

Chapter 1

Introduction to the Mediterranean Island Landscapes

I.N. Vogiatzakis¹, A.M. Mannion², and G. Pungetti³



The west Mediterranean Islands as seen from MODIS Terra satellite

1.1 Introduction

All Mediterranean Islands resemble each other; each island is different in its own way. Apart from their distinctive differences Mediterranean Islands share many characteristics with islands in general. Places of romance, excitement and adventure or just

¹Centre for Agri-Environmental Research, University of Reading, UK

²Department of Geography, University of Reading, UK

³Cambridge Centre for Landscape and People and University of Cambridge, UK

Table 1.1 Island political definitions (From EURISLES 2002; MEA 2005)

Source	Definition
UN Convention on the law of the seas Part VIII Article 121	An island is a naturally formed area of land, surrounded by water, which is above water at high tide
UNESCO Man and the Biosphere	Small islands are 10,000km ² or less in surface area with 500,000 or fewer residents
European Union	An 'island region' is a segment of a Member State which is entirely surrounded by sea, has no physical links to the mainland and is not the seat of the capital city of any European Union country
Council Regulation (EC) No. 2019/93	A smaller island is an island the permanent population of which does not exceed 100,000 inhabitants

escape from the pressures of busy lifestyles, islands worldwide have always held a particular fascination for people. Those of the Mediterranean Basin have a special place in human and environmental history. Due to their position, Mediterranean Islands are among the most visited, studied and exploited. They also feature prominently in subjects such as mythology, literature, radio, television and travelling material.

Although there are many definitions of what constitutes an island (Table 1.1), the *Oxford English Dictionary* definition is 'a piece of land surrounded by water'. This definition sets the scene for the notion of insularity which defines many of the characteristics and processes discussed in this book. The idea of the island laboratory initiated by the works of Charles Darwin (1859) on species and ecosystems was followed by Evans (1977) for humans and early societies. Islands are thus judged as natural laboratories and provide a foundation for the study of natural and cultural processes (MacArthur and Wilson 1967; Whittaker 1998; Patton 1996). Insularity is truly a limiting factor to resources, allowing hence scientists to study the ways in which biological or human communities have adapted to their environment. This limiting factor generates a self-contained microcosm, almost a closed system, with defined boundaries. This sets islands apart from the contiguity of the continents and thus defines a laboratory of manageable and quantifiable proportions.

Unlike isolated oceanic islands Mediterranean Islands are located adjacent to the mainland of three different continents (Fig. 1.1) with which they exhibit many similarities in biota and physical environments. In the past some of the largest islands hosted remarkable ancient civilizations; there are many similarities and many differences in the patterns and timing of human colonization just as there are differences in current anthropogenic activities. Ecologically the islands are individually unique and all are considered to be hotspots of biodiversity at a global scale (Médail and Quézel 1997; Davis et al. 1994).

The book addresses these issues and the major environmental changes that the islands experienced during the Quaternary. In particular it focuses on the changes



Fig. 1.1 The Mediterranean region and the major islands (Adapted from GLOBAL GIS © 2001 American Geological Institute. With permission)

during the Holocene, approximately the last 10,000 years, and their effects on biota, and on the current human pressures that are now threats to the sustainability of the island communities. The general aim of this book is to review the existing qualitative and quantitative information, which is currently fragmented, on the Mediterranean Islands' physical and cultural environments. The specific objectives of the book are to:

- Synthesize the fragmented information available on the islands' landscapes, by providing an overview of the landscape/environmental and ecological changes during the last 10,000 years, and comparing these changes between the different islands
- Enhance the understanding of the past and present in order to provide insights for the future
- Suggest sustainable land-use practices and new tools for conserving Mediterranean Island environments
- Explore a common strategy for sustainable development of the landscape and biota of Mediterranean Islands
- Fill a niche that is not serviced at present by current research

Overall there are c.5,000 Mediterranean Islands. However, it is the largest islands that dominate the Mediterranean scene (Table 1.2). They host indeed large numbers of biota, and are characterized by exceptional cultural elements while at the same time are subjected to the most intense environmental and socio-economic pressures. This is the reason why this book focuses on them.

Insularity is perceived and experienced differently by visitors and inhabitants. The latter consider that insularity is a disadvantage, especially in comparison with mainland regions. There are disadvantages directly related to the physical environment,

Table 1.2 Characteristics of the major Mediterranean Islands (After Hopkins 2002)

Island	Country	Size (km ²)	Population (1,000)	Density (inhab/km ²)
Sicily	Italy	25,708	5,097	198
Sardinia	Italy	24,090	1,661	69
Cyprus	Cyprus	9,241	784	85
Corsica	France	8,681	272*	29
Crete	Greece	8,261	559	68
Balearics	Spain	5,014	768	153
Maltese	Malta	316	400	1,266
Archipelago				

* See Chapter 10.

e.g. restricted resources including land, water, energy, coastal erosion, marine and coastal pollution, whereas others are a consequence of isolation from the mainland, e.g. difficult access to education and health services, absence of favourable conditions for many types of businesses, higher cost of living due to the need for imports, population decrease (Table 1.3). Visitors conversely, consider the coastline to be an asset and relative isolation a benefit in comparison with the hurly burly of urbanized continental areas. However, visitors spend relatively little time on their holiday destinations and so do not experience the long-term disadvantages.

Over the past few decades, changes in agricultural practices, especially the increase in animal husbandry, have resulted in biodiversity loss. Moreover, tourism has led to migration from rural to urban areas and to increased pressure on coastal ecosystems (Scapini 2002). Although these issues are common throughout the Mediterranean Basin, they are amplified in the islands due to insularity and specific constraints. Socio-economic problems, for example, are often compounded by the fragility and vulnerability of the islands. Consequently Mediterranean Islands experience greater difficulty in achieving a comparable level of development and standard of living when compared with the European mainland (EESC 2003).

Special reference must be made to tourism because it has been one of the most important factors in the Mediterranean Basin's socio-economic development in the last 50 years. The arrival of tourism in the islands has led to broader socio-economic and cultural changes and several unwelcome economic, environmental and sociocultural impacts which currently threaten the islands' sustainability (Briassoulis 2003). Tourism has been adopted universally in islands as a tool for development (Ioannides et al. 2001; Conlin and Baum 1995). In the case of the Mediterranean Islands, tourism is viewed as the only activity capable of reviving local economies (Kousis 2001). Even where cultural impacts are very strong, the economic benefits associated with tourism make it irresistible to local communities (Williams 1997). Examples of socio-economic and cultural problems include a degree of homogenization as food and recreation preferences from tourist homelands are adopted and which sometimes displace local traditions. Truly, the aspirations of many islanders tend to view tourism as a means of rapid wealth generator resulting in avoidance of other essential employment. The seasonality

Table 1.3 Permanent disadvantages of island regions (After EESC 2003)

Disadvantage	Nature
Isolation from the mainland	Physical
Higher cost of sea and air transport, communications and infrastructure on account of natural and climate-related obstacles	Economic
Restricted usable land area	Physical
Limited fishery resources	Physical
Restricted water supplies	Physical
Restricted sources of energy	Physical
Marine and coastal pollution	Physical
Special difficulties in waste management	Physical
Falling population, particularly of young people	Social
Coastal erosion	Physical
The shortage of qualified workforce	Social
The absence of favourable economic climate for businesses	Economic
Difficult access to education and health services	Social
Small scale and seasonal nature of local markets	Economic

of tourism as intensive work for just two thirds of the year is often considered preferable to all-year-round employment. Tourism also encourages a shift in population from rural to urban environments, and traditional jobs such as those linked with agriculture are hence eschewed.

The impacts of tourism on landscape degradation, with excessive demands on water supplies and problems of waste management are common issues throughout the coastal areas of the Mediterranean Basin, but in islands they are amplified. Another severe but unquantifiable problem is that of the invasion of alien plants and animals. Many of these problems will be compounded by global climate change and may, in turn, affect socio-economic activities including tourism.

Increasingly, however, the sand-sea complex is insufficient since the sophistication of tourists' demands grows. This can contribute to improved preservation of environmental quality because access is required to 'Nature', archaeology, good water quality and aesthetic environments. Therefore nature and/or cultural conservation is no longer necessarily an impediment to tourism development but a means for making the islands more attractive to visitors. It does, however, require good planning and active management.

1.2 Nature and Culture in the Mediterranean Islands

In this introductory chapter, the various subjects illustrated in this book and the organization of its content are explained. Part I comprises background chapters defining the major geological, environmental, cultural and socio-economic factors which have influenced Mediterranean Island landscapes in time and space. In Chapter 2 there is emphasis on Quaternary environmental changes. The separation

of the African and European plates around 150 million years ago resulted in the formation of the Mediterranean Basin. Throughout the last part of the last ice age c.20,000 years ago the climate of the area was significantly drier and cooler than it is today. Faunal evidence shows the presence of horse, reindeer, mammoth and marmot, while palynological evidence suggests a predominance of grassland, with small areas of pine and deciduous woodland (Patton 1998). The coastlines of the Mediterranean have changed significantly since the end of the last ice age c.12,000 years ago due to sea level rise. Thus the biogeographic characteristics of islands today (i.e. size and distance from mainland) have been altered. At the time of the last glacial maximum (i.e. 18,000 years ago) Sardinia was joined to Corsica, Minorca to Mallorca, the Maltese and Egadi groups to Sicily. In the Aegean Sea most of the Cycladic islands were joined together while the islands in the north and east were part of the mainland (Patton 1996).

When humans first appeared in the Mediterranean Islands and when the islands were settled on a permanent basis are controversial issues. Table 1.4 gives a synopsis of generally accepted dates for the earliest establishment of a significant settlement on the islands discussed in this book. This table is indicative but not definitive, and caution is urged regarding its interpretation on several grounds. First, the falls and rises of sea levels as Quaternary ice advances waxed and waned have joined and severed the connections between most of these islands and the mainland and between islands too. Second, the evidence for human presence and related age estimations is patchy and sometimes controversial. Third, absence of evidence does not necessarily mean absence of humans, and presence of evidence does not necessarily mean the existence of a viable population with a permanent island home because it is highly likely that visits by mainland people occurred before and after permanent settlement.

A survey of island colonization including work up to 1989 by Cherry (1990) and a discussion of later prehistoric developments in Blake and Knapp (2005) provide additional information. Further insights into early human colonization of at least some of the islands are possible from the analysis of the genetic characteristics of present-day populations. During the last cold stage in Europe, Sykes (2001) has identified seven likely refugia for humans: Mount Parnassus (Greece), southern Russia, southern France, northern Spain, north-east Italy, Central Italy and the Euphrates region of Syria. As warm conditions developed, populations expanded from these refugia to people Europe. Genetic characteristics from populations in Italy and Sicily indicate two expansions c.20,500 and 8,000 years ago from the Italian refugia into Italy and Sicily. These same populations did not, however, colonize Sardinia (Francalacci et al. 2003) where genetic characteristics indicate a wave of colonization from southern France, or the Iberian peninsula, c.9,000 years ago (Rootsi et al. 2004). Corsican populations reflect instead colonization from the northern Italy refugium. Crete was probably colonized from mainland Greece and, on the basis of geography, Malta would have been susceptible to invasion from Sicily and north Africa.

In terms of environmental impact in the Mediterranean Islands, however, the early Holocene appears to have been crucial as the transformation of wildscapes

into landscapes began. Thereafter these landscapes became increasingly modified by human activity, as discussed in Chapter 3.

From the time of Darwin (1859) and Wallace (1892) to MacArthur and Wilson (1967), scientists have been fascinated by the evolutionary biology of island biota, particularly in relation to factors determining species diversity, adaptive radiation and evolutionary changes within populations (Grant 1998; Whittaker 1998). Most of the islands in the Mediterranean are biodiversity hot spots which have provided refuge for many plant species, including endemics, and contributed to evolutionary differentiation (Blondel and Aronson 1999; Snogerup 1985). The large Mediterranean Islands *shared* some common elements before the arrival of humans such as dwarf elephants and hippos (Blondel and Aronson 1999) but also had distinct differences. Mediterranean Islands possess floras of special interest. They all contain a high number of endemic species, some relictual, others more recent and a high proportion of plants of Mediterranean Islands is endemic to the Mediterranean Basin including several wild relatives of crops (Heywood 1995; Greuter 1995). Landscape fragmentation due to human activity has also occurred. These factors together with the effects of insularity on biota, their biogeographical affinities and peculiarities are discussed in Chapter 4.

Apart from being biodiversity refuges, Mediterranean Islands provided the stages of some of Europe's most impressive early civilizations. Mediterranean Island landscapes have indeed great symbolic value; historical monuments and mediaeval cities are preserved on most islands and bear witness to their culturally powerful past. Moreover, new archaeological findings are constantly being unearthed. The Taulas and Talaiots of the Balearics, the Nuraghi and Torri of Sardinia and Corsica, the Neolithic stone Temples of Malta and Gozo and the Minoan Palaces of Crete are evidence of Europe's historical fabric. They also reflect the islands' importance to ancient civilizations and the role of the sea in their maintenance as cultural foci (Pungetti 1996).

Commonly throughout the Mediterranean Basin, human identities and cultures in the islands are diverse both historically and currently (Proudfoot and Smith 1997). Evans (1977) argued that just as insularity has profound consequences for biota it had similarly profound impacts on culture. What are the cultural effects of insularity? Moreover, if island communities have particular cultural features, has this resulted in a particular/distinct cultural landscape? These questions are considered in Chapter 5.

Albert Camus wrote: 'Generally, I like all islands. There it is easier to rule.' Islands, particularly those of smaller size, are often powerless in political terms. Although in prehistory many of the islands were characterized by remarkable indigenous civilizations in recent times mainland powers have dominated over islands. As discussed in Chapter 6, all the islands examined in this book have historically been in a position of political subservience to an outside power. Due to their strategic position many islands endured repeat invasions and wars; they were also instruments for defence, trade and exploitation of natural resources. First came the Greeks, followed by the Phoenicians, Etruscans, Carthaginians and the Romans; later came the Sarrasins, Genoans, Venetians and the Turks to mention but a few of the conquerors. Today, all but two of these islands are components of a mainland

state belonging to the European Union (EU). The island states of Cyprus and Malta gained their independence relatively recently from the British and in most recently were admitted as members of the European Union in 2004. Other islands like Sicily, Sardinia and Corsica, although part of a mainland state, have retained an autonomous status with regional governments in place and in control of legislation and administration. At the national level, some of the changes in the last 100 years have been related either to policies of negligence or more recently with the implementation of EU legislation to policies of attention, since most of the islands were incorporated under the Least Favoured Areas, Objective 1. This has given rise to the distinct political landscapes of the Mediterranean Islands.

1.3 Mediterranean Island Landscapes

Part II focuses on individual islands. Chapter 7 deals with Sicily the largest and highest island in the Mediterranean with a rich archaeological heritage. It is dominated by the presence of Mt. Etna, one of the most active volcanoes in the world. The volcano has created and destroyed landscapes in the past and has influenced the culture of the people who have lived in its shadow. The west of the island is characterized by extensive citrus orchards surrounded by stonewalls and hedges, i.e. a typical Mediterranean garden landscape. In the island's centre there are agro-silvo-pastoral landscape remnants of the old feudal system. Sicily's quasi-island status marks it out as different from the other islands because its prehistory is linked with that of Italy; humans were present at least 35,000 years ago though additional evidence points to a significant spread of human occupation c.9,000 years ago (Table 1.4). Due to its proximity to the mainland its environmental, ecological, cultural and socio-economic characteristics are thus close to those of South Italy which itself contrasts with North Italy.

Geologically, as described in Chapter 8, Sardinia has many affinities with Corsica since they originated from the Corsico-Sardinian complex, a 'continental microplate' which parted from the European plate in the Oligocene-Miocene some 30 million years ago, but their landscapes differ in many respects. Sardinia is the second largest island in the Mediterranean with a great variety of geological formations, particular morphological features such as *giare* and *tacchi* and a mining heritage. Early dates from Sardinia, c.13,500 years ago, are disputed but could reflect a Palaeolithic presence; later dates c.9,200 years ago are from deposits associated with human remains and artefacts. The island has extensive traditional landscapes and abundant dune systems, as well as a rich archaeological heritage. Despite widespread eucalypt plantations, the island has generally retained its semi-natural vegetation. Although not as widespread as in other Mediterranean Islands, tourism is increasingly becoming the main source of income.

Chapter 9 examines the island of Cyprus which is dominated by two mountain ranges parallel to each other in an east-west direction and which are separated by a wide plain. The remarkable site of Akrotiri, not only contains evidence for early

Table 1.4 A tentative chronology for the human colonization of Mediterranean Islands

Island	Date (approx BP)	Site	Reference
Sicily	37,000–20,000	Stone tools on Catania Plain and Agrigento province	Leighton 1999
	17,000–10,000	Abundant evidence from coastal caves	
Sardinia	13,500	Corbeddu Cave*	Hofmeijer 1997
	9,100	Corbeddu Cave	Sondaar et al. 1986
Cyprus	10,600	Akrotiri Aetokremnos	Simmons 1999
Corsica	11,500–9,500	Various rock shelters	Costa et al. 2003
Crete	8,000	Knossos	Rackham and Moody 1996
Balearics (disputed)	5,000–4,000	Various, e.g. Cova des	Alcover 2004
	7,000–8,000	Moro, Mallorca	
Malta	7,500	Ghar Dalam Cave	Trump and Cilia 2002

* Dates for Sardinia are disputed, see Chapter 3.

Holocene settlement of Cyprus but also for the active hunting of pygmy hippopotami; indeed, these hunter-gatherers may have been responsible for the latter's extinction. Copper extraction in the past has caused destruction of natural habitats. The British administration (1878–1960) contributed to the increase of forest cover by introducing and enforcing strict legislation, but also through extensive plantations of introduced species. Since 1974 Cyprus has been a divided island as a result of an armed-political conflict which gave rise to two distinct parts: an urbanized south and a predominantly rural north. Tourism dominates island economics.

Corsica, the subject of Chapter 10, is the second highest island in the Mediterranean; has a predominantly mountainous terrain with a well-defined extensive plain on the east coast. Geologically it has the same tectonic history as the Alps. The research of Costa et al. (2003) indicates similarities between Sardinian finds and Corsican rock shelters and probably reflects colonization by Mesolithic hunter-gatherers. The island has extensive forests and traditional agro-forestry systems. Agriculture is less intensive than in other Mediterranean Islands while the population is concentrated in many small villages mainly on the mountain zone. Since c.1980 Corsica has experienced a fourfold increase in the number of tourists (Kousis 2001). Today it is an island with autonomous status, and a unique designation of natural parks that covers 40% of its area.

Crete is recognized as a Global Centre of Plant Diversity by the IUCN (Davis et al. 1994) due to its high degree of endemism. As discussed in Chapter 11 there are three principal mountain massifs on the island with several peaks over 2,000m and karstic features including gorges, dolines, caves and underground rivers. Terraces, enclosures and greenhouses are examples of old and recent features which make up an extensive agricultural landscape. The dominant activities are sheep

rearing, olive and vine production. The widespread tourist development on the north coast has led to the destruction of dune systems.

The penultimate chapter in Part II, Chapter 12, is concerned with the Balearics, an archipelago of 151 islands and islets only four of which are inhabited at present. Their remarkable geomorphology and isolation have resulted in a unique biodiversity, with differences occurring between the east and west islands of the archipelago. The Balearics are as archaeologically distinct as they are biogeographically distinct because they have always been isolated. The history of human colonization is controversial (see Alcover 2004) and centres on either an early or late colonization based on age estimations of c.8,000 and c.4,000 years ago. Approximately 40% of the islands' territory is under some type of environmental protection. The islands are among the most popular tourist destination in the Mediterranean; tourism is an income generator which exerts enormous pressure on land use and biodiversity.

Neolithic cultures are in evidence on all the islands through their legacy of ceramic technology and megalithic construction. The case of Malta, however, in Chapter 13 intriguing insofar as it was (most probably) joined to Sicily at several times in the last 2 million years and thus could have received humans at any time on their excursions out of Africa. Yet the earliest dates for human colonization are c.7,400 years ago, by which time a sophisticated culture was established. Malta, an island state, has experienced an increased economic development in the last 30 years resulting increased pressures on the landscape. The island's high population density, moreover, along with intensive tourism has brought significant pressures on the overall balance between rural and urban areas and ecosystems. Urbanization, intensive agriculture and hunting have resulted in great habitat loss and the decimation of bird populations.

1.4 Future Perspectives

Part III of the book deals with future perspectives. Based on the chapters focused on the individual islands (Chapters 7–13), Chapter 14 presents the founding of a landscape strategy for Mediterranean Island landscape development with a focus on multifunctionality. This has been central in the past to sustainable resource management in traditional Mediterranean rural landscapes (Naveh 1998; Makhzoumi and Pungetti 1999). Embracing the many roles of landscape in socio-economic terms, and the need for sustainable management of the integral natural and human resources are critical to ensure a viable future. Therefore, the chapter advocates the use of a holistic approach based on landscape ecology principles in order to develop strategies for the Mediterranean Island landscapes. This transdisciplinary approach brings together in a unified framework the natural and cultural elements of the landscape and is inclusive of the views expressed by scientists and stakeholders alike. The concluding chapter (Chapter 15) is a comparative summary of the landscape character and changes in the Mediterranean Islands; it underlines their differences and similarities, and highlights the challenges and prospects they face in the ensuing decades.

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