McDONALD INSTITUTE MONOGRAPHS

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By Charles French, Chris O. Hunt, Reuben Grima, Rowan McLaughlin, Simon Stoddart & Caroline Malone

Volume 1 of Fragility and Sustainability – Studies on Early Malta, the ERC-funded *FRAGSUS Project*

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With contributions by
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On the cover: *View towards Nadur lighthouse and Ghajnsielem church with the Gozo Channel to Malta beyond, from In-Nuffara (Caroline Malone).*

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Preface and dedication

Caroline Malone

The *FRAGSUS Project* emerged as the direct result of an invitation to undertake new archaeological fieldwork in Malta in 1985. Anthony Bonanno of the University of Malta organized a conference on 'The Mother Goddess of the Mediterranean' in which Colin Renfrew was a participant. The discussions that resulted prompted an invitation that made its way to David Trump (Tutor in Continuing Education, Cambridge University), Caroline Malone (then Curator of the Avebury Keiller Museum) and Simon Stoddart (then a post-graduate researcher in Cambridge). We eagerly took up the invitation to devise a new collaborative, scientifically based programme of research on prehistoric Malta.

What resulted was the original Cambridge Gozo Project (1987–94) and the excavations of the Xagħra Brochtorff Circle and the Għajnsielem Road Neolithic house. Both those sites had been found by local antiquarian, Joseph Attard-Tabone, a long-established figure in the island for his work on conservation and site identification.

As this and the two other volumes in this series report, the original Cambridge Gozo Project was the germ of a rich and fruitful academic collaboration that has had international impact, and has influenced successive generations of young archaeologists in Malta and beyond.

As the Principal Investigator of the *FRAGSUS Project*, on behalf of the very extensive *FRAGSUS* team I want to dedicate this the first volume of the series to the enlightened scholars who set up this now 35 year-long collaboration of prehistoric inquiry with our heartfelt thanks for their role in our studies.

We dedicate this volume to:

Joseph Attard Tabone
Professor Anthony Bonanno
Professor Lord Colin Renfrew

and offer our profound thanks for their continuing role in promoting the prehistory of Malta.

Acknowledgements

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For Chapter 2, we extend warm thanks to the staff of the ^{14}CHRONO centre at QUB, especially Stephen Hoper, Jim McDonald, Michelle Thompson and Ron Reimer, all of whom took a keen interest in the *FRAGSUS Project*. The success of the *FRAGSUS Project* in general and the radiocarbon dating exercise has depended on their work. We thank the Physical Geography Laboratory staff at the School of Geography, University College Dublin, for the use of their ITRAX XRF core scanner. In particular, we would like to thank Dr Steve McCarron, Department of Geography, National University of Ireland, Maynooth and Dr Jonathan Turner, Department of Geography, National University of Ireland, University College, Dublin. We thank Prof. Patrick Schembri for sourcing and collecting the *Acanthocardia* samples from the Natural Museum of Natural History. Sean Pyne O'Donnell thanks Dr Chris Hayward at the Tephrochronology Analytical Unit (TAU), University of Edinburgh, for help and advice during microprobe work. Dr Maxine Anastasi, Department of Classics and Archaeology, University of Malta, helped identify the pottery from the settlement cores. Dr Frank Carroll helped show us the way forward; but sadly is no longer with us. Chris Hunt, Rory Flood, Michell Farrell, Sean Pyne O'Donnell and Mevrick Spiteri were the coring team. They were helped by Vincent Van Walt, who provided technical assistance. Al Ruffell and John Meneely did geophysical evaluation and GRP location of the cores. During fieldwork, Tim Kinnaird and Charles French were assisted by Sean Taylor, Jeremy Bennett and Simon Stoddart. We are grateful to the Superintendence of Cultural Heritage, Malta and Heritage Malta for permission to undertake the analyses and much practical assistance.

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For Chapter 6, Reuben Grima wrote the first draft of this contribution, receiving comments and additions from the other authors.

For Chapter 7, Simon Stoddart wrote the first draft of this contribution, receiving comments and additions from the other authors.

For Chapter 9, we thank Sharlo Camilleri for providing us with a copy of the GIS data produced by the MALSIS (MALtese Soil Information System) project. We are grateful to Prof. Saviour Formosa and Prof. Timmy Gambin, both of the University of Malta, who facilitated the donation of LiDAR data, together with computer facilities, as part of the European project ERDF156 *Developing National Environmental Monitoring Infrastructure and Capacity*, from the former Malta

Environment and Planning Authority. A number of individuals were happy to share their recollections of shepherding practices in Malta and Gozo over the last sixty or seventy years; others facilitated the encounters. We are grateful to all of them: Charles Gauci, Grezzju Meilaq, Joseph Micallef, Louis Muscat, Ċettina and Anġlu Vella, Ernest Vella and Renata Zerafa.

Simon Stoddart would like to thank Prof. Martin Jones and Rachel Ballantyne for their advice in constructing Figure 11.4. The editors would like to thank Emma Hannah for compiling the index.

Firstly, the FRAGSUS Project is the result of a very generous research grant from the European Research Council (Advanced Grant no' 323727), without which this and its two partner volumes and the research undertaken could not have taken place. We heartily thank the ERC for its award and the many administrators in Brussels who monitored our use of the grant. The research team also wants to record our indebtedness to the administrators of the grant within our own institutions, since this work required detailed and dedicated attention. In particular we thank Rory Jordan in the Research Support Office, Stephen Hoper and Jim McDonald – CHRONO lab, and Martin Stroud (Queen's University Belfast), Laura Cousens (Cambridge University), Glen Farrugia and Cora Magri (University of Malta), the Curatorial, Finance and Designs & Exhibitions Departments in Heritage Malta and Stephen Borg at the Superintendence of Cultural Heritage. Finally, we thank Fr. Joe Inguanez (Emeritus Head of Department, Department of Sociology, University of Malta) for offering us the *leitmotif* of this volume while a visiting scholar in Magdalene College, Cambridge: '*Mingħajr art u ħamrija, m'hemmx sinjorija*' translating as 'without land and soil, there is no wealth'.

Foreword

Anthony Pace

Sustainability, as applied in archaeological research and heritage management, provides a useful perspective for understanding the past as well as the modern conditions of archaeological sites themselves. As often happens in archaeological thought, the idea of sustainability was borrowed from other areas of concern, particularly from the modern construct of development and its bearing on the environment and resource exploitation. The term sustainability entered common usage as a result of the unstoppable surge in resource exploitation, economic development, demographic growth and the human impacts on the environment that has gripped the World since 1500. Irrespective of scale and technology, most human activity of an economic nature has not spared resources from impacts, transformations or loss irrespective of historical and geographic contexts. Theories of sustainability may provide new narratives on the archaeology of Malta and Gozo, but they are equally important and of central relevance to contemporary issues of cultural heritage conservation and care. Though the archaeological resources of the Maltese islands can throw light on the past, one has to recognize that such resources are limited, finite and non-renewable. The sense of urgency with which these resources have to be identified, listed, studied, archived and valued is akin to that same urgency with which objects of value and all fragile forms of natural and cultural resources require constant stewardship and protection. The idea of sustainability therefore, follows a common thread across millennia.

It is all the more reason why cultural resource management requires particular attention through research, valorization and protection. The *FRAGSUS Project* (Fragility and sustainability in small island environments: adaptation, cultural change and collapse in prehistory) was intended to further explore and enhance existing knowledge on the prehistory of Malta and Gozo. The objective of the project as designed by the participating institutional partners and scholars, was to explore untapped field resources and archived archaeological material from a number of sites and their landscape to answer questions that could be approached with new techniques and methods. The results of the *FRAGSUS Project* will serve to advance our knowledge of certain areas of Maltese prehistory and to better contextualize the archipelago's importance as a model for understanding island archaeology in the central Mediterranean. The work that has been invested in *FRAGSUS* lays the foundation for future research.

Malta and Gozo are among the Mediterranean islands whose prehistoric archaeology has been intensely studied over a number of decades. This factor is important, yet more needs to be done in the field of Maltese archaeology and its valorization. Research is not the preserve of academic specialists. It serves to enhance not only what we know about the Maltese islands, but more importantly, why the archipelago's cultural landscape and its contents deserve care and protection especially at a time of extensive construction development. Strict rules and guidelines established by the Superintendence of Cultural Heritage have meant that during the last two decades more archaeological sites and deposits have been protected in situ or rescue-excavated through a statutory watching regime. This supervision has been applied successfully in a wide range of sites located in urban areas, rural locations and the landscape, as well as at the World Heritage Sites of Valletta, Ġgantija, Ħaġar Qim and Mnajdra and Tarxien. This activity has been instrumental in understanding ancient and historical land use, and the making of the Maltese historic centres and landscape.

Though the cumulative effect of archaeological research is being felt more strongly, new areas of interest still need to be addressed. Most pressing are those areas of landscape studies which often become

peripheral to the attention that is garnered by prominent megalithic monuments. *FRAGSUS* has once again confirmed that there is a great deal of value in studying field systems, terraces and geological settings which, after all, were the material media in which modern Malta and Gozo ultimately developed. There is, therefore, an interplay in the use of the term sustainability, an interplay between what we can learn from the way ancient communities tested and used the very same island landscape which we occupy today, and the manner in which this landscape is treated in contested economic realities. If we are to seek factors of sustainability in the past, we must first protect its relics and study them using the best available methods in our times. On the other hand, the study of the past using the materiality of ancient peoples requires strong research agendas and thoughtful stewardship. The *FRAGSUS Project* has shown us how even small fragile deposits, nursed through protective legislation and guardianship, can yield significant information which the methods of pioneering scholars of Maltese archaeology would not have enabled access to. As already outlined by the Superintendence of Cultural Heritage, a national research agenda for cultural heritage and the humanities is a desideratum. Such a framework, reflected in the institutional partnership of the *FRAGSUS Project*, will bear valuable results that will only advance Malta's interests especially in today's world of instant e-knowledge that was not available on such a global scale a mere two decades ago.

FRAGSUS also underlines the relevance of studying the achievements and predicaments of past societies to understand certain, though not all, aspects of present environmental challenges. The twentieth century saw unprecedented environmental changes as a result of modern political-economic constructs. Admittedly, twentieth century developments cannot be equated with those of antiquity in terms of demography, technology, food production and consumption or the use of natural resources including the uptake of land. However, there are certain aspects, such as climate change, changing sea levels, significant environmental degradation, soil erosion, the exploitation and abandonment of land resources, the building and maintenance of field terraces, the rate and scale of human demographic growth, movement of peoples, access to scarce resources, which to a certain extent reflect impacts that seem to recur in time, irrespectively of scale and historic context.

Anthony Pace
Superintendent of Cultural Heritage (2003–18).

Chapter 6

Cultural landscapes in the changing environments from 6000 to 2000 BC

Reuben Grima, Simon Stoddart, Chris O. Hunt, Charles French, Rowan McLaughlin & Caroline Malone

6.1. Introduction

The highly fragmented landscape of the Maltese archipelago presents a range of different environments which evolved along different trajectories and presented different constraints and opportunities to its prehistoric inhabitants. It is remarkable how such a small surface area could show such variation and how each phase of the Neolithic responded to that variation. The *FRAGSUS Project* has yielded a wealth of new data and insights on a number of sites and landscapes across the archipelago and the opportunity is also taken to publish relevant elements of the survey undertaken in the Cambridge Gozo Project undertaken between 1987 and 1995, whose data were analysed by Sara Boyle (Figs. 6.1 & 6.2) in her doctoral dissertation (Boyle 2013; 2014). The picture that is emerging is one of different sites following life-histories that were often divergent (Volume 2). Comparison of these diverging stories allows some broad generalizations to be put forward about the way the inhabitants appropriated, exploited and ordered the landscape. However, given the diversity of life history, we can envisage that the next generation of scholars will uncover further diversity, perhaps even filling what currently appear to be clear gaps during the fifth millennium BC in the total life histories of the islands. Drawing on the rich detail of environmental and archaeological evidence revealed by the project, this chapter will tentatively outline some of the cultural responses to the changing environment that can be made out so far, after a brief analysis of the formal surface surveys undertaken in the Maltese Islands.

6.2. A short history of survey of a fragmented island landscape

Islands offer enormous opportunities for surface survey, and a number of notable Mediterranean examples now exist which have taken up this important challenge (Renfrew & Wagstaff 1982; Cherry 1990, 2004; Bevan & Connolly 2004, 2013). The idea of an island laboratory may have been critiqued (Rainbird 1999), but the small island does offer opportunities for an intensity and degree of coverage that is more problematic in larger landscapes. This was the motivation for the Cambridge Gozo survey of the late 1980s and early 1990s, even if ultimately thwarted by the unanticipated enormity of the Xagħra Brochtorff Circle and its consumption of the then meagre resources. The same problem faced the team when the Xagħra Brochtorff Circle was published in 2009 and only the briefest of outlines of the surface survey were given (Malone *et al*. 2009a, 41–2). Gozo was chosen as the sample area because of its greater preservation of cultural remains, a situation that was apparent even in the early twentieth century when Ashby chose Santa Verna as one of his excavation areas. This reasoning was the same that motivated the choice of sites for excavation in the 1980s on an island that had been relatively little explored and certainly never systematically excavated, even if investigated by a number of illustrious scholars of Maltese archaeology such as Ashby and Zammit. The clarity of its geology also permitted an easily articulated sampling programme (Figs. 1.3, 6.1 & 6.2). This programme started with an intensive study of the Xagħra plateau, later partly complemented by a much less complete study of the Ghajnsielem plateau, that was to be linked by transects cross-cutting the geological framework of the island. These transects were never completed, because of the absorption of resources in the completion of the Xagħra Brochtorff Circle excavation, but nevertheless a useful coverage was achieved, more than has been systematically undertaken in the Maltese Islands before or since. The aim was principally to investigate the distinctive prehistory of the island while also collecting the easily recognized Punic and Roman material, together with medieval and modern ceramics, and recording

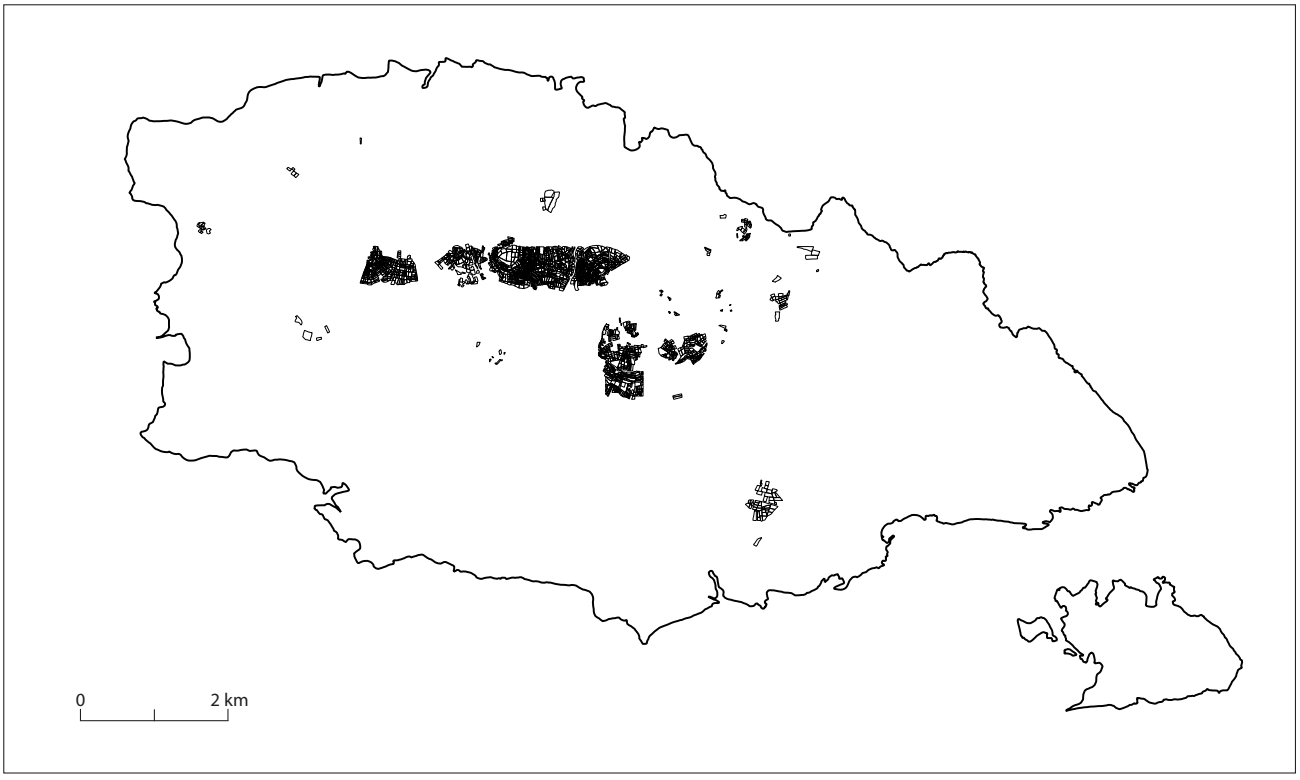


Figure 6.1. *The location of the Cambridge Gozo Project survey areas (R. McLaughlin).*

standing remains, water systems and evidence for shooting of birds, also from the modern period. The period of the survey from 1987–95 coincided with a generally fairly relaxed attitude by local farmers, tenants and owners, who normally permitted access to their fields. Such an attitude no longer exists, with more intensive crops, great land value and general suspicion of people walking over a farmland which is now usually encased in high wire fences.

The survey was designed from experience in the Ager Lunensis (Delano Smith *et al*. 1986), Punta Stilo (Hodder & Malone 1984) and the Gubbio valley surveys (Malone & Stoddart 1994), adapted to the distinctive terrace landscape of Gozo. From the very first (Stoddart n.d.) the aim was to record density of human land use (that is scatters of cultural material) as well as 'sites'. The idea was to produce a density map of weight of material per unit area (usually a terrace) and also a fragmentation index per unit area (weight/number of fragments). It was always intended that these maps would be used to interpret the cultural use of the landscape and the effect of geomorphological factors. Surveyors were instructed to collect all portable cultural material, 'except for rubbish that would be a danger to health'. Notes were made on the form of both collected and uncollected material on specially designed sheets, including a consistent policy to recover gun cartridge cases as well as other distinctive modern material. One of the young surveyors was something of an expert in clay pigeon shooting and started a simple typology of gun cartridge cases according to their use. The principal aim though, was to recover prehistoric material because it addressed the focal aims of the Cambridge Gozo project and was unusually distinctive, allowing a level of phasing even from small sherds that is unusual in the prehistoric Mediterranean (Malone & Stoddart 2000). Previous experience had shown that later material was more easily recovered (di Gennaro & Stoddart 1982) even if Medieval and modern material at that stage had not been catalogued for the Maltese Islands. The surveyors were, therefore, instructed to give equal weight to all periods.

The sampling units within the plateaux and transects were determined by the cultural patterns of the landscape, namely the terraced field. Each terraced field had a paper recording form allocated to it even if nothing was found. A new area number was also selected when there was a change in land use or if the field was larger than normal (this decision was left to the team leader, but a rough guide was the size of the interior of the Xagħra Brochtorff Circle (diameter of

45 m), so that the surveyors had a rapid visual guide to the sampling unit on the basis of where they otherwise spent much of their time. The field sampling unit was usually very much smaller, reflecting the fragmented nature of the landscape.

The survey benefitted from the high standard of topographic maps from the islands. A photocopy was taken into the field, where the direction of travel on each numbered terrace was recorded, with additional details on the back of the survey form. A master copy was held in the finds hut. Labelling of finds bags included the Area (usually terrace) number, the date, initials and visit number. The pottery was weighed and sorted by David Trump and a Small Finds Register kept for distinctive or complete objects, in the same pattern as the Xagħra Brochtorff excavation. A small group of project members, notably Duncan Brown, specialized in maintaining the survey standards and leading teams.

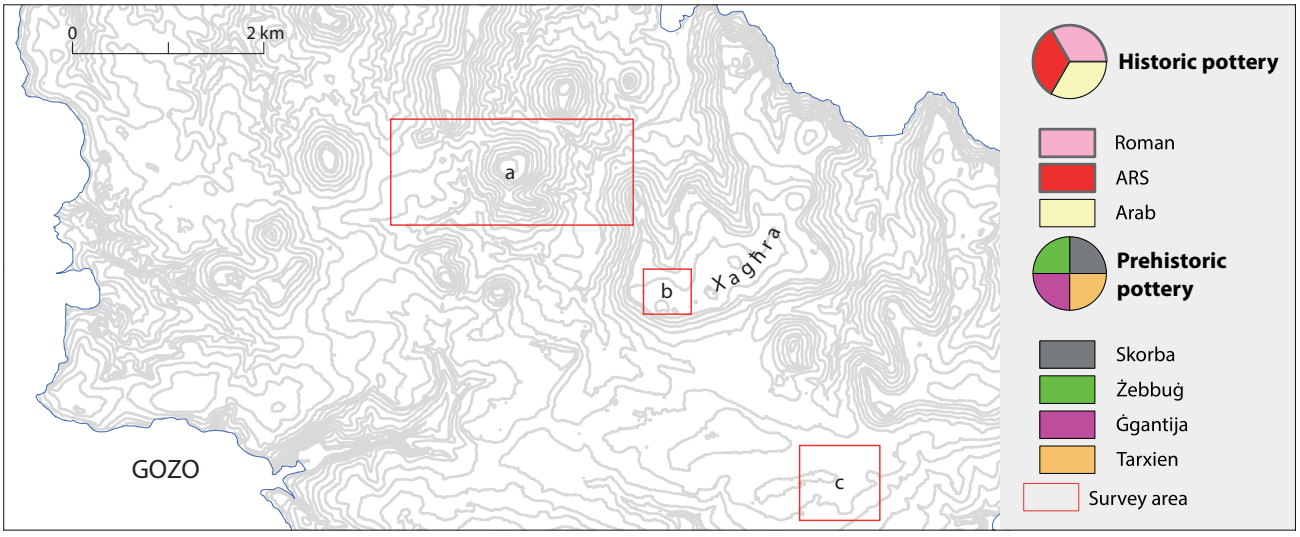
The pre-numbered survey forms provided the central register of information connected to the finds, and ultimately the database, indexed on the site number. A new form was filled in for each visit. Where necessary an area was subdivided (e.g. 1.01, 1.02 ….). The forms provided information on the four figure 1:2500 map number, the eight figure grid reference, the local Maltese toponym, estimated dates (for later verification), the density of finds, linkages to other areas, the amount of material collected, any small finds (flint, obsidian, coins, etc.), time spent in each area, time of day, density of coverage (generally 3 m apart), the phase of activity (transect, revisit, informant, etc.), ground cover, ground (especially level of washing) and weather conditions, as well as the merit of a return visit. Details of the topographic and geological location were recorded but later enhanced using GIS methodologies.

The same aims were shared by the Mġarr ix-Xini valley survey on the southeastern quarter of the island of Gozo, directed by Anthony Pace and George Azzopardi. Although this has yet to be published, we do know from the hypsometric study of its catchment and the pollen core taken at the interface of this valley with the sea (see Chapters 2 & 3), that it is one of the locations in Gozo which has the most intensive and destructive erosional run-off. For this reason, it is no surprise that the information kindly provided by Anthony Pace shows this valley largely to have material from the first millennium BC onwards (see Chapter 7). The aim of the (North West) Malta survey project (Docter *et al*. 2012) on the immediately adjoining land on the mainland of Malta was focused on the Phoenician and Punic period and the field survey made a relatively small contribution to the prehistoric period through some struck stone and one piece of Tarxien pottery relating to the period in this chapter. However, a desktop documentation of the same area nevertheless recorded 222 sites dated to the prehistoric period on a total of 308 data sheets, demonstrating the ubiquity of prehistoric activity on this part of the island. Nevertheless, for these reasons, the Cambridge Gozo Project survey remains the main source of information on the prehistoric landscapes covered by this chapter and Chapter 7 that is not otherwise available in archives held in Malta's National Museum of Archaeology and at the Superintendence of Cultural Heritage, recovered largely by rescue work.

A number of trends in settlement choices were identified through the GIS study undertaken by Sara Boyle (2013): namely that hotspots of occupation tended to be reoccupied on many occasions through prehistory, that the location of choice for settlement tend to be the east and south facing slopes of the landscapes, away from the cold northwesterly prevailing winds, and also at the geological interface between limestone and clay, where springs tended to emerge. The lighter and better drained soils of the plateau tops were also preferred over the heavy clay slopes that only came into active use in the second millennium BC. Furthermore, a scatter of 228 struck stone fragments were recovered across the landscape showing land use beyond the habitational hotspots (190 chert, 32 obsidian and 6 other materials).

6.3. Fragmented landscapes

The different topographic regions of the archipelago, described in Chapter 1, played an important role in shaping the evolution of different local environments, and the changing constraints and opportunities that they presented for human exploitation (Grima & Farrugia 2019). The main island of Malta may be divided into three main regions: the parallel ridges and valleys to the northwest, the Rabat-Dingli uplands to the west, and the central plain, made up largely of gently rolling and low-lying terrain stretching from the centre of the island to the east and southeast coast. The surface geology of the first two is predominantly Upper Coralline Limestone, while that of the third is mainly Globigerina Limestone. The topography of Gozo, on the other hand, is distinctly different. Flat-topped hills capped in Upper Coralline Limestone form mesas that rise dramatically across much of the island, while the lower ground, where the surface geology is predominantly Globigerina Limestone, is more gently contoured. This varied surface geology has largely determined the different soils that formed in different parts of the archipelago (see Chapters 1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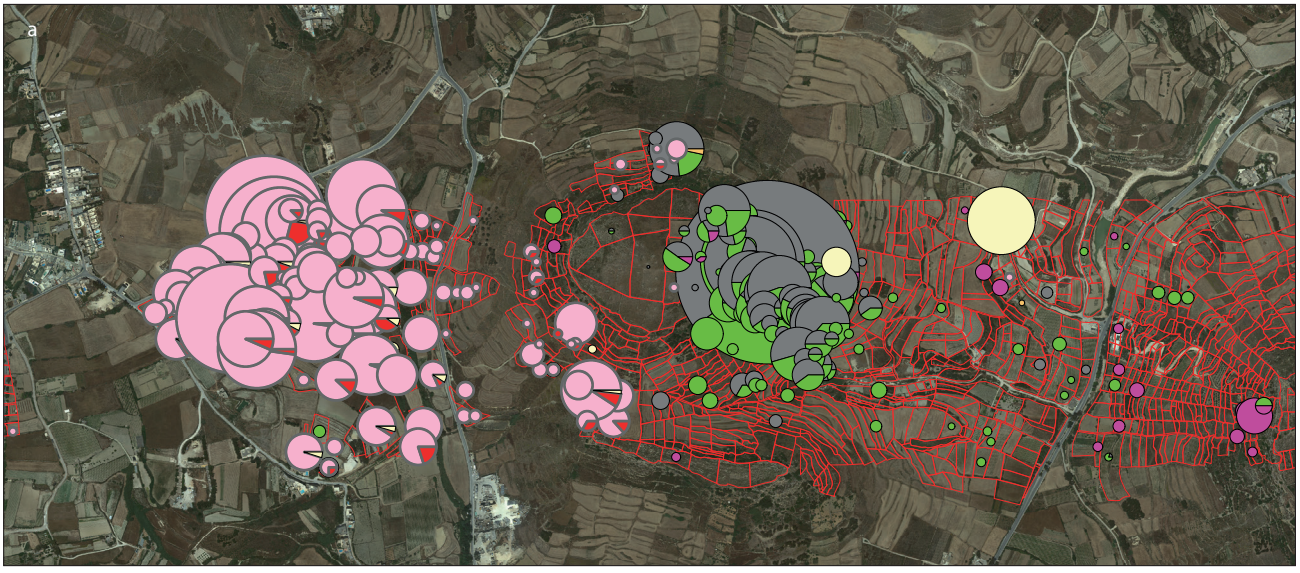
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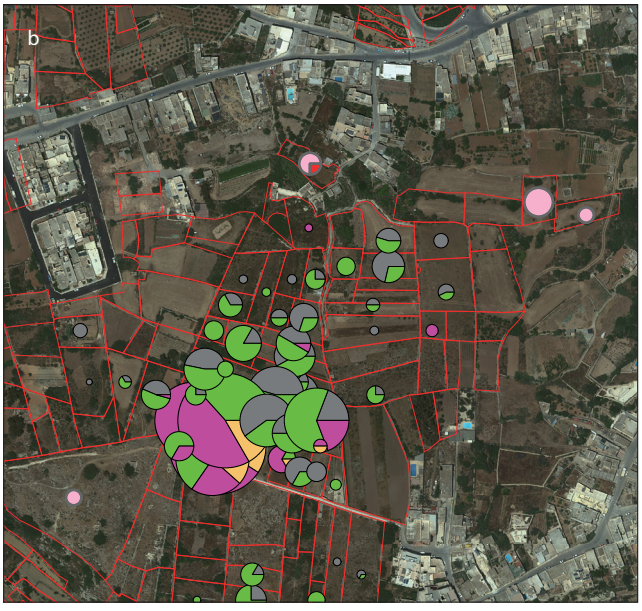
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& 5). The slope and topography had influenced the different rates of loss of soil cover in different areas (see Chapters 2, 5 & 8). The more low-lying areas have been more susceptible to change as a result of coastal erosion and sedimentation, compounded by rising sea levels and changes in coastal lagoons (see Chapter 4). Each of these factors played a part in how successive generations of inhabitants perceived and organized their island world.

One of the most significant results of the geoarchaeological work conducted during the course of the *FRAGSUS Project* has been to establish that during the Neolithic, well-developed soils were present on the Upper Coralline Limestone mesas on Gozo, such as the Xagħra plateau (see Chapter 5). The low-lying Globigerina Limestone landscape that stretches across much of the southern half of the island might also have been ideal for earlier prehistoric agriculture as it presented a light, fine loessic-silt-like soil that would have been easily tillable in the past. However, it would have been less moisture retentive and prone to wind-blow and run-off erosion by rain-splash, so it may have been a challenge to maintain as resilient and productive arable land in the past. These areas have also been more heavily disturbed by modern activity, making geoarchaeological investigation more difficult. Nevertheless, results obtained from south of Ta' Marżiena have also detected the possible traces of relict well-developed reddish-brown buried soils comparable to the ones identified on the Xagħra plateau, suggesting that such soils were probably once more widely present in the surrounding landscape (see Chapter 5).

6.4. The Neolithic appropriation of the landscape

A crucially important result that has emerged from the *FRAGSUS Project* is the apparent decline in human activity during much of the fifth millennium BC. The intensive dating programme undertaken during the project has had far-reaching implications for the way the history of early human settlement of the archipelago is understood. Prior to the project, the general consensus was that the islands witnessed an unbroken human presence from the end of the sixth millennium BC through to the end of the Temple Period around the mid-third millennium BC. The apparent absence of datable archaeological evidence for human activity for the greater part of the fifth millennium BC may suggest a decline in the human population. The lacuna even raises the question of whether the islands were practically depopulated, before receiving a fresh influx of inhabitants after the end of the fifth millennium BC. Equally there was never a time when signatures of arable agriculture and pastoral activities disappeared from the palynological record, nor indeed a cessation in soil erosion in the deep core records, which together suggest that there were still people active in the landscape and practising subsistence agriculture (see Chapters 2, 3 & 5). However, as already indicated above, the investigation of new stratified sites and a new life history of the early inhabitants could easily have a substantial effect on our future understanding of the overall pattern of occupation. Nevertheless, some of the broad characteristics of the island environments in which these successive stages of human settlement took place in Malta have become clearer in light of the *FRAGSUS Project*. Some of the possible effects that the changing environments may have had on the cultural appropriation of the landscape are outlined below.

Figure 6.2 *(opposite). Fieldwalking survey data from around a) Ta' Kuljat, b) Santa Verna, and c) Għajnsielem on Gozo from the Cambridge Gozo survey and the* FRAGSUS Project *(R. McLaughlin).*

6.5. A world in flux (5800–4800 cal. BC)

The first clearly attested human presence on the archipelago in the sixth millennium BC was a time of rapid change in the physical landscape. During this period, the sea level rose by nearly a metre every century (Benjamin *et al*. 2017, 42). The impact on different parts of the archipelago varied according to the local topography and the effects would have been more detectable on the northeastern flanks of the islands where there is now a drowned landscape (Prampolini *et al*. 2019) and lagoons persisted over a long and variable period of time (see especially Chapter 4). Marine incursions deep inland were witnessed in the Marsa valley (Carroll *et al*. 2012, 33) and the Burmarrad valley (Marriner *et al*. 2012, 11). Much of St Paul's Bay was submerged at this time, but it appears that the inner end of the bay at Xemxija, which is dry land today, was not inundated (see Chapter 3). Further north, the Sikka l-Bajda reef was completely submerged (Foglini *et al*. 2016). Within Mellieħa Bay, the wave-cut Quaternary deposits which are still visible along the northern shore of the bay, standing to a height over two metres above sea level (Pedley *et al*. 2002), probably started eroding into the sea at a similar time. Similar wave-cut deposits survive along the northern coast facing Comino, which could only have started eroding into the sea as the inundation of the channel between Malta and Comino progressed. The same is true of the Quaternary deposits along the modern shoreline of the Ħamrija Bank on the south

coast of Malta (Pedley *et al*. 2002). The loss of land to marine transgression and erosion between the early sixth and the early fifth millennia BC was unrelenting and dramatic, and its effects palpable to each generation of inhabitants, who must have wondered how far and how long it would continue. The relationship to the sea level rise might have been particularly focused on the lagoons located at the foot of significant access points to some temple locations, notably near Borġ in-Nadur, Buġibba, Għajn Żejtuna and Xemxija, since these would have continued to witness visible change more readily than other parts of the island landscape. Moreover, in the presence of considerable infant mortality recorded at least over the following two millennia within the Xagħra Brochtorff Circle (Stoddart *et al*. 2009), the populations of prehistoric Malta must have been affected by both the loss of island space and, at times, the loss of people to occupy that space (Stoddart 2015; Thompson *et al*. 2020).

During the millennia preceding the earliest recorded presence of humans on Malta, the sea level had risen at even faster rates (Benjamin *et al*. 2017). The land-bridge between Malta and Sicily was submerged between 14,000 and 13,000 BC, and between 11,000 and 8000 BC, the extent of the archipelago was reduced to about half its size (Foglini *et al*. 2016). An inevitable consequence of this dramatic loss of land was that the archipelago became a constricted refuge for wild animal species migrating away from the inundated areas. It is reasonable to surmise that the varied wild flora and fauna and the absence of large predators would have been part of the initial attraction of the archipelago for the settlers who appear to be established there by early in the sixth millennium BC.

Evidence of agricultural activity has been documented by *FRAGSUS* from around 5900 BC (see Chapter 3). Even as the terrain was being improved for agricultural purposes, indigenous wild animals would have represented a very temporary and rapidly diminishing resource. Bird trapping might have been one seasonal source of food together with molluscs from the shoreline. As the islands continued to shrink in size during the first millennium of agricultural activity, wild animal species that could be hunted for food were probably driven rapidly to extinction. Marine food that might have been exploited appears not to have been extensively used, perhaps as taboos relating to food changed as farming became established. A future research aim would be to discover dated archaeological deposits that can address these issues.

The Cambridge Gozo survey provides a useful indication of the micro-changes in human occupation over this period (Boyle 2013; Fig. 6.3). In the very first occupation phase (identified by Għar Dalam style pottery), eleven locations are known on Gozo, of which five can be defined as hot spots and three locations within the survey area were more densely occupied than elsewhere in the landscape: the future 'temple' areas of Ġgantija and Santa Verna, and the eastern flank of Ta' Kuljat. From the survey evidence, over the course of the next phase (Grey Skorba and Red Skorba ceramics), occupation became focused around the spring on the eastern flank of Ta' Kuljat, and settlement was maintained at Santa Verna, these sites perhaps offering an indication of the retrenchment of human occupation into zones centred on crucial perennial springs. In contrast, there was little evidence for contemporary activity at Ġgantija, in spite of its water supplies. More broadly, during the Skorba phases, there were nine locations on Gozo of which five were hotspots, suggesting more concentrated, consolidated activity.

6.6. The fifth millennium BC hiatus (4800 to 3800 cal. BC)

The hiatus in archaeological evidence in the fifth millennium BC between the periods marked by Red Skorba and Żebbuġ ceramic styles was largely unsuspected before the application of high-resolution dating by the *FRAGSUS Project*. At face value, this might be a phase when the Maltese landscape was abandoned by people. There is, however, what seems to be evidence for human activity in the landscape from the pollen analyses, which show the continuation of cereal pollen and indicators of grazing throughout the fifth millennium BC. The pollen analysis is probably also indicative of increasing effective moisture levels from the beginning of the fifth millennium BC, which is consistent with rising lake levels and expanding forest in Sicily at this time (see Chapter 3; Carroll *et al*. 2012). While domesticated livestock, if abandoned by their keepers, might be expected to continue living in the Maltese Islands, domesticated cereals are dependent on people for their propagation and would be unlikely to continue as a significant component of the vegetation without human intervention.

Whether this agricultural activity was the signature of full-fledged occupation of the Maltese Islands, or the actions of groups coming from Sicily, perhaps seasonally, to sow, harvest and tend animals is uncertain, currently. If people remained resident in the landscape, it is possible that they abandoned ceramic manufacture (or adopted the making of non-durable low-fired or non-distinctive ceramics) and constructed flimsy dwellings that left no trace, or that they relocated all habitation to now-submerged coastal localities and/or currently heavily built-up locations where archaeological evidence has been lost. This hiatus is certainly

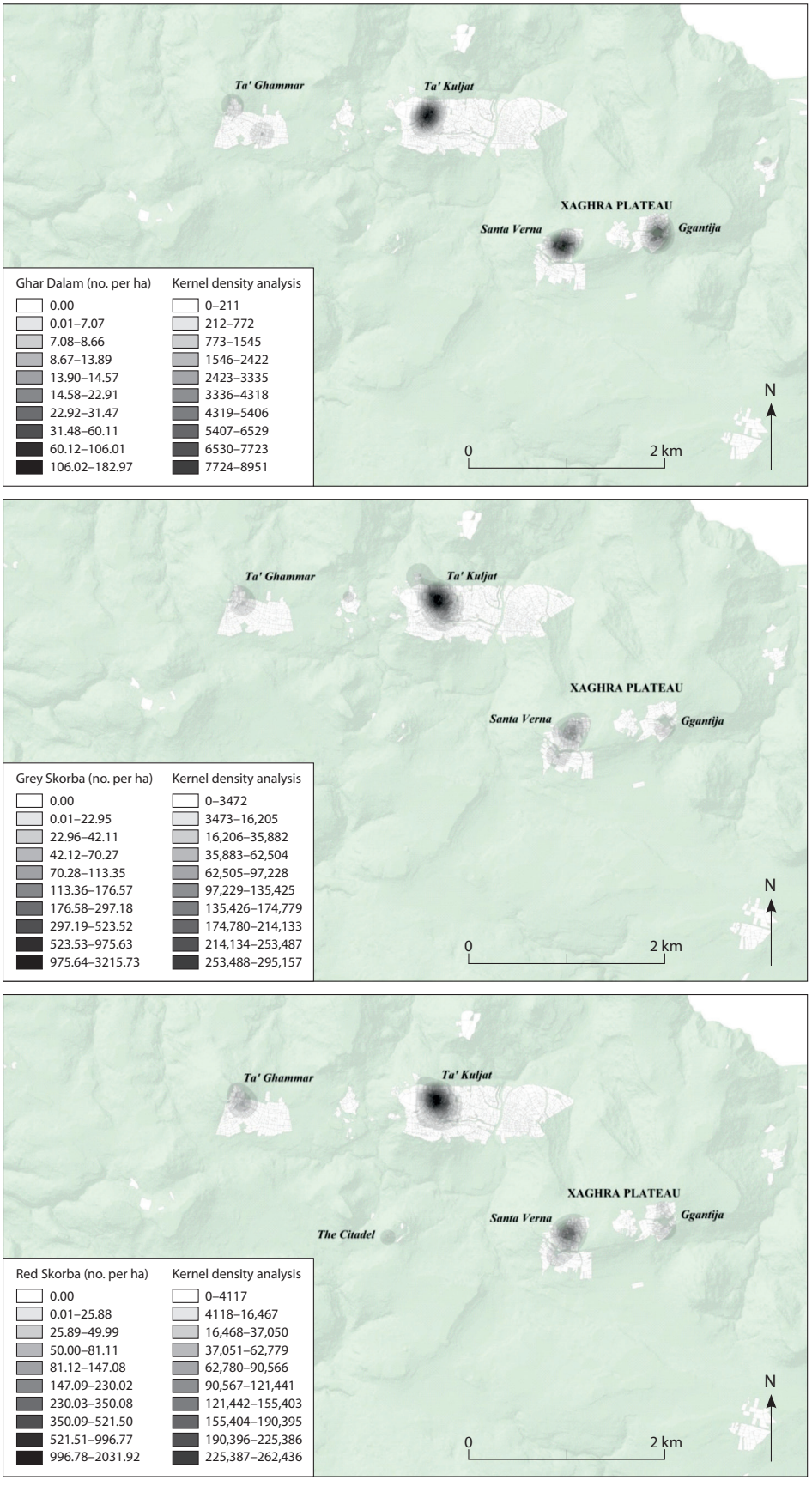

Figure 6.3. *The first cycle of Neolithic occupation as recorded by the Cambridge Gozo survey using kernel density analysis for the Għar Dalam, Red Skorba and Grey Skorba phases (S. Boyle).*

something for future research to explore more fully in the Maltese Islands.

The beginning and end of this archaeological hiatus coincides with evidence of gypsum deposits in our cores at Xemxija and Wied Żembaq suggesting extremely strong seasonality and possible pollen evidence from the Salina Deep Core for short episodes of low precipitation. In a marginal environment, the effects of factors which may appear to have a limited impact are often multiplied, because they may help push a population across the critical threshold between subsistence and starvation. It is conceivable that seasonal water stress contributed to the destabilization of some communities and precipitated a reorganization and relocation of human activity, with abandonment of established settlements. There could even have been a strategic withdrawal, as seen earlier in prehistoric Cyprus (Guilaine *et al*. 2011, ch. 52; Dawson 2014, 185ff) at the start of the hiatus, and possibly the incoming of people from Sicily at the start of the Żebbuġ phase. Meanwhile, the rate of sea level rise fell off from around a metre a century to around a metre every millennium (Benjamin *et al*. 2017, 42).

6.7. Reappropriating the landscape: the 'Temple Culture'

The resurgence of evidence of human activity that has been attested by the *FRAGSUS* dating programme occurs at the earliest from 3910/3640 cal. BC (see Chapter 2, and Volume 2, Chapters 2, 4 and 7)) and coincides with significant changes in the material culture repertoire. The Żebbuġ ceramic phase (3800–3600 cal. BC) has long been considered to be a new departure from the preceding Ghar Dalam/Grey Skorba and Red Skorba ceramic styles (ending by 4980/4690 cal. BC) (Trump 1966) since it shows many more similarities to the succession of ceramic styles that follow it, through the period of megalithic construction generally known as the 'Temple Period'. The Żebbuġ phase has, in fact, often been considered the first phase of the Temple Period (*c*. 3800–3600 cal. BC). The possibility of a hiatus in ceramic production during the fifth millennium BC has also shed light on the innovative forms and patterns seen in the ceramic sequence at around the same time (see Volume 2, Chapter 10). The innovations in decorative technique, pottery forms, fabric and temper that appear with the Żebbuġ phase appear consistent with the suggestion of a fresh influx of inhabitants with a close relationship to Sicily. The importance of this new cycle of inscription on the landscape was much emphasized in 1990 (Bonanno *et al*. 1990, 199, table 1), a generation before the evidence of a possible hiatus in the chronology began to emerge. In that paper, it was pointed out on the basis of Evans' data that the Żebbuġ phase was crucial to a new stage in the islands' 'ideological' development. Later, in 2004, David Trump reiterated that observation on the basis of the ceramic style:

> *While Red Skorba shows remarkable advances on Grey, these were not followed up. The second cycle opens with Żebbuġ phase pottery, its antecedents firmly back in Sicily, showing no local continuity. Whatever that may mean in terms of Maltese history is quite uncertain in the present state of knowledge* (Trump 2004, 254).

The revised chronological framework goes a long way to answer precisely the questions that Bonanno, Gouder, Malone, Stoddart and Trump had variously posed over the last quarter century. It also helps explain the emergence of another cultural phenomenon, which is perhaps the most remarkable material expression of the Neolithic in Malta, the monumental megalithic temples. Since David Trump's excavations at Skorba more than half a century ago (Trump 1961a & b, 1966), the appearance of megalithic monuments had popularly been attributed to the Ġgantija phase ('the earliest temple'), although some scholars had argued for earlier antecedents in the Żebbuġ (Trump 1966, 49; Evans, 1971, 34; Bonanno *et al*. 1990). Following recalibration of radiocarbon dates, the phase was shown to span from 3700–3500 cal. BC. The general understanding, until new dating offered the present picture, was that following a millennium and a half of human settlement of the archipelago, megalithic monuments appeared across the archipelago in a short space of time in the Ġgantija phase. Since megalithic monuments were often built on sites which had already been nodes of human activity for several centuries, and in some cases stretching back to the earliest known human habitation of the islands during the Għar Dalam phase, the triggers that gave rise to this sudden investment in monument-building had remained elusive.

The new chronology that has emerged through *FRAGSUS* has cast light on the dating problem of the earliest temple building, a problem that has challenged scholars until now. The more refined dating made possible by the re-excavation of Santa Verna in particular has pushed back the date for the earliest phases of the megalithic monument firmly to the Żebbuġ phase, and dated it to around 3700 cal. BC (see Chapters 2 & 12, and Volume 2 Chapter 2). This revised chronology for the onset of megalithic monument building has far-reaching implications. Prior to this revision, no elegant or compelling explanation has been forthcoming for the apparent temporal separation

between the start of a distinct cultural sequence suggested by the ceramic evidence and rock cut tomb building from the Żebbuġ phase, while placing the emergence of megalithic monument building only from the Ġgantija phase (*c*. 3400 cal. BC) onwards. The revised chronology appears to resolve this difficulty with a parsimonious explanation, which may also have far-reaching implications for the cultural reappropriation of the landscape that started by the mid fourth millennium BC, and the role of megalithic monuments in this process, as discussed below.

A close association between the environmental and cultural evidence is now confirmed by the revised chronological sequence. This shows that firstly, the arrival of new groups or renewed intensification of human activity on the archipelago was accompanied by renewed social organization, which had not been suspected previously. Second, the new cultural sequence represented by the Żebbug phase ceramic repertoire, which was always suspected to be related to Sicilian groups, can now be shown to be contemporary with them. Third, the extraordinary emergence of megalithic monument building, which traditionally was thought to have started at the onset of the Ġgantija phase, and had little association with contemporary developments on Sicily, now dates to the very beginning of this landscape cycle. The close temporal association emerging between these three crucial processes in the *FRAGSUS* evidence is of major significance. In light of the new chronological framework, the three processes are different aspects of a single cultural phenomenon. The emergence of a new ceramic tradition and the adoption of monument-building were inseparable from the repopulation and intensive reoccupation and exploitation of the landscape. In this light, the building of monuments was arguably a process of 'altering the land' (cf. Bradley 1993) to possess and control the landscape.

The distribution of Żebbuġ phase sites in the landscape is instructive here. The comparison between what is known of the distribution and the intensity of cultural activity before and after the apparent hiatus of the fifth millennium BC is particularly revealing. This comparison is made possible by the evidence gathered from a series of sondages that John Evans and David Trump excavated on megalithic monumental sites during the 1950s and 1960s (and a feature of the Bonanno *et al*. (1990) analysis), the fieldwalking data from the 1987–1995 Cambridge Gozo Survey, and the results of the site excavation and fieldwalking surveys undertaken during the *FRAGSUS Project* (see Chapter 7 & Volume 2). Some considerable emphasis was given to the power of this new ideological cycle starting in the Żebbug in earlier research (Bonanno *et al*. 1990, 199 & table 1), but the detection of the possible fifth millennium BC hiatus gives much greater emphasis to its importance.

The new interpretation is supported by the trends visible from the Cambridge Gozo survey (Fig. 6.4). In the first part of this cycle (Żebbug) the concentrations of activity returned to Santa Verna and Ġgantija, the two future 'temple' sites. During this phase there were 11 locations on Gozo of which five were 'hotspots' discovered on the survey. The distribution of sites was statistically more clustered that in the previous cycle (Boyle 2013). This developed into an oscillation of the relative importance of these sites over the following 1500 years. In the next part of the cycle (the elusive Mġarr), Santa Verna declined in importance, although it recovered its role in the Ġgantija phase, only to lose its importance once again in the final Tarxien phase (Fig. 6.5). During the Ġgantija phase there were 15 locations on Gozo of which five were survey 'hotspots'. Sites tended to have an easterly aspect, perhaps to enhance their agricultural potential. More generally there was continuity into the Tarxien phase, allowing for some contraction into 12 locations on Gozo. These transitions are borne out by the available excavation evidence (see Volume 2), since this suggests that the Santa Verna site was sidelined during Tarxien phase and many of the paraphernalia transported either to the Xagħra Brochtorff Circle or to the Ġgantija 'temple,' where activity was concentrated until the end of the Temple Period. A similar tendency may also be observed in the data from the intensive fieldwalking survey conducted around Santa Verna and Ġgantija (2014) during the *FRAGSUS Project* (see Volume 2).

The evidence from excavations and sondages undertaken on a number of megalithic sites by Ashby *et al*. (1913), Evans (1971) and Trump (1966) (cf. Bonanno *et al*. 1990, 199, table 1) have been corroborated by the intensive re-excavation work conducted during the *FRAGSUS Project*, which has also provided more refined dating than was previously possible. Both at Santa Verna and at Skorba, the sixth to early fifth millennia BC ceramic phases of Għar Dalam, Grey Skorba and Red Skorba are well represented. In both sites, activity on the same site appears to resume in the Żebbuġ phase. A background scatter of Għar Dalam and Skorba ware was also detected in the *FRAGSUS* excavations at Ġgantija, Taċ-Ċawla and at Kordin III (see Volume 2, Chapters 3, 4, 5, 6 & 7). These sites also showed a well-attested Temple Period presence from the Żebbuġ phase onwards.

Turning to other sites where no excavations were undertaken as part of the *FRAGSUS Project*, we may refer to the results of earlier work. At Ta' Ħaġrat, the earliest pottery recorded is from the Għar Dalam phase

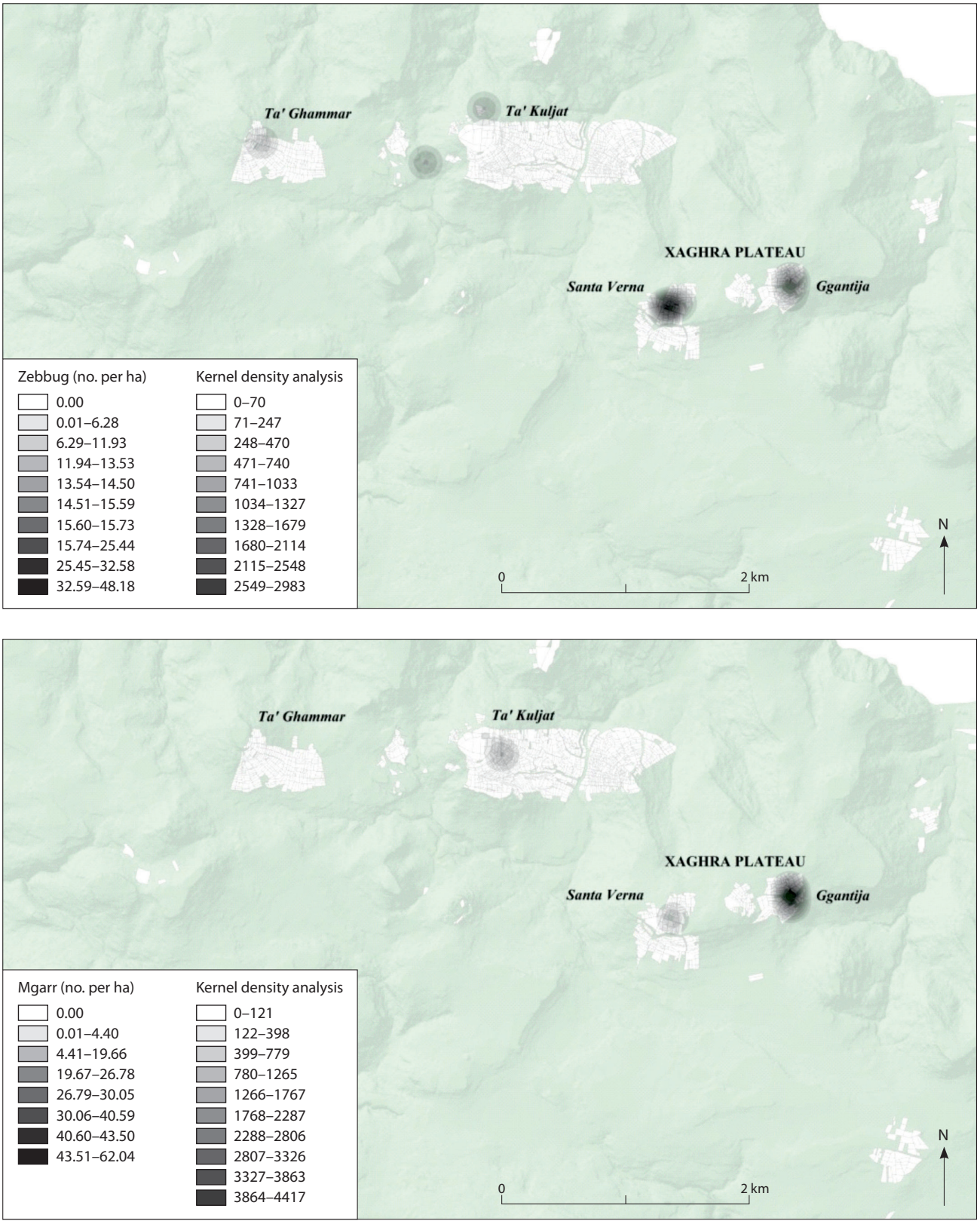

Figure 6.4. *The first half of the second cycle of Neolithic occupation as recorded by the Cambridge Gozo survey using kernel density analysis implemented for the Żebbuġ and Mġarr phases (S. Boyle).*

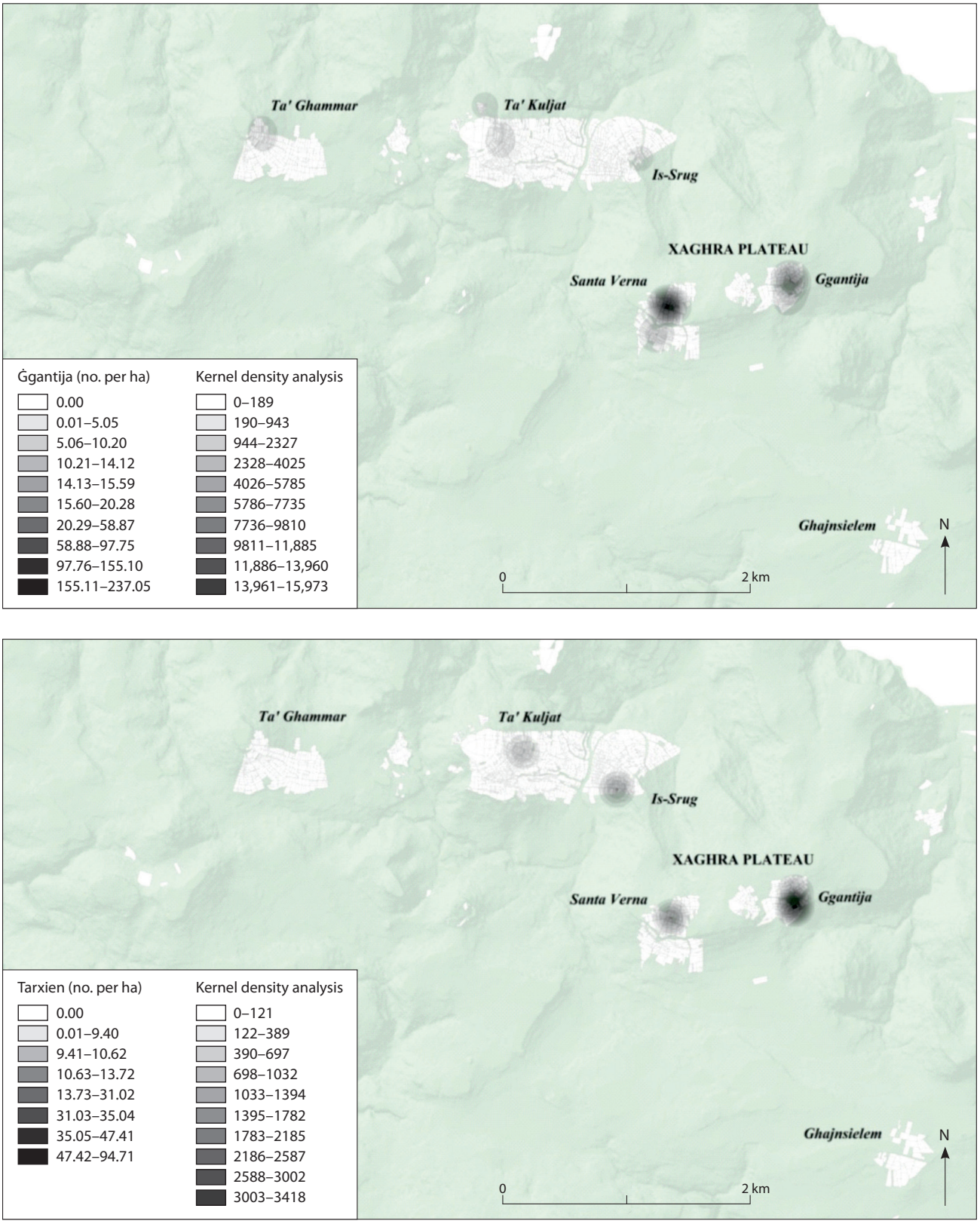

Figure 6.5. *The second half of the second cycle of Neolithic occupation as recorded by the Cambridge Gozo survey using kernel density analysis for the Ġgantija and Tarxien phases (S. Boyle).*

(Evans 1971, 33), but detection of later phases was difficult. The sondages cut by Evans at Tarxien yielded no evidence earlier than the Żebbuġ phase (Evans 1971, 135). At Ħaġar Qim, the earliest pottery detected in a series of sondages below the floors only stretched back to the Mġarr phase (Evans 1971, 88). The earliest pottery recorded from Mnajdra was, once again, from the Żebbuġ phase (Evans 1971, 101). At the Buġibba temple, the four trenches cut by Evans in 1954 failed to detect any pottery earlier than the Tarxien phase (Evans 1971, 111). Nonetheless, the palynological data from the Salina Deep Core (see Chapter 3) certainly suggests that people were in the vicinity and practising agriculture from the earlier Neolithic even if there are no sites or artefacts to indicate this presence, and the high frequency of charcoal in Maltese sediments dating to around 6000 cal. BC also indicates clearance around that time. In the case of the Tal-Qadi site, the dating evidence available is admittedly more tenuous, as it is presently limited to the pottery held in storage from the 1927 excavations, which includes a single sherd from the Żebbuġ phase, but no earlier material (Evans 1971, 43). In recent decades, extensive investigations have been undertaken by the Italian Archaeological Mission on the prehistoric deposits associated with the megalithic monument at Tas-Silġ. Notwithstanding careful excavation to bedrock at a number of points, the earliest material that was detected was from the Tarxien phase (Cazzella & Recchia 2012, 18).

The evidence that has just been reviewed is admittedly uneven, and the results may appear sporadic. Site locations seem to fall into two main groups: sites that had longevity of successive occupation back to the earlier Neolithic, and sites which in the later Temple Period were occupied for the first time. It could be argued this pattern may be better understood in the light of the geoarchaeological and palaeoenvironmental results presented in this volume by the *FRAGSUS* team. The relationship between the evolution of monumental activity and the wider environment may in turn shed light on how the cultural appropriation of the landscape continued to unfold during the Temple Period.

Of the sites that have been assessed and for which there is dating evidence, it seems that they fall into two major groups. One group represents megalithic monuments that were built on sites already in use before the apparent hiatus in human activity during the fifth millennium BC. A second group includes megalithic complexes that were built on sites that only started being used after the fifth millennium BC from the Żebbuġ phase or later. This observation may sound like a tautology; 'some sites are in use much earlier, while others are not'. What makes this observation more interesting is the topographical and geological context in which they occur. The sites where earlier Neolithic activity has been detected are located on the Upper Coralline Limestone, in close proximity to the freshwater springs that emerge from the perched aquifer above the underlying clay (Ruffell *et al*. 2018). Santa Verna, Ġgantija, Ta' Ħaġrat and Skorba all share this characteristic. The one exception is Kordin III, which has yielded early Neolithic evidence, yet is located away from the Upper Coralline Limestone outcrops, along the margins of the open rolling Globigerina Limestone landscape of southeast Malta. The remaining monumental sites (which to date have not yielded pre-Żebbuġ material are located on or around the margins of the open Globigerina Limestone landscape that characterizes eastern and southern Malta. Tas-Silġ, Tarxien, Ħaġar Qim, Mnajdra, Buġibba and Tal-Qadi all share this common factor. It should be emphasized that this is an argument from silence, and that new evidence from future work may significantly alter the patterns noted here. With these limitations in mind, it is nevertheless useful to consider the possible implications.

This broad correlation between the history of use of these sites and their landscape setting appears to be significant. An earlier attempt has been made to suggest a model for how megalithic monuments in different parts of the landscape developed over time (Grima 2007, 2008b). In that contribution, it was noted that megalithic monuments associated with the ridges and valleys in northern Malta emerged during the earlier period of megalithic monument construction in the Ġgantija phase, but generally did not register much further growth during the Tarxien phase. On the other hand, the megalithic buildings on the Globigerina Limestone landscape in south and east Malta continued to register significant growth through the Tarxien Temple Period, resulting in the most extensive megalithic complexes in the archipelago. The complexes – Tas-Silġ, Borġ in-Nadur, Ħaġar Qim, Mnajdra, Tarxien and the Ħal Safleni Hypogeum are all on the margins of the plateau and most are associated with springs or wells or are close to valleys where there would have been at least intermittent fresh water. The Tarxien phase was a time of declining effective moisture and the light well-drained soils on the Globigerina Limestone would have been the first to become drought-prone and unable to support arable farming. It is conceivable that the growth of these sites in the Tarxien phase was a response to the increasing difficulty faced by farming communities.

The new evidence that has been captured by *FRAGSUS* with fresh fieldwork has shed new light on the questions of continuity, growth and constraint, and allows a better-informed explanatory model to be

proposed. On the basis of the megalithic monuments where tenable chronological and stratigraphic evidence is available, it appears that the life-histories of those examples that were built on the Upper Coralline Limestone mesas of Gozo and the ridges of northern Malta share two important characteristics. The first is that, in most cases, they stand on sites that were already in use as sustainable if modest foci during the earlier Neolithic settlement of the archipelago. The second is that the same megalithic complexes generally appear to register less growth in the later Temple Period, an episode of often extravagant building, expansion and cultural expression. An extra detail of the *FRAGSUS* research from the Xagħra plateau of Gozo is that the long-standing site of Santa Verna does not appear to continue into the Tarxien period, when activity and expansion was transferred to the adjacent Xagħra Brochtorff Circle and Ġgantija (see Volume 2), one of the largest temples. The palynological analyses at Santa Verna show a drying trend, with the disappearance of algae in the latest samples, so it can be hypothesized that the site was not retained because water on the site failed. Ġgantija in the Tarxien period also presents evidence for manuring in its immediate vicinity, which could be related to the reliable spring water emerging beneath the temple complex (Ruffell *et al*. 2018) (see Chapters 3 & 5). The low-intensity scatters of Żebbuġ- and Ġgantija-phase potsherds evident in the Cambridge Gozo survey (Figs. 6.1, 6.2), which may be the result of manuring, are not replicated by spreads of Tarxien-phase material, suggesting retrenchment of arable farming into small irrigated enclaves in the last phase of the Temple Period.

At least for Gozo, the cultural landscape appears to have focused on these trustworthy 'club houses' as arid landscape conditions made subsistence increasingly difficult (Barratt *et al*. 2020). These pressures were perhaps more evident in most of the megalithic complexes located around the Globigerina Limestone landscape of south and east Malta, which more often than not appear to trace their origins to no earlier than the Żebbuġ phase, but then appear to have continued to be enlarged and elaborated into the final Tarxien phase of the Temple Period. This distinct pattern could be related to the different landscape environments in which they are located. We could suggest that the different life-histories of these two groups of monuments are tied to the changing constraints and opportunities that these environments presented, and which may be tied to a reliable water supply.

During the sixth millennium BC the Neolithic settlement of the archipelago appears to have taken full advantage of the abundant freshwater springs around the Upper Coralline Limestone mesas on Gozo and ridges on northwest Malta. The geoarchaeological results have also given firm indications that the brown argillic soils on these Upper Coralline Limestone environments were already well-developed during the early Neolithic settlement of the archipelago (see Chapter 5). The same geoarchaeological work has shown that during the earlier Neolithic, soil erosion from the upper parts of the valley slopes is already evident in, for example, the Xemxija valley, and that by the time of the construction of the early megalithic monuments in the fourth millennium BC, over-exploitation had impoverished these soils through erosion and depletion. The geoarchaeological investigation has also identified the relicts of possible well developed buried soils on the Globigerina Limestone landscape, for example to the south of Ta' Marżiena on Gozo, and in the cores from Wied Żembaq and Marsaxlokk on Malta (see Chapter 5). The general indications from the dating evidence that has been captured for these buried soils are that the soils on the Upper Coralline Limestone and at the upper slope transition zone between the Blue Clay/Greensand and Upper Coralline Limestone were already being exploited from at least the sixth millennium BC, and especially so in the fourth and third millennia BC. Unfortunately, there is an absence of good soil/sediment evidence to suggest that the fine silt soils on the Globigerina Limestone were being intensively exploited at similar periods, but these areas would have been ideal for early agricultural exploitation. Rather, there is later evidence in the second millennium BC for all areas being utilized for agriculture except the Blue Clay geological exposures in many of the valleys. This could reflect that while human presence was probably ubiquitous across the archipelago throughout the different periods of Neolithic settlement, the exploitation of different areas by different communities may have followed various trajectories of intensification.

There appears then, from these data, to be a convergence between the palaeoenvironmental and cultural evidence under discussion. Drawing together the different strands that have been considered, the new *FRAGSUS* evidence implies a broad picture of renewed intensification of activity on the archipelago at the start of the Żebbuġ phase focused on the Upper Coralline Limestone landscapes of the plateaux. Also, that the upper third of the valley slopes that had been more intensively occupied during the earlier Neolithic settlement appear to have been intensively reoccupied in the Żebbuġ. Subsequently, activity seems to have become more concentrated by the Tarxien phase in the early third millennium BC, with some areas becoming less intensively used and some temple sites disused.

6.8. Transition and decline

The end of the Temple Period in Malta has, to date, been viewed as a social and economic collapse or failure (Trump 1976), leading to drastic changes in culture and even a hiatus in settlement by many, but not for all scholars (e.g. Bonanno *et al*. 1990; Grima 2008a; Malone & Stoddart 2013). The evidence for the collapse was never as strong as some may have hoped; the idea ultimately stemmed from Zammit's excavations at Tarxien and the identification of an apparently sterile layer lying between the Tarxien and Tarxien Cemetery phases (Zammit 1930). However, a gradual transition between the phases has been noted at a number of other archaeological sites, most notably the platform façade of the Ġgantija temples, where Evans (1971, 180) found occasional Tarxien Cemetery sherds under structural features, and in a footnote to his report states:

> *This poses something of a problem, since it seems to imply that pottery of the Tarxien Cemetery type must have been imported into Gozo, or that the people of the Tarxien Cemetery culture must have been present in the island before the end of the Tarxien phase.*

It should be noted that new dating at three sites (Xagħra Brochtorff Circle, Taċ-Ċawla and Tas-Silġ) all confirm a chronological distinction between the Thermi pottery and Tarxien Cemetery. Previously the materials were conflated as one post-Temple episode. Now Thermi is associated with the final Tarxien phase, whilst the Cemetery material is quite separate and later. Previous excavations at Ħal Saflieni, Buġibba, Mnajdra, Kordin III and Tal-Qadi (Evans 1971) have all yielded sherds identified broadly as Tarxien Cemetery but have not yet been reassessed. From the new dates, it seems clear there was a gap of some centuries between Thermi (*c*. 2400–2200 cal. BC) and Tarxien Cemetery (after 2000 cal. BC). This gap implies that sites were often occupied in the TX/Thermi, and again in the TXC, but there is little suggestion of continuity of occupation, given the centuries long gap. At Skorba, ruins of the West Temple were occupied during the Tarxien Cemetery phase by people Trump (1966, 7), perhaps unhelpfully, named 'squatters'. The megalithic building was altered to accommodate a domestic function; but no radiocarbon evidence was ever sought to date when this occurred. Instead the original radiocarbon dates of *c*. 1600 cal. BC for the Tarxien Cemetery phase were obtained from a cache of charred *Vicia faba* (horse beans) found at Tarxien itself, and now re-dated through *FRAGSUS* to *c*. 1800 cal. BC. At the Xagħra Brochtorff Circle, the main Tarxien Cemetery activity areas were spatially and temporally distinct from the burial activity, and located above the collapsed and abandoned burial caves. This Early Bronze Age activity dated to around 1900–1800 cal. BC (Malone *et al*. 2009a, 341ff) associated with a small number of distinctive Tarxien Cemetery sherds, cups and figurine fragments, was part of apparently domestic occupation. Earlier in the sequence, however, Thermi-grey ware style almond rim sherds were associated with both the final burial deposits at Xagħra, probably around 2350–2400 cal. BC (the end of the Neolithic-Copper Age) and also found scattered in the superficial domestic levels of the Tarxien Cemetery occupation. The Thermi-style grey wares were likely made from local clay employing grog (see Malone *et al*. 2009, 239) and appear to be a local production. Until now, both these style categories have been seen as a signal of disturbance or intrusion rather than the distinction of different material cultures that may have been present in Malta in the final centuries of the third and early years of the second millennium BC. Additional evidence is now attested from Taċ-Ċawla (see Volume 2, Chapter 3, and Tas-Silġ (Cazzella & Recchia 2012, 2013, 2015; Recchia & Cazzella 2011; Recchia 2004–5) which can expand on the detail and dating of this elusive period. As mentioned above, there has been a consensus view that the end of the Tarxien phase was a social and economic collapse, and this led to a likely break in the cultural sequence, though it has been widely acknowledged that definitive evidence for this has been lacking (Azzopardi 2014; Pace & Azzopardi 2008; Malone *et al*. 2009a). A new scenario might argue that new ceramics (Thermi-grey wares of the Cetina complex) were introduced into the still functioning Tarxien Culture, perhaps with new populations, in the period 2400–2200 cal. BC and the two distinct cultural identities coexisted with a level of continuity at several sites. Meanwhile, burial activity at Xagħra evidently slowed and stopped at this very period. The current dating does reveal a period of between two and four centuries between the Thermi-style ceramics episode and the establishment of the Tarxien Cemetery phase with its distinctive pottery and cremation burial traditions. The AMS dates achieved for this appear for this next phase to be securely dated to the early second millennium BC. It is certainly not proven that Thermi Grey wares and Tarxien Cemetery pottery occurred contemporaneously together at any securely dated site.

Evidence from the *FRAGSUS Project* excavations of the Taċ-Ċawla settlement (see Volume 2, Chapter 3) provides detail of the dating relationship for Thermi. At this site, which contained a domestic structure and midden deposits associated with occupation at

a seasonal water source, Thermi pottery occurred in contexts dating to as early as *c*. 2400 until *c*. 2200 cal. BC. The sherds appeared mainly in a pit dug into the upper levels of the stratigraphic profile of plastered floors of a Tarxien period house, distinct and separate from Tarxien pottery. Importantly, no distinctive Tarxien Cemetery pottery was identified on the site (see Volume 2, Chapter 10). Elsewhere Tarxien Cemetery material has been noted in various temple sites (e.g. Ġgantija) but always in levels dissociated from secure Tarxien deposits.

In terms of the landscape context, occupation of settlements such as Taċ-Ċawla and the megalithic sites signals the enduring importance of freshwater sources during the opening centuries of the Bronze Age. At a human level, the landscape was probably not significantly reorganized from the Temple Period patterns. It is possible that the intensity of activity was somewhat less than in previous centuries, as the overall quantity of Tarxien Cemetery pottery from sites is typically much less than that of the Tarxien Period. The quantity may reflect a short duration of use over three to five centuries at most, or a small population. In contrast, Tarxien style was sustained from *c*. 2800–2400 cal. BC with an apparently dense and dynamic population.

The current evidence from the *FRAGSUS* study does clarify these questions of time and space a little. The environmental story suggests drying conditions towards the end of the third millennium BC, a reduction in cereal pollen indicative of reduced arable activity, and a slight and short-lived regrowth of scrub in a few localities. These factors together could suggest that there was a marked reduction in intensive occupation of the Maltese islands, tallying neatly with the cultural changes seen in ceramics, settlement and burial practices.

The *FRAGSUS Project*'s palynological work (see Chapter 3) was undertaken in tandem with an extensive programme of radiocarbon dating and Bayesian age-depth modelling, which has allowed the ages of such events to be estimated more robustly and with more precision than before. This development, and the greater number of sediment cores now available for study, have demonstrated that cereal agriculture continued at a low level at a few sites throughout the period, similar to the rather insubstantial archaeological evidence. Generally, the overall area of cultivation in established coastal sites was probably significantly lower than in earlier periods, but there was some relocation of activity inland, suggested by a rise of cereal pollen in the Burmarrad 2 core from *c*. 2400 BC (Gambin *et al*. 2016).

Reduced activity in the later part of the Tarxien phase is also apparent from the temporal distribution of radiocarbon dates at Taċ-Ċawla, the various temple sites excavated by the *FRAGSUS Project*, and at the Xagħra Brochtorff Circle (see Volume 2). These data suggest a steady reduction in activity spanning *c*. 2500–2100 cal. BC occurring at similar rates in different contexts, as would be expected if the underlying population was steadily reducing.

The evidence from the Cambridge Gozo survey, in as much as sherds can be assessed from surface material (and without the current understanding of Thermi wares and their third millennium BC date), appears both to support and to qualify the interpretations of the transition to the Early Bronze Age Tarxien Cemetery phase (Fig. 7.1). On the one hand, there is evident reoccupation in the period around Santa Verna with greater intensity than in earlier phases, whilst at Ġgantija, there was a decline in intensity. The landscape appears to fill out with the eastern flank of Ta' Kuljat reoccupied, whilst a new occupation started on Ta' Għammar further west. These distributions seem to suggest a level of expansion in settlement and landscape exploitation. Indeed, there appear to have been as many as 16 Early Bronze Age sites on Gozo of which eight were hotspots and these were statistically clustered (Boyle 2013). These observations might argue against a complete socio-economic collapse at the end of the Temple Period, although environmental change nonetheless strongly influenced the events of this era. The well-known 4.2 ka BP climate event, which is the culmination of a long trend of aridification in the central Mediterranean from about 2500 cal. BC (Sadori *et al*. 2013) must have impacted upon Malta too, and may partly explain the apparent lack of continuity between Tarxien-Thermi and the Tarxien Cemetery phases at some sites. Importantly, climatic fluctuation was not directly responsible for the end of the Temple Period. That 'end' had already begun a protracted cultural transformation as effective moisture and agriculture started to decline more than two centuries before, but it likely contributed to the reduced activity levels, and constrained the abilities of the islanders to reverse the pattern of on-going decline. This situation, where climatic and ecosystem trends interacted with cultural development, but did not dominate them completely, is a recurring feature of the settlement history of the Maltese Islands, and speaks for the resilience of those prehistoric populations.

6.9. Conclusion

The more detailed picture of the changing landscape that has emerged from the *FRAGSUS Project* has revealed a complex mosaic of different environmental constraints and opportunities, unfolding at different

scales and following different time frames. The more complex understanding that this emerging picture is permitting is also shedding new light on cultural processes that were at least in part a response to these changing environmental conditions. Cultural phenomena such as the emergence of megalithism in the early fourth millennium BC have been considered in this new light, which has allowed a more parsimonious, satisfactory and perhaps simpler explanation than hitherto available. The emerging evidence is allowing periods of cultural intensification to be considered against the changing environmental context. The apparent dearth of evidence of cultural activity during much of the fifth millennium BC is challenging but cannot be explained by less favourable environmental conditions, while the fourth millennium BC 'boom in megalithism' may now be reconsidered with the apparent renewed intensification of human activity in the landscape after the preceding lull. The diverging life-histories of different megalithic monuments across the landscape can be better explained against the emerging backdrop of a changing environment. The transition to the Early Bronze Age has also been reconsidered in light of the *FRAGSUS Project*, as one of complex cultural transformation rather than abandonment and recolonization, in which environmental change, though not necessarily the prime causal factor, was nevertheless a significant catalyst.

Temple landscapes

The ERC-funded *FRAGSUS Project* (*Fragility and sustainability in small island environments: adaptation, cultural change and collapse in prehistory, 2013–18*), led by Caroline Malone (Queens University Belfast) has explored issues of environmental fragility and Neolithic social resilience and sustainability during the Holocene period in the Maltese Islands. This, the first volume of three, presents the palaeo-environmental story of early Maltese landscapes.

The project employed a programme of high-resolution chronological and stratigraphic investigations of the valley systems on Malta and Gozo. Buried deposits extracted through coring and geoarchaeological study yielded rich and chronologically controlled data that allow an important new understanding of environmental change in the islands. The study combined AMS radiocarbon and OSL chronologies with detailed palynological, molluscan and geoarchaeological analyses. These enable environmental reconstruction of prehistoric landscapes and the changing resources exploited by the islanders between the seventh and second millennia BC. The interdisciplinary studies combined with excavated economic and environmental materials from archaeological sites allows Temple landscapes to examine the dramatic and damaging impacts made by the first farming communities on the islands' soil and resources. The project reveals the remarkable resilience of the soil-vegetational system of the island landscapes, as well as the adaptations made by Neolithic communities to harness their productivity, in the face of climatic change and inexorable soil erosion. Neolithic people evidently understood how to maintain soil fertility and cope with the inherently unstable changing landscapes of Malta. In contrast, second millennium BC Bronze Age societies failed to adapt effectively to the long-term aridifying trend so clearly highlighted in the soil and vegetation record. This failure led to severe and irreversible erosion and very different and short-lived socio-economic systems across the Maltese islands.

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