there is an entrance to the natural passage between the rocks which is 7.60m long and leads to the side entrance of a small cave. The cave is 3.60m high, its SW-oriented main entrance is blocked with a Nuragic wall of 3.90m length and 0.70m height. The other, perpendicular wall inside the cave reaches 2m of length and 0.90m of height. The distribution of the Nuragic walls outside the cave indicates that they protected the entrance to the natural passage leading to the cave.

References:
1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Main entrance to the cave (to the left) and the Nuragic wall at Bruncu Brailoi.



The main entrance to the cave and the Nuragic wall running across it.



The natural passage among the rocks leading to the side entrance of the cave.

Protonuraghe Bruncu Ottixeddu (Castiadas)

Condition: heavily damaged

Location: 39.2502616, 9.544681. The monument is located on the top of a rocky mountain overlooking the area of Ottixeddus. Nuraghe Su Modditzi and protonuraghi Su Sciusciu I and II are visible at the east, Nuraghe Idda is visible at the SW.

Description: this unusual structure consists of three sectors which are roughly aligned NE-SW. The southernmost sector includes a curved wall facing east and reaching up to 2.30m of height which is adjacent to the natural rocks. The central sector faces west, it is 8.80m long and its wall reaches up to 1.60m of thickness. The remains of a chamber are distinguishable in its western part (currently up to 0.80m of height). The northern sector is aligned with the central one – it is 9.60m long and its curved wall reaches up to 2.20m of height. There is no clearly distinguishable entrance to the complex.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



The wall in the northern sector of Protonuraghe Bruncu Ottixeddu.



The central sector of Protonuraghe Bruncu Ottixeddu (Castiadas).



The southern sector of Protonuraghe Bruncu Ottixeddu (Castiadas).

Protonuraghe Cala Sinzias (Castiadas)

Condition: mediocre

Location: 39.180984, 9.570555. The monument is located at the end of a SW-oriented promontory. Part of the coastline is visible, as well as the site Nuraghe Montixeddu to the west.

Description: this circular-shaped structure has only 8m of diameter in its highest preserved point and no clear traces of the tholos chamber. Together with significant incorporation of natural rock into the structure it allows to interpret the monument as a protonuraghe. The entrance (1.30 x 0.60m) opens to the NE (circa 40° orientation) and consists of the architrave (1.80 x 1.70 x 0.50m) resting upon two natural rocks. The incorporation of natural formations is obvious also in the eastern part of the structure. The best preserved part of the masonry is located at the north where it reaches 2.50m of height.

References:
1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.
2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Protonuraghe Cala Sinzias (Castiadas) with its extraordinary entrance resting upon the natural rocks – view from the NE.



Protonuraghe Cala Sinzias in its landscape context – view from the NE.



The collapsed central part of Protonuraghe Cala Sinzias (Castiadas).

Protonuraghe Casteddu (Castiadas)

Condition: mediocre

Location: 39.248972, 9.496536. The monument is located on the top of a mountain, 1.5km north of Castiadas. The coastline is visible at the east.

Description: the structure consists of two sectors – a semi-circular building resting upon a natural rock and an elongated bastion adjacent to its east. The semi-circular structure is preserved up to 2.40m of height, its entrance was located probably at the south. The bastion is 17.20m long and preserved up to 2m of height. It consists of much smaller stones than the main structure, which suggests that the two could have been built in different periods. No remains of internal spaces within the bastion are visible, but its elongated shape suggests presence of a corridor.

References:
1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.
2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



The northern part of the main structure of Protonuraghe Casteddu (Castiadas).



Small stones in the masonry of a bastion of Protonuraghe Casteddu (Castiadas).



The mountain with Protonuraghe Casteddu (Castiadas) – view from the NW.

Protonuraghe Comideddu (San Vito)

Condition: mediocre

Location: 39.379038, 9.541894. The monument is located on the top of a mountain which offers wide views to the west and SW. Nuraghe S'Arridelaxiu is visible at the west, Nuraghe Asoru at the SW, Nuraghe San Priamo I at the SE and the Nuragic settlement of Riu Mannu at the south.

Description: type D protonuraghe of sub-circular shape (7.70m of diameter on the N-S axis, 7.80m diameter on the E-W axis). The thickness of the wall reaches 1.60m in the eastern part of the structure. The irregular-shaped chamber of 3.50 x 2.80m can be entered through a corridor of 2.80m length, 0.70m width and circa 180° orientation. The outer wall-face reaches up to 2m of height at the east, at the NW the structure rests upon a natural rock.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8199).



The western part of Protonuraghe Comideddu (San Vito).



The chamber of Protonuraghe Comideddu (San Vito) – view from the west.



The landscape context of Protonuraghe Comideddu (San Vito) – view from the SE.

Protonuraghe Genna Spina (Castiadas)

Condition: heavily damaged

Location: 39.218535, 9.531221. The remains of this monument are located on the south-oriented promontory with nuraghi San Pietro, Sa Figu and Monte Turno visible at the NE and Protonuraghe Brebeis visible at the north.

Description: this oval-shaped monument incorporated natural rocks resting upon them at the east and north. The only preserved part of the wall is 5.20m long and reaches up to 2.40m of height. In the central part of the structure there are significant accumulations of debris including mainly small and medium-sized stones. At the SE the wall is adjacent to the natural rock with a large cavity (1.30m high, 1.9m deep and 2.20m wide) which seems to be natural, but could have been artificially enhanced – its relation to the protonuraghe is unknown, but it could hardly escape the attention of its inhabitants.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



The best preserved part of the cyclopean masonry in Protonuraghe Genna Spina (Castiadas).



Accumulations of debris in the central part of Protonuraghe Genna Spina.



A rock shelter (possibly artificially enhanced) adjacent to the walls of Protonuraghe Genna Spina (Castiadas).

Protonuraghe Is Laccus (Castiadas) (known also as Casa Caccus)

Condition: good

Location: 39.193815, 9.538831. The monument is located on the top of a hill with a wide view of the coastline. At the NE the following nuraghi are visible (from the west): San Pietro, Sa Figu, Monte Turno and Gibe Truttiri.

Description: this circular-shaped structure has 8.80m in diameter (measured on roughly SE-NW axis). The entrance is oriented to the SE (circa 120°) and well-preserved. It is followed by a 5m long corridor (2.3m of maximum height) which ends with a collapse. There is no entrance on the other end of the corridor which allows to classify this monument as a protonuraghe of type B (with closed corridor) in Giovanni Ugas' (2005) typology. Adjacent to the main structure at the north is a rounded bastion preserved up to 1m of height.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Protonuraghe Is Laccus (Castiadas) – view from the north.



The southern part of Protonuraghe Is Laccus (Castiadas).



The entrance (left) and corridor of Protonuraghe Is Laccus (Castiadas).

Protonuraghe Liuru Ganudu (Castiadas) (known also as Bruncu Liuru-Piludu)

Condition: mediocre

Location: 39.2271046, 9.4767192. One of the highest located monuments in sample area 1 is located on a rocky mountain promontory on 442m altitude. This location offers wide view of the coastline and area to the east. View towards the west is completely blocked by the mountain massif.

Description: this elongated monument is adjacent to the northern side of a rocky promontory. The structure is over 15m long, in its western part there are remains of a small circular tower of circa 5.20 x 4.80m diameter. The elongated shape of the structure and limited space between the 1.20m thick wall and natural rocks indicate that connected to the circular tower was a corridor, currently filled with debris. North of the main structure, lower down the slope there is a parallel wall which reaches 1.60m of height. The floorplan of Protonuraghe Liuru Ganudu is strikingly similar to that of the nearby Protonuraghe Casteddu.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



Protonuraghe Liuru Ganudu (Castiadas) – the elongated main structure.



The wall located north of the main structure of Nuraghe Liuru Ganudu.



View from the circular tower along the main structure of Nuraghe Liuru Ganudu.

Protonuraghe Macionni (Castiadas)

Condition: mediocre

Location: 39.1843552, 9.5418164. The monument is located on he mountain ridge which offers wide view of the coastline. Locations of nuraghi Sa Proca, Gibe Truttiri, Monte Turno, Cala Sinzias, San Pietro, Sa Figu and Is Laccus are visible to the N-NE.

Description: the structure is oval in shape and reaches 9.70 (E-W axis) x 8.80 (N-S axis) m of diameter. The entrance opens to the SE (circa 120°), currently it is of 0.70 x 0.45m dimensions and has an architrave of 1.50 x 0.90 x 0.35m dimensions. The entrance is followed by a mostly collapsed corridor. The outer wall-face reaches up to 3m of height at the south and 3.20m at the north. Adjacent to the structure at the west there is a wall of maximum height of 1.60m which is constructed directly upon the natural rock. Large amounts of debris directly north of the protonuraghe without significant lack of stones in the preserved outer wall-face suggest significant height of the structure.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



The northern part of Protonuraghe Macionni (Castiadas).



Well-preserved masonry in the southern part of Protonuraghe Macionni (Castiadas).



Landscape context of Protonuraghe Macionni – view from the south.

Protonuraghe Marongiu (Muravera)

Condition: heavily damaged

Location: 39.380425, 9.566114. Remains of the Nuragic structure are located on the ridge of a promontory which descends towards the east. Nuraghe S'Acqua Seccis is visible at the east.

Description: this small structure has 7.50m of diameter in its highest preserved point (measured roughly on the NW-SE axis). The best preserved parts of the masonry are on the SE (2.50m high) and western (2.20m) arc of the wall. At the south and NW the walls include the natural rocks which is a common phenomenon in this part of Sardinia. This, together with small size of the structure and lack of visible remains of the chamber, allows to interpret Marongiu as a protonuraghe. To the east of the monument there are remains of a small settlement.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Masonry in the SE part of Protonuraghe Marongiu (Muravera).



View from Protonuraghe Marongiu (Muravera) to the north.



Coursed cyclopean masonry on the western arc of Protonuraghe Marongiu.

Protonuraghe Monte Crobu (Castiadas) (known also as Cuili Piras)

Condition: mediocre

Location: 39.285401, 9.554165. The monument is located on the northern slope of a mountain, few hundred meters south of the pre-Nuragic standing stones of Cuili Piras.

Description: this irregular-shaped protonuraghe has an entrance opening to the N-NE (circa 5° orientation) with a large architrave (1.70 x 0.45 x 0.80m dimensions). The masonry is polygonal cyclopean and consists mainly of large stones. The structure seems to have partle rested upon the northern slope of the mountain.

References:

1. Bagella, S. 1998. “Corridors nuraghi: territorial aspects” in *Papers from the EAA Third Annual Meeting at Ravenna 1997*. Volume III: Sardinia. Edited by Moravetti, A. Oxford: Archaeopress, p. 133

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant’ Elena: Sardalito.

3. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Protonuraghe Monte Crobu (Castiadas) – view from NW.



Polygonal cyclopean masonry of Protonuraghe Monte Crobu (Castiadas).



The entrance to Protonuraghe Monte Crobu and view towards the standing stones of Cuili Piras.

Protonuraghe Monte Nai (Muravera)

Condition: partly damaged

Location: 39.2555455, 9.568039. The structure is located on a promontory which forms the eastern part of the massif of Monte Nai. The coastline and the summit of Monte Nai are visible from here.

Description: possible protonuraghe of type D (with a corridor and chamber) of oval shape. In its central part there are remains of a small chamber, probably oval as well. The outer wall-face of the structure is in best condition at the north where it reaches up to 2.40m of height. In the western part of the structure the wall rests upon the natural rock. On the southern slope of the promontory there is a large amount of debris from the structure.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The SE part of Protonuraghe Monte Nai (Muravera).



The northern part of Protonuraghe Monte Nai (Muravera).



The landscape location of Protonuraghe Monte Nai (Muravera) seen from the south.

Protonuraghe Montixeddu (Castiadas)

Condition: mediocre

Location: 39.177608, 9.558403. The monument is located on the top of a hill with the coastline visible at the NE and SE. The sites of nuraghi Sa Proca, Cala Sinzias and Sinzias are visible at the east.

Description: this oval-shaped structure has 9.80m in diameter, its outline is preserved on its whole perimeter (except partly damaged NW sector). The masonry is preserved up to 2.20m of height at the SW. The entrance opens to the SE (circa 105º) and is 0.85m wide, it is followed by remains of a corridor. Just outside the entrance lies a flat slab of 1.25 x 0.55 x 0.30m dimensions, possibly the original architrave of the doorway. The masonry in the western part of the structure is close to coursed-cyclopean, it is among the best executed sectors of masonry in this area.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



The SW part of Protonuraghe Montixeddu (Castiadas).



The entrance to Protonuraghe Montixeddu (Castiadas).



Protonuraghe Montixeddu (Castiadas) – view from the south.

Protonuraghe Mortus (Muravera)

Condition: mediocre

Location: 39.309251, 9.563496. The monument is located on the western part of the hilltop which constitutes the northernmost end of the chain of hills. Nuraghe Mannu II and the site of *tomba di giganti* Mon't Arbu are visible at the NW and Nuraghe Mannu I at the south. The coastline is visible to a very limited extent.

Description: the main tower is circular in shape and has 6.75m of diameter. In its centre there are remains of a small chamber of 1.20 x 1.10m dimensions. The walls of the tower are preserved up to 2.30m of height in its western part. Around the tower and to the east there are remains of the key-shaped bastion. The entrance to the bastion opens to the SE (circa 140°), it is 1.10m wide and survives up to 1.85m of height (northern side where it rests upon the natural rock). The entrance is followed by remains of a corridor of 5.5m length which leads towards the main tower.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Protonuraghe Mortus (Muravera) – the entrance to the bastion and corridor.



Protonuraghe Mortus (Muravera) – the western part of the main tower.



The chamber inside the main tower of Protonuraghe Mortus (Muravera).

Protonuraghe Nuraxeddu (Castiadas)

Condition: heavily damaged

Location: 39.2059966, 9.5054027. The monument is located o na rocky culimnation of a hill. Views in all directios except the NW are limited by the surrounding mountains. The locations of protonuraghi Brebeis and Genna Spina, and nuraghi San Pietro, Sa Figu and Monte Turno are visible at the NW.

Description: the structure has 9.20 x 8.70m diameter (measured respectively on E-W and N-S axis). The outer wall-face reaches up to 2.70m of height. No remains of an entrance nor internal spaces can be distinguished. It was probably a protonuraghe, which is indicated by its oval shape and inclusion of natural rocks as parts of the construction.

Reference:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



Protonuraghe Nuraxeddu (Castiadas) – view from the east.



The NW part of Protonuraghe Nuraxeddu (Castiadas).



The collapsed central part of Protonuraghe Nuraxeddu (Castiadas).

Protonuraghe Perdiaxiu (Muravera)

Condition: mediocre

Location: 39.302726, 9.572956. The monument is located on a rocky summit which constitutes the western end of a chain of hills. Nuraghe Mannu I is visible at the south and Nuraghe Mortus at the NW. The coastline is poorly visible at the SW.

Description: this semi-circular structure of 9 x 6.40m dimensions rests upon natural rocks to its south. The walls are preserved up to 3.40m of height. The central part of the monument is filled with earth and debris, but a probable wall of the chamber of 1.80m length and 0.50m height is visible.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Protonuraghe Perdiaxiu (Muravera) – view from the NE.



The masonry of Protonuraghe Perdiaxiu fills spaces between natural rocks.



Protonuraghe Perdiaxiu (Muravera) in its landscape context – view from the south.

Protonuraghe Pispisa (Muravera)

Condition: mediocre

Location: 39.298542, 9.537187. The monument is located on the top of a hill with extensive views to the east. The sites of nuraghi Monte Ontroxiu and Figu Niedda are visible to the NW, but there is no visibility of the coastline.

Description: the main tower has 9.30m in diameter (measured on E-W axis), at the south it rests upon the natural rocks. In the central part of the tower there are remains of a small chamber. Probable remains of the passage leading to the chamber from the south allow to classify this structure as the protonuraghe. Adjacent to the main tower (at the north and west) there is a rounded bastion with probable remains of a passage (staircase?) running clockwise from the south to the NE. The bastion reaches up to 3.90m of width in its northern part, the NE part is collapsed. No obvious remains of the entrance to the structure are visible, but location of the corridor suggests its S-SE orientation.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Protonuraghe Pispisa (Muravera) – the western part of the main tower.



Protonuraghe Pispisa (Muravera) – view from the NE.



Protonuraghe Pispisa (Muravera) – the eastern part of the main tower.

Protonuraghe Ponzianu (Muravera)

Condition: mediocre

Location: 39.395557, 9.573808. The monument is located on the promontory oriented to the south. The easiest approach is from the north, all the other sides are protected with precipices and very steep slopes. Nuraghe S'Acqua Seccis is visible at the SE, Protonuraghe Marongiu and Nuraghe Monte Zippiri are visible at the south.

Description: the structure is irregular in shape (somewhat similar to trapesium), at the east and south it rests upon the natural rocks. The best preserved parts of the walls are at the west (3.20m of height) and the NE (3.60m high and same length). Adjacent at the SW there are remains of a small structure (roughly 4.80m of length and similar width), possibly a bastion – its size and similar masonry allow to suggest that it was built together with the main structure as a single project. No clear remains of the entrance to the protonuraghe can be seen. The masonry is mostly packed cyclopean consisting of small stones.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Protonuraghe Ponzianu (Muravera) – view from the NW.



Spectacular location of Protonuraghe Ponzianu (Muravera) – view from the north.



The western wall of Protonuraghe Ponzianu (Muravera) – view from the SW.

Protonuraghe S'Accedda (Castiadas)

Condition: partly damaged

Location: 39.2616078, 9.4839692. The monument is located on the culmination of a narrow ridge which descends to the SE.

Description: the main part of this protonuraghe is a semi-oval structure adjacent to the western side of the rocky ridge. The structure is 13m long and its walls are preserved up to 2.20m of height. West of the structure, few meters down the slope there is a wall preserved up to 1.80m of height with traces of entrance in its southern part – this corresponds with a collapse in the southern part of the main structure, perhaps marking an entrance connected to the entrance in the western wall. North of the main structure, along the ridge, there are walls filling spaces between natural rocks – the largest one is located on the eastern side of the ridge and reaches 3m of height.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



The main structure of Nuraghe S'Accedda (Castiadas) – view from the SW.



A wall between the natural rocks north of the main structure of Nuraghe S'Accedda.



The main structure (to the left) and the western wall (to the right) of Nuraghe S'Accedda (Castiadas).

Protonuraghe S'Ortu (Muravera)

Condition: heavily damaged

Location: 39.3085388, 9.5493373. The monument is located on the top of a rocky hill which does not offer visibility of the coastline. Nuraghe Mortus is visible at the east and the summit of Monte Liuru at the north.

Description: this semi-circular structure is preserved in very poor condition. The wall of 5.90m length survives up to 0.60m of height, no remains of the entrance nor internal spaces can be distinguished. In the centre of the summit there is a group of natural rocks on which the construction probably rested upon.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Remains of the masonry of Protonuraghe S'Ortu (Muravera) – view from the SE.



The hilltop with Protonuraghe S'Ortu (Muravera) – view from the west.



The natural rocks on which the walls of Protonuraghe S'Ortu partly rest upon.

Protonuraghe Sa Ridroxi (Muravera) (known also as Ridroxu)

Condition: mediocre

Location: 39.289514, 9.578832. The monument is located on the promontory descending to the south, several kilometers of coastline are visible from here.

Description: the oval-shaped protonuraghe has the outer wall-face preserved on all of its perimeter, it is preserved up to 4m of height at the east. The corridor is oriented to the SE (circa 150°) and is 3m long. Remains of the walls, possibly secondary addition, are visible at the NE, being adjacent to the outer wall-face of the protonuraghe. In the nearby there are remains of a Neolithic or Chalcolithic *allee couverte* tomb.

References:

1. Bagella, S. 1998. “Corridors nuraghi: territorial aspects” in *Papers from the EAA Third Annual Meeting at Ravenna 1997*. *Volume III: Sardinia.* Edited by Moravetti, A. Oxford: Archaeopress.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant’ Elena: Sardalito.

3. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The NW part of Protonuraghe Sa Ridroxi (Muravera) – view from the north.



Corridor of Protonuraghe Sa Ridroxi (Muravera) – view from the east.



View of Protonuraghe Sa Ridroxi revealing its location – as seen from the south.

Protonuraghe Scalas (Muravera)

Condition: heavily damaged

Location: 39.272788, 9.568736. The monument is located on the edge of a plateau with a steep slope protecting it at the east.

Description: the natural rocks were used as integral parts of the monument. Little remains of the masonry survived, making it difficult to assess the overall plan of the protonuraghe. The best preserved part of the masonry is located in the SW part of the monument, reaching 1.50m of height.

References:

1. Bagella, S. 1998. “Corridors nuraghi: territorial aspects” in *Papers from the EAA Third Annual Meeting at Ravenna 1997*. Volume III: Sardinia. Edited by Moravetti, A. Oxford: Archaeopress, p. 133

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant’ Elena: Sardalito.

3. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Protonuraghe Scalas (Muravera) – remains of the masonry in the SW part of the protonuraghe.



Protonuraghe Scalas (Muravera) – view from the west.



Natural rocks used as part of the construction of Protonuraghe Scalas (Muravera).

Protonuraghe Su Cannisoni (Castiadas)

Condition: heavily damaged

Location: 39.215593, 9.561409. The monument is located on a low ridge descending to the SE. The coastline is perfectly visible, the sites of nuraghi Gibe Truttiri and Monte Turno can be seen at the SE, while nuraghi Sa Figu, Monte S'Ollastinu and Brabudu at the south.

Description: this probable protonuraghe is oval in shape, its best preserved parts of the walls are at the east (up to 2.20m of height) and south. The masonry stands directly on the natural rocks, incorporating them in the western part of the monument. No obvious remains of the internal spaces survived, but the polygonal cyclopean masonry with large stone blocks (examples: 2 x 0.50 x 0.55m and 1.30 x 0.60 x 0.90m), oval shape, incorporation of natural rocks and lack of visible remains of the tholos allow to interpret this monument as a protonuraghe.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Protonuraghe Su Cannisoni (Castiadas) – remains of the wall in the eastern part of the monument.



The masonry of Protonuraghe Su Cannisoni (Castiadas).



View from Protonuraghe Su Cannisoni to the SE with nuraghi Monte Turno and Gibe Truttiri visible.

Protonuraghe Su Sciusciu I (Muravera)

Condition: heavily damaged

Location: 39.255066, 9.553325. The monument is located in the western part of the hilltop of Su Sciusciu (218 m of altitude), some 30m west of Protonuraghe Su Sciusciu II. Nuraghi Bruncu Ottixeddu, Idda and Bau Travalazzu are visible to the west, Monte Su Crobu with the necropolis and protonuraghe is visible to the north.

Description: Protonuraghe Su Sciusciu ("sciusciu" means precipice in the Sardinian language) is a D-shaped monument with the semi-circular part at the south. The best preserved part of the masonry is at the SW where the wall reaches up to 1.8m of height. The northern wall has circa 9m of length and is preserved up to 1.60m of height. At the SE the monument rests upon the natural rocks. The quality of masonry is much worse than in Protonuraghe Su Sciusciu I, possibly the two structures were built in different periods.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Protonuraghe Su Sciusciu I (Muravera) – the SW part of the structure.



Protonuraghe Su Sciusciu I (Muravera) – view from Protonuraghe Su Sciusciu II.



The eastern part of Protonuraghe Su Sciusciu I (Muravera).

Protonuraghe Su Sciusciu II (Muravera)

Condition: mediocre

Location: 39.255469, 9.554156. The structure is located on the eastern part of the hilltop of Su Sciusciu (218m of altitude). Protonuraghe Su Sciusciu I is visible, further to the west the sites of nuraghi Bruncu Ottixeddu, Idda and Bau Travalzzu can be seen.

Description: this circular structure has circa 8m in diameter. The best preserved part of the walls is at the SW where they reach up to 2.70m and rest upon the natural rock. In the SE part of the monument the preserved wall-face reaches up to 2m of height. Lack of the traces of tholos chamber and incorporation of natural rocks allow to classify the monument as the protonuraghe. The quality of masonry is much better than in Protonuraghe Su Sciusciu I, possibly the two structures were built in different periods.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The wall in the western part of Protonuraghe Su Sciusciu II rests upon the natural rock.



Protonuraghe Su Sciusciu II (Muravera) – view from the west.



The masonry in the northern part of Protonuraghe Su Sciusciu II (Muravera).

Protonuraghe Su Tasuru I (San Vito)

Condition: good

Location: 39.372653, 9.549281. The monument is located on a promontory oriented to the south. Protonuraghe Comideddu and Nuraghe S'Arridelaxiu are visible at the NW, while Nuraghe Asoru is visible at the SW. A limited section of the coastline is visible at the SE.

Description: a circular structure with a bastion. The main tower has 8.0m of diameter (measured on roughly NW-SE axis), the arc-shaped bastion is adjacent at the north. The entrance to the protonuraghe is oriented to the east (circa 80°), it has 0.90m height, 0.60m width and an architrave of 1.25 x 0.60 x 0.30m dimensions. It is followed by a 2.20m long corridor which ends with a collapse. In the western part of the main structure there is an internal space accessible only through a hole in its ceiling, it is over 2.60m deep. The easiest approach to the protonuraghe is from the north, it is protected with a cyclopean wall which cuts the neck o the promontory separating it from the massif of hills.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8183).



Protonuraghe Su Tasuru I (San Vito) in its landscape context – view from the NW.



The entrance to Protonuraghe Su Tasuru I (San Vito) – view from the east.



The western part of Protonuraghe Su Tasuru I (San Vito).

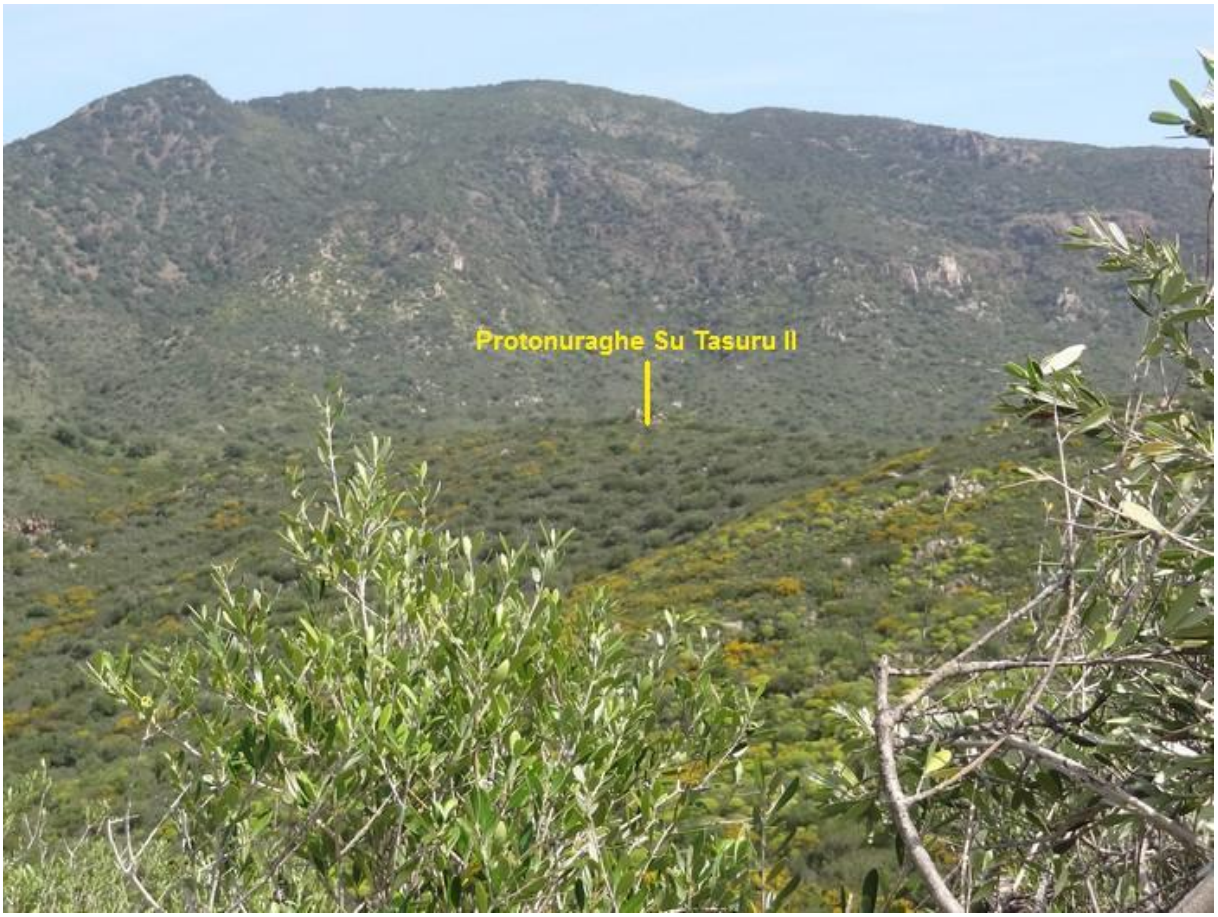
Protonuraghe Su Tasuru II (San Vito)

Condition: heavily damaged

Location: 39.383009, 9.546805. The monument is located on the culmination of a N-S oriented ridge overlooking a valley to its east. Protonuraghe Comideddu is visible at the SW and Nuraghe Cardaxiu at the NE.

Description: plan of this structure is difficult to interpret due to its severe damage, but most likely it was an irregular structure, perhaps a protonuraghe. Its best preserved part is at the east where a wall of 5.20m length and 1.70m height is visible. At the west and north the natural rock were used as integral parts of the structure. At the SW there is a piece of masonry of 2.40m height constructed of stone blocks ranging from very large to small size. No obvious remains of the entrance are visible. South of the protonuraghe there are remains of a Nuragic settlement.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8182).



Protonuraghe Su Tasuru II (San Vito) in its landscape context – view from Protonuraghe Comideddu.



The eastern part of Protonuraghe Su Tasuru II (San Vito).



The western part of Protonuraghe Su Tasuru II (San Vito).

2. SINGLE-TOWERED NURAGHI AND NURAGHI-CAPANNE

Nuraghe Arridelaxiu (San Vito)

Condition: heavily damaged

Location: 39.3796518, 9.5343357. The site is atypically located on a flat lowland area. The promontory with Nuraghe Su Linnamini is visible to the north, while the location of Protonuraghe Comideddu can be seen to the west.

Description: remains of a single-towered nuraghe of 11.10m diameter (measured on roughly N-S axis). Significant amount of debris around the structure and its relatively large diameter suggest existence of a tower of considerable height, possibly with a tholos chamber. The outer wall-face survived up to 2.40m of height in the southern part of the structure. No obvious remains of the entrance can be distinguished (perhaps it was located in the destroyed SW part of the nuraghe).

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8198).



The best preserved part of Nuraghe Arridelaxiu (San Vito) – view from the south.



Remains of the outer wall-face in the northern part of Nuraghe Arridelaxiu.



The cyclopean masonry in the SE part of Nuraghe Arridelaxiu (San Vito).

Nuraghe Brabudu (Castiadas) (also known as De Brobudu)

Condition: heavily damaged

Location: 39.193279, 9.55451. The monument is located at the middle of a ridge running from the NW to the SE. The coastline is visible at the NW, as well as nuraghi Gibe Truttiri and Monte Turno. Nuraghe Monte S'Ollastinu is visible at the south.

Description: it is a heavily damaged nuraghe, possibly a complex one. The outline of the main tower with collapsed tholos chamber is particularly well distinguishable at the north and west, at the north the walls reach 2.3m of height (measuring from the surface of the mound). At the north and east there are remains of a rectangular bastion. Probably the nuraghe had no lateral towers – no traces of them are visible among remains of the bastion, the limited space on the narrow ridge also makes their existence very unlikely. The masonry of the nuraghe is mostly coursed cyclopean.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Best preserved part of the masonry in Nuraghe Brabudu (Castiadas).



Nuraghe Brabudu seen from Nuraghe Monte S'Ollastinu (Castiadas).



Collapse in the central part of Nuraghe Brabudu (Castiadas).

Nuraghe Bruncu Campulongu (Villasimius)

Condition: heavily damaged

Location: 39.1346427, 9.5117341. The monument is located on a hilltop which offers perfect visibility of the coastline to its south. Nuraghi S'Argalla I and II are visible at the NE and Nuraghe S'Accu Sa Pira at the north.

Description: a single-towered nuraghe of 10.40m diameter, its walls survived up to 1.90m of height at the east and 1.60m at the north. No clear traces of internal spaces nor the entrance can be distinguished, interior of the structure is completely filled with earth and debris.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



The cyclopean masonry in the eastern part of Nuraghe Bruncu Campulongu (Villasimius).



Remains of the outer wall-face in the northern part of the structure.



The location of Nuraghe Bruncu Campulongu seen from Nuraghe Accu Sa Pira.

Nuraghe Bruncu Su Predi (Muravera)

Condition: mediocre

Location: 39.3265796, 9.5758295. The monument is located on a rocky summit which constitutes part of a chain of hills and offers wide view of the coastline. Nuraghe Giordi is visible to the NW, Protonuraghe Bruncu Brailoi to the south and Nuraghe Nicola Podda to the east.

Description: the main tower of circa 5.50m diameter is adjacent to the natural stone pillar constituting the top of a mountain. No remains of internal spaces nor the entrance can be distinguished. South of the tower, on a slope there are remains of a wall protecting nuraghe from the easiest approach.

References:

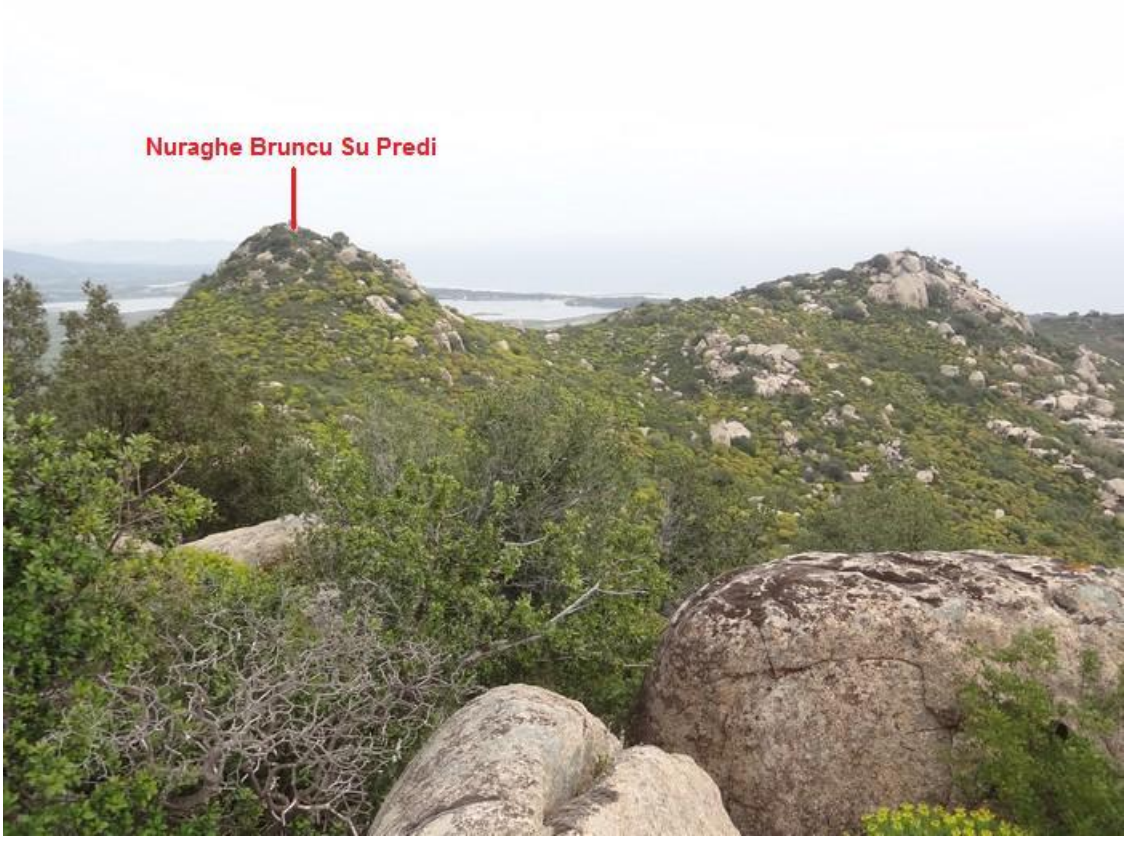
1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Bruncu Su Predi (Muravera) – masonry of the tower.



Remains of a wall protecting the southern approach to Nuraghe Bruncu Su Predi.



Nuraghe Bruncu Su Predi seen from Protonuraghe Bruncu Brailoi (Muravera).

Nuraghe Cerbinu (San Vito)

Condition: heavily damaged

Location: 39.33885, 9.5295949. The monument is located on the top of an isolated hill which offers a view of the coastline. Nuraghi Garrabosu and Don Giovanni Mattaciolu are visible at the east, Nuraghe Sant' Aleni could have been visible at the NE.

Description: this circular structure has 8.40m in diameter (measured on E-W axis). The outline of the wall is visible on most of its perimeter except a minor destroyed sector at the north. There are two possible locations of the entrance – one of them at the SW (circa 205º orientation) with a visible collapse (this location is more plausible), the other one at the east. The outer wall-face is best preserved in the SE part of the structure, it reaches 1.70m of height. In the centre of the nuraghe remains of a small chamber are visible.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8178).



Nuraghe Cerbinu (San Vito) – view from the west.



The collapsed centre of Nuraghe Cerbinu (San Vito).



The hilltop location of Nuraghe Cerbinu (San Vito) – view from the SW.

Nuraghe Corrocoi (Castiadas)

Condition: heavily damaged

Location: 39.2879027, 9.4852741. The monument is located on a slight rise of a ground located S-SE of a mountain massif. The sites of nuraghi Cuili Paliu, Cruxi and Meurru are visible to the N-NE.

Description: this single-towered structure, or more likely a large roundhouse, has circa 13.5m in diameter. The entranc was located probably in its southern part, since there is no clear outline of the wall there. No traces of internal spaces can be distinguished. Majority of masonry consists of unusually small stones, combined with relatively little amount of debris it calls into doubt whether the structure was a tower.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



The northern part of Nuraghe Corrocoi (Castiadas) – view from the NW.



Masonry in the NE part of Nuraghe Corrocoi (Castiadas).



Remains of Nuraghe Corrocoi (Castiadas) – view from the east.

Nuraghe Cruxi (Castiadas)

Condition: heavily damaged

Location: 39.2975075, 9.4927776. The monument is located on the southern end of a promontory which is part of a larger massif of hills. The locations of nuraghi Cuili Paliu, Monte Gruttas and Birru are visible at the south, as well as nuraghi Monte Ontroxiu and Figu Niedda at the east.

Description: a small nuraghe-*capanna* partly resting upon natural outcrops. The masonry is preserved up to 1.70m of height in the northern part of the structure. No traces of the entrance can be distinguished, the chamber is completely collapsed. It is impossible to precisely measure the diameter of the nuraghe due to its severe damage, but it was probably close to 8m.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



The northern part of Nuraghe Cruxi (Castiadas).



Remains of the wall in the NE part of Nuraghe Cruxi (Castiadas).



The landscape context of Nuraghe Cruxi (Castiadas) – view from the west.

Nuraghe Cuili Paliu (Castiadas)

Condition: partly damaged

Location: 39.292097, 9.4943105. The monument is atypically located on the slope of a hill descending towards the south. The locations of nuraghi Cruxi and Meurru are visible to the N-NW.

Description: the structure is circular in shape, it reaches 9.40m of diameter on both N-S and E-W axis. The walls are preserved up to 3.50m of height in the northern part of the tower. Probable location of the entrance is at the south, the chamber is completely collapsed. North of the tower there is a cyclopean wall which could have been part of the settlement.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



Nuraghe Cuili Paliu (Castiadas) – view from the north.



The eastern part of Nuraghe Cuili Paliu (Castiadas).



Atypical location of Nuraghe Cuili Paliu (Castiadas) – the slope of a hill.

Nuraghe Cuili Senni (Muravera)

Condition: heavily damaged

Location: 39.385185, 9.575818. The monument is located on the top of a small hill with the easiest approach from the west. This location is overlooked by the mountains at the east, north and the hill with Nuraghe S'Acqua Seccis at the west. The coastline is not visible.

Description: Cuili Senni is a probable single-towered nuraghe (*monotorre*) of 9m diameter in its highest preserved point. The best preserved part of the walls is located in the northern part of the nuraghe, it reaches 1.7m of height. At the west the nuraghe rests upon a natural rock, while at the south the masonry is heavily damaged by tree roots and close to collapse. The chamber is completely collapsed and filled with earth, no remains of internal features are visible.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Cuili Senni (Muravera) – view from the NW.



The masonry in the southern part of Nuraghe Cuili Senni is falling apart.



View from Nuraghe Cuili Senni towards Nuraghe S'Acqua Seccis.

Nuraghe Domu de S'Orcu (Muravera) (known also as S'Orcu)

Condition: mediocre

Location: 39.384227, 9.588698. The monument is atypically located on a flat area, some 100m NE of a steep hill. The visibility of the coastline and other sites is very poor from here.

Description: this single-towered nuraghe (*monotorre*) has a partly preserved tholos(?) chamber of 3.20m diameter on the current floor level. The overall diameter of the tower in its highest preserved point is 7.5m. The outer wall-face is in best condition in the western part of the nuraghe where it reaches 2.20m of height. S-SE of the tower there are remains of the Nuragic settlement – its presence explains the atypical location of the nuraghe.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Domu de S'Orcu (Muravera) – view from the west.



The chamber of Nuraghe Domu de S'Orcu (Muravera)



Nuraghe Domu de S'Orcu (Muravera) – view from the NE.

Nuraghe Forada Procaxius (San Vito)

Condition: heavily damaged

Location: 39.377649, 9.5176739. The monument is located on the top of a low hill overlooking Basoru plain. Nuraghe Monte Narbeddu is visible above to the east, but the location does not offer visibility of the coastline.

Description: this small single-towered nuraghe has 7.80m in diameter (measured on SW-NE axis). Its chamber is completely collapsed, but the outline of the tower is visible on its whole perimeter. The outer wall-face reaches up to 1.80m of height in the northern part of the structure. Remains of the entrance of circa 190º orientation are visible, its western part survived in better condition.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8185).



Nuraghe Forada Procaxius (San Vito) – view from the NW.



Remains of the entrance to Nuraghe Forada Procaxius (San Vito).



Collapsed chamber of Nuraghe Forada Procaxius (San Vito) – view from the south.

Nuraghe Garrabosu (Muravera) (known also as Carrabosu)

Condition: mediocre

Location: 39.311118, 9.583561. The monument is located on the top of a rocky hill, at the south it rests upon a huge natural outcrop which completely blocks view in that direction. Nevertheless, the location offers excellent visibility of the coastline.

Description: this unusual nuraghe can hardly be compared to any other monument in this area. The U-shaped tower is very small, it has only 4.2 x 3m dimensions and rests upon much larger rock outcrop, its walls are preserved up to 1.80m of height. The tower is enclosed by a wall (possibly bastion), possible entrance to which is a gap between the masonry at the outcrop at the NW (circa 300°). The easiest approach to the nuraghe (from the NW) is blocked with a wall which lies on a slope below the main structure. This wall fills the space between two rock outcrops, it is 4.10m long, 1.85m high and 1.40m long. The whole monument is built of medium-sized and small stones, the packed cyclopean masonry is predominant.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The tower of Nuraghe Garrabosu (Muravera) – view from the NW.



The outer (NW) wall protecting the approach to Nuraghe Garrabosu.



The wall enclosing the tower of Nuraghe Garrabosu – view from the NW.

Nuraghe Gibe Truttiri (Castiadas)

Condition: mediocre

Location: 39.206467, 9.56399. The monument is located on the culmination of the hill, about 80m away from the coast. This viewpoint controls a significant part of the coastline, Nuraghe Monte Turno is visible at the north.

Description: it is a single-towered nuraghe (*monotorre*) constructed with polygonal cyclopean and coursed cyclopean masonry. The best preserved parts of the masonry are located in the northern and western part of the monument. At the east the walls incorporate natural rocks. The overall diameter of the tower is circa 10.5m which suggests that it could be constructed without a tholos chamber and with one floor only. No obvious remains of the entrance can be distinguished.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Nuraghe Gibe Truttiri (Castiadas) – view from the NE.



Nuraghe Gibe Truttiri (Castiadas) – the western arc of the wall.



Nuraghe Gibe Truttiri seen from Nuraghe Monte Turno.

Nuraghe Idda (Castiadas)

Condition: mediocre

Location: 39.247682, 9.532866. The monument is located on the top of a hill without visibility of the coastline. Nuraghi Bruncu Ottixeddu and Su Modditzi are visible at the NE, Protonuraghe Bau Travalazzu at the north and nuraghi Figu Niedda and Monte Ontroxiu at the NW.

Description: this structure consists of the circular tower and a rounded bastion around it. The main tower has 6.5m in diameter, in its centre there are remains of a circular chamber (possibly of tholos construction) of 2m diameter in its highest preserved point. The walls of the bastion are preserved up to 4m of height. S-SW of the nuraghe there are remains of a settlement.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



The bastion and tower of Nuraghe Idda (Castiadas).



The chamber of the tower in Nuraghe Idda (Castiadas).



Nuraghe Idda (Castiadas) – the SE part of the structure.

Nuraghe Masone Murtas (Castiadas)

Condition: heavily damaged

Location: 39.2223857, 9.4871288. Nuraghe Masone Murtas is located on the top of a low hill, currently covered with a dense forest which does not allow for assessment of invervisibility of other sites or the coastline.

Description: this single-towered nuraghe survived in very poor condition. The outline of the wall is distinguishable on the northern and western arc of the tower (the outer wall-face reaches up to 1.60m of height at the north). It is possible to distinguish an ill-defined and faded outline of a chamber. No traces of the entrance can be distinguished.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



Remains of the outer wall-face in the northern part of Nuraghe Masone Murtas (Castiadas).



Remains of the outer wall-face of Nuraghe Masone Murtas (Castiadas).



Barely traceable remains of a chamber of Nuraghe Masone Murtas (Castiadas).

Nuraghe Meurru (Castiadas)

Condition: partly damaged

Location: 39.2962807, 9.485777. The monument is located on a highland promontory oriented to the south. Nuraghi Cuili Paliu, Monte Gruttas and Birru are visible at the SE, Nuraghe Cruxi is visible at the east. The coastline is not visible from here.

Description: the outline of this single-towered nuraghe is visible mainly in its western and eastern part. At the south the monument rests upon the natural rocks which partly substitute for walls, while at the north the structure is collapsed. The outer wall-face survived up to 2.60m of height in the western part of the tower. Also in the western part of the monument there are remains of a partly preserved chamber preserved up to 1.90m of height from the current floor level. The overall diameter of the structure is circa 10m (measured roughly on S-W axis).

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



Remains of the chamber in Nuraghe Meurru (Castiadas) – view from the SE.



Masonry in the western part of Nuraghe Meurru (Castiadas).



The location of Nuraghe Meurru in its landscape context – view from the SE.

Nuraghe Monte Arrubiu (Muravera)

Condition: heavily damaged

Location: 39.324123, 9.551386. The monument is located on the top of a mountain with steep slopes at the south, east and west, but without a view towards the coastline (the massif of Monte Liuru blocks the visibility). The easiest approach to the site is from the north. The site of Nuraghe Corritta is visible at the NW.

Description: this single-towered nuraghe is in very poor condition. The outline of its walls is visible at the north, SE and partly at the west. The tholos chamber is heavily damaged and filled with earth and debris which form a mound. The northern wall-face (possible internal wall-face of the staircase) is built of large stones which are laid in courses, while the masonry in other preserved parts of the tower is much poorer in structure.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The outline of the wall in the northern part of Nuraghe Monte Arrubiu (Muravera).



Nuraghe Monte Arrubiu (Muravera) – the SE arc of the wall.



Remains of the masonry in the western part of Nuraghe Monte Arrubiu.

Nuraghe Monte Gruttas (Castiadas)

Condition: partly damaged

Location: 39.2816454, 9.4995046. The structure is located on the top of a rocky hill which does not offer visibility of the coastline. The hilltop with Protonuraghe Birru is visible to the south.

Description: this single-towered nuraghe had a bastion adjacent to its southern part. The tower has circa 11m in diameter (measured on E-W axis). The outer wall-face reaches 3.10m of height at the NW arc of the tower. Probable remains of the entrance are oriented to the south (circa 160°). Remains of the bastion are in poor condition, its outline is difficult to interpret – it could have been a rounded structure like in several monuments in the area of Castiadas (Protonuraghe Is Laccus, Nuraghe Idda etc.).

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



The SW arc of Nuraghe Monte Gruttas (Castiadas).



The polygonal cyclopean masonry of Nuraghe Monte Gruttas (Castiadas).



The hilltop location of Nuraghe Monte Gruttas – view from the east.

Nuraghe Monte Ontroxiu (Muravera)

Condition: heavily damaged

Location: 39.30804, 9.531727. The monument is located on the summit of a mountain without visibility of the coastline. Nuraghe Figu Niedda is visible at the SW, Nuraghe Cann'e Frau is visible at the NE.

Description: this circular structure has 9m in diameter (measured roughly on N-S axis). The outer wall-face survived in best condition at the north and SW (up to 1.5m of height), the outline of the wall is visible on most of the tower's diameter except the east. North of the nuraghe there is a 5.2m long wall, possibly remains of a small bastion. No remains of internal spaces nor the entrance to the nuraghe can be seen.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Monte Ontroxiu (Muravera) – masonry in the northern part of the structure.



Nuraghe Monte Ontroxiu (Muravera) – the southern arc of the wall.



The location of Nuraghe Monte Ontroxiu seen from Nuraghe Figu Niedda.

Nuraghe Monte S'Ollastinu (Castiadas)

Condition: mediocre

Location: 39.188992, 9.556227. The monument is located on a promontory oriented to the east, overlooked by the mountains at the west. The coastline is visible at the NW, at the SW the view is blocked by a chain of hills. Nuraghi Monte Turno and Gibe Truttiri are visible at the NW, Nuraghe Brabudu is visible at the north.

Description: this is a single-towered nuraghe (*monotorre*) with its walls preserved in decent condition on whole perimeter of the tower. The tholos chamber is partly filled with earth and debris and incomplete, but its general condition is good – its top preserved point is close to the original top of the tholos dome. The outer wall-face of the nuraghe survived up to 5m of height in its western part. The entrance was probably located in the southern part of the nuraghe – it is indicated by a significant collapse which is adjacent to the southern part of the tholos chamber (probable remains of the entrance passage).

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Nuraghe Monte S'Ollastinu (Castiadas) – view from the NW.



The tholos chamber of Nuraghe Monte S'Ollastinu (Castiadas).



Possible remains of the intra-mural staircase in the western part of Nuraghe Monte S'Ollastinu (Castiadas).

Nuraghe Monte Turno (Castiadas) (known also as Monte Turnu)

Condition: heavily damaged

Location: 39.209238, 9.567949. The hilltop on the promontory of Monte Turno which cuts into the sea and offers extensive views to the north and south, controlling the coastline. Nuraghe Gibe Truttiri is visible at the south, nuraghi Monte S'Ollastinu and Brabudu at the SW.

Description: it was a small single-towered nuraghe (*monotorre*). The outline of the wall is visible on most of monument's perimeter (except the south). The irregular masonry structure varies between coursed-cyclopean and polygonal-cyclopean. The diameter of the nuraghe in its highest preserved point is only about 8m, which suggests that the monument did not have a tholos chamber and its internal spaces were very limited.

Reference:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



The masonry of Nuraghe Monte Turno (Castiadas).



The promontory with Nuraghe Monte Turno on its top – view from the south.



Polygonal-cyclopean masonry in the eastern part of Nuraghe Monte Turno.

Nuraghe Monte Zippiri (Muravera) (known also as Monte Su Zippiri)

Condition: mediocre

Location: 39.368457, 9.577148. The monument is located on the south-orientated ridge. The easiest access is from the north, the other sides are protected with steep slopes. This location offers extensive view of the coastline, while at the west the sites of nuraghi Santoru and Sa Spadula are visible.

Description: this monument is a small complex nuraghe. The walls of the main tower are visible on most of its perimeter – at the NE they reach 2.60m of height, at the SE 2.20m of height and at the SW 3.40m of height. In the central part of the main tower there are remains of the chamber, majority of which is filled with earth and debris. The diameter of the main tower in its highest preserved point is 9.60m, in its NE part the walls incorporate natural rocks. Adjacent at the north are remains of the rectangular bastion which does not have lateral towers.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Monte Zippiri (Muravera) – the NW arc of the wall.



The masonry in the eastern part of Nuraghe Monte Zippiri (Muravera).



Location of Nuraghe Monte Zippiri (Muravera) seen from the west.

Nuraghe Moros (Castiadas)

Condition: mediocre

Location: 39.2163327, 9.5134816. The monument is located on the top of a hill which constitutes part of the chain of hills. The location of Protonuraghe Casteddu is visible to the NW, the coastline is visible to the SE.

Description: the tower has 8.55m in diameter (measured on E-W axis), its outer wall-face is preserved up to 2.40m of height in the eastern part of the structure. Probable remains of the collapsed entrance can be seen in the southern part of the structure. The chamber is completely collapsed.

Reference:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



The eastern part of Nuraghe Moros (Castiadas).



Remains of the entrance in Nuraghe Moros (Castiadas).



View from Nuraghe Moros to the SE with coastline visible.

Nuraghe Mumosa (Muravera)

Condition: mediocre

Location: 39.335353, 9.554838. The monument is located on the ridge which is oriented roughly on E-W line. The coastline is visible at the east and NE, Nuraghe Corritta is visible at the west.

Description: Mumosa is a single-towered nuraghe (*monotorre*) of 12.8m diameter. On the SW arc of the wall there are probable remains of the entrance (circa 220° orientation) – its western side is in better condition with a 1.10m long wall. The outline of the wall is best preserved in the NW (2.40m of height) and southern (up to 2.80m of height) part of the nuraghe. The masonry is mostly polygonal cyclopean consisting of granite blocks. At the north and west the walls incorporate the natural rocks. At the NW there are remains of a wall adjacent to the nuraghe, but its masonry structure is poor and the wall itself does not form an outline of a bastion.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Mumosa (Muravera) – view from the south.



Nuraghe Mumosa (Muravera) – the northern arc of the wall.



View from Nuraghe Mumosa towards the coastline at the east.

Nuraghe Nicola Podda (Muravera)

Condition: heavily damaged

Location: 39.327896, 9.582409. Nuraghe Nicola Podda is located on a rocky hilltop which constitutes the eastern end of a chan if hills. This location overlooks the coastline, Nuraghe Bruncu Su Predi is visible to the west, Protonuraghe Bruncu Brailoi to the SW and nuraghi Don Giovanni Mattaciolu and Garrabosu to the SE.

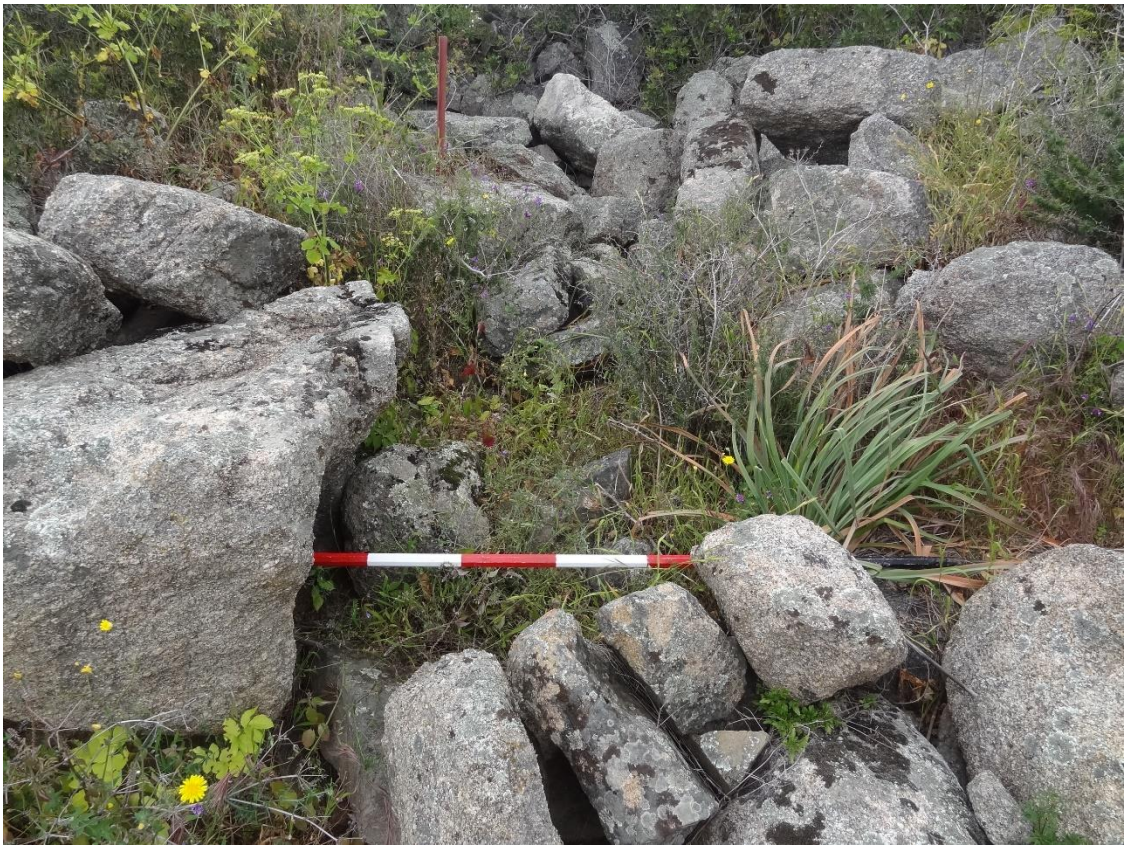
Description: this single-towered nuraghe is much larger than the nearby Nuraghe Bruncu Su Predi, it has 10.5m in diameter (measured on E-W axis). The outline of the tower is visible on most of its diameter, in its northern part it includes natural rocks. The outer wall-face survived up to 1.80m height in its western part. Probable remains of the entrance are oriented to the east (circa 95º). This anomaly (most of the entrances to the nuraghi open to the south) is understandable due to extremely sharp slope and rock outcrops immediately south of the nuraghe. Emains of a circular chamber are still distinguishable.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The western part of Nuraghe Nicola Podda (Muravera).



Remains of the entrance to Nuraghe Nicola Podda (Muravera).



Nuraghe Nicola Podda (Muravera) in its landscape context – view from the west.

Nuraghe Nuraxeddu (Castiadas)

Condition: partly damaged

Location: 39.217232, 9.489826. The monument is located on the summit which constitutes the northern end of a mountain chain in the northern part of Monte Minniminni massif. Being located on 422m of altitude, it is the highest located Nuragic site in sample area 1. The location of Nuraghe Masone Murtas is visible at the north, Nuraghe Sa Figu is visible at the NE.

Description: it is a single-towered nuraghe with an outer wall-face preserved on all of its perimeter. The structure has 7.20 x 6.90m diameter (measured respectively on E-W and N-S axis), its entrance is 0.80m wide and 1.40m high, being followed by a partly collapsed corridor leading into the chamber (filled with debris) of 2.20m diameter in its highest preserved point. The entrance opens to the SE (circa 160º). The outer wall-face is preserved up to 2.70-2.85m of height in the northern part of the tower. North of the nuraghe there is a wall of 6.40m length, 1.60m height and 1.50m thickness (curiously, it does not protect the nuraghe from the easy southern approach, but from the north where the slope is steep).

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The entrance to Nuraghe Nuraxeddu (Castiadas) – view from the SE.



The outer wall-face in the northern part of Nuraghe Nuraxeddu (Castiadas).



The landscape context of Nuraghe Nuraxeddu (Castiadas) – view from the SW.

Nuraghe Piras (Castiadas)

Condition: mediocre

Location: 39.2922537, 9.4820514. The monument is located on the edge of a flat area overlooking a natural gully to its north. The site of Nuraghe Meurru is visible to the NE. The coastline is visible to the SE, viws in other directions are mostly blocked by hills.

Description: the outer wall-face survived up to 2.20m of height in the southern part of the nuraghe. The entrance of 1.90m height and 1.40m width opens to the south (1.05 x 0.60 x 0.35 m dimensions), it is followed by a collapsed corridor. Since the central part of the nuraghe is completely collapsed and covered with thick vegetation, it is difficult to ascertain whether the corridor continued towards the centre of the structure or ended with a chamber.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



Nuraghe Piras (Castiadas) – the entrance seen from the south.



Cyclopean masonry in the western part of Nuraghe Piras (Castiadas).



Collapsed cental part of Nuraghe Piras (Castiadas).

Nuraghe Piscareddu (Muravera)

Condition: mediocre

Location: 39.297069, 9.584463. The monument is located on the enlogated ridge with extensive views to the south and east (including the coastline).

Description: the walls are preserved on whole perimeter of the tower, the best preserved part of the masonry is at the northern arc (3m high). The perimeter of the tower is 9m in its highest preserved point. The entrance is located at the SW (its orientation is about 240°) and followed by a 3m long corridor which is partly filled with debris (its northern wall is in better condition than the southern one). At the NW there is a wall adjacent to the nuraghe, but due to its poor quality of masonry it is likely to be secondary (however, the entrance to the nuraghe opens to the area enclosed by this wall).

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Piscareddu (Muravera) – the masonry of the northern arc of the tower.



Partly collapsed entrance passage of Nuraghe Piscareddu – view from the north.



Nuraghe Piscareddu (Muravera) – view from the west.

Nuraghe Porceddus (Villasimius)

Condition: partly damaged

Location: 39.147618, 9.559684. The monument is located on a promontory oriented to the east. The visibility of the coastline and nearby islands is limited by other promontories in the nearby, no other nuraghi can be seen from here.

Description: this single-towered nuraghe has 7.80m in diameter (measured on roughly E-W axis). The outline of the wall is visible on whole perimeter of the tower, the outer wall-face is preserved up to 2m of height at the west and 1.90m of height at the NE. In the central part of the nuraghe there are remains of a collapsed circular chamber. In the southern part of the structure the walls rest directly upon the natural rock.

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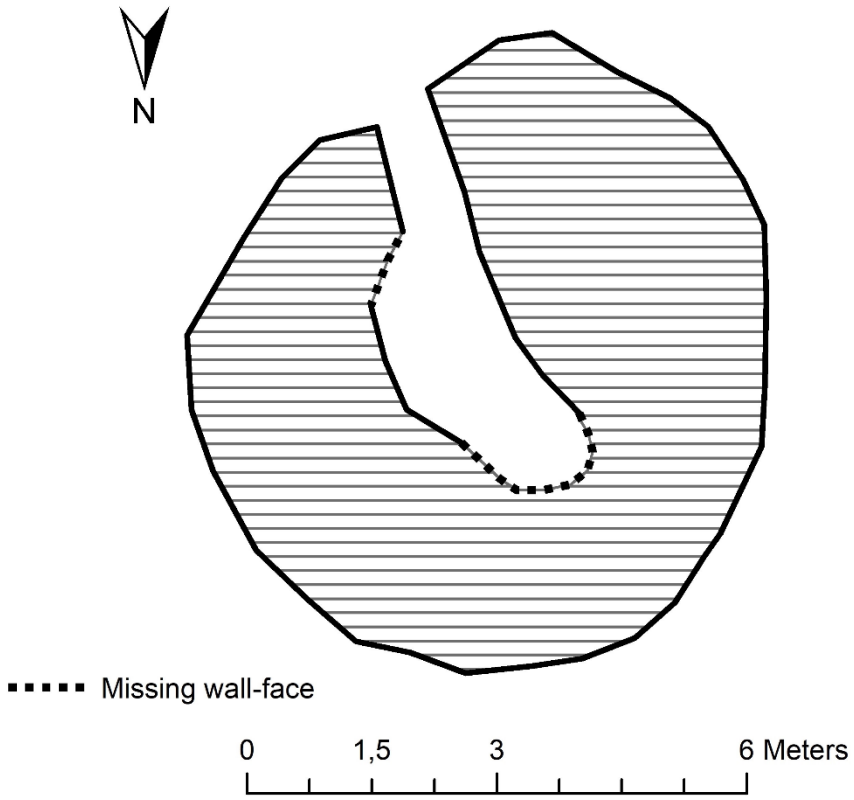
Nuraghe Porceddus (Villasimius) – view from the north.



Nuraghe Porceddus in its landscape context – view from the SW.



Nuraghe Porceddus (Villasimius) – the eastern arc of the wall.



Plan of Nuraghe Porceddus (Villasimius), prepared by the author with the use of Leica Total Station.



View from Nuraghe Porceddus (Villasimius) towards the coast.

Nuraghe Priamo Orru (San Vito)

Condition: partly damaged

Location: the monument is located on the top of a rocky hill offering far view to the east where locations of nuraghi Asoru and S'Arridelaxiu and Comideddu are visible. The easiest approach to the site is from the SE.

Description: the structure has circa 9m in diameter (measured on N-S axis), its outline is distinguishable on whole perimeter. The outer wall-face is in best condition on the southern arc of the tower (1.80m of height), the entrance opens to the SE (circa 110° orientation) – only its top part of 0.55 x 0.30m dimensions is visible. The collapsed corridor (a capstone of 1.25 x 0.55 x 0.35m dimensions is still in situ) leads to remains of a chamber, probably circular in shape.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8181).



The southern part of Nuraghe Priamo Orru (San Vito)



The NW arc of Nuraghe Priamo Orru (San Vito).



The hilltop with Nuraghe Priamo Orru – view from the NW.

Nuraghe Riu Molas (Muravera) (known also as Rio Molas)

Condition: mediocre

Location: 39.398638, 9.59367. The monument is located on the ridge of a east-oriented promontory which offers extensive view of the coastline. Nuraghe Puncilioni is visible at the north and Nuraghe Murtas at the NE.

Description: the structure consists of a tower of circa 9.50m diameter and a small bastion. The walls of the tower survived up to 3.80m of height in its northern part. In the eastern part of the nuraghe there is a gap in the walls (circa 80° orientation) and a significant collapse – possible remains of the entrance. The bastion is adjacent to the western part of the tower. The masonry of the structure includes sectors built in packed cyclopean and poorly executed coursed cyclopean style.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Riu Molas (Muravera) – the northern part of the structure.



Nuraghe Riu Molas (Muravera) – remains of the bastion in the foreground, masonry of the tower in the background



Nuraghe Riu Molas in its landscape context – view from the south.

Nuraghe S'Achiloni (San Vito)

Condition: heavily damaged

Location: 39.4125297, 9.5435008. This monument is located on the top of a mountain overlooking the towns of Muravera, Villaputzu and San Vito. The coastline is visible to the south, the location offers also extensive views in all directions except south.

Description: this heavily damaged, probably single-towered nuraghe has 8.40m in diameter (measured on the NE – SW axis). The best preserved part of the outer wall-face is in the southern sector of the structure where the masonry reaches up to 1.45m of height. The chamber is completely collapsed, no remains of the entrance can be distinguished. Due to small size of the structure and archaic masonry structure existence of a tholos is unlikely, probably it was nuraghe-*capanna*.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8207).



Nuraghe S'Achiloni (San Vito) – the best preserved sector of masonry.



Nuraghe S'Achiloni (San Vito) – major collapse in the NE part of the structure.



View from Nuraghe S'Achiloni towards San Vito at the NW.

Nuraghe S'Argalla I (Villasimius)

Condition: partly damaged

Location: 39.1363705, 9.5176953. The monument is located on the top of a hill overlooking the coastline. The sites of nuraghi S'Argalla II, Bruncu Campulongu and Accu Sa Pira are visible to the west, the site of Nuraghe Baccu 'e Gattus is visible to the NE.

Description: this single-towered nuraghe reaches 8m of diameter, its outline is visible on almost whole perimeter of the structure (except of the partly damaged SW part where the entrance could have been located). The outer wall-face survived up to 1.60m of height in the eastern part of the nuraghe. In the centre there are remains of the chamber reaching 4.20m of diameter. Thickness of the wall reaches 1.60m.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



Nuraghe S'Argalla I (Villasimius) – remains of the collapsed chamber.



Nuraghe S'Argalla I (Villasimius) – view from the SE.



The masonry of Nuraghe S'Argalla I (Villasimius).

Nuraghe S'Argalla II (Villasimius)

Condition: heavily damaged

Location: 39.1377956, 9.5150037. The monument is located on the top of a hill which constitutes the western end of a chain of hill. Nuraghe S'Argalla I is visible to the SE, Nuraghe Bruncu Campulongu to the SW and Nuraghe Accu Sa Pira to the west. The coastline is visible to the S-SW.

Description: a nuraghe-*capanna* or protonuraghe which incorporates natural rocks (especially in the NE part of the structure). The outer wall-face is preserved up to 2.10m of height in the eastern part of the nuraghe. Adjacent to the SW part of the structure there are remains of a small bastion preserved up to circa 1m of height. Existence of large natural outcrops in the centre of the nuraghe and limited size of the structure rule out existence of a tholos chamber.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



Nuraghe S'Argalla II (Villasimius) – masonry in the eastern part of the structure



Remains of the bastion in the SW part of Nuraghe S'Argalla II (Villasimius).



Locations of nuraghi S'Argalla I and II (Villasimius) seen from the NW.

Nuraghe S'Oxiu (Villasimius)

Condition: heavily damaged

Location: 39.1511006, 9.5213002. The monument is located on the top of a low hill. Locations of nuraghi Accu Sa Pira, Bruncu Campulongu, S'Argalla I and S'Argalla II are visible to the west, while to the east the location of Nuraghe Baccu 'e Gattus can be seen. The location does not offer visibility of the coastline.

Description: this nuraghe is probably Nuraghe S'Oxiu referred to by E. Valtan (2003: 19), although it is not sure. The eastern arc of the tower survived in best condition (the masonry reaches up to 1.60m of height). The outline of the structure is difficult to capture in its western part, but its significant size suggests possible existence of a tholos. In the southern part of the nuraghe there are traces of illegal excavations.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



The SE part of Nuraghe S'Oxiu (Villasimius).



Remains of the masonry on the eastern arc of Nuraghe S'Oxiu (Villasimius).



A low hill with remains of Nuraghe S'Oxiu (Villasimius) – view from the east.

Nuraghe Sabadi (Castiadas)

Condition: mediocre

Location: 39.2657923, 9.4982573. The monument is located on the top of a hill which does not offer view of the coastline. Protonuraghe Birru and Nuraghe Monte Gruttas are visible at the north.

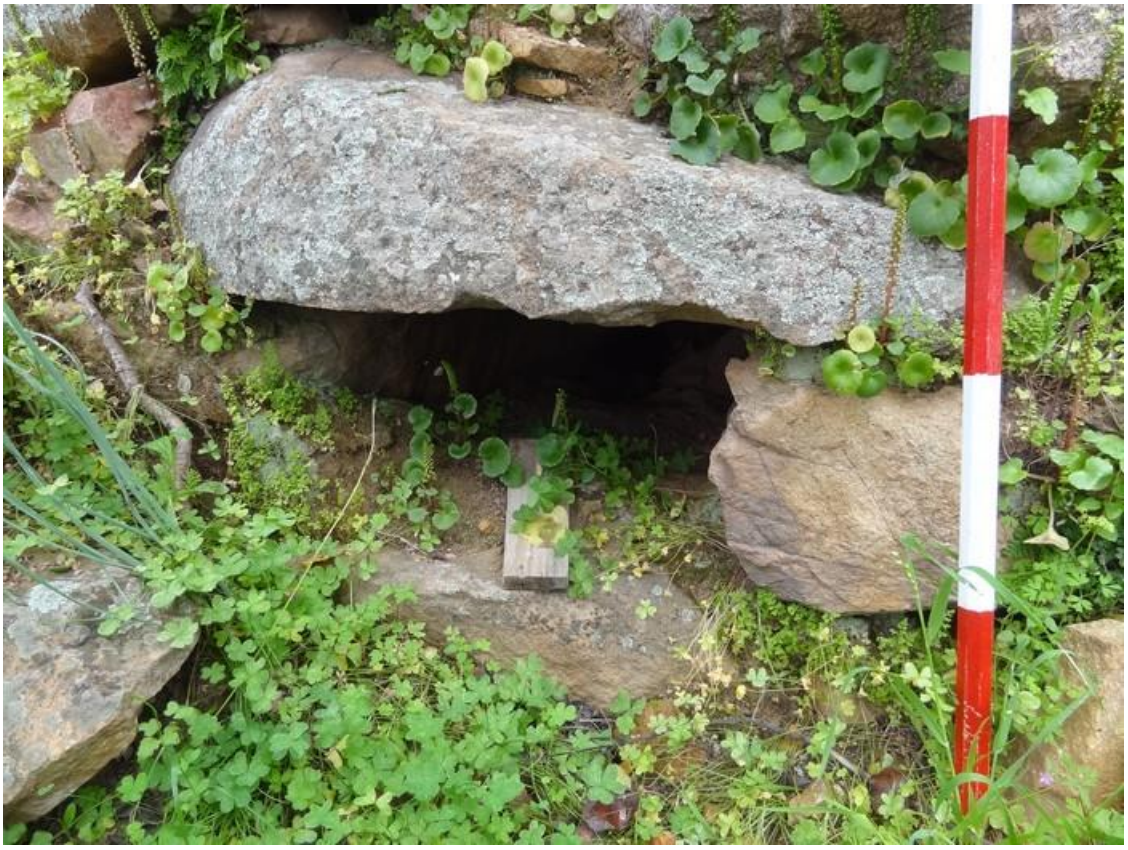
Description: this single-towered nuraghe has 10.20m in diameter, its walls are preserved up to 2.90m at the NW and 2.60m at the NE. The entrance is oriented to the SE (circa 150° orientation) and partly filled with earth and debris. The architrave of the entrance has 1.20 x 1.20 x 0.35m dimensions. Over the entrance there is a small window (0.60 x 0.35m dimensions) which offers view into the earth-filled entrance corridor. The central part of the monument is filled with concrete.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



Nuraghe Sabadi (Castiadas) – view from the NW.



A small window over the earth-filled entrance to Nuraghe Sabadi (Castiadas).



View from Nuraghe Sabadi to the north with locations of other monuments marked.

Nuraghe San Pietro (Castiadas)

Condition: mediocre

Location: 39.208725, 9.55095. The nuraghe is located on the top of a hill, south of the massif of Monte Cannas. The location offers extensive view of the coastline, nuraghi Sa Figu, Monte Turno and Gibe Truttiri are visible at the east, Protonuraghe Is Laccus is visible at the SW.

Description: this single-towered nuraghe (*monotorre*) survived in relatively good condition. It has 8.20m in overall diameter, the outer wall-face survived up to 2.80m of height at the northern arc. The outline of the chamber is clearly visible, it has 4m in diameter. The entrance opens to the SE (circa 130°), it is 1.70m high, 0.95m wide and has an architrave of 1.05 x 0.30 x 0.70m dimensions. The corridor leading to the chamber is 2.60m long, the first 1.50m is free from debris.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



The entrance to Nuraghe San Pietro (Castiadas) – view from the east.



Nuraghe San Pietro (Castiadas) – the northern part of the structure.



The corridor leading to the chamber of Nuraghe San Pietro (Castiadas).

Nuraghe San Priamo I (San Vito)

Condition: partly damaged

Location: 39.364665, 9.552896. The monument is located on the elongated N-S oriented ridge, the site offers view of the coastline. Nuraghe San Priamo II is visible at the south, Nuraghe Asoru at the west and nuraghi Santoru and Sa Spadula at the east.

Description: this circular tower of 9.50m diameter (measured on the N-S axis) survived up to 2.50m of height. The outer wall-face is preserved on most of the tower's diameter, especially at the north and west. In the central part of the structure remains of a large chamber (possibly of tholos construction) can be seen. In the SW part of the nuraghe the walls rest directly upon the natural rock. To the west of the structure there are possible remains of a small bastion – the wall is made of large stones which suggests its Nuragic origin, but below it there are later terraces, the structure might be one of them.

References:
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Nuraghe San Priamo I (San Vito) – view from the north.



The chamber of Nuraghe San Priamo I (San Vito) is filled with debris.



The location of Nuraghe San Priamo I – view from the south.

Nuraghe San Priamo II (San Vito)

Condition: mediocre

Location: 39.362664, 9.554594. The second nuraghe near San Priamo village is located on the plateau of a hill, significantly lower than Nuraghe San Priamo I. This location offers view of the coastline.

Description: the nuraghe-*capanna* has 11.50m in diameter, the outer wall-face survived in best condition in its western and northern part where it reaches up to 2.50m of height. In the centre of the structure there are remains of a chamber, probably not tholos construction, which has 4.70m in diameter. At the north the approach to the nuraghe is protected with a 30m long cyclopean wall which reaches up to 2.60m of thickness.

References:
1. Salvi, D. 2008. “Il popolamento antico del Sarrabus: Is Pirois e San Priamo” in *La civilta nuragica: nuove acquisizioni II*. Soprintendenza peri Beni Archeologici della Sardegna, p. 405-417.



Nuraghe San Priamo II (San Vito) – view from the NW.



The wall protecting approach to Nuraghe San Priamo II (San Vito).



Nuraghe San Priamo II in its landscape context – view from Nuraghe San Priamo I.

Nuraghe Sant' Aleni (San Vito)

Condition: partly damaged

Location: 39.3467615, 9.5478031. The monument is atypically located on a flat lowland area with limited visibility of the coastline. The locations of nuraghi Cuili Su Casteddu and Monte Idda are visible at the N-NW.

Description: the structure has 12.60m in diameter, which is one of the largest in this area, suggesting existence of a tholos chamber. The outer wall-face is preserved on whole perimeter of the tower and reaches up to 2.60m of height on its NE arc. The entrance is visible in the SE part of the tower, it is currently blocked with a secondary masonry.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 9897).



Nuraghe Sant' Aleni (San Vito) – view from the south with visible entrance.



Masonry in the western part of Nuraghe Sant' Aleni (San Vito).



The northern part of Nuraghe Sant' Aleni (San Vito).

Nuraghe Su Braccu (Muravera)

Condition: heavily damaged

Location: 39.3874053, 9.5838466. The monument is located on the top of a hill overlooking a valley. Nuraghe S'Acqua Seccis is visible to the south and the coastline to the east.

Description: this single-towered nuraghe is heavily damaged, only its N-NW part survived in reasonable condition. The walls survived up to 2.10m of height, the chamber is completely collapsed, as well as the southern part of the nuraghe. Adjacent to the NW part of the tower there is a rounded bastion reaching up to 1.80m of height. In the central part of the nuraghe there are some large vitrified blocks which might suggest metallurgical activity within the nuraghe.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Su Braccu (Muravera) – the NW part of the structure.



Remains of the bastion of Nuraghe Su Braccu (Muravera).



Nuraghe Su Braccu (Muravera) – vitrified blocks in the central part of the tower.

Nuraghe Su Cunventu (Muravera)

Condition: heavily damaged

Location: 39.416127, 9.583988. The monument is located on the top of a hill with a gentle slope at the west and steep slopes at the other sides. Nuraghe Su Nuraxi could have been visible from here, but the houses of Muravera do not allow to verify this possibility. The coastline is visible at the SE, originally this view might have been more extensive.

Description: it was probably a typical single-towered nuraghe (*monotorre*). It has circa 14m of diameter. The outline of the wall is particularly well visible in the western and eastern part of the nuraghe (at the west there are two shallow trenches reaching up to 0.40m of depth which expose the wall-face). To the east of the nuraghe there are remains of the Nuragic settlement.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Su Cunventu (Muravera) – view from the west.



Nuraghe Su Cunventu (Muravera) – view from the SE.



Outline of the wall in the western part of Nuraghe Su Cunventu (Muravera).

Nuraghe Su Modditzi (Muravera)

Condition: heavily damaged

Location: 39.262685, 9.55163. The monument is located on the summit which constitutes the northern end of the chain of hills. The sites of Nuraghe Idda, Protonuraghe Bau Travalazzu and Nuraghe Bruncu Ottixeddu are visible at the west, Monte Crobu is visible at the north and Protonuraghe Arrubiu at the NE.

Description: the outline of the wall of this single-towered nuraghe (*monotorre*) survived on most of its perimeter. The structure has 9.20m in diameter, there are no clear traces of a tholos chamber. Ledda (1985) suggests the northern orientation of the entrance, but in my view the collapse and gap in the wall-face at the south are much more convincing as its probable location. The best preserved parts of the masonry are on the NW and SE arc of the wall, they reach up to 2.40m of height. Some 15m north of the tower one the slope below it there is a megalithic wall consisting of particularly large stone blocks (one of them has 1.80 x 1.10 x 0.70m dimensions) – it probably protected the monument from relatively easy northern approach (the northern slope is gentler than the eastern and western ones).

References:
1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Su Modditzi (Muravera) – the eastern arc of the wall.



The collapsed central part of Nuraghe Su Modditzi (Muravera).



The summit holding Nuraghe Su Modditzi (in the middle).

Nuraghe Tersilia (known also as Pranu di Monte Nai)

Condition: heavily damaged

Location: 39.2434371, 9.5685768. The monument is located on the top of a low hill, about 150m of the coastline. The massif of Monte Nai and the coastline are perfectly visible from here.

Description: remains of the circular tower are heavily overgrown, thus their remains are difficult to interpret. The internal spaces are completely collapsed, but it is probable that the entrance was located at the south. The best preserved part of the masonry is on the northern arc of the tower where the height of a wall exceeds 2m.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The NE part of Nuraghe Tersilia (Muravera).



The NW part of Nuraghe Tersilia (Muravera) – view from the west.



Nuraghe Tersilia in its landscape context – view from the NW.

3. COMPLEX NURAGHI

Nuraghe Asoru (San Vito)

Condition: good

Location: 39.3685072, 9.5315006. The monument is located on a flat lowland plain just north of the old SS125 road. It is intervisible with Nuraghe Monte Narbeddu, Nuraghe Su Linnamini and Protonuraghe Comideddu.

Description: Nuraghe Asoru is a complex structure constructed of granite blocks. It consists of a central tower preserved to 10 m of height and an irregular-shaped bastion which might be interpreted as the older proto-Nuragic construction (Ledda 1989). The entrance passage to the main tower is filled with debris (circa 185° orientation), in front of it there is a small courtyard. The masonry of the structure is mostly packed cyclopean with large and medium-sized stone blocks.

References:

1. Ledda, R. (1989). *Censimento archeologico nel territorio del Comune di Villaputzu.* Edizioni Castello.

2. Lilliu, G. (2005). *I nuraghi: torri preistoriche di Sardegna.* Nuoro: Ilisso Edizioni (p. 241-244).



Nuraghe Asoru (San Vito) – view from the east.



Partly preserved tholos dome of Nuraghe Asoru (San Vito).



Courtyard in front of the entrance to the main tower of Nuraghe Asoru (San Vito).

Nuraghe Baccu ‘e Gattus (Villasimius)

Condition: mediocre

Location: 39.1499919, 9.528923. This complex nuraghe is located on the culmination of a narrow ridge of N-S orientation. Locations of nuraghi S’Argalla I, S’Argalla II, Bruncu Campulongu and Accu Sa Pira are visible to the west. Only a limited sector of the coastline is visible to the south.

Description: the monument consists of two towers and adjacent bastion. The main tower reaches 9.30m of diameter, its 1.40m wide entrance is oriented to the SE (circa 160°) and is followed by a corridor of 2.45m length. The outer wall-face of the main tower survived in best condition in its NE part where it is preserved up to 2.60m of height. The lateral tower is adjacent to the main tower at the south, it has a chamber of 4.50m diameter, entrance to which is oriented to the east (circa 60°). The entrance has an architrave of 1.30 x 0.50 x 0.40m dimensions. Adjacent to the lateral tower at the east is a bastion with an entrance of 0.85m width. Through the bastion runs a collapsed corridor wich connectes to the entrance to the lateral tower.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



The main tower of Nuraghe Baccu ‘e Gattus (Villasimius).



Entrance to the chamber of a lateral tower of Nuraghe Baccu ‘e Gattus (Villasimius).



The chamber of the lateral tower in Nuraghe Baccu ‘e Gattus (Villasimis).

Nuraghe Baccu Sa Figu (Castiadas)

Condition: mediocre

Location: 39.238495, 9.4889353. The monument is located on the NW-SE oriented rocky ridge. Protonuraghe Casteddu is visible at the NW, the coastline is not visible from here.

Description: the main tower has 9.40m in diameter (measured on roughly NE-SW axis), its outer wall-face is preserved up to 2.80m height on the NE arc of the tower. Remains of the tholos chamber of 4.30m diameter (measured on roughly N-S axis) are perfectly distinguishable, it has two niches. The northern niche is 0.90m wide and 0.85m deep, the western niche is 1.20m wide and 1.20m deep. There are no indisputable remains of the intra-mural staircase. The entrance opens to the south (circa 170º). Adjacent at the south there is a large bastion (probably of triangular shape) with walls preserved up to 3.20m of height in its eastern part. At the southern end of the bastion there are remains of a lateral tower with remains of a chamber preserved up to 1.20m of height.

References:
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The main tower of Nuraghe Baccu Sa Figu (Castiadas) – view from the SW.



The bastion of Nuraghe Baccu Sa Figu (Castiadas) – view from the east.



The western niche in the main tower of Nuraghe Baccu Sa Figu (Castiadas).

Nuraghe Cardaxiu (San Vito)

Condition: mediocre

Location: 39.3885299, 9.5499945. The monument is located on the summit of an elongated ridge running from the north to the south. Protonuraghi Su Tasuru II and Comideddu are visible to the SW. The coastline is not visible from this point.

Description: the nuraghe consists of two circular sectors adjacent to each other. The southern one occuppies the summit of a ridge and reaches circa 9.50m diameter. Adjacent at the north is a rounded structure of circa 10m diameter with a wall preserved up to 3.20m of height. On the SW slope of the ridge there are significant amounts of debris suggesting possibility of existence of further structures south of the main tower.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8201).



The northern sector of Nuraghe Cardaxiu (San Vito).



Nuraghe Cardaxiu (San Vito) in its landscape context – view from the south.



Remains of the wall in the southern sector of Nuraghe Cardaxiu.

Nuraghe Corritta (Muravera)

Condition: mediocre

Location: 39.334318, 9.543245. The Nuragic complex of Corritta is located on the ridge of a north-south oriented chain of hills offering a view towards the coastline and Nuraghe Mumosa at the east. The steep slopes protect the site at the west and east, the easiest approach is from the north.

Description: this complex nuraghe is oriented along the narrow ridge of a hill. The main tower is in best condition in its NE part, while in its centre the top of the earth-and-debris filled chamber is visible. The main tower is surrounded by a rounded bastion with two lateral towers at its northern and southern end. The walls of the bastion are in best condition at the west where they reach up to 4m of height. The southern tower has circa 8.5m of diameter in its highest preserved point, while the northern tower circa 8.80m. The monument is a splendid example of efficient use of the limited area on a narrow ridge. On the western slope, below the nuraghe, there are remains of the Nuragic settlement.

References:
1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The western part of the rounded bastion of Nuraghe Corritta (Muravera).



Nuraghe Corritta (Muravera) – the NE arc of the main tower.



Remains of the collapsed northern tower of Nuraghe Corritta.

Nuraghe Don Giovanni Mattaciolu (Muravera)

Condition: partly damaged

Location: 39.311207, 9.603589. The monument is located on the end of the north-oriented promontory which offers extensive view of the coastline. The site of Protonuraghe Baracca Su Entu can be seen at the west.

Description: this complex nuraghe consists of a large main tower and much smaller lateral tower with tholos chamber. The main tower is heavily damaged, its central part is completely collapsed, the walls survived up to 2m of height in the eastern part of the structure. The entrance to the main tower opens to the SE (circa 100°), it has an architrave of 1.25 x 0.25m dimensions and a small window of 0.35 x 0.40m dimensions above it. The lateral tower has a tholos chamber of 2.80m diameter on current floor level and an entrance of 1.30 x 0.70m dimensions with an architrave of 0.85 x 0.17 x 0.60m dimensions. This entrance is oriented to the SE (circa 130° looking inside the tower) and is followed with a partly collapsed corridor which probably connected the lateral tower with the main tower.

References:
1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The entrance to the main tower of Nuraghe Don Giovanni Mattaciolu (Muravera).



The eastern tower of Nuraghe Don Giovanni Mattaciolu with its tholos chamber.



The entrance to the eastern tower of Nuraghe Don Giovanni Mattaciolu.

Nuraghe Figu Niedda (Muravera)

Condition: partly damaged

Location: 39.302443, 9.528834. The monument is located on the top of a low hill without visibility of the coastline. Nuraghe Monte Ontroxiu is visible at the NE.

Description: the main tower has 9.50m in diameter and consists of large stone blocks. Its walls are preserved up to 2.20m of diameter at the NE and 1.50m at the SW. No clear remains of a tholos chamber nor an entrance can be seen. At the SE there are probable remains of a lateral tower with traces of a small circular chamber. This tower was probably connected with the main tower thorough an elongated bastion remains of which are adjacent to the eastern part of the keep.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Figu Niedda (Muravera) – the eastern part of the main tower.



The masonry in the SW part of the main tower of Nuraghe Figu Niedda (Muravera).



Remains of the lateral tower of Nuraghe Figu Niedda (Muravera).

Nuraghe Is Traias (Villasimius)

Condition: partly damaged

Location: 39.1326922, 9.5307469. The monument is located on a low hilltop offering a wide view of the coastline at the S-SW.

Description: the nuraghe consists of the main tower and two lateral towers adjacent at the south. The main tower has circa 11m diameter (measured on roughly N-S axis), its outer wall-face reaches up to 1.40m of height in its eastern part.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



The eastern part of the main tower of Nuraghe Is Traias (Villasimius).



Nuraghe Is Traias – remains of the masonry cleaned from the vegetation.



Remains of the lateral tower in Nuraghe Is Traias (Villasimius).

Nuraghe Mannu (Muravera)

Condition: heavily damaged

Location: 39.296015, 9.572487. The monument is located on the top of a mountain with extensive views to the north, south and west (circa 5km long part of the coastline is visible from here). This location completely dominates over the surrounding landscape.

Description: heavily damaged main tower of Nuraghe Mannu has 8.5m in diameter in its highest preserved point. The outline of the wall is particularly well distinguishable on the southern and western arc of the tower. At the south there are remains of an 8-shaped construction which might be a bastion or two lateral towers. The location of this structure indicates southern orientation of the entrance. The masonry is mostly coursed cyclopean and consists of granite blocks.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Mannu (Muravera) – view from the south.



The location of Nuraghe Mannu – the highest peak visible on the photo.



Nuraghe Mannu (Muravera) – the western arc of the wall seen from the NW.

Nuraghe Manunzas (Villasimius) (known also as Is Prezzus)

Condition: heavily damaged

Location: 39.1367616, 9.538524. The monument is located on the summit constituting part of a low ridge of N-S orientation. The coastline is visible at the south, there is no intervisibility with other Nuragic sites.

Description: Valtan's (2003: 15) assessment of this structure as a complex nuraghe is probably correct. The collapsed main tower reaches 12m of diameter and is preserved up to 1.80m of height. At the south there are probable remains of a lateral tower of bastion, as well as traces of a settlement.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



The outer wall-face of the main tower in Nuraghe Manunzas (Villasimius).



The outer wall-face in the northern part of Nuraghe Manunzas (Villasimius).



The hilltop with Nuraghe Manunzas (Villasimius) – view from the NE.

Nuraghe Mont'Arbu (San Vito)

Condition: mediocre

Location: 39.3871016, 9.5195796. The monument is located on the southern edge of a hilltop plateau, overlooking the Basoru plain at the south and the coastline at the SE. Numerous nuraghi overlooking the Basoru plain are visible from here – Asoru, Arridelaxiu, Forada Procaxius and Monte Narbeddu. Nuraghe Su Linnamini and Protonuraghe Comideddu are visible on hilltops at the east.

Description: this complex structure consists of the main tower and adjacent bastion. The main tower has 9 x 7.60m in diameter (measured on SW-NE and SE-NW axis respctively), its chamber of 4.60 x 3.70m diameter is partly preserved. The entrance of 1.20m width is clearly distinguishable, it opens to the SE. Relatively limited wall thickness (up to 3.10m in the southern part of the structure) calls into doubt whether the monument had an intra-mural staircase and stone upper floor.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 9238).



The chamber of Nuraghe Mont'Arbu (San Vito) – view from the NE.



Nuraghe Mont'Arbu (San Vito) – view from the north.



Remains of the entrance to the tower of Nuraghe Mont'Arbu (San Vito).

Nuraghe Monte Narbeddu (San Vito)

Condition: mediocre

Location: 39.3777693, 9.5222698. The monument is located on the ridge of an elongated promontory. The coastline is visible at the SE, there are several nuraghi visible from here: Forada Procaxius at the west, Asoru at the south, Arridelaxiu and Comideddu to the east and Su Linnamini to the NE.

Description: this is one of the most complex nuraghi in sample area 1. The main tower reaches 8.70m in its highest preserved point (measured on the E-W axis), its tholos chamber is completely collapsed. Adjacent to the north there is a small lateral tower with partly preserved chamber. Adjacent to the south there is a large bastion of 9.20m diameter (measred on N-S axis) with remains of the entrance. The bastion reaches up to 2.10m of height in its western part.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 9240).



The main tower of Nuraghe Monte Narbeddu (San Vito).



Nuraghe Monte Narbeddu (San Vito) – the chamber of the northern tower.



Collapsed remains of the entrance in the bastion of Nuraghe Monte Narbeddu.

Nuraghe Monti Mereu (Villasimius)

Condition: heavily damaged

Location: 39.141923, 9.5265466. The monument is located on the hilltop constituting part of the elongated ridge of Monti Mereu overlooking the town of Villasimius. Nuraghi S'Argalla I and II, Accu Sa Pira and Bruncu Campulonguare visible at the west, Nuraghe Baccu 'e Gattus is visible at the SE.

Description: this complex nuraghe consists of the main tower of 11.80m diameter (measured on roughly N-S axis) and the bastion or lateral tower which is adjacent at the south, thus the construction aligns with orientation of the ridge. The outline of the main tower is particularly well-distinguishable on its northern arc, the outer wall-face survived up to 1.50m of height. The outer wall-face of the bastion/southern tower survived up to 1m of height in its western part.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



Nuraghe Monti Mereu (Villasimius) – outer wall-face of the southern tower/bastion.



Nuraghe Monti Mereu in its landscape context – view from the SE.



Remains of the wall in the northern part of the main tower of Nuraghe Monti Mereu.

Nuraghe Murtas (Muravera)

Condition: mediocre

Location: 39.406553, 9.602836. The monument is located on the flat area, about 1.2km of from the coast. The coastline is poorly visible from here.

Description: this is a complex nuraghe with a bastion. The current length of the remaining structure is 21.5m. In the eastern part of the nuraghe there is a lateral tower of circa 6.5m diameter and with the walls preserved up to 1.8m m above the surface of the mound (at least another 1m is buried under the ground level – as suggested by the slope). Another lateral tower could have been located at the west, but heavy vegetation and poor preservation of this part of the structure make it difficult to verify this suggestion. In the central part of the monument there are remains of the main tower, partly damaged in its southern part – the best preserved part of the walls is at the north where the masonry reaches up to 2.20m of height.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The eastern tower of Nuraghe Murtas (Muravera) – view from the south.



The main tower of Nuraghe Murtas (Muravera) – view from the east.



The western part of Nuraghe Murtas (Muravera) – view from the south.

Nuraghe Porto Pirastu (Muravera)

Condition: mediocre

Location: 39.29435, 9.611561. The monument is located on the top of a promontory which cuts into the Mediterranean Sea. A modern harbor site is adjacent to the promontory.

Description: this complex nuraghe has a main tower of 8m diameter in its highest preserved point, its interior is partly filled with concrete. Adjacent at the SE there are possible remains of a lateral tower, while at the NW there is partly preserved bastion. The limited diameter of the main tower and its archaic polygonal cyclopean masonry suggest, that the structure did not have a tholos. Below the nuraghe, at the neck of the promontory, there is a heavily damaged stone wall which uses the natural rocks as its integral part – it might be a Nuragic construction protecting the nuraghe from the side of the land.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The main tower of Nuraghe Porto Pirastu (Muravera).



Promontory with Nuraghe Porto Pirastu (Muravera) seen from the NE.



View from the main tower at the bastion of Nuraghe Porto Pirastu (Muravera).

Nuraghe S'Acqua Seccis (Muravera) (known also as Acqua Seccis or Monte S'Acqua Seccis)

Condition: good

Location: 39.382314, 9.584238. The monument is located on the top of a mountain offering extensive views towards the coastline, in a commanding position over the surrounding landscape. Nuraghe Cuili Senni had to be visible at the NW (currently the view is blocked by vegetation) and Nuraghe Su Braccu at the north, probably also Protonuraghe Ponzianu at the NW.

Description: Nuraghe S'Acqua Seccis is one of the most complex Nuragic structures in the SE Sardinia and one of the few nuraghi in Muravera-Castiadas area with a well-preserved tholos chamber.

In the central part of the complex there is a main tower with a tholos chamber (4.20m of diameter on the current floor level). In the NE part of the chamber there is a niche of over 2m height, 1.20m width at the floor level and 1.4m depth. During the survey the tholos chamber was in conservation and supported with a wooden construction. On the NE arc of the tower there is a partly preserved intra-mural staircase with 10 steps, each one consisting of only one stone block.

Around the main tower there is a rectangular bastion and towers on its corners. The SW tower is oval in its highest preserved point (roughly 2.10 x 1.70m of internal diameter). The NW tower (5.50m of diameter) has its interior exposed, inside it there is a niche of 1.50m height, 0.70m width (at the floor level) and 1.70m depth. The SW and NW tower are connected with a 6m long wall of the bastion. The eastern part of the bastion is heavily damaged.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe S'Acqua Seccis (Muravera) – view from the NW.



Nuraghe S'Acqua Seccis (Muravera) – the western wall-face of the bastion.



Nuraghe S'Acqua Seccis (Muravera) – interior of the NW tower.



Intra-mural staircase (left) and entrance to the chamber (right) in the main tower of Nuraghe S'Acqua Seccis (Muravera).

Nuraghe S'Omu 'e S'Orcu (Castiadas)

Condition: mediocre

Location: 39.231144, 9.561498. The monument is located on the top of a hill with limited view at the coastline, but extensive lies to the north and south.

Description: this complex nuraghe consists of the main tower with partly preserved tholos chamber and a roughly triangular bastion with two lateral towers and the entrance opening to the south. The main tower has 3.80m of internal diameter in its highest preserved point. The SW tower is in particularly good condition, it has a possible window of 0.80 x 0.15m dimensions. The wall-face of the bastion is over 3.50m high in the western part of the monument. South of the nuraghe there are remains of the antemural with at least two further towers.

Reference:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.



The SW tower of Nuraghe S'Omu 'e S'Orcu (Castiadas).



The eastern wall of the bastion in Nuraghe S'Omu 'e S'Orcu (Castiadas).



Remains of the main tower of Nuraghe S'Omu 'e S'Orcu (Castiadas).

Nuraghe Sa Spadula (Muravera)

Condition: mediocre

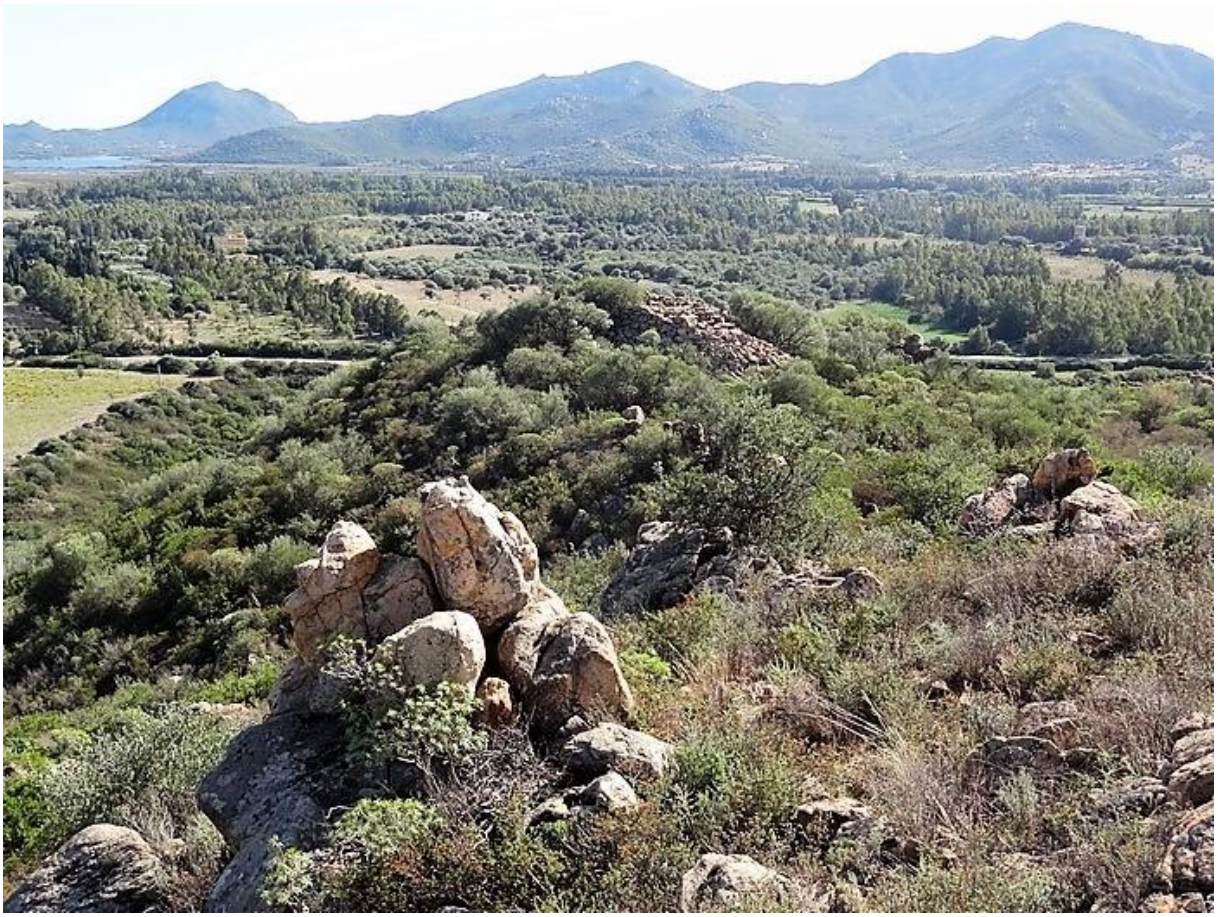
Location: 39.363777, 9.569389. The site is located on the top of a hill which constitutes the southern end of the chain of hills, the easiest approach to the nuraghe is from the north. Nuraghe Monte Zippiri is visible to the east, the coastline is perfectly visible.

Description: the monument consists of two towers which are adjacent to each other. The western tower survived in better condition, its chamber has 4.90 x 2.30m dimensions, while the walls reach 2.20m of thickness (measured in the northern part of the tower). The outer wall-face of the western tower survived up to 2m of height in its northern part. The eastern tower is in much poorer condition, its interior is completely collapsed. To the north of the nuraghe there are remains of the Nuragic settlement.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Sa Spadula (Muravera) in its landscape context – view from the north.



The chamber of the western tower in Nuraghe Sa Spadula (Muravera).



Nuraghe Sa Spadula (Muravera) – the masonry of the eastern tower.

Nuraghe Santoru (Muravera)

Condition: good

Location: 39.367624, 9.567622. The Nuragic complex of Santoru is located on the top of a rocky mountain which offers extensive views to the south and to the coastline. Nuraghe Sa Spadula is visible at the south, Nuraghe Monte Zippiri at the east and Nuraghe S'Acqua Seccis at the NE.

Description: the complex includes the main tower and the antemural with remains of at least two towers. The main tower has a well-preserved entrance which opens to the south (1.10m width, 0.90m height) with a small window of 0.75 x 0.70m dimensions above it. The chamber of the main tower is oval (5 x 3.60m diameter on its current floor level). The intramural staircase opens left of the entrance and is filled with debris. The antemural protects the main tower from the north, east and partly south. The best preserved tower of is semi-circular and has 5m in diameter. The masonry of the antemural often incorporates natural rocks.

References:
1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



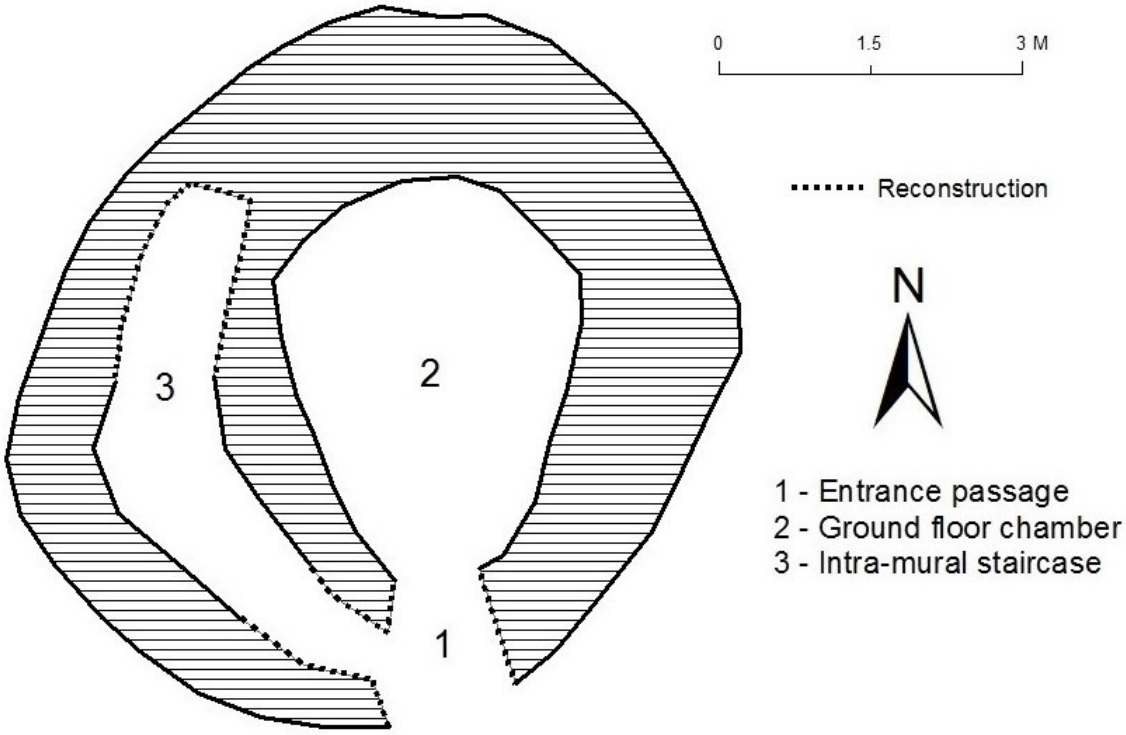
Nuraghe Santoru (Muravera) seen from the north – antemural in the foreground, the main tower in the background.



Nuraghe Santoru (Muravera) – the main tower.



The chamber of the main tower in Nuraghe Santoru (Muravera).



The main tower of Nuraghe Santoru (Muravera). Plan prepared by the author with the use of Leica Total Station.



Antemural of Nuraghe Santoru (Muravera) built directly upon the natural rock.

Nuraghe Su Linnamini (San Vito)

Condition: heavily damaged

Location: 39.3847974, 9.5302735. The structure is located on the hilltop constituting the southern end of an elongated ridge. Nuraghe S'Arridelaxiu and Comideddu are visible at the SE, Nuraghe Asoru at the south and Nuraghe Monte Narbeddu at the SW.

Description: the main tower reaches 10.10m diameter (meadured on roughly E-W axis), its walls are preserved up to 2.05m of heigh on the NE arc. Adjacent at the north and south are remains of two rounded bastions. The northern one is in better condition, it has 7.40 x 5.50m dimensions. The southern bastion is only partly preserved, originally it reached at least 7m of diameter.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8197).



Nuraghe Su Linnamini (San Vito) – the main tower seen from the E-NE.



The main tower of Nuraghe Su Linnamini (San Vito) – view from the west.



The northern bastion of Nuraghe Su Linnamini (San Vito).

4. NURAGHI OF UNDEFINABLE TYPOLOGY

Nuraghe Accu Sa Pira (Villasimius)

Condition: heavily damaged

Location: 39.137624, 9.5089298. Remains of the structure are located on the top of a rocky hill. Nuraghe Bruncu Campulongu is visible at the south, nuraghi S'Argalla I and II are visible at the north. This location offers wide view of the coastline.

Description: at the summit of the hill there is a mound of debris without any clear traces of the walls. No outline of the wall nor internal spaces can be distinguished. At the SE slope of the hill there is the only clear sector of masonry which survived, it is 5m long and up to 1.70m high, filling gap between natural rocks.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



The only distinguishable sector of masonry in Nuraghe Accu Sa Pira (Villasimius).



The hilltop location of Nuraghe Accu Sa Pira seen from Nuraghe S'Argalla II.



Nuraghe Accu Sa Pira (Villasimius) – debris at the top of a hill.

Nuraghe Cann'e Frau (Muravera)

Condition: heavily damaged

Location: 39.316456, 9.543082. The remains of a Nuragic structure are located on the top of a low hill which constitutes the eastern end of the chain of hills. Nuraghe Monte Ontroxiu can be seen to the SW and Nuraghe Monte Arrubiu to the NE.

Description: the poor state of preservation does not allow to specify the typology of this monument. It is possible that it consisted of a circular tower with a bastion. The SE arc of a possible tower is preserved up to 0.80m of height. To its north there is a poorly preserved 8m long section of a straight wall which survives up to 1.40m of height – this structure might be part of a larger bastion. In the western part of the remains the masonry rests directly upon the natural rock.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The masonry in the NW part of Nuraghe Cann'e Frau (Muravera).



Nuraghe Cann'e Frau (Muravera) – view from the west.



The SE arc of the wall of Nuraghe Cann'e Frau (Muravera).

Nuraghe Cuili Su Casteddu (San Vito)

Condition: partly damaged

Location: 39.3495917, 9.5470749. The monument is located on the edge of a plateau of Cuili Su Casteddu, among numerous features from the historic periods (probable Roman fortifications and medieval structures). The coastline is visible at the east, Nuraghe Monte Idda is visible at the west, Nuraghe Sant'Aleni is visible at the SE.

Description: although the nuraghe survives up to 3.10m of height, its outer wall-face is preserved only on the northern and eastern arc – at other sides it was obliterated during construction of adjacent structures from the historic period. Due to this heavy alteration of the area around the nuraghe it is impossible to rule out its more complex plan than just one tower. Also, the plateau of Cuili Su Casteddu is enclosed by remains of a massive megalithic wall of unsure chronology. Its plan is close to triangular, which – together with good quality of masonry with regular blocks, unlike in most of the nuraghi in Sarrabus – indicates Roman or medieval rather than Nuragic origin.

References:
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Nuraghe Cuili Su Casteddu (San Vito) – view from the north.



Cuili Su Casteddu (San Vito) – remains of a fortification wall of unsure chronology.



Cuili Su Casteddu (San Vito) – view from the south.

Nuraghe Giordi (Muravera)

Condition: heavily damaged

Location: 39.331376, 9.573715. The hilltop occupied by Nuraghe Giordi constitutes the northern end of a chain of hills, offering extensive view towards the coastline. At the north the nuraghe is protected by a small cliff.

Description: this heavily damaged nuraghe sits directly on the natural rocks, some of which are incorporated into its NE and SE part. The best preserved part of the masonry (1.60m high and 3.50m long) is located in the western part of the structure. There are two large collapses in the eastern and SW part of the nuraghe. The significant accumulation of debris in the central part of the hilltop marks the location of probable chamber. The poor state of preservation does not allow to assess the floor plan and typology of this monument.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Remains of the masonry in the western part of Nuraghe Giordi (Muravera).



Collapse and mass of debris in the eastern part of Nuraghe Giordi (Muravera).



View from Nuraghe Giordi to the west reveals the significance of its location.

Nuraghe Mitza Sa Granaccia (Muravera)

Condition: heavily damaged

Location: 39.266575, 9.57174. The nuraghe is located on the top of a hill with extensive views to the north and to the coastline at the east.

Description: the monument is preserved as an overgrown stony mound with little traces of masonry. The largest part of the wall (5m long) consists of large polygonal blocks and is located at the south. However, despite it being straight it is difficult to interpret this wall as evidence of a bastion – the space on the hilltop is very limited and the size of the mound relatively small. Therefore, it was probably a single-towered nuraghe (*monotorre*) or a small protonuraghe – lack of preserved remains of internal spaces does not allow to decide.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Mitza Sa Granaccia (Muravera) – remains of the masonry in the southern part of the monument.



Nuraghe Mitza Sa Granaccia in its landscape context – view from the north.



Collapsed walls in the northern part of Nuraghe Mitza Sa Granaccia (Muravera).

Nuraghe Monte Idda (San Vito)

Condition: heavily damaged

Location: 39.3505374, 9.5362588. The monument is located on the top of a mountain dominating over surrounding landscape, offering wide view of the coastline. Nuraghe Asoru is visible at the north, the site of Nuraghe Garrabosu is visible far at the SE.

Description: the plan of this monument is difficult to read. The top of a mountain is occupied by remains of an incompletely circular structure with the natural rocks constituting the western part of it. The masonry survived in best condition on the northern arc of the structure, it reaches up to 1.10m of height at the NE. Limited secors of masonry are visible also in the eastern and southern part of the structure. The diameter of the structure is circa 6.70m (measured on roughly N-S axis). North of this structure, some 1.50m lower, there are remains of ill-defined structure with masonry preserved up to 1m at the east.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8180).



The mountain of Monte Idda (San Vito) with nuraghe on its top.



The southern part of Nuraghe Monte Idda (San Vito).



Remains of the masonry in the northern part of Nuraghe Monte Idda (San Vito).

Nuraghe Monte Idda (Castiadas)

Condition: heavily damaged

Location: 39.2514227, 9.5418996. The monument is located among the rock outcrops on the top of Monte Idda. Nuraghi Su Modditzi, Bruncu Ottixeddu, Su Sciusciu I and II are visible at the east, Protonuraghe Bau Travalazzu is visible at the NW.

Description: remains of previously unrecorded rounded structure discovered by the author during the survey. It reaches 7.50 x 5m dimensions and is constructed of large stone blocks. The outer wall-face reaches up to 1.75m height at the SE and 1.40m at the NW. At the south the structure rests upon the natural rocks.

References:
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Cyclopean wall in the eastern part of Nuraghe Monte Idda (Castiadas).



Landscape location of Nuraghe Monte Idda (Castiadas) – view from the east.



Remains of the wall in the western part of Nuraghe Monte Idda (Castiadas).

Nuraghe Monti Ferru (Muravera) (known also as Costa Sa Perdera)

Condition: heavily damaged

Location: 39.2985142, 9.5998031. The monument is located on a promontory constituting the SW part of the massif of Monti Ferru mountain. The site offers a wide view of the coastline (including the promontory with Nuraghe Porto Pirastu).

Description: the typology of this oval-shaped structure is difficult to ascertain – it could be a protonuraghe or a nuraghe-*capanna*, but severe damages and complete collapse of internal spaces do not allow for a more detailed assessment. The outer wall-face survived up to 2m height in the southern part of the nuraghe. The entrance could have been located in the southern part of the structure as well (indicated by a significant collapse).

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Monti Ferru (Muravera) – view from the south.



Nuraghe Monti Ferru (Muravera) in its landscape context – view from the SE.



Cyclopean masonry of Nuraghe Monti Ferru (Muravera).

Nuraghe Puncilioni (Muravera)

Condition: heavily damaged

Location: 39.404442, 9.595332. The remains of this nuraghe are located on the promontory which descends towards the east. The visiblity of the coastline is perfect, Nuraghe Riu Molas can be seen at the NW.

Description: the monument is in very poor condition. It is preserved as a mound of debris with a 3.30m long and 0.80m high part of the wall preserved in its northern part. The overall diameter of the structure was probably close to 12m. No remains of internal spaces are visible in completely collapsed central part of the nuraghe. At the east the structure rests upon the natural rocks. The typology of this monument is difficult to defined – it could be a single-towered nuraghe (*monotorre*) or a, as Ledda (1985) suggests, a circular protonuraghe.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Puncilioni (Muravera) is preserved as a mound of debris with little traces of masonry.



Remains of masonry in the northern part of Nuraghe Puncilioni (Muravera).



The landscape context of Nuraghe Puncilioni – view from the NW.

Nuraghe Punta Molentis (Villasimius)

Condition: heavily damaged

Location: 39.13689, 9.555546. The monument is located on the top of a large promontory which cuts into the sea. No other nuraghi can be seen from here, but the visibility of the coastline and the nearby islands in excellent.

Description: the monument is heavily damaged and its typology it very difficult to ascertain. In the northern part of the remains there is a 6.50m long sector of straight wall preserved up to 1m of height, while on the edge of the rock outcrop to its SE there is a 0.60m high wall built directly upon the natural rock. These remains indicate irregular rather than circular plan of the structure, which suggests it could be a protonuraghe.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 8109).



Remains of the masonry in the eastern part of Nuraghe Punta Molentis (Villasimius).



Remains of the wall in the northern part of Nuraghe Punta Molentis (Villasimius).



View from Nuraghe Punta Molentis towards the coast and the islands at the SE.

Nuraghe Sa Figu (Castiadas) (known also as Monte Cannas)

Condition: heavily damaged

Location: 39.20906, 9.557309. The structure is located on the top of a hill which constitutes the SE part of the massif of Monte Cannas. The sites of nuraghi Monte Turno and Gibe Truttiri are visible to the east.

Description: all that remains of this structure is a 2.60m high and up to 1.40m thick sector of a wall which constituted the northern part of the nuraghe. In the collapsed central part of the monument no distinguishable outline of internal spaces can be seen and the overall plan of the structure is unclear, thus it is difficult to ascertain its typology. It could have been a single-towered nuraghe (*monotorre*) or a circular protonuraghe. Just south of the preserved remains, on the edge of the hilltop there are natural rocks which could have been incorporated into the structure.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

2. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Nuraghe Sa Figu (Castiadas) – view from the NW.



Nuraghe Sa Figu (Castiadas) – view from the north.



The landscape contet of Nuraghe Sa Figu (Castiadas) – view from the south.

Nuraghe Sa Iba de Ziu Franciscu (Muravera)

Condition: heavily damaged

Location: 39.285198, 9.588288. The site is located on the top of a low hill which offers extensive view of the coastline. Nuraghi Sa Ridroxi and Mannu are visible to the NW.

Description: the circular structure has 7.10m in diameter, its outline is barely visible – only one incomplete course of stones has survived, especially on the northern arc. No obvious remains of the entrance can be seen, but it could have been oriented to the south (indicated by lack of a clear outline of the wall in the southern part of the nuraghe). South of the nuraghe, on a slope below it there are remains of a wall preserved up to 1.40m of height. On the slopes around the monument large amounts of pottery from the historic period which indicates re-use of the site in the Roman and/or medieval period.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Sa Iba de Ziu Franciscu (Muravera) – view from the north.



Remains of the wall below the nuraghe – view from the south.



Sherds of pottery found below Nuraghe Sa Iba de Ziu Franciscu (Muravera).

Nuraghe Sa Proca (Castiadas)

Condition: heavily damaged

Location: 39.1843947, 9.5726685. The monument is located on the top of a mountain overlooking the coastline. The sites of protonuraghi Cala Sinzias and Montixeddu are visible at the east, the sites of nuraghi Monte S'Ollastinu, Brobudu, Gibe Truttiri, Monte Turno, Sa Figu, San Pietro and Tersilia are visible at the north.

Description: typology of this monument is very diffcult to ascertain due to its poor condition – it survived mostly as a large concentration of debris with occasional remains of masonry. A large sector of the wall (7.60m of length, 1.35m of height) in the northern part of the site is at least partly secondary. On the western slope of the mountain, below the nuraghe, there are remains of a wall preserved up to 1.10m of height.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli*. Comune di Castiadas.



The best preserved part of masonry in Nuraghe Sa Proca (Castiadas).



Debris in the central part of Nuraghe Sa Proca (Castiadas).



View from Nuraghe Sa Proca (Castiadas) to the north.

Nuraghe Santa Matta (Muravera)

Condition: heavily damaged

Location: 39.411728, 9.584074. The monument is located on the ridge of a promontory which descends towards the east. Nuraghe Su Cunventu is visible at the NE.

Description: this monument is in very poor condition. The interrupted outline of the walls is visible on most of the tower's perimeter, reaching up to 1m of height at the north. The diameter of the tower is 11-11.50m. There are no distinguishable remains of the internal spaces and the typology of the monument is difficult to interpret.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Nuraghe Santa Matta (Muravera) – view from the NE.



Nuraghe Santa Matta (Muravera) – view from the NW.



View from Nuraghe Santa Matta towards the coastline at the NE.

Nuraghe Su Nuraxi – Via Castello (Muravera)

Condition: destroyed

Location: 39.4207375, 9.5726752. The site of the monument is located on a hill in the current town centre of Muravera.

Description: the monastery which was located on the hilltop included remains of a nuraghe. It was destroyed in the 1960s, the local people still point out large stone blocks located in a place called Nuraxi next to Via Castello. However, it is impossible to ascertain whether they come from the monastery or from the nuraghe.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Boulders near Via Castello (Muravera) which – according to the local people – come from 1960s dismantling of the monastery and remains of the nuraghe.

5. SETTLEMENTS ASSOCIATED WITH THE NURAGHI

Insediamento nuragico di Corritta (Muravera)

Condition: heavily damaged

Location: 39.3345287, 9.5431428. Remains of the settlement extend W-NW of the nuraghe of the same name.

Description: the exact extent and plan of the settlement are difficult to read due to collapses, large amounts of debris and vegetation. It seems probable that it included a wall running through the western slope of the hill with Nuraghe Corritta.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Remains of a wall west of Nuraghe Corritta (Muravera).

Insediamento nuragico di Domu de S‘Orcu (Muravera)

Condition: heavily damaged

Location: 39.3842521, 9.5882803. Remains of the settlement extend on a flat area around Nuraghe Domu S‘Orcu (Muravera).

Description: remains of at least one circular roundhouse are visible near the single-towered Nuraghe Domu ‘Orcu.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Remains of a circular hut in the settlement of Domu de S‘Orcu (Muravera).

Insediamento nuragico di Don Giovanni Mattaciolu (Muravera)

Condition: heavily damaged

Location: 39.310859, 9.6035099. The area of the settlement extends south of the nuraghe of the same name.

Description: remains of several circular huts are distinguishable in deep vegetation covering the promontory between the nuraghe and the unmade road.

References:
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Remains of a structure south of Nuraghe Don Giovanni Mattaciolu (Muravera).

Insediamento nuragico di Idda (Castiadas)

Condition: heavily damaged

Location: 39.247497, 9.5331515. Remains of the Nuragic settlement extend to the SE of Nuraghe Idda.

Description: possible remains of structures can be identified on a flat area extending SE of the nuraghe. The exact extent and plan of the settlement is difficult to distinguish.

References:
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Nuraghe Idda (Castiadas) and posible extent of the settlement – view from the NE.

Insediamento nuragico di Manunzas (Castiadas)

Condition: heavily damaged

Location: 39.1363206, 9.5386246. Remains of the Nuragic settlement are located on a ridge south of Nuraghe Manunzas.

Description: E. Valtan (2003: 15) describes the settlement as consisting of “substantial number of huts built of medium-sized stones”. Few of them are still distinguishable on a ridge south of the nuraghe. Sherds of Roman pottery were found within the area of the settlement, confirming longevity of the period in which it was inhabited.

References:

1. Valtan, E. 2003. *Villasimius Antiqua. Nuraghi ed altro in riva al mare*. Comune di Villasimius.



Remains of a circular hut south of Nuraghe Manunzas (Villasimius).

Insediamento nuragico di Marongiu (Muravera)

Condition: heavily damaged

Location: 39.3807692, 9.5661467. Remains of this small Nuragic settlement are located on a narrow ridge around Protonuraghe Marongiu.

Description: the settlement consisted of few circular huts, its extent was probably limited to the promontory with Protonuraghe Marongiu.

References:
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These remains of structures are located east of Protonuraghe Marongiu (Muravera).

Insediamento nuragico di Monte Zippiri

Condition: heavily damaged

Location: 39.3682895, 9.577349. Probable remains of a Nuragic settlement are located east of Nuraghe Monte Zippiri, on the same promontory.

Description: remains of a wall with probable trace of a circular structure are distinguishable east of the nuraghe. In addition, there is a well-preserved elongated structure of rounded shape of uncertain age.

References:
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Remains of a structure located east of Nuraghe Monte Zippiri (Muravera).



A well-preserved structure of uncertain age east of Nuraghe Monte Zippiri.



Remains of a structure east of Nuraghe Monte Zippiri (Muravera).

Insediamento nuragico di Nicola Podda (Muravera)

Condition: heavily damaged

Location: 39.3279666, 9.58202. The area of a settlement extends north and west of Nuraghe Nicola Podda.

Description: possible remains of several hut circles are visible on the ridge of a mountain massif near Nuraghe Nicola Podda.

References:
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Remains of a circular hut located NW of Nuraghe Nicola Podda.

Insediamento nuragico di Sa Spadula (Muravera)

Condition: heavily damaged

Location: 39.3640095, 9.5693131. Remains of this Nuragic settlement occupy a rocky ridge north of Nuraghe Sa Spadula.

Description: the exact extent and plan of the settlement is difficult to read due to heavy vegetation and poor condition of structures. However, considering complexity of the nuraghe and significant extent of area suitable for construction of buildings it could have been a settlement of above average size.

References:
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Remains of a structure north of Nuraghe Sa Spadula (Muravera).

Insediamento nuragico di Su Cunventu (Muravera)

Condition: partly damaged

Location: 39.4161965, 9.584135. Remains of this settlement are located on the top and gentle slopes of a hill with Nuraghe Su Cunventu.

Description: east of the nuraghe there are clearly distinguishable remains of a circular hut. SE of the nuraghe there are remains of a rectangular structure with at least two rooms, possibly of Iron Age – comparable to rectangular structures from the Nuragic settlements near Paulilatino (Moravetti 2000) – or Roman origin.

References:
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Remains of a circular hut in the settlement of Su Cunventu (Muravera).

6. OPEN SETTLEMENTS

Insediamento nuragico di Riu Mannu (San Vito)

Condition: heavily damaged

Location: 39.3744955, 9.5412531. The site of the open settlement as indicated by Piano Paesaggistico Regionale is located on a low hill, south of the mountain with Protonuraghe Comideddu.

Description: no traces of a nuraghe can be distinguished, suggesting that the settlement was probably an open one. Thick vegetation covering much of its area makes it difficult to distinguish remains of specific structures.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 9892).



The site of the Bronze Age settlement of Riu Mannu (San Vito).

Insediamento nuragico di Feraxi (Muravera)

Condition: heavily damaged

Location: 39.3111246, 9.5956242. The site is located at the foot of a mountain massif, east of nuraghi Garrabosu and Baracca Su Entu, some 500m west of Nuraghe Don Giovanni Mattaciolu.

Description: site of a Nuragic complex is an uncultivated area with possible poorly distinguishable remains of structures.

References:
1. 2006. Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari (number 9931).



View over the settlement area as seen from the east.

Insediamento nuragico di Monte Antoni Peppi (Muravera)

Condition: heavily damaged

Location: 39.3644305, 9.5952058. The site of a Bronze Age settlement is located on the top of a mountain overlooking the coastline.

Description: near the rocky hilltop of Monte Antoni Peppi there is a semi-circular concentration of stone blocks with possible traces of masonry which can be interpreted as debris from a collapsed structure. On the eastern slope of the mountain undiagnostic sherds of pottery were found.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.
2. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 9905).



Monte Antoni Peppi (Muravera) – view from the NE.



Undiagnostic sherd of pottery found on the eastern slope of Monte Antoni Peppi.



Possible remains of a structure near the summit of Monte Antoni Peppi (Muravera).

7. TOMBE DI GIGANTI

Tomba di giganti Bau S'Arena (Muravera)

Condition: mediocre

Location: 39.2880563, 9.5765778. The monument is located on the culmination of a low hill west of Protonuraghe Sa Ridroxi.

Description: the tomb has a small exedra of 3.40m width and a 6.05 m long burial chamber which reaches 1.05m width. There are no traces of a stele in the centre of the exedra, which suggests that it is a type C tomb built in the Middle Bronze Age. 30m north of the tomb there is another megalithic tomb, identified by Ledda (1985: 302) as *tomba a corridoio*, as it lacks exedra.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Tomba di giganti *Bau S'Arena (Muravera) – view from the SE.*



The burial chamber of tomba di giganti *Bau S'Arena (Muravera).*



Tomba di giganti *Bau S'Arena (Muravera) – view from the NE.*

***Tomba di giganti* Masone Pardu (Castiadas)**

Condition: partly damaged

Location: 39.2566857, 9.5094019. The monument is located on the eastern slope of a gentle hill. Nuraghi Monte Ontroxiu, Monte Gruttas and Birru are visible to the north.

Descripton: the burial chamber is 6.95m long (it is possible it was longer originally) and up to 0.95m wide, it has the NW-SE orientation (circa 240-50º). None of the capstones is in its original position and no distinguishable remains of the exedra or the entrance survived. The tomb does not seem to be associated with any specific nuraghe or settlement.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera*. Quartu Sant' Elena: Sardalito.

2. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli*. Comune di Castiadas.



The burial chamber of tomba di giganti *Masone Pardu (Castiadas).*



The southern part of the burial chamber of tomba di giganti *Masone Pardu.*



The burial chamber of tomba di giganti *Masone Pardu (Castiadas).*

***Tomba di giganti* Mitza Sa Granaccia (Muravera)**

Condition: heavily damaged

Location: 39.267576, 9.572978. The monument is located on a gentle slope descending to the north. The coastline could have been visible at the east, but currently the vies is blocked by houses. Nuraghe Mitza Sa Granaccia is visible at the SW.

Description: among the remains of this heavily damaged monument there is a probable part of the burial chamber (2.30m long) and possible course of the roughly N-S aligned exedra reaching some 8m of length. The poor state of preservation does not allow to assess the typology of this tomb.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Tomba di giganti *Mitza Sa Granaccia – remains of the masonry.*



Probable remains of the burial chamber in tomba di giganti *Mitza Sa Granaccia.*



Remains of the cyclopean masonry in tomba di giganti *Mitza Sa Granaccia.*

***Tomba di giganti* Mont'Arbu (Muravera)**

Condition: mediocre

Location: 39.3133638, 9.5499703. The monument is located on the culmination of a low hill west of the massif of Monte Liuru mountain. Nuraghi Cann'e Frau and Monte Ontroxiu are visible at the east.

Description: the tomb has 10.40m in length and up to 5.80m in width, the burial chamber has 0.70m width in it ending part, 1.15m in it central part and 1.10m near the entrance. The entrance opens to the south (circa 185º). The exedra is heavily damaged, there is no evidence for existence of a stele – this allows to attribute this tomb to the Middle Bronze Age.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



The burial chamber of tomba di giganti *Mont'Arbu (Muravera).*

***Tomba di giganti* Monte Crobu I (Castiadas)**

Condition: mediocre

Location: 39.2817991, 9.5504451. The monument is located on a flat lowland area south of the massif of Monte Crobu mountain, circa 150m east of *tomba di giganti* Monte Crobu II.

Description: the burial chamber of this tomb is at least 13.50m long, its ceiling made of capstones is preserved on 3.20m long sector. The height of the chamber is up to 0.90m (measuring from the current floor level). The exedra survived in fairly good condition (especially its southern wing, the northern one is partly damaged), it is circa 15m wide, 2m thick and is preserved up to 1.30m of height. There is no evidence for presence of stele in the middle of exedra – combined with the coursed cyclopean masonry structure indicates the Middle Bronze Age origin of the tomb.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Tomba di giganti *Monte Crobu I (Castiadas) – the southern wing of exedra.*



Tomba di giganti *Monte Crobu I (Castiadas) – the southern wing of exedra.*



The burial chamber – general view (left) and its well-preserved part (right).

***Tomba di giganti* Monte Crobu II (Castiadas)**

Condition: partly damaged

Location: 39.282069, 9.5489189. The monument is located on a gentle slope south of Monte Crobu mountain, circa 150m west of *tomba di giganti* Monte Crobu I.

Description: the burial chamber of at least 13.40m length is oriented from the NW to the SE (330-150º). One of the capstones (1.80 x 0.80 x 0.15m) is still preseved, although partly moved. In the northern part of the tomb its clear outline with kerbstones is visible (2.20m of width). The southern part of the tomb with probable remains of exedra and entrance is heavily damaged and diffcult to interpret.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Part of the burial chamber of tomba di giganti *Monte Crobu II (Castiadas).*



Kerbstones in the outline of the structure of tomba di giganti *Monte Crobu II.*



The burial chamber of tomba di giganti *Monte Crobu II (Castiadas).*

***Tomba di giganti* Monte Zippiri (Muravera)** (known also as Monte Su Zippiri)

Condition: mediocre

Location: 39.369662, 9.578471. The monument is located on the SW slope of Monte Zippiri, NE of the nuraghe of the same name. Nuraghe Santoru is visible at the west.

Description: the elongated burial chamber is oriented to the NW (circa 275°). Its eastern part is a niche in the natural rock (possibly artificially enhanced or re-used *domus de janas*), while the western one consists of the walls constructed with use of the coursed cyclopean masonry. The entrance to the tomb does not have a stele which allows to classify it as type C tomb. One of two preserved capstones has 1.30 x 0.70 x 0.30m dimensions, while the architrave over the entrance (visible mainly from the interior of the chamber) is 1.20m long. The total length of the burial chamber is 4.40m, its height in the eastern part is 1.45m (depth of the cavern in the natural rock is 1.80m), while the width varies from 0.75m near the entrance to 2.10m in the eastern part. The exedra of the tomb is only partly preserved – its northern wing is 3.80m long, while the southern one is destroyed.

References:
1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.
2. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.



Tomba di giganti *Monte Zippiri – the western part of the burial chamber.*



Tomba di giganti *Monte Zippiri (Muravera) – the central part of the exedra.*



Tomba di giganti *Monte Zippiri (Muravera) – the eastern part of the burial chamber.*

***Tomba di giganti* Sant' Aleni (San Vito)**

Condition: destroyed

Location: the monument was located few hundred meters north of Nuraghe Sant' Aleni and was completely destroyed during construction of a local road in the 1980s.

Description: nothing is known about typology of the tomb. Some of the boulders constituting part of the structure were dumped near the bridge east of Monte Idda.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol 1/8: Cagliari* (number 9896).



Stone blocks originally constituting part of tomba di giganti Sant' Aleni (San Vito).

***Tomba di giganti* Cuili Camisa (Castiadas)**

Condition: destroyed

Location: 39.3017023, 9.4968224 (approximately).

Description: no distinguishable traces of the megalithic tomb could be identified during the survey.

Reference:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli.* Comune di Castiadas.

***Tomba di giganti* Sa Spadula (Muravera)**

Condition: destroyed

Location: 39.3601005, 9.5652509 (approximately). The monument was located SW of the nuraghe of the same name.

Description: the monument was destroyed in 1987 during road construction. No description or details regarding its architecture or typology are known.

Reference:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.

8. DUBIOUS AND NEGATIVELY VERIFIED SITES

Protonuraghe Baccu di Monte Nai (Muravera)

Location: 39.242771, 9.561481 (approximately). The location lies not far from the pre-nuragic standing stones and remains of the Punic fort of Baccu di Monte Nai.

Description: the protonuraghe is mentioned by Ledda (1985: 315), but no trace of it could be located during the survey. Ledda's photograph does show what appears to be natural rocks without any obvious remains of a structure.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.

Nuraghe Mannu II (Muravera)

Location: 39.3177984, 9.5578051. A rocky hilltop in the SW part of the massif of Monte Liuru.

Description: no traces of a structure could be located on this nor other nearby hilltops, Soprintendenza per i beni archeologici di Cagliari e Oristano could not locate it either (Manunza, personal communication). Most likely it is an error of the IGM (Istituto Geografico Militare) map.

References:

1. *Norme di tutela dei beni paesaggistici e dei beni identitari.* Comune di Muravera.

Nuraghe Sinzias (Castiadas)

Location: 39.1818281, 9.5753038. Supposed site of the monument is located on the ridge of a hill overlooking the coast. Protonuraghe Cala Sinzias and Nuraghe Sa Proca are visible from here.

Description: no remains of a Nuragic structure could be located during two surveys of the area. Close to the top of a hill there are remains of a rectangular structure, probably of modern origin.

References:

1. 2004. *Comune di Castiadas: Risorse archeologice e sistema dei vincoli*. Comune di Castiadas.

Bruncu S'Arrosadu (Muravera)

Location: 39.2960648, 9.5456386. The summit of Bruncu S'Arrosadu is located north of the massif of Monte Crobu.

Description: Leda (1985: 125-126) reports a collapsed megalithic wall of possible Nuragic origin at the summit of Bruncu S'Arrosadu. The structure could not be conclusively indentified during the survey for this project, but a find of handmade pottery with inclusions, similar to those found near other nuraghi in this area, suggests a possible Nuragic site.

References:

1. Ledda, R. 1985. *Censimento archeologico nel territorio del Comune di Muravera.* Quartu Sant' Elena: Sardalito.



Sherd of pottery found near the summit of Bruncu S'Arrosadu (Muravera).

Appendix 2. Nuragic sites in sample area 2

1. Protonuraghi

Baccu Argiolasi (Barisardo).....555
Baccu Arzula (Tortoli).....557
Foxi (Barisardo).....559
Geperarci (Barisardo).....561
Muxieddu (Tortoli).....563
Serra ‘e Ladamini (Tortoli).....565
Serras Interazzas (Tortoli).....567

2. Mixed-type nuraghi

Murcu (Cardedu).....569

3. Single-towered nuraghi

Genna Masoni (Cardedu).....571
Nuraxeddu (Tortoli).....573
Nurta (Elini).....575
Su Fraii (Cardedu).....577
Su Ziniburu (Barisardo).....579
Trunconi (Cardedu).....581

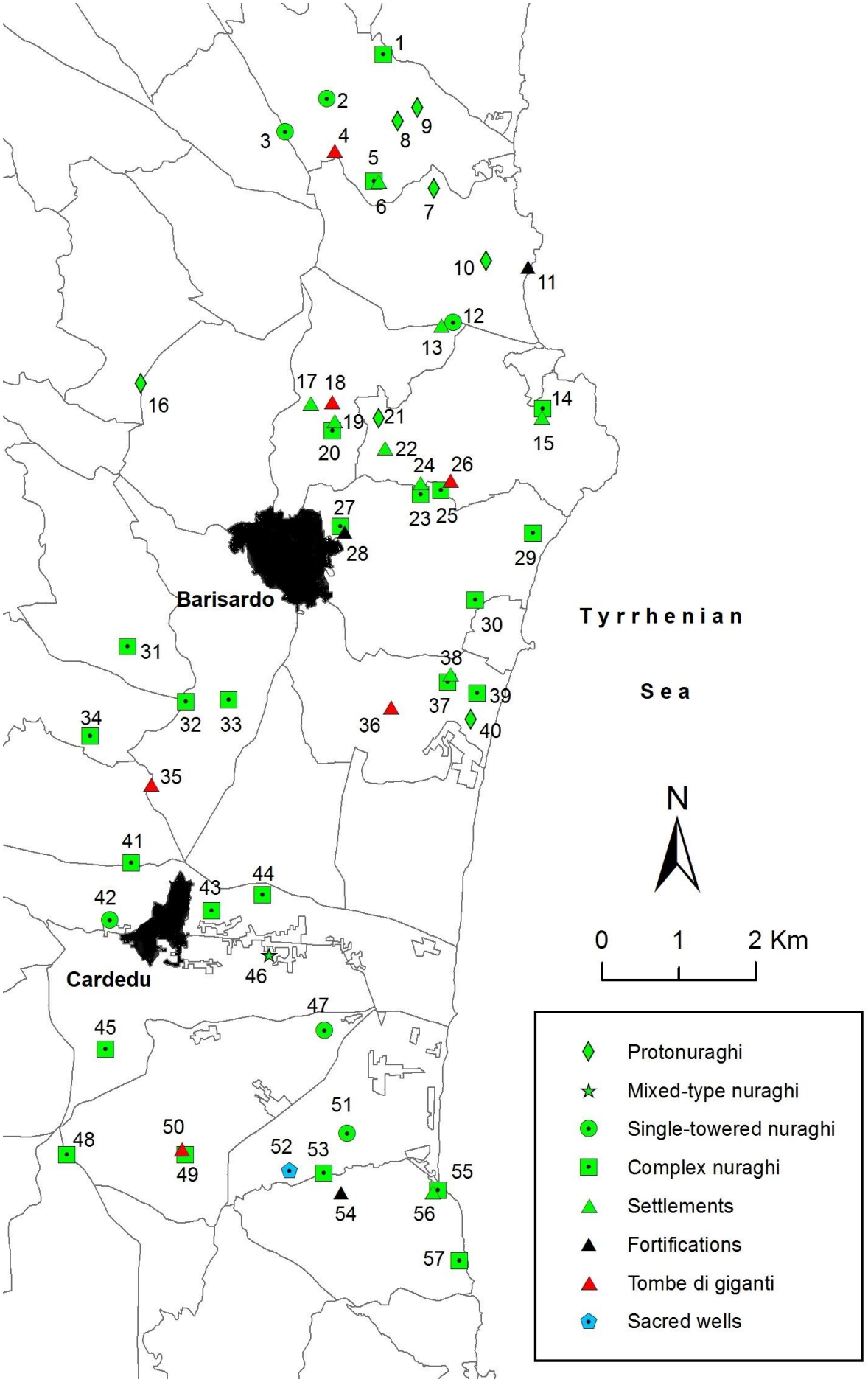
4. Complex nuraghi

Arbu (Lanusei).....583
Boschinu (Barisardo).....585
Brocca (Cardedu).....587
Cardedu (Cardedu).....589
Cea (Loceri).....591
Corti Accas (Tortoli).....594
Desfollas (Cardedu).....597
Giba ‘e Scorka (Barisardo).....599
Iba Manna (Barisardo).....601
Lurcuri (Barisardo).....604
Mattale (Barisardo).....606
Mindeddu (Barisardo).....609
Moru (Barisardo).....612
Niedda Puliga (Barisardo).....616
Perd’e Pera (Cardedu).....618
Puliga (Loceri).....620
Sa Perda ‘e S’Obiga (Cardedu).....623
Sa Serra de Is Perdas (Osini).....625
Sellersu (Barisardo).....627
Serra ‘e S’Omu (Cardedu).....631
Su Angedu (Cardedu).....633
Su Crastu (Barisardo).....635
Turuddis (Tortoli).....637
Ursu (Lanusei).....640

5. Settlements

Baccu Argiolasi (Barisardo).....642
Iba Manna (Barisardo).....644
Lurcuri (Barisardo).....644
Moru (Barisardo).....644
Perd’e Pera (Cardedu).....646
Sellersu (Barisardo).....648
Su Ziniburu (Barisardo).....650
Teccu (Barisardo).....651

Turuddis (Tortoli).....652
6. Fortifications
Monte Arista (Cardedu).....653
Punta Cea (Tortoli).....655
Su Crastu (Barisardo).....657
7. *Tombe di giganti*
Bellisceddu (Barisardo).....659
Brocca (Cardedu).....661
Fragori (Barisardo).....663
Iba Manna (Barisardo).....665
Niedda Puliga (Barisardo).....665
Preda Longa (Tortoli).....665
8. *Pozzi sacri*
Su Presoni (Cardedu).....667


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
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18
19
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21
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56
57
Barisardo
Cardedu
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2 Km
Protonuraghi
Mixed-type nuraghi
Single-towered nuraghi
Complex nuraghi
Settlements
Fortifications
Tombe di giganti
Sacred wells

Protonuraghi: 7 – Baccu Arzula, 8 – Serras Interazzas, 9 – Serra ‘e Ladamini, 10 – Muxieddu, 16 – Geperarci, 21 – Baccu Argiolasi, 40 – Foxi

Mixed-type nuraghi: 46 – Murcu

Single-towered nuraghi: 2 – Nuraxeddu, 3 – Nurta, 12 – Su Ziniburu, 42 – Trunconi, 47 – Genna Masoni, 51 – Su Fraii

Complex nuraghi: 1 – Corti Accas, 5 – Turuddis, 14 – Sellersu, 20 – Iba Manna, 23 – Moru, 25 – Niedda Puliga, 27 – Su Crastu, 29 – Giba ‘e Scorka, 30 – Boschinu, 31 – Cea, 32 – Puliga, 33 – Mattale, 34 – Ursu, 37 – Lurcuri, 39 – Mindeddu, 41 – Arbu, 43 – Cardedu, 44 – Sa Perda ‘e S’Obiga, 45 – Serra ‘e S’Omu, 48 – Sa Serra de Is Perdas, 49 – Brocca, 53 – Desfollas, 55 – Perd’e Pera, 57 – Su Angedu

Settlements: 5 – Turuddis, 13 – Su Ziniburu, 15 – Sellersu, 17 – Teccu, 19 – Iba Manna, 22 – Baccu Argiolasi, 24 – Moru, 38 – Lurcuri, 56 – Perd’e Pera

Fortifications: 11 – Punta Cea, 28 – Su Crastu, 54 – Monte Arista

Tombe di giganti: 4 – Preda Longa, 18 – Iba Manna, 26 – Niedda Puliga, 35 – Bellisceddu, 36 – Fragori, 50 – Brocca

Sacred wells: 52 – Su Presoni

1. PROTONURAGHI

Protonuraghe Baccu Argiolasi (Barisardo)

Condition: heavily damaged

Location: 39.8571638, 9.6599704. The monument is located over the northern edge of the plateau of Teccu. The coastline is visible at the north.

Description: this irregular-shaped structure with collapsed internal spaces is most likely a protonuraghe. In its central part remains of a corridor 0.90m width are distinguishable. The outer wall-face of the structure is best preserved in its SE part, it reaches up to 1.40m of height.

References:
– (the site was located by M. Castoldi)



Cyclopean masonry of Protonuraghe Baccu Argiolasi (Barisardo) and view towards coastline.



Remains of a corridor in Protonuraghe Baccu Argiolasi (Barisardo).



Undiagnostic sherds of pottery found near Protonuraghe Baccu Argiolasi (Barisardo).

Protonuraghe Baccu Arzula (Tortoli)

Condition: heavily damaged

Location: 39.8844564, 9.6684864. The monument is located on the culmination of a rocky ridge. The coastline is visible to the NE only, Nuraghe Turuddis is visible to the west.

Description: the monument is semi-oval in shape, it rests upon the natural rocks. The structure is 8.70m long, the outer wall-face is preserved up to 3.60m of height. In the eastern part of the structure there are possible traces of an internal space – a corridor or a small chamber. Overall shape of the monument, probability of existence of a corridor, archaic polygonal-cyclopean masonry and heavy use of natural rock support interpretation of this structure as a corridor nuraghe.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2204).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Protonuraghe Baccu Arzula (Tortoli) – view from the S-SE.



Protonuraghe Baccu Arzula (Tortoli) – view from the east.



Possible remains of a corridor in Protonuraghe Baccu Arzula (Tortoli).

Protonuraghe Foxi (Barisardo)

Condition: heavily damaged

Location: 39.8217752, 9.6734619. The monument is located on the culmination of a hill circa 200m west of the coastline and 100m north of the water channel. Nuraghe Lurcuri is visible to the NW and Nuraghe Mindeddu to the north.

Description: this irregular-shaped monument survived in poor condition. In its northern part there is a semi-oval wall of 7.80m length which survived up to 1.90m of height. In the central part of the protonuraghe there are traces of a corridor of 1.70m width and SW-NW orientation. In the western part of the structure there is a wall of 1.80m height and 2.60m length which fills a gap between natural rocks.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.

2. Bagella, S. 1998. “Corridors nuraghi: territorial aspects” in *Papers from the EAA Third Annual Meeting at Ravenna 1997. Volume III: Sardinia*. Edited by Moravetti, A. Oxford: Archaeopress.



The best preserved part of the outer wall-face is located in the NE part of Protonuraghe Foxi (Barisardo).



Masonry in the northern part of Protonuraghe Foxi (Barisardo).



Remains of the corridor in Protonuraghe Foxi (Barisardo).

Protonuraghe Geperarci (Barisardo)

Condition: partly damaged

Location: 39.8614803, 9.6235849. The monument is located on the culmination of a promontory overlooked by higher ground at the west. Nuraghe Iba Manna is visible to the east, while Nuraghe Su Crastu and coastline are visible to the SE.

Description: this protonuraghe has a T-shaped corridor with two entrances. One of them is located in western part of the structure, the other one in the southern part. The western entrance has 1.20 x 0.90 x 1.10m dimensions and an architrave of 1.90 x 1.50 x 0.50m dimensions, while the southern entrance is 1.60m wide. The E-W oriented part of the corridor is 6.80m long (it has partly preserved capstones), the N-S oriented one is partly collapsed and preserved on 5m of length.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2204).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.
3. Bagella, S. 1998. “Corridors nuraghi: territorial aspects” in *Papers from the EAA Third Annual Meeting at Ravenna 1997. Volume III: Sardinia*. Edited by Moravetti, A. Oxford: Archaeopress.



The western entrance to Protonuraghe Geperarci (Barisardo).



Roughly N-S oriented part of the corridor of Protonuraghe Geperarci (Barisardo).



Preserved part of the corridor behind the western entrance to Protonuraghe Geperarci (Barisardo).

Protonuraghe Muxieddu (Tortoli) (known also as Musciu)

Condition: heavily damaged

Location: 39.8756571, 9.6766068. The monument is located on the top of a rocky hill with view of the coastline to the SE.

Description: the structure is roughly rectangular in shape, its length is over 11m. At the west it consists entirely of the natural rocks. The entrance is oriented to the east (circa 100°) and is preserved up to 1.50m of height (the northern side). It is followed by a 1.80m long corridor which reaches from 0.95 to 1.90m of width and ends with a natural rock. No other remains of internal spaces and be distinguished.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2968).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The corridor of Protonuraghe Muxieddu (Tortoli) – view from the east.



The northern part of Protonuraghe Muxieddu (Tortoli).



Protonuraghe Muxieddu (in the centre) in its landscape context – view from the NE.

Protonuraghe Serra ‘e Ladamini (Tortoli)

Condition: mediocre

Location: 39.8938224, 9.6662414. The monument is located on a rocky ridge of the massif of Serra ‘e Ladamini. Extensive view of the coastline to the east (up to current harbor in Arbatax), Protonuraghe Baccu Arzula is visible to the south.

Description: this oval structure rests upon a rocky outcrop, it has circa 7m in diameter (measured on roughly N-S axis). The entrance of 2.50 x 0.90m dimensions opens to the south (circa 170º), it is followed by a corridor preserved on 5.20m length which turns left almost immediately behind the entrance. The outer wall-face of the structure reaches up to 2.80m of height in its southern part. A gap between the natural rocks which leads to the protonuraghe from the S-SW is blocked with a wall of 2.95m length an 1.95m height. South of the protonuraghe there is another wall which fill a gap between the natural rock outcrops, it is of SE-NW orientation, 7.30m length and up to 2.25m high. Overall, the complex is remarkably well-integrated with the natural rocks.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Entrance to Protonuraghe Serra ‘e Ladamini (Tortoli) – view from the south.



Protonuraghe Serra ‘e Ladamini (Tortoli) and it setting on natural rock outcrops.



The SE wall which fills a gap between two rock outcrops.

Protonuraghe Serras Interazzas (Tortoli)

Condition: partly damaged

Location: the monument is located on a culmination of a rocky ridge parallel to the one which holds Protonuraghe Serra ‘e Ladamini (visible to the east). Limited visibility of the coastline to the NE and SE.

Description: the structure consists of two walls enclosing a 5.40m long gap between natural rock outcrops. The eastern wall survived in relatively good condition (it is 3.20m high), while the western one is collapsed, and so are internal spaces (corridor or a small chamber) of the structure. East of the structure, on a slope which constitutes the easiest approach to the site, there is a wall of 11.50m length preserved up to 1.60m height.

References:

1. 2006. Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra (number 2964).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Protonuraghe Serras Interazzas (Tortoli) seen from the N-NE.



Protonuraghe Serras Interazzas (Tortoli) in its landscape context – view from the SE.



Remains of the wall on a slope east of Protonuraghe Serras Interazzas (Tortoli).

2. MIXED-TYPE NURAGHI

Nuraghe Murcu (Cardedu)

Condition: partly damaged

Location: 39.7939878, 9.6425629. The site is located on a low rise of the ground in the centre of a valley. Nuraghe Cardedu is visible at the NW, Nuraghe Sa Perda e S'Obiga could have been visible at the north.

Description: this elongated structure of 13.50m length (originally longer) is a probable example of mixed-type nuraghe (*nuraghe misto*) with elements of protonuraghe and tholos nuraghe. The entrance is oriented to the south (circa 180°) and followed with a 5.30m long corridor which leads to partly collapsed chamber which reaches 4.50m of diameter. The outer wall-face of the structure survived up to 1.60m at the east, while the western part of the nuraghe is heavily damaged.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 8301).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The tower of Nuraghe Murcu (Cardedu) – view from the east.



The corridor of Nuraghe Murcu (Cardedu).



The entrance to Protonuraghe Murcu (Cardedu) – view from the south.

3. SINGLE-TOWERED NURAGHI

Nuraghe Genna Masoni (Cardedu)

Condition: partly damaged

Location: 39.7849997, 9.6509609. The monument is located on an elongated ridge which is the eastern continuation of the massif of Monte Perdu Pili. This location offers an extensive view of the coastline. Locations of Nuraghi Murcu, Sa Perda ‘e S’Obiga, Cardedu and Trunconi are visible from here.

Description: this single-towered nuraghe has 9.20m in diameter and an entrance of 1.35 x 0.85m dimensions and SW orientation (circa 125º). The entrance corridor is preserved on 3.80m of length, to its right there is a niche of 1.70 x 1.10m dimensions and 1.65m of depth. Opposite to it, left of the entrance, there is an intra-mural staircase of 0.65m width.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 8300).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Nuraghe Genna Masoni (Cardedu) – view from the south.



Entrance to the collapsed tholos chamber of Nuraghe Genna Masoni (Cardedu).



Niche located right of the entrance to Nuraghe Genna Masoni (Cardedu).

Nuraghe Nuraxeddu (Tortoli)

Condition: partly damaged

Location: 39.8949378, 9.6523368. The monument is located on the culmination of a low hill with very gentle slopes. Nuraghe Nurta is visible to the NW and Nuraghe Turuddis to the NE. The coastline is not visible from here.

Description: a circular structure of 10.30m diameter (measured on roughly E-W axis). The outer wall-face is best preserved in the northern part of the nuraghe, it is up to 3.90m high. In the collapse central part of the nuraghe there are traces of an internal space, chamber or a corridor (in the latter case it could warrant interpretation of the structure as protonuraghe).

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2963).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The northern part of Nuraghe Nuraxeddu (Tortoli).



Nuraghe Nuraxeddu (Tortoli) – view from the south.



Remains of a collapsed corridor(?) in Nuraghe Nuraxeddu (Tortoli).

Nuraghe Nurta (Elini)

Condition: mediocre

Location: 39.8911008, 9.6458995. The monument is located on the top of a hill. The coastline is visible at the SE, nuraghi Turuddis and Nuraxeddu are visible to the east.

Description: this single-towered nuraghe has 9.30m in diameter. In its centre there is a partly preserved tholos chamber of 3.30m diameter in its highest preserved point (measured on SW-NE axis). The outer wall-face of the tower is best preserved on its NW arc where it is up to 3.80m high. The eastern part of the nuraghe is mostly collapsed, in its southern part the structure rests upon natural rocks.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2956).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.

3. Nieddu, C. 2006. *Siti archeologici d'Ogliastra*. Provincia d'Ogliastra.



Nuraghe Nurta (Elini) – view from the SW.



The tholos chamber of Nuraghe Nurta (Elini).



Nuraghe Nurta (Elini) in its landscape context – view from the north.

Nuraghe Su Ziniburu (Barisardo)

Condition: heavily damaged

Location: 39.8684605, 9.6714476. The monument is located on the culmination of the second northernmost promontory of the plateau of Teccu. Protonuraghi Muxieddu and Serra ‘e Ladamini are visible to the north, while the visibility of the coastline is limited.

Description: this single-towered nuraghe is preserved as a mound of debris with outline of a wall visible in its northern and western part. The pest preserved part of the outer wall-face is in the NE part of the nuraghe where it reaches up to 1.55m height. The internal spaces are completely collapsed and impossible to distinguish.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2969).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The outer wall-face in the NE part of Nuraghe Su Ziniburu (Barisardo).



Nuraghe Su Ziniburu (Barisardo) – view from the west.



View from Nuraghe Su Ziniburu towards the massif of Serra ‘e Ladamini.

Nuraghe Su Fraii (Cardedu)

Condition: mediocre

Location: 39.7727585, 9.6542479. The monument is located on the top of a hill with steep slopes. This location offers extensive view of the coastline, Nuraghe Genna Masoni is visible to the north.

Description: the tholos chamber of this single-towered nuraghe is partly preserved, it has 3.50m in diameter on it current floor level (measured on N-S axis). The entrance opens atypically to the E-NE (circa 70º), it has an architrave of 1.10 x 0.70 x 0.30m dimensions. Left of the entrance there are traces of an intra-mural staircase. The overall diameter of the tower is 10.40m (measured on SW-NE axis).

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2042).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Partly preserved tholos chamber of Nuraghe Su Fraii (Cardedu) – view from the north.



Remains of the entrance to Nuraghe Su Fraii (Cardedu).



Outer wall-face of Nuraghe Su Fraii (Cardedu).

Nuraghe Trunconi (Cardedu)

Condition: partly damaged

Location: 39.7982382, 9.6181615. The site is located on the top of a rocky mountain, it has been constructed directly upon a natural rock. Nuraghe Cardedu is visible at the east, the site of Nuraghe Murcu is visible at the SE.

Description: the structure consists of a small circular tower which rests upon a natural rock in it northern part, as well as a wall locate below it to the east. The tower is preserved up to 3m of height, inside it there is a trace of an internal space of roughly N-S orientation. The wall to east of the tower (possibly a small bastion) is L-shaped, it is preserved up to 2.40m of height.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 8303).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Nuraghe Trunconi (Cardedu) – a general view.



The eastern part of the bastion in Nuraghe Trunconi (Cardedu).



Nuraghe Trunconi (Cardedu) – the eastern part of the tower.

4. COMPLEX NURAGHI

Nuraghe Arbu (Lanusei)

Condition: partly damaged

Location: 39.8049291, 9.6215156. The monument is located on the top of a hill which offers view of the coastline and Nuraghe Cardedu to the east. Views to the NE and SE are limited by hills and the massif of Monti Ferru respectively. The easiest approach to the nuraghe is from the west, the slope is particularly steep at the east.

Description: this complex structure consists of the main tower of 8.40m diameter and a rounded bastion adjacent to its western part. The bastion is preserved up to 3.60m of height. The outer wall-face of the main tower is in best condition in its NW part (up to 2.80m of height). The entrance is located in the SE part of the tower (circa 100º). On the western slope of the hill there are remains of a megalithic wall preserved up to 1.40m of height, possibly an antemural.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2275).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Nuraghe Arbu (Lanusei) – view from the north.



The hilltop with Nuraghe Arbu (Lanusei) – view from the east.



Remains of a possible antemural located west of Nuraghe Arbu.

Nuraghe Boschinu (Barisardo)

Condition: mediocre

Location: 39.8358397, 9.6744812. The monument is located on the top of a low hill with gentle slopes which offers view of the coastline. Nuraghi Niedda Puliga and Moru are visible to the NW.

Description: this complex nuraghe originally consisted of at least two towers. The southern tower survived in slightly better condition, it has a circular chamber of 3.20 x 3m diameter preserved up to 2.70m in its NE part. A 2.30m long passage (an architrave of the outer doorway has 1.20 x 0.60 x 0.45m dimensions) connects it with a courtyard of 2.70m length. In the northern part of this courtyard there is the entrance (1 x 0.90m dimensions, architrave of 1.35 x 0.75 x 0.85m dimensions) to the northern tower. The entrance corridor is 3.20m long and up to 1.60m wide. At its end there is a completely collapsed chamber and to its right there are traces of a niche.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1885).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The entrance to the northern tower of Nuraghe Boschinu (Barisardo).



Interior of the southern tower of Nuraghe Boschinu (Barisardo).



The courtyard of Nuraghe Boschinu (Barisardo) seen from the main tower.

Nuraghe Brocca (Cardedu)

Condition: partly damaged

Location: 39.7704331, 9.6294871. The monument is located on the top of a hill with a limited view of the coastline to the east. The site of Nuraghe Genna Masoni is visible to the NE and the site of *pozzo sacro* Su Presoni to the SE. *Tomba di giganti* Brocca is located about 100m to the NE.

Description: this structure consists of two towers. The main tower survived in best condition in its eastern part (up to 2.70m of height). The eastern tower (possibly a bastion) is adjacent to the SE part of the main tower; it has about 6m in diameter and survived up to 1.80m of height in its northern part. The entrance to the complex was located probably in its collapsed southern part.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2038).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The main tower of Nuraghe Brocca (Cardedu) – view from the north.



Remains of a bastion or lateral tower of Nuraghe Brocca (Cardedu).



The hilltop with Nuraghe Brocca (Cardedu) – view from the SW.

Nuraghe Cardedu (Cardedu)

Condition: partly damaged

Location: 39.799214, 9.6338162. The monument is located on the top of a hill overlooking the town of Cardedu. Nuraghi Trunconi (west) and Sa Perda ‘e S’Obiga (east) are visible from here.

Description: this complex structure consists of the main tower and remains of a bastion or lateral tower. The main tower survived up to 2.90m of height in its western part, it was built with the use of coursed cyclopean masonry (seven courses of stones preserved near the entrance to the tower). The entrance to the main tower is located immediately west of the place where the bastion/lateral tower is adjacent to the main tower. The architrave of the entrance has 1.35 x 0.85 x 0.45m dimensions, while the entrance corridor is 3.20m long and leads to the chamber of 3.90m diameter (measured on N-S axis). The bastion/lateral tower is oval in shape and is preserved up to 2.70m of height, in its eastern part there are possible remains of the entrance. Separate entrances to both towers and apparent lack of communication between them suggest that the monument could have been built in two phases.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 8302).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The entrance to Nuraghe Cardedu (Cardedu).



The outer wall-face in the western part of Nuraghe Cardedu (Cardedu).



Possible remains of the entrance to the bastion/lateral tower of Nuraghe Cardedu.

Nuraghe Cea (Loceri)

Condition: mediocre

Location: 39.8304845, 9.6211374. The monument is located on the culmination of a low hill (244m altitude) in the central part of the plateau of Loceri. The location offers poor visibility of the coastline, Nuraghe Puliga is visible to the east.

Description: the main tower of circa 9m diameter in its highest preserved point constitutes the centre of a rounded bastion of 12.10m diameter (measured on roughly E-W axis). The entrance to the main tower opens to the SW (circa 210º), it has an architrave of 1.60 x 0.40 x 0.70m dimensions. The tholos chamber of the main tower is collapsed. In the southern part of the bastion there is a partly preserved corridor of 1.7m width and 1.2m height which leads towards the entrance to the main tower.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2280).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.
3. Nieddu, C. 2006. *Siti archeologici d'Ogliastra*. Provincia d'Ogliastra.



Polygonal cyclopean masonry of the bastion in Nuraghe Cea (Loceri).



Corridor in the bastion of Nuraghe Cea (Loceri).



Collapsed tholos chamber of the main tower in Nuraghe Cea (Loceri).



Nuraghe Cea (Loceri) in its landscape context – view from the south.



Undiagnostic sherds of handmade pottery found near Nuraghe Cea (Loceri).

Nuraghe Corti Accas (Tortoli)

Condition: partly damaged

Location: 39.9001883, 9.6610412. The monument is located on the culmination of a rocky ridge which constitutes the northern part of the massif of Serra ‘e Ladamini. The coastline as well as the Nuragic complex of Ortali ‘e Su Monti (beyond sample area 2) are visible to the NE.

Description: this complex nuraghe consists of the main tower, bastion with a courtyard and a rounded structure adjacent to its western part (it is either western part of the bastion or remains of a lateral tower).

The main tower has 10.50m in diameter (measured on E-W axis). It has an oval chamber of 3.90 x 2.70m (SW-NE x SE-NW) diameter. It is NW part there is a niche of 1.20m width and 2.40m depth. The chamber is preserved up to 1.90m of height (measured from its current floor-level). In the western part of the main tower there are probable remains of a staircase of 1m width. The outer wall-face of the main tower is preserved up to 3.90m in its western part, 2.10m in its eastern part and 2.20 in its northern part.

Adjacent to the southern part of the main tower is a bastion of c. 10.90 x 9.10m dimensions with a 5.50m long corridor. The entrance to the corridor (which is also the entrance to the nuraghe) opens to the south, it is 1.65m high and 1.10m wide. Right of the entrance there is a niche of 1.80m depth and 1.60m height. The corridor ends with remains of a small courtyard. In the eastern part of the bastion there are remains of a chamber of 3.40 x 1.90m (probably sub-triangular in shape).

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2953, as Cortis Acca).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The outer wall-face of the main tower in Nuraghe Corti Accas (Tortoli).



Western arc of a bastion or tower in Nuraghe Corti Accas (Tortoli).



The corridor in the bastion of Nuraghe Corti Accas (Tortoli).



Remains of the eastern chamber in the bastion of Nuraghe Corti Accas (Tortoli).

Nuraghe Desfollas (Cardedu)

Condition: heavily damaged

Location: 39.768122, 9.6506725. The monument is located on a rocky hilltop which constitutes the northern part of the massif of Monte Arista and offers a view of coastline (to the NE). Nuraghi Su Fraii and Genna Masoni are visible to the north.

Description: the structure consists of two poorly preserved towers. The western tower is mostly collapsed, it is preserved up to 2m of height in its NW part. The eastern tower rests upon natural rock outcrops, it has 9.45m in diameter, the outline of its chamber is visible in its NW part. The entrance to the eastern tower (which was probably the main entrance to the complex) was located most likely in the southern part of the tower.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2043).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



A rocky hilltop with Nuraghe Desfollas (Cardedu) – view from the east.



Nuraghe Desfollas (Cardedu) – northern part of the chamber in the eastern tower.



Remains of the western tower of Nuraghe Desfollas (Cardedu).

Nuraghe Giba ‘e Scorka (Barisardo)

Condition: heavily damaged

Location: 39.8435567, 9.6835443. The monument is located near the SE edge of the plateau of Teccu, in a location offering a wide view of coastline.

Description: the monument consisted of the main tower of 8.30m diameter with a small courtyard in front of it (Lilliu 2005: 137). Unfortunately, the structure has been mostly destroyed recently – all that remains is a mound of debris with remains of a wall in its northern and western part, height of which does not exceed 1.50m. The courtyard described by Lilliu is no longer distinguishable.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1888).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.

3. Lilliu, G. 2005. *I nuraghi: torri preistoriche di Sardegna.* Nuoro: Ilisso Edizioni.



Nuraghe Giba ‘e Scorka (Barisardo) in the 1960s(?), before its destruction (photo by courtesy of R. Pilia).



Remains of Nuraghe Giba ‘e Scorka (Barisardo).



Remains of the outer wall-face in Nuraghe Giba ‘e Scorka (Barisardo).

Nuraghe Iba Manna (Barisardo)

Condition: mediocre

Location: 39.8557822, 9.6528035. The monument is located on the top of a hill in the western part of the plateau of Teccu, which constitutes its highest point. Nuraghi Moru and Niedda Puliga are visible to the SE and Nuraghe Sellersu to the NE.

Description: it is a typical example of nuraghe *a tancato* (a structure consisting of two towers with a courtyard between them). The main tower has 9.40m in diameter, its tholos chamber has 3.40 x 3.25m diameter (N-S x E-W). In the eastern part of the tholos chamber there is a niche of 1.45m height and 0.60m width. The entrance corridor is preserved up till 4.40m of length. Adjacent to the SE part of the main tower there are remains of a courtyard of 3.80 x 4.20m diameter and a completely collapsed lateral tower. Around the nuraghe there are remains of a settlement.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1888).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The main tower of Nuraghe Iba Manna (Barisardo).



The tholos chamber in the main (northern) tower of Nuraghe Iba Manna (Barisardo).



The entrance corridor to the main tower of Nuraghe Iba Manna.



Niche in the tholos chamber of the main tower of Nuraghe Iba Manna (Barisardo).



Entrance from the courtyard to the southern tower of Nuraghe Iba Manna.

Nuraghe Lurcuri (Barisardo)

Condition: partly damaged

Location: 39.825994, 9.670195. The monument is located on the top of a low hill with Nuraghe Mindeddu visible at the east and Protonuraghe Foxi at the SE.

Description: the floorplan of this nuraghe is difficult to read due to extensive damaged to the structure and thick vegetation covering the remains. It was a complex nuraghe (*monotorre*) with a bastion and at least one lateral tower (at the south). In the central part of the main tower there are remains of a tholos chamber of 4.30m diameter (measured on SW-NE axis) at its current floor level. The outer wall-face of the bastion is best preserved n its SW part where it reaches 2.55m of height.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1886).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The SW part of the bastion in Nuraghe Lurcuri (Barisardo) – view from the west.



Remains of the tholos chamber of Nuraghe Lurcuri (Barisardo).



Masonry of the bastion of Nuraghe Lurcuri (Barisardo).

Nuraghe Mattale (Barisardo)

Condition: mediocre

Location: 39.8240762, 9.6367076. The monument is located on the top of a hill offering a wide view of coastline. However, no other Nuragic sites are visible from here.

Description: Nuraghe Mattale is one of the most complex Nuragic structures in sample area 2. Its main part is triangular in shape and consists of the main tower, adjacent bastion and two lateral towers. The main tower has 7.40m of diameter in its highest preserved point, its tholos chamber is collapsed, although its outline is still distinguishable. The South-Eastern tower survived in best condition in its NW part. The tholos chamber has 2.70m of diameter on its current floor level, its entrance of 1.80 x 0.70m dimensions is followed by partly preserved staircase which probably provided communication with the main tower. The South-Western tower has a poorly preserved tholos chamber of 3.90m diameter on its current floor level. Existence of a small courtyard between the two lateral towers is very probable. Some 40m west of this part of the nuraghe there is a partly preserved antemural with a well-preserved tower which has a chamber of 5.60 x 3.70m diameter.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1890).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The main tower of Nuraghe Mattale (Barisardo).



The south-eastern tower of Nuraghe Mattale (Barisardo) with an entrance to the staircase.



Tower in the antemural of Nuraghe Mattale (Barisardo).



Nuragic pottery from Nuraghe Mattale (Barisardo).

Nuraghe Mindeddu (Barisardo)

Condition: good

Location: 39.8246684, 9.6746045. The monument is located on the top of a low hill near the coastline. Nuraghe Lurcuri is visible to the east and the location of Protonuraghe Foxi to the south.

Description: this complex Nuragic structure consists of the main tower of 8.60m diameter (in its highest preserved part), a concentric bastion around it, and a lateral tower in its SE part. The tholos chamber is mostly preserved, although it is currently inaccessible due to collapsed entrance. Remains of a collapsed intra-mural staircase are visible, their location suggests it opened left of the entrance. The bastion survived in best condition in its south-eastern part where there are remains of a small tower with remains of a chamber of 1.90m diameter. Sherds of the Late Bronze Age pottery were reported from the area around the nuraghe (Archeosystem 1990: 146).

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1887).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.
3. Lilliu, G. 2005. *I nuraghi: torri preistoriche di Sardegna.* Nuoro: Ilisso Edizioni.



The main tower of Nuraghe Mindeddu (Barisardo) – view from the SE.



Nuraghe Mindeddu (Barisardo) – the outer wall-face in the SE part of the main tower.



View over the main tower of Nuraghe Mindeddu towards Nuraghe Lurcuri.



Remains of the collapsed staircase in the main tower of Nuraghe Mindeddu.



Remains of a chamber in the lateral tower of Nuraghe Mindeddu (Barisardo).

Nuraghe Moru (Barisardo)

Condition: good

Location: the monument is located on a promontory constituting part of the southern edge of the plateau of Teccu. Nuraghe Niedda Puliga is visible to the east, Nuraghe Crastu to the SW and Nuraghe Iba Manna to the NW. The coastline is visible to a limited extent at the SE.

Description: Nuraghe Moru constitutes the largest, most complex and best preserved nuraghe in sample area 2. the main tower of this complex structure has a chamber of 5.60m diameter with almost intact tholos dome. There are three niches in the walls of the chamber, they are arranged in the shape a cross which is typical for the tholos chambers with three niches (Nuraghe Santa Sabina – Silanus, Nuraghe San Giorgio – Birori, Moravetti 1998a: 294, 535). The niches are of following dimensions:

Western niche: 1.15-1.80m high, 2.10m deep, architrave of 0.75 x 0.30m
Northern niche: 1.75-2m high, 1.80m deep, no architrave
Eastern niche (mostly filled with debris): 0.90m high, 1.20m deep, no architrave

The entrance corridor in the main tower is 4.20m long and opens to the South-East. The architrave of the entrance to the main tower has 0.80 x 0.45 x 0.65m dimensions. The intra-mural staircase opens left of the entrance, it is 0.90-1m wide and partly collapsed. Opposite the staircase there is a niche of 0.65m height and 1.20m depth.

The main tower is surrounded by a quadrilobate bastion, in the southern part of which there is an entrance with an architrave of 1.50 x 0.55m dimensions. The outer wall-face of the bastion is in best condition in its western part. The best preserved lateral tower is the North-Western one, it has a partly collapsed tholos chamber of 3.20m diameter on its current floor level. The other towers are heavily damaged and the wall between them is mostly collapsed.

Brown Nuragic pottery ornamented with parallel incised lines (Late Bronze Age/Early Iron Age), and Roman pottery was reported from the main tower and surroundings of the nuraghe (Archeosystem 1990: 127-128). North of the nuraghe there are remains of a settlement.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1884).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Tholos dome in the main tower of Nuraghe Moru (Barisardo).



Nuraghe Moru: the western niche in the tholos chamber of the main tower.



Partly collapsed intra-mural staircase in the main tower of Nuraghe Moru (Barisardo).



Remains of the tholos chamber in the NW tower of Nuraghe Moru (Barisardo).



Western part of the bastion in Nuraghe Moru (Barisardo).

Nuraghe Niedda Puliga (Barisardo)

Condition: mediocre

Location: the monument is located on a promontory which is part of the southern edge of Altopiano di Teccu. Nuraghe Moru and Nuraghe Su Crastu are visible to the west, Nuraghe Iba Manna is visible to the NW. The coastline is visible to the SE.

Description: this complex nuraghe consists of two towers – the northern one has 6.90m in diameter in its highest preserved point. The outer wall-face is in best condition in the northern and western part of the tower reaching up to 2.80m of height. The entrance was probably located at the south, its likely location is marked with a large collapse. The internal spaces of the structure are completely collapsed. The southern tower is almost completely destroyed.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1883).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Nuraghe Niedda Puliga (Barisardo) – view from the NW.



View from Nuraghe Niedda Puliga towards Nuraghe Moru.



The outer wall-face of the northern tower of Nuraghe Niedda Puliga (Barisardo).

Nuraghe Perd'e Pera (Cardedu)

Condition: mediocre

Location: 39.7660206, 9.6680431. The monument is located on the top of a low rocky hill some 60m of the coast. Nuraghi Su Fraii and Genna Masoni are visible to the north.

Description: the main tower is preserved up to 3.40m in its eastern part, it measures 7.20 x 6.70m of diameter (E-W x N-S) its rests upon natural rocks. The chamber has 2.35 x 1.55m (N-S x E-W) diameter on its current floor level. The entrance to the tower measures 1.85 x 1.05m, it opens to the SE (circa 150º) and is followed by a 2.35m long corridor. On a rocky slope below the nuraghe there are several walls, the most significant of them is located east of the main tower – it has roughly N-S orientation, it is 8.10m long and up to 2.70m high. The wall located on the slope west of the tower is 12.80m long. Around the nuraghe there are remains of an extensive settlement with an antemural.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1889).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The main tower of Nuraghe Perd'e Pera (Cardedu).



The entrance to the main tower of Nuraghe Perd'e Pera (Cardedu).



This megalithic wall is located east of the main tower of Nuraghe Perd'e Pera.

Nuraghe Puliga (Loceri)

Condition: mediocre

Location: 39.8239299, 9.6300423. The monument is located on a promontory which constitutes part of the eastern edge of a highland plateau of Loceri (Taccu di Loceri). The location offers extensive views towards the east and the coast.

Description: this complex nuraghe consists of two towers and an antemural which protects the towers from the west (the easiest approach to the site). The main tower measures 7.80 x 7.40m in diameter in its highest preserved point, its entrance opens to the south (circa 190º). The entrance to the main tower is 0.85m high and 1.05m wide, it is followed by a corridor preserved up to 3.10m of length. Above the entrance there is a window of 0.45 x 0.30m dimensions. The lateral tower is located S-SE of the main one, it measures 4.55m in diameter, its chamber measures 0.85m in diameter in its highest preserved point. The antemural is partly preserved, it is circa 25m long.

References:
1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1889).
2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The entrance to the main tower of Nuraghe Puliga (Loceri).



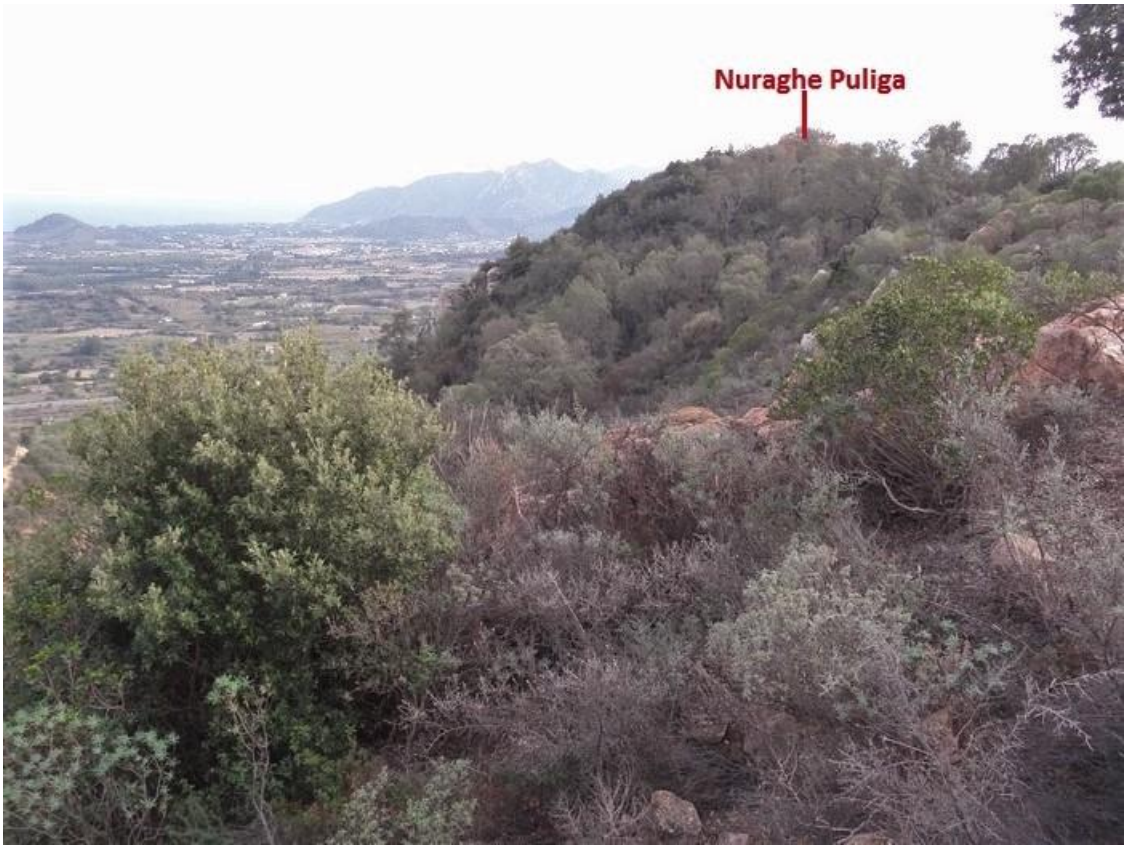
The lateral tower of Nuraghe Puliga (Loceri).



Remains of the chamber of the lateral tower of Nuraghe Puliga (Loceri).



Remains of the antemural of Nuraghe Puliga (Loceri).



Nuraghe Puliga (Loceri) in its landscape context – view from the north.

Nuraghe Sa Perda ‘e S’Obiga (Cardedu)

Condition: mediocre

Location: the monument is located on a coastal plain circa 2.5km of the coastline, constituting one of the few examples of a nuraghe located in non-defensive position in sample area 2. Nuraghe Cardedu is visible to the west, Nuraghe Murcu could have originally been visible to the south.

Description: the monument is a large sub-circular structure of circa 30m diameter. It was probably a complex nuraghe with the main tower, bastion and possibly lateral towers, but complete collapse of internal spaces and heavy vegetation covering the centre of the structure make its plan practically unreadable. In the northern part of the structure there are remains of an intra-mural staircase or passage, but it is difficult to interpret its relationship with the rest of the structure. The outer wall-face of the nuraghe survived up to 4m of height in its southern part and 3m in its western part.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2039).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Nuraghe Sa Perda ‘e S’Obiga (Cardedu) – the outer wall-face.



Large stones in the masonry of Nuraghe Sa Perda ‘e S’Obiga (Cardedu).



Lowland location of Nuraghe Sa Perda ‘e S’Obiga (Cardedu).

Nuraghe Sa Serra de Is Perdas (Osini)

Condition: partly damaged

Location: 39.7705537, 9.6112856. The monument is located on the culmination of a gentle hill, in isolation from other Nuragic sites. The coastline is not visible from here.

Description: this structure consists of the main tower and a bastion. In the main tower there is a corridor preserved up to 7.20m of length which opens to the SE (circa 130º). The length of the corridor and lack of clear remains of the tholos chamber indicate it might be a complex protonuraghe. The rounded bastion is adjacent to the main tower at the east, it survives up to 1.20m of height in its southern part.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 8305).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The hilltop with Nuraghe Sa Serra de Is Perdas (Osini) – view from the west.



The main tower of Nuraghe Sa Serra de Is Perdas (Osini).



The corridor in the main tower of Nuraghe Sa Serra de Is Perdas (Osini).

Nuraghe Sellersu (Barisardo)

Condition: good

Location: 39.8582024, 9.6850168. this complex structure and associated settlement are located over the northern edge of the plateau of Teccu. The location offers an extensive view of the coastline with several bays. Nuraghe Iba Manna is visible to the SW.

Description: the main tower of this complex nuraghe is built of basalt blocks and has 8.10m of diameter in its highest preserved point (measured on E-W axis). The tholos chamber is mostly preserved, although partly filled with debris and inaccessible, although remains of the intra-mural staircase are still distinguishable.

The western tower has a chamber of 3.20 x 3m dimensions on its current floor level. The entrance to the chamber is located in the eastern part of the tower, it has 0.70m of width and 0.50m of height from the current floor level.

Adjacent to the eastern part of the main tower is a bastion with possible remains of an eastern tower. The entrance to the bastion opens to the NE (circa 40º), it is 1.15m high and 1.20m wide and has an architrave of 0.80 x 0.90 x 0.30m dimensions. It is followed by a 7.25m long corridor which has up to 2.10m of height. Right of this corridor opens a 3m long corridor oriented to the NW which is up to 1.80m high. It leads lead to another entrance (circa 320º orientation) to the bastion, which currently is mostly filled with debris.

In 2014 Nuraghe Sellersu and its surrounding settlement were cleared of vegetation by Gruppo Archeologico di Barisardo.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1896).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The main tower of Nuraghe Sellersu (Barisardo) – view from the NE.



Nuraghe Sellersu – remains of the intra-mural staircase of the main tower.



The western tower of Nuraghe Sellersu (Barisardo).



Nuraghe Sellersu (Barisardo) after cleaning from vegetation – view from the east.



The entrance to the bastion of Nuraghe Sellersu (Barisardo).



Corridor inside the bastion of Nuraghe Sellersu (Barisardo).

Nuraghe Serra ‘e S’Omu (Cardedu)

Condition: heavily damaged

Location: 39.783122, 9.6175057. Remains of this nuraghe are located on the top of an isolated hill between the rivers of Riu Pelau and Riu Serra ‘e S’Omu. Nuraghe Genna Masoni is visible to the east, Nuraghe Desfollas to the SE and Nuraghe Trunconi to the north.

Description: the overall floorplan of the monument is difficult to read due to poor state of preservation and heavy vegetation, but remains of the tower preserved up to 2.40m of height are still distinguishable. East of this tower there is a mound of debris with traces of masonry which possibly constitutes remains of another tower. Remains of the antemural are distinguishable near the edge of a hilltop.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2040).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The best preserved part of Nuraghe Serra ‘e S’Omu (Cardedu).



Remains of a probable eastern tower in Nuraghe Serra ‘e S’Omu (Cardedu).



Nuraghe Serra ‘e S’Omu – remains of the antemural on the edge of a hilltop.

Nuraghe Su Angedu (Cardedu)

Condition: heavily damaged

Location: 39.7576501, 9.6712665. The monument is located on a rocky spur in the eastern part of the massif of Monte Arista. It lies in direct proximity of the coastline and offers a wide view of it.

Description: the monument consists of the main tower and a sub-rectangular bastion located to its west. The main tower measures 5.60m in diameter (measured on roughly N-S axis), in its eastern part it partly utilizes the natural rock as part of the structure. The entrance to the bastion is 1.70m wide and opens to the easiest approach to the nuraghe (circa 260º), it is followed by a short collapsed corridor. Nuraghe Su Angedu is an example of a skillful use of topography where relatively limited area was available to build a structure.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2045).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



A rocky spur near the coast which carries Nuraghe Su Angedu (Cardedu).



Remains of the main tower in Nuraghe Su Angedu (Cardedu).



Remains of a corridor in the bastion of Nuraghe Su Angedu (Cardedu).

Nuraghe Su Crastu (Barisardo)

Condition: partly damaged

Location: 39.8445071, 9.6538617. The monument is located on the northern edge of a flat hilltop, opposite of the southern edge of the plateau of Teccu. Nuraghi Moru and Niedda Puliga are visible to the NW. The coast is not visible from here.

Description: this complex structure of sub-rectangular shape is mostly collapsed and its floorplan is practically impossible to read. It might have consisted of the main tower with a rectangular bastion around it. In the SE part of the nuraghe there are possible remains of a lateral tower preserved up to 2.10m of diameter. In the central part of the nuraghe there are remains of an internal space of 3.20m length and circa 1.10m depth, possibly remains of a staircase.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 1891).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The outer wall-face of the bastion of Nuraghe Su Crastu (Barisardo).



View from Nuraghe Su Crastu towards the southern edge of the plateau of Teccu.



Remains of an internal space (possibly a staircase) in Nuraghe Su Crastu.

Nuraghe Turuddis (Tortoli)

Condition: good

Location: 39.885188, 9.6594648. The monument is located on the top of a hill with a view of the coastline to the SE. Protonuraghe Baccu Arzula is visible to the east.

Description: the monument consists of a well-preserved main tower which constitutes the centre of a sub-triangular bastion. The main tower has 8.10m in diameter, its partly preserved tholos chamber has 3.10 x 2.90m in diameter on its current floor level. The entrance to the tower (with a window of 0.50 x 0.45m dimensions above it) opens to the SE (circa 150º) and is followed by a 3.45m long corridor. Left of the corridor opens the intra-mural staircase of 0.90-1.10m width. In the eastern part of a bastion there are remains of a 5.90m long corridor leading to the entrance to the main tower with another corridor (or niche) opening to its right. In front of the entrance to the main tower there are probable remains of a small courtyard.

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2955, as Truddis).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The main tower of Nuraghe Turuddis (Tortoli) – view from the west.



The tholos chamber of the main tower in Nuraghe Turuddis (Tortoli).



The entrance to the tholos chamber of the main tower seen from the inside.



The entrance to the main tower of Nuraghe Turuddis (Tortoli).



Niche or corridor which opens right of the corridor leading to the main tower.

Nuraghe Ursu (Lanusei)

Condition: partly damaged

Location: 39.8199644, 9.6153867. The monument is located on the top of a hill north of Monte Astili, overlooking the plateau of Loceri. Nuraghe Puliga is visible to the NE.

Description: the main tower of this complex structure is preserved primarily in its southern and eastern part where preserved walls reach up to 2.80m of height. North of the main tower there is a lateral tower with partly preserved tholos chamber of 2.55 x 1.90m diameter and 2.40m on its current floor level. The structures between the main and lateral towers are very difficult to distinguish due to heavy damage done by illegal excavation which revealed large amounts of handmade pottery (including pieces of storage jars and probably *tegami* – shallow plates typical for the Middle Bronze Age in Sardinia).

References:

1. 2006. *Piano Paesaggistico Regionale Sardegna, vol. 5/8: Provincia Ogliastra* (number 2267).

2. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The main tower of Nuraghe Ursu (Lanusei).



Partly preserved tholos chamber in the lateral tower of Nuraghe Ursu (Lanusei).



Pottery sherds, probably parts of jarge storage jars, from Nuraghe Ursu (Lanusei).

5. SETTLEMENTS

Insediamento nuragico di Baccu Argiolasi (Barisardo)

Condition: mediocre

Location: 39.8557719, 9.6602252. The area of the settlement is located near the centre of the plateau of Teccu, east of Nuraghe Iba Manna and south of the corridor nuraghe of Baccu Argiolasi.

Description: the settlement consists of at least 4-5 huts of relatively small (over 5m) diameter. Numerous sherds of handmade pottery with inclusions can be found within the area of the settlement.

References:
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Remains of a circular hut in the settlement of Baccu Argiolasi (Barisardo).



Remains of structures in the settlement of Baccu Argiolasi (Barisardo).



Sherds of pottery from the settlement of Baccu Argiolasi (Barisardo).

Insediamento nuragico di Iba Manna (Barisardo)

Condition: heavily damaged

Location: 39.8559757, 9.6530449. Possible remains of a settlement are located around Nuraghe Iba Manna, close to the highest point of the plateau of Teccu.

Description: possible remains of a settlement are difficult to read due to vegetation. In the nearby, on the South-East slope of the hill, there is a Late Neolithic *domus de janas*.

References:
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Insediamento nuragico di Lurcuri (Barisardo)

Condition: destroyed

Location: 39.8260846, 9.6697497. The settlement extended probably both east and west of Nuraghe Lurcuri.

Description: Archeosystem (1990) reported finds of Nuragic and Roman pottery west of Nuraghe Lurcuri, suggesting existence of a settlement. During the survey for this project the Nuragic pottery was found also east of the nuraghe.

References:
1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.

Insediamento nuragico di Moru (Barisardo)

Condition: partly damaged

Location: 39.8484455, 9.6661904. Remains of a Nuragic settlement are located north and west of Nuraghe Moru, near the southern edge of the plateau of Teccu.

Description: precise extent of the settlement is difficult to ascertain due to heavy vegetation, but remains of several circular huts are clearly distinguishable.

References:
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A circular hut in the settlement of Nuraghe Moru (Barisardo).



Remains of a circular hut in the settlement near Nuraghe Moru (Barisardo).

Insediamento nuragico di Perd'e Pera (Cardedu)

Condition: mediocre

Location: 39.766082, 9.6678239. The Nuragic settlement of Perd'e Pera extends around the rocky spur with the nuraghe of the same name.

Description: two of the best preserved circular huts are located north of the rock with the nuraghe. The North-Eastern hut has 6.50m in diameter, while the North-Western one has 7.45m in diameter. The settlement is enclosed by an antemural, which is best preserved in the western part of the settlement.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The North-Western hut in the settlement of Perd'e Pera (Cardedu).



The North-Western hut in the settlement of Perd'e Pera – view from the south.



The North-Eastern hut in the settlement of Perd'e Pera (Cardedu).

Insediamento nuragico di Sellersu (Barisardo)

Condition: mediocre

Location: 39.8579421, 9.6848103. The settlement extends south of Nuraghe Sellersu, near the northern edge of the plateau of Teccu.

Description: remains of circular huts are distinguishable south of Nuraghe Sellersu. The neck of a promontory with the nuraghe and settlement is cut with an antemural built of large and medium-sized stone blocks.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Remains of the Nuragic settlement with Nuraghe Sellersu in the background.



Remains of a circular hut in the Nuragic settlement of Sellersu (Barisardo).



Remains of the antemural in the Nuragic settlement of Sellersu (Barisardo).

Insediamento nuragico di Su Ziniburu (Barisardo)

Condition: mediocre

Location: 39.8683637, 9.6708414. Remains of this Nuragic settlement are located South-West of Nuraghe Su Zinibiru, near the northern edge of the plateau of Teccu.

Description: remains of at least one circular hut with large basalt blocks in its lower part and small to medium sized blocks in the upper part of the wall are distinguishable. The hut has 7m in external diameter (measured roughly on NW-SE axis) and 4.90m of internal diameter, its walls are preserved up to 0.90m of height.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



A circular hut in the settlement of Su Ziniburu (Barisardo) – view from the west.

Insediamento nuragico di Teccu (Barisardo)

Condition: heavily damaged

Location: 39.8590724, 9.649601. Remains of the settlement are located near the western edge of the plateau of Teccu, NW of Nuraghe Iba Manna.

Description: poorly preserved remains of structures, probably circular huts, can be distinguished. Their location, typical for the Nuragic sites on the plateau of Teccu, suggests Nuragic origin.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Remains of a wall of a probable circular hut near the western edge of the plateau of Teccu (Barisardo).

Insediamento nuragico di Turuddis (Tortoli)

Condition: heavily damaged

Location: 39.8851541, 9.6597639. Possible remains of Nuragic structures can be identified around Nuraghe Turuddis.

Description: it is possible that Nuraghe Turuddis, one of he most complex nuraghi in sample area 2, had an associated settlement, remains of which are difficult to interpret due to heavy vegetation covering significant part of its surroundings.

References:
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Possible remains of a settlement located W-NW of Nuraghe Turuddis (Tortoli).

6. FORTIFICATIONS

Struttura muraria di Monte Arista (Cardedu)

Condition: mediocre

Location: 39.7624698, 9.6511701. The wall is located near the summit of Monte Arista, in the lower part of a basalt ouctrop formation. Many Nuragic sites are visible from the summit above the wall.

Description: this wall of probable Nuragic origin has roughly E-W orientation, it is preserved up to 1.80m of height. The entrance (1.40m of height, 1.05m of width) is located at the western end of the wall, it opens to the SE (circa 120º) and is followed by a 1.20m long passage. The architrave (0.85 x 0.55 x 0.20m dimensions) rests upon the natural rock at the west and upon the wall at the east.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Full extent of the wall near the summit of Monte Arista (Cardedu).



Entrance in the Nuragic wall near the summit of Monte Arista (Cardedu).



The wall near the top of Monte Arista in its landscape context seen from the south.

Struttura muraria di Punta Cea (Tortoli)

Condition: heavily damaged

Location: 39.8749027, 9.6829435. The Nuragic wall is located in the eastern part of a rocky ridge of roughly NW-SE orientation which ends with Punta Cea. Nuraghe Sellersu is visible to the south.

Description: the wall is adjancent to the southern side of the rocky ridge, forming the shape of an elongated arc. It is in best condition in its eastern and western part, where it reaches up to 2m of height. The middle part of the wall is collapsed.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



The western part of the Nuragic wall near Punta Cea (Tortoli).



The eastern part of the Nuragic wall near Punta Cea (Tortoli).



View from the Nuragic wall towards the coastline to the south.

Struttura muraria di Su Crastu (Barisardo)

Condition: heavily damaged(?)

Location: 39.8436885, 9.6544987 (approximately). The monument was reported by Archeosystem (1990: 132) near the South-Eastern edge of a plateau with Nuraghe Su Crastu.

Description: according to Archeosystem the megalithic wall of probable Nuragic origin has a NE-SE orientation is up to 2.20m high and 15m long, creating a terrace. During the survey for this project several walls have been identified in this area, one of them built with polygonal basalt blocks, but none of them could be conclusively identified as the one described by Archeosystem. Many sherds of handmade pottery were found on the South-Eastern slope of the hill.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



A wall built with large basalt blocks, it could not be conclusively identified as the one recorded by Archeosystem (1990).



Sherds of pottery found on the SE slope of the hill with Nuraghe Su Crastu.



View from the SE slope of the hill towards the plateau of Teccu.

7. TOMBE DI GIGANTI

***Tomba di giganti* Bellisceddu (Barisardo)** (known also as Ilixeddu)

Condition: mediocre

Location: 39.8142453, 9.6248147. The monument is located near the eastern edge of a natural terrace. Nuraghe Puliga must have originally been visible from here, currently the view is obscured by heavy vegetation.

Description: the burial chamber is in good condition, it is 10.60m wide, its width varies from 1.15m near the entrance to 0.80m near the end. Its height reaches 1.70m, the vault is of flat-arch type, indicating the Middle Bronze Age origin of the tomb. The entrance is 0.35m wide, it opens to the east (circa 100º). The exedra is heavily damaged and difficult to distinguish.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Tomba di giganti *Bellisceddu (Barisardo) – the entrance and part of the chamber.*



Well-preserved funerary corridor of tomba di giganti *Bellisceddu (Barisardo).*



Arched vaulting of tomba di giganti *Bellisceddu (Barisardo).*

***Tomba di giganti* Brocca (Cardedu)**

Condition: heavily damaged

Location: 39.7711072, 9.6289654. The monument is located on a narrow ridge, some 100m North-West of Nuraghe Brocca.

Description: according to Archeosystem (1990: 166) the monument was in good conditio untill the 1970s when it was mostly destroyed by illegal excavations. The course of the funerary corridor is still partly distinguishable, albeit only few stones from the walls of the burial chamber are still in situ. In the only measurable place the chamber is 1.10m wide. In the southern part of the tomb there is a probable displaced capstone of 1.60m length.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Tomba di giganti *Brocca (Cardedu) – remains of the burial chamber.*



Remains of tomba di giganti *Brocca with a possible capstone in the foreground.*



View from tomba di giganti *Brocca towards the hill with Nuraghe Brocca.*

***Tomba di giganti* Fragori (Barisardo)**

Condition: partly damaged

Location: 39.8229895, 9.6615623. The monument is located on a culmination of a gentle rise of a ground in a lowland area SE of Barisardo, in isolation from other Nuragic sites.

Description: the burial chamber of this partly damaged tom bis 8.15m long, its width varies from 1.15m in its nothern part to 0.60m in its southern part. It is of roughly NW-SE orientation. The exedra is completely destroyed. The masonry of the burial chamber and presence of a block which might be a dentiled frieze indicates it was a Middle or Late Bronze Age tomb without stele.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Tomba di giganti *Fragori (Barisardo) – the burial chamber seen from the north.*



The burial chamber of tomba di giganti *Fragori (Barisardo) seen from the south.*

***Tomba di giganti* Iba Manna (Barisardo)**

Condition: destroyed

Location: 39.8595089, 9.654386 (approximately). The tomb was located on the plateau of Teccu, north of Nuraghe Iba Manna. Its approximate position was recorded with the help of Roberto Pilia.

Description: no distinguishable traces of the tomb survived.

References:
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***Tomba di giganti* Niedda Puliga (Barisardo)**

Condition: destroyed

Location: 39.8497284, 9.6709031 (approximately). The tomb was located in the southern part of the plateau of Teccu, North-East of Nuraghe Niedda Puliga. Its approximate position was recorded with the help of Roberto Pilia.

Description: no distinguishable traces of the tomb survived.

References:
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***Tomba di giganti* Preda Longa (Tortoli)**

Condition: mediocre

Location: 39.8888319, 9.6536136. The tomb is located south of Nuraghe Nuraxeddu, on a flat lowland area.

Description: the burial chamber survived on a distance of 4.60m, its orientation is roughly E-W. The entrance, which did not survive, opened to the east. The width of the burial chamber varies from 1m in its eastern part to 0.75m at the end. The exedra is mostly destroyed.

References:

1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.



Burial chamber of tomba di giganti *Preda Longa (Tortoli) – view from the east.*

8. POZZI SACRI

Pozzo sacro Su Presoni (Cardedu)

Condition: good

Location: 39.7685065, 9.6454328. The monument is located close to the bottom of a valley, on a gentle slope west of Nuraghe Desfollas.

Description: this well-preserved *pozzo sacro* has a 2m high and 1m wide entrance (circa 120º orientation, 2.05 x 0.45 x 0.40m architrave) which is followed by a staircase (the first step is still visible) leading to the intact tholos chamber of 1.65m diameter. The vestibule, now only partly distinguishable, is over 2m wide. The masonry of the sacred well is not ashlar, which suggests the Late Bronze Age rather than Iron Age origin of this monument. On the architrave there is a series of carvings attributed to the Punic period.

References:
1. Archeosystem 1990. *Progetto i nuraghi (recognizione archeologica in Ogliastra, Barbagia, Sarcidano): il territorio*. Milano: Consorzio Archeosystem.
2. Pitzalis, G. 2008. “L’Ogliastra in eta preistorica” in *Ogliastra: storia e societa, vol 1.* Zonza Editori, p. 17-31.
3. Webster, M. 2014. *Water-temples of Sardinia: Identification, Inventory and Interpretation*. Uppsala Universitet.



The sacred well of Su Presoni (Cardedu) – part of the atrium and entrance.



The staircase of the sacred well of Su Presoni (Cardedu).



A general view of the sacred well of Su Presoni with atrium and entrance.



Pozzo sacro Su Presoni (Cardedu) – first step of the staircase.

Appendix 3. Spatial relations between pre-Nuragic and Nuragic sites in sample area 1

1. Probable relationship

Pre-Nuragic site: Standing stones of Baccu di Monte Nai (Muravera).
Nuragic site: Protonuraghe Baccu di Monte Nai (Muravera).
The standing stones reported by Ledda (1985: 185) are located on the same flat lowland area as the possible site of Protonuraghe Baccu di Monte Nai, few meters of it.

Pre-Nuragic sites: *allée couverte*(?) and menhir of Bau S'Arena (Muravera)
Nuragic site: *tomba di giganti* Bau S'Arena (Muravera)
Relationship: Possible Late Neoltihic ***allée couverte*** (which might be another *tomba di giganti*) is located few meters north of the *tomba di giganti* of the same name. *Norme di tutela dei beni paesaggistici e dei beni identitari* reports a standing stone located south of the necropolis.

Pre-Nuragic sites: *domus de janas* and Late Neolithic settlement of Costa Sa Perdera (Muravera)
Nuragic site: Nuraghe Monti Ferru (Muravera)
Relationship: *domus de janas* is located some 150m South-West of the nuraghe, in a rock below it. The settlement of Ozieri culture which constitutes of circular huts (Ledda 1985: 79) is likewise located on the SW slope of the Monti Ferru mountain, south of the nuraghe.

Pre-Nuragic sites: stone rows of Cuili Piras (Muravera), Neolithic settlement of Monte Crobu (Muravera)
Nuragic site: Protonuraghe Monte Crobu (Muravera)
Relationship: the standing stones, many of them erected in alignments, are located on a plateau, some 300m north of the mountain with Protonuraghe Monte Crobu. The megalithic complex is perfectly visible from the protonuraghe (the entrance of the protonuraghe faces the standing stones). In the area close to the standing stones and in front of the protonuraghe there are remains of a Late Neolithic settlement of Ozieri culture where numerous lithic artefacts were found (Ledda 1985: 75).

Pre-Nuragic site: stone row of Mont'Arbu (Muravera)
Nuragic site: *tomba di giganti* Mont'Arbu (Muravera)
Relationship: a stone row consisting of five menhirs is located on the culmination of a low hill near *tomba di giganti* of the same name. Ledda (1985: 231) concludes that this stone row is to be observed in relation with the Nuragic megalithic tomb.

Pre-Nuragic site: *allée couverte*(?) Monte Crobu (Castiadas)
Nuragic sites: *tomba di giganti* Monte Crobu I, *tomba di giganti* Monte Crobu II (Castiadas)
Relationship: 50m NE of *tomba di giganti* Monte Crobu I and 200m east of *tomba di giganti* Monte Crobu II there is a tomb without exedra which Ledda (1985) classifies as *tomba a corridoio*. It could be a Late Neolithic ***allée couverte*** or another *tomba di giganti*, albeit with destroyed exedra.

Pre-Nuragic site: *domus de janas* Monte Nai (Muravera)
Nuragic site: Protonuraghe Monte Nai (Muravera)
Relationship: some 100m north of the protonuraghe, in the northern slope of the promontory constituting eastern part of the massif of Monte Nai, there is a Late Neolithic *domus de janas* with two chambers (Ledda 1985: 81).

Pre-Nuragic sites: *domus de janas* Monte Zippiri, *tafoni* Monte Zippiri (Muravera)

Nuragic sites: Nuraghe Monte Zippiri, *tomba di giganti* Monte Zippiri (Muravera)
Relationship: in the SE part of the massif of Monte Zippiri, few hundred meters N-NE of the nuraghe and *tomba di giganti*, there is a *domus de janas* with two chambers, as well as two *tafoni* (small rock shelters used for burial purposes), probably of Neolithic origin.

Pre-Nuragic site: stone row of Ottixeddus (Castiadas)
Nuragic site: Protonuraghe Bruncu Ottixeddu (Castiadas)
Relationship: the stone row which consists of nine menhirs (Ledda 1985: 184-184) is located on the eastern slope of a hill with Protonuraghe Bruncu Ottixeddu, less than 200m of it.

Pre-Nuragic site: standing stones of Pranu Ontroxiu (Muravera)
Nuragic site: Nuraghe Monte Ontroxiu (Muravera)
Relationship: the standing stones are located on the southern slope of a low hill, not far from Nuraghe Monte Ontroxiu. Ledda (1985: 229) suggested that “there exists relationship between the standing stone and the nearby nuraghe”.

Pre-Nuragic sites: standing stones and *allee couverte* of Sa Ridroxi (Muravera)
Nuragic site: Protonuraghe Sa Ridroxi (Muravera)
Relationship: the standing stones are located at the foot of the hill with the protonuraghe, while the *allée couverte* is located on the top of a low hill west of the protonuraghe.

Pre-Nuragic site: *domus de janas* San Priamo (San Vito)
Nuragic site: Nuraghe San Priamo II (San Vito)
Relationship: the Late Neolithic *domus de janas* is located on the southern slope of the hill with Nuraghe San Priamo II, some 70m away of it.

Pre-Nuragic site: standing stones of Scalas (Muravera)
Nuragic site: Protonuraghe Scalas (Muravera)
Relationship: a large complex of standing stones, including no less than 43 menhirs, is located 200m west of Protonuraghe Scalas, on the culmination of the same hill.

2. Possible relationship

Pre-Nuragic site: stone rows of Baracca Su Entu (Muravera)
Nuragic site: Protonuraghe Baracca Su Entu (Muravera)
Relationship: The stone rows of Baracca Su Entu, which consist of 25 standing stones (Ledda 1985: 222), are located east of a hilltop with a corridor nuraghe of the same name.

Pre-Nuragic sites: natural cave and standing stones of Brai Loi (Muravera)
Nuragic sites: Protonuraghe Bruncu Brailoi, Nuraghe Nicola Podda (Muravera)
The natural cave of Brai Loi is located east of the summit of Bruncu Brailoi which carries a protonuraghe, few hundred meters of Nicola Podda. The complex of four standing stones is located NW of the summit with Protonuraghe Bruncu Brailoi.

Pre-Nuragic site: megalithic complex of Cristolaxeddu (Muravera)
Nuragic site: settlement of Monte Antoni Peppi (Muravera)
Relationship: the megalithic complex is reported by *Norme di tutela dei beni paesaggistici e dei beni identitari* (Muravera) east of the mountain with the settlement, in an area overlooked by it.

Pre-Nuragic site: standing stones of Cuili Becciu (Castiadas)
Nuragic site: Nuraghe Monte Gruttas (Castiadas)
Relationship: the standing stones are located on a lowland plain some 300m NW of Nuraghe Monte Gruttas, near the foot of the hill with the nuraghe.

Pre-Nuragic sites: *domus de janas* and settlement near Don Giovanni Mattaciolu (Muravera)
Nuragic site: Nuraghe Don Giovanni Mattaciolu (Muravera)
Relationship: *Piano Paesaggistico Regionale* (2006) reports a rock-cut tomb and pre-Nuragic settlement in close proximity to Nuraghe Don Giovanni Mattaciolu. However, it is possible that this is a mistaken reference to the tomb and settlement of Costa Sa Perdera.

Pre-Nuragic site: standing stones of Monte di Villa Castiadas (Castiadas)
Nuragic site: Nuraghe Idda (Castiadas)
Relationship: a destroyed complex of standing stones was located few hundred meters east of Nuraghe Idda.

Pre-Nuragic sites: Neolithic settlement and standing stones of S'Enni (Muravera)
Nuragic site: Nuraghe Cuili S'Enni (Muravera)
Relationship: the Late Neolithic settlement of S'Enni is associated with Ozieri culture, as demonstrated by numerous pottery sherds and lithic artefacts found within its area. It is located in a valley of Senni, in association with mostly destroyed complex of standing stones (Ledda 1985: 85, 244), below Nuraghe Cuili S'Enni.

Pre-Nuragic site: standing stones of Sa Iba S'Arridelu (Muravera)
Nuragic site: Nuraghe Piscareddu (Muravera)
Relationship: Ledda (1985: 244) reports existence of a large complex of standing stones "in proximity" and below Nuraghe Piscareddu. All of the standing stones were removed and are buried under the material from field clearance, their exact original location is unknown.

Pre-Nuragic site: stone rows of Santa Giusta (Castiadas)
Nuragic site: Nuraghe S'Omu S'Orcu (Castiadas)
Relationship: the stone row of Santa Giusta is reported by Ledda (1985: 181) as located in "short distance" of the nuraghe.

Pre-Nuragic site: standing stones of Stagno di Santa Giusta (Muravera)
Nuragic site: Nuraghe Tersilia (Muravera)
Relationship: a complex of standing stones was located on a lowland coastal plain, few meters east of the hill with Nuraghe Tersilia. All of the standing stones were destroyed during the agricultural works (Ledda 1985: 244).

Pre-Nuragic site: stone rows of Su Braccu (Muravera)
Nuragic site: Nuraghe Domu de S'Orcu (Muravera)
Relationship: a destroyed complex of stone rows was located on a lowland plain near Nuraghe Domu de S'Orcu (precise location is unknown).

Pre-Nuragic site: stone rows of Su Sciusciu (Castiadas)
Nuragic sites: Protonuraghe Su Sciusciu I, Protonuraghe Su Sciusciu II (Castiadas)
Relationship: an alignment of standing stones is located on a low hill (87m altitude) south of protonuraghi Su Sciusciu I and II.

Pre-Nuragic site: *domus de janas* Su Tasuru (San Vito)

Nuragic site: Nuraghe Su Tasuru I (San Vito)
Relationship: two Late Neolithic rock-cut tombs are located in the same mountain massif as Nuraghe Su Tasuru I, some 300m west of it.