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## SPATIAL DYNAMICS OF MEDITERRANEAN COASTAL REGIONS: A SURVEY

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A series of phenomena of growth, change and pressure have characterized the spatial evolution of the coastal belt of both developed and developing Mediterranean countries over the last few decades, from Spain to Italy, from Croatia to Turkey, from Cyprus and Malta to Maghreb countries. These phenomena include, according to different local situations, demographic and touristic pressure towards the coast, change in coastal settlement systems, industry development and traffic growth, land use and cover change, and consequently a lot of problems for coastal spatial planning.

**Key words:** coastal regions, spatial dynamics, demographic and touristic pressure, Mediterranean countries

### INTRODUCTION

This paper deals with a series of phenomena of growth, change and pressure which have characterized the spatial evolution of the coastal belt of both developed and developing Mediterranean countries over the last few decades. It summarizes the research led by a group of geographers mainly from Italy, but also from other Mediterranean countries (Cori and Lemmi 2002; see also King et al. 2001). These researchers have been working within the framework of the Human Dimensions of Global Environmental Change Programme.

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The paper considers as "coastal regions" those areas included in the maritime mid-level administrative units of the Mediterranean countries as defined by the "Blue Plan", the well-known first systematic study of the development impact of the whole Mediterranean region (Grenon and Batisse 1988).

These regions possess a coastline of no less than 45 000 km: Greece, with its indentations and islands, and Italy together account for more than half of this length, followed by Croatia and Turkey. Whether highly industrialized (as in the northwest) or developing (as in the south), these areas seem to be more sensitive to the consequences of and more effective to the causes of human-induced global change processes – from industrial pollution to sea-level rise – than other regions.

### HUMAN PRESSURE

More than 60 % of the world's population resides in coastal regions; these regions are attractive and have specific natural resources and economic activities. Research carried out within the framework of "Blue Plan" shows that, in Mediterranean countries, the coastal population accounts for 10 % of the total population in countries such as France and former Yugoslavia, but up to 100 % in island states such as Malta, and small "coastal states" such as Albania, Lebanon and Israel. Very high figures are also found in larger states such as Italy, Tunisia, Libya, Algeria and especially Greece. The Mediterranean coastal population density is more than twice as high as the density of the Mediterranean population as a whole.

Projections for 2025 A.D. show that the Mediterranean coastal population will most probably grow and, depending on the various scenarios, might amount to 160 to 210 million inhabitants. Dramatic growth is predicted to take place in the coastal regions of southern and eastern Mediterranean countries: over 300 inhabitants/sq. km. in 2025 in Israel as a whole and for the Algerian and Egyptian coastal belts, and over 500 for Lebanon and coastal Syria. In Libya density figures will remain much lower, but even there the environmental context favours concentration along the Mediterranean coast. Since the late 1980s Turkey has shown a strong demographic increase and a positive migratory balance in the provinces along its western and southern coasts (Reiffers 1997, pp. 311-312). All this implies a growing demand on coastal resources and a need for urgent local development, with possible serious environmental effects.

Even in the first group of countries, however, a "sunbelt factor" will produce some effects (Charrier 1994). The very dynamic French Cote d'Azur shows the combined outcomes of coastalization, sunbelt factor, agglomeration economies and "frontier effect". Moreover, migratory movements from southern Mediterranean countries to northern and particularly north-western countries also tend to concentrate in the provinces bordering the Mediterranean coastline (Brunetta and Rotondi 1996): indeed, these provinces seem to offer a good synthesis of modern development and traditional quality of life, which is also shown by the parallel European north-south migration.

The percentage of the Italian population living in the coastal communes grew at a regular rate from ca. 20 % to ca. 30 % between 1861 and 1961, but since then it has remained largely unchanged. In certain regions, for example

Tuscany, a "counter-coastalization" has occurred since the 1980s, with a flow of population away from the coast, which was encouraged by specific regional development policies.

Finally, a special case is that of the smaller coastal islands of Croatia, where (with the exception of a few northern islands where tourism has developed) population has been dwindling over the past 70 years, and the government gives incentives for young people to return there and contribute to a demographic revival.

## TOURISTIC PRESSURE

A substantial part of human pressure on Mediterranean coasts is caused by tourism: a growing population from the hinterland demands leisure services and activities along most of the Mediterranean coastline and "exploits" the Mediterranean itself as a big tourist lake, full of both natural and cultural attractions (Lozato-Giotart et al. 2001). As stressed by Keckes (1996), these people are "a mixed blessing: while they provide an essential part of host countries" income, they also significantly add to the environmental woes of already stressed coastal zones and exert a further pressure on scarce resources". The total number of temporary coastal dwellers is estimated to be 100-150 million each year – which is more than 30 % of the world figure – and this figure is expected to have doubled by the year 2025.

In Spain, special names for coastal regions have been coined since the 1950s in order to launch the country's Mediterranean coast on the international tourist market, for example: Costa Dorada, Costa Blanca, Costa del Sol, Costa de la Luz. In addition, Balearic Islands such as Majorca, Menorca and Ibiza are popular amongst millions of people from northern and north-western Europe and have been largely transformed as a result of tourism.

In France, the traditionally well-known Cote d'Azur is now accompanied by the Cote Vermeille: tourist pressure on the French Mediterranean coast is clearly demonstrated by some figures: ca. 50 % of the country's second homes, 60 % of the hotel facilities and 80 % of the holiday villages and camping sites are concentrated here (Capineri et al. 1995).

In some Italian regions, which were affected by the wave of tourism during the second half of last century, the increase in human pressure on the coast has not been stopped. Along many stretches of the Italian coastline, hotels and other tourist settlements are found in such high density that there is more than one bed available for every 2 m of coastline (Montanari 1996). Along the Adriatic coast, tourist pressure is by far the main driving force of the systematic occupation of the whole coastal space available under the 50-m contour – an occupation which even affects the fragile amphibious lands close to the Po Delta and the Lagoon of Venice (Fabbri 1997).

But even away from the three traditional "tourist powers" of the north-western Mediterranean, we can find examples of coastal regions with recent urbanization, numerous service activities and infrastructures due to the rapid development of local tourism, frequently brought about by external forces. This is the case on the Turkish Riviera (Sprengel 1998), the Lebanese coast, Cyprus, Mediterranean Morocco and particularly Tunisia.

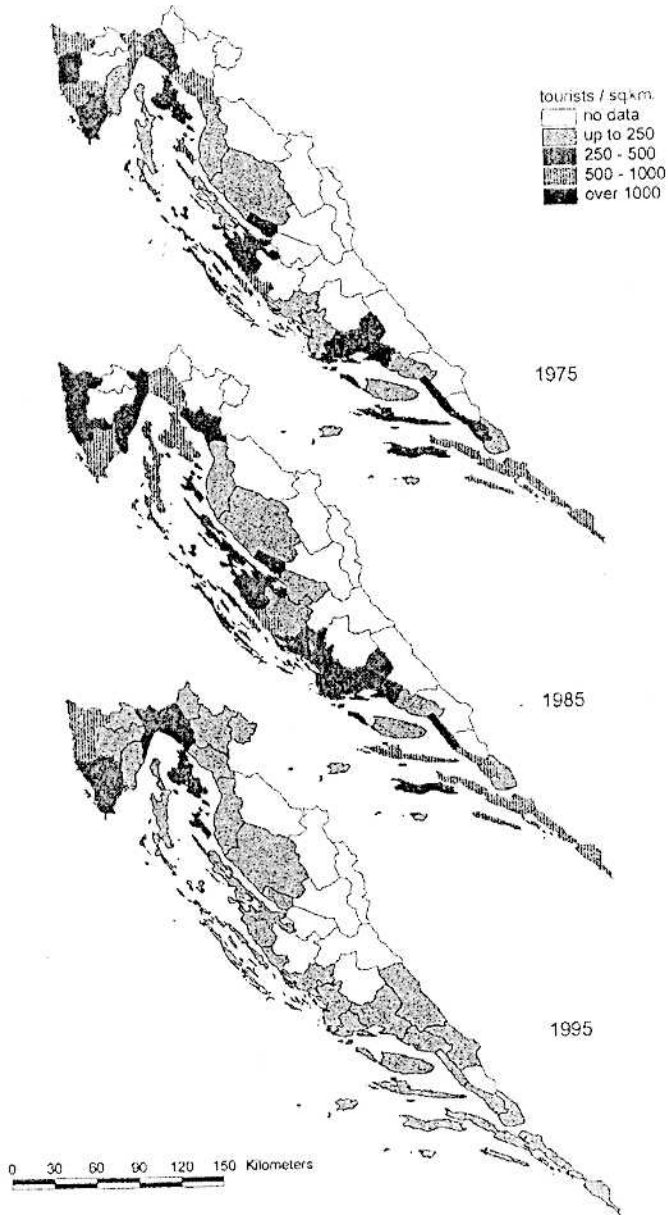


Fig. 1. Tourist pressure trends in coastal Croatia

The case of the north-eastern Mediterranean is special and needs further research. Greece and Croatia are the leading countries in a possible process of west-east shifting of international tourism within the Mediterranean area. In the eastern Adriatic, the undeniable opportunities of the indented and picturesque.

Croatian coast have only been limited by the political and military situation of the 1990s (Crkvencic 1996). Greece simply has to coordinate the potentialities of its archaeological and artistic heritage with the traditional sea-sun-shore appeal.

As a whole, Mediterranean countries provide at least 25 % of the world's hotel accommodation, and an even larger share of other tourist structures. This refers to a situation in which 90 % of accommodation is provided by the northern shores: both this concentration and prospects of 'southern' decentralization are going to produce considerable challenges for the future.

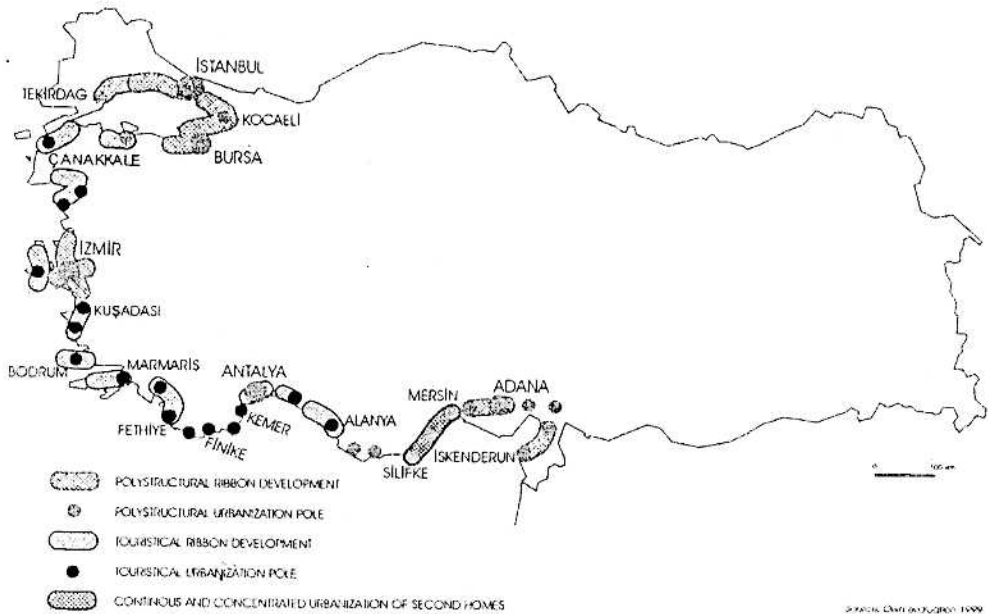


Fig. 2. Types of coastal urbanisation in Mediterranean Turkey (1985-1997)

Source: Own evaluation 1999

## SETTLEMENT SYSTEM CHANGE

A significant and growing portion of the Mediterranean coastal population can be characterized as urban: 538 urban settlements with more than 10 000 inhabitants each are at present found along the Mediterranean shores; of these, 45 exceed a population of 200 000. By 2025 the urban population might be 75 to 85 % of the total.

This represents a substantial trend of change in the Mediterranean coastal settlement system, even though it is consistent with an old-established metropolitan tradition. However, an even more dramatic change is clearly foreseeable in terms of the physical housing system, given the new forms of urbanization that imply the systematic increase in the number of homes – especially second homes – frequently along a narrow strip of coastline, in more and more countries.

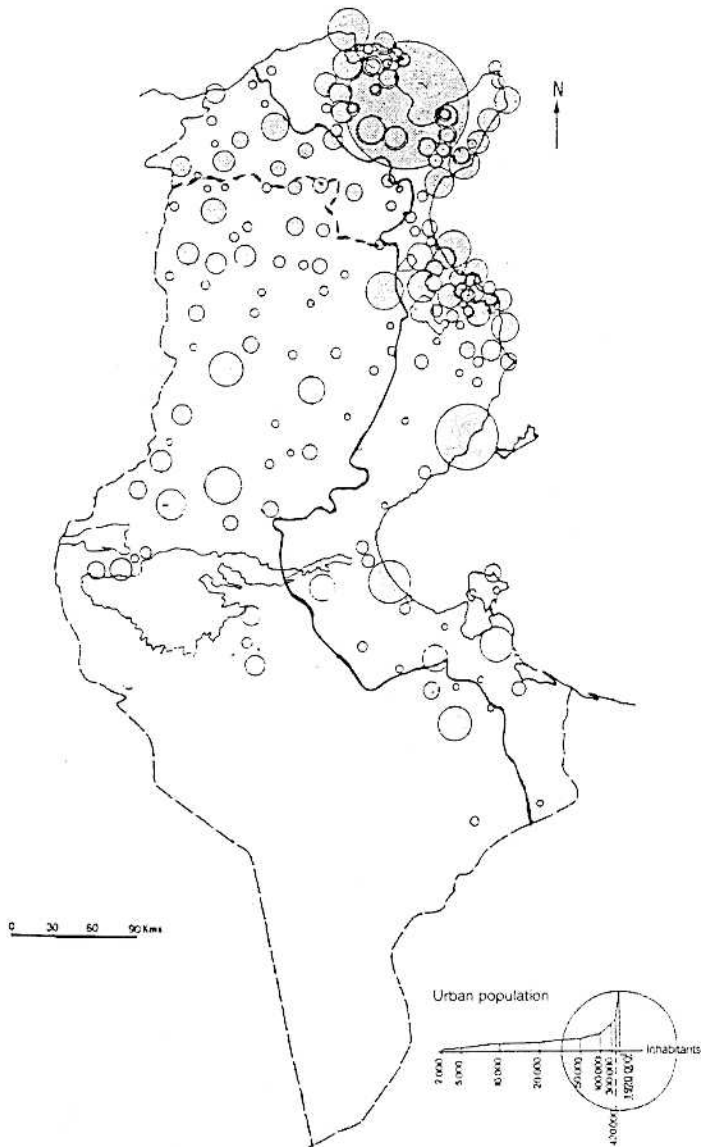


Fig. 3. Towns in Tunis, 2001

In Spain, the number of houses along the Mediterranean coast grew by 77 % over 20 years, while the national figure – also rather high – was 61 %. Along the whole north-western Mediterranean Arc, the housing stock grew by 57 % over the same period (while the population was edging up by 13 %) and second homes by 171 %.

In two Italian regions, Calabria and Sardinia, a growth of more than 100 % in their building stock occurred in a narrow strip of coastal communes, which is a much faster growth than in inland communes. Through the expansion of scattered urbanization – often illegal – corresponding to a specific “seasonal” lifestyle, the number of second homes along peninsular and insular Greek coasts has multiplied (Lemmi 1997). Even on smaller islands, for instance Malta, the coastline has proved to be very attractive to households. These new forms of settlement growth – which are frequently underestimated, since they are partly due to unauthorized building – lead to new land uses, which have a marked environmental impact.

### INDUSTRIAL GROWTH

As we know, significant industrial activities characterize Mediterranean coastal regions. Steel and metal plants, not to mention shipyards, are traditionally located near the sea, along industrial coastal axes from Marseille to Taranto and from Athens to Tunis. More recently, coastal industry has expanded along the Mediterranean coastline, especially on southern and south-eastern shores. Oil processing plants, already established almost everywhere, have been growing along the central and western African Mediterranean coastline. The same holds, to an even larger extent, for thermal power stations which need “water locations”. They are now evenly located along the coasts from western Algeria to the Turkish gulf of Iskenderun. This is the same area which houses 25 oil tanker leaving points, while a corresponding line of 22 landing points exists along the north-western coastline, from Gibraltar to northern Croatia.

The north-eastern Mediterranean, from southern Croatia to southern Turkey has generally escaped coastal industrial development as have many islands, notably Corsica, the Balearic Archipelago, Crete and most Greek islands, because of the predominance of tourism; on the other hand Cyprus and some northern Croatian islands are slightly affected by industrial developments and Sardinia and Sicily are heavily industrialized (Rota 1997).

So, while many processes of industrial “eco-restructuring” and the introduction of high-tech and “clean” industrial settlements (e.g. Cote d’Azur) are being undertaken by Mediterranean industrialized countries, there are also some signs of a planned “dirty decentralization” of factories. Many of these factories pollute the marine environment, especially close to big harbours, the large coastal settlements and the coastal industrial complexes. In less industrialized countries, where development has been uncontrolled, waste treatment technologies are often poor and ecological norms do not exist or are applied tolerantly.

### TRAFFIC GROWTH

Growth of motor vehicle traffic is another source of pollution in the Mediterranean area, clearly connected with urban, tourist and industrial developments. In 1963, 15 million cars were registered in Mediterranean countries (in this case the whole of each country has been considered, not only coastal provinces). The number increased to 65 million in 1981, and 117 million cars are now (2002) on the road, together with the vast number of motorcycles and heavily polluting



mopeds; as a whole, they are a source of tremendous pollution. The figures for the north-western Mediterranean – where Italy has recently overtaken France – are much higher than in the other regions, but growth trends are certainly more impressive in the south-eastern Mediterranean; and the impact of traffic (in terms of the number of cars, accidents etc.) are much higher in coastal administrative units than in inland ones.

An increase in the number of vehicles denotes increased daily and seasonal mobility, which is logically encouraged by the new settlement models discussed above. But it also means more land consumption for roads and parking space. This happens throughout the Mediterranean region, but more markedly along the coastline. Road development projects in Israel and Lebanon are currently planned along the coastline, which are considered the most “natural” setting. Coastal planners should pay special attention to this trend, which will have a major impact on the environmental quality in coastal zones (Belfiore et al. 1998, p. 81) One cannot help thinking of the impact of parallel roads on the coastal landscape, for example, the newly planned Croatian coastal highway from Dubrovnik to Rijeka in the unique context of the Eastern Adriatic coastal environment.

Another type of pressure which should not be underestimated is maritime traffic. About 220 000 vessels of different size enter or cross the Mediterranean Sea each year. The number of Mediterranean ports is also impressive. In Croatia, for example, trade, fishing and tourism have generated, along its particularly long and indented Adriatic coast, ca. 250 ports and boat harbours of different types and sizes. Many of these, of course, are simple tourist harbours or “marinas”; but even these can exert a certain “pressure” on coastal life.

### CHANGE IN LAND USE AND COVER

The transformations described above, if translated into terms of physical appearance of the Mediterranean coastal regions, produce substantial changes in land use and land cover.

In Spanish, French and Italian Mediterranean regions, verified cover changes include a reduction of utilized agricultural land, an expansion of uncultivated land and built-up areas, and, on a more positive note, a slight increase in woodland. These changes can be summarized as a progressive transfer from agricultural use to other uses. The trend is reinforced dramatically to meet both the new settlement patterns and radical changes in urban structure and the growing demand of tourism and traffic infrastructures. It must be added that the agricultural areas mostly affected by the spread of new housing are frequently the best ones (Cortesi et al. 1996).

Changes in land use and cover are still under investigation in other Mediterranean areas. In many of them, a similar scenario of increasing competition for space, of settlement and infrastructure expansion and of reduction in agricultural area, can be imagined – with subsequent increases in water- and wind erosion and, at least locally, salinization and desertification. There are some cases of an opposite development, for instance in Albania, where agriculture has, so far, continued to gain space at the expense of woodland (Ziu 1994).



The consequences of these changes upon the Earth's biogeochemical cycles are still to be studied. Such consequences primarily imply long-term effects. However, this is not a task for geographers.

### SPATIAL PLANNING

It is clear that the series of processes considered so far represents a challenge to the human capacity of controlling "spontaneous" spatial processes and making them "sustainable": in short, to the human capacity of achieving true and reasonable spatial planning.

Apparently, spatial planning, at least in most Mediterranean countries, has only discovered coastal areas very recently: and now such planning is urgently called for. Indeed, as we well know, the environmental issue has only recently been acknowledged by planning in general: planners accepted and encouraged, with a "laissez-faire" behaviour, uncontrolled urban and infrastructural expansion, the diffusion of industry into coastal areas and the sprawl of mass tourism towards the sea. Spatial planning became aware of the environmental problem long after profound changes had already affected the Mediterranean.

It is true that from the 1970s onwards protected areas began to spread out around the Mediterranean basin. But a map of the distribution of national parks in the Mediterranean shows that very few of them are coastal or marine parks; protected environments are more often located in mountainous areas, where tourist demands are not as heavy.

In this respect, the north-western section of the Mediterranean is in the most favourable situation: there are 10 national and 40 regional parks from Gibraltar to Sicily. They make up an area of 1.8 million ha which includes marshlands, woodlands, maquis and areas whose fauna is of special interest; attempts have also been made to set up marine parks.

Regarding other Mediterranean countries, it should be noticed that the Croatian islands, considered a great treasure and of special value for the country, are subject to special state protection according to the Constitution. Together with "continental" coasts, they host a number of parks, reserves and "protected landscapes". Greek spatial planning also seems to have considered both coasts and islands, as shown, for example, by carrying capacity assessments undertaken by the Priority Actions Programme. In Libya and Tunisia, urban planning aims at limiting coastal settlement developments and, where possible, directing urban expansion towards inland locations.

During the last 15 years, planning initiatives have shifted into *Coastal Area Management Programmes* organized within the international framework of the Mediterranean Action Plan, and conceived as "a special case of regional development programmes" (Vallega 1998, p. 89). These programmes try to extend coastal planning practice to countries such as Albania, Turkey, Syria, Lebanon, Israel, Malta and Morocco. Coastal managers and planners should be convinced that coastal management is not only concerned with "a narrow zone consisting of the foreshore, inshore and offshore"; it should also include "littoral cities, seaports and manufacturing areas". Coastal management should thus be substantially extended landward.

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## PRIESTOROVÁ DYNAMIKA STREDOMORSKÝCH POBREŽNÝCH OBLASTÍ: PREHĽAD

Štúdiá sa zaoberá sériou javov súvisiacich s rastom, zmenou a tlakom, ktoré charakterizujú priestorový vývoj pobrežných pásiem rozvinutých a rozvojových krajín Stredomoria za posledné desaťročia.

V pobrežných oblastiach, definovaných ako 40 míľový široký pás pozdĺž pobrežia, sídli vyše 60 % svetovej populácie. Sú to oblasti atraktívne so zvláštnymi prírodnými zdrojmi a hospodárskymi aktivitami. Podstatná časť antropogénneho tlaku na stredomorské pobrežie je zapríčinená cestovným ruchom – vysoká hustota zaľudnenia na pobreží súvisí s existenciou prímorských turistických stredísk: šíriace sa obsadzovanie zázemia – od pobrežia smerom do vnútrozemia – si vyžaduje zriaďovanie služieb a aktivít na využívanie voľného času pozdĺž takmer celého stredomorského pobrežia a využíva aj samo Stredomorie ako veľké jazero pre turistov, plné prírodných i kultúrnych atrakcií. Významnú a narastajúcu časť stredomorskej pobrežnej populácie možno charakterizovať ako urbánu: pozdĺž stredomorského pobrežia existuje 538 mestských sídiel, každé s vyše 10 000 obyvateľmi, kde 45 z nich dosahuje viac ako 200 000 obyvateľov. Do roku 2025 bude podiel urbánneho obyvateľstva z celkového počtu pravdepodobne predstavovať 75 až 85 %.

V stredomorských pobrežných oblastiach existujú významné hospodárske aktivity. Hoci stredomorské priemyselné krajiny podnikajú mnohé eko-reštrukturalizačné procesy a zavádzajú takzvané „čisté“ priemyselné sídla (napríklad Côte d'Azur), ešte stále tu možno nájsť znaky „špinavej decentralizácie“ priemyslu. Nárast automobilovej dopravy je ďalším zdrojom znečistenia v Stredomori. Je nepopierateľne spojený s rozvojom urbanizácie, cestovným ruchom a priemyslom. Takýto vývoj, premietnutý do fyzickej podoby stredomorských pobrežných oblastí, zapríčiňuje podstatné zmeny využívania krajiny. Je jasné, že viaceré procesy, ktoré skúmajú geografi, predstavujú istú výzvu pre ľudstvo „spontánne“ kontrolovať viaceré z nich a tieto meniť na trvalo udržateľné s cieľom dospieť k rozumnému priestorovému plánovaniu.

Preložila H. Contrerasová