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Artificialization and Islandness on the Spanish Tourist Coast

Abstract
This article analyses recent trends in coastal urban growth, mainly prompted by tourism in its various forms, experienced along the Spanish Mediterranean coasts and the Canary Islands, with a special focus on the Balearic Islands. The article seeks to measure and compare the differential rates of urban growth between island and continental coasts during the period 1990–2006, coinciding with the latest major economic growth cycle in Southwestern Europe, and where real estate and tourism activities have played a central role. The results suggest that the degree of urbanization in island coastal regions analysed is lower than that of mainland coastal regions.

Keywords
Coastal Artificialization • tourism • islandness • Spain • Western European Mediterranean • Balearic Islands

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Since the end of World War II, tourist activity and the coastal Mediterranean have gone hand in hand. When the tourist industry reached the Mediterranean, a new form of tourism began: Mass Tourism. The advent of the welfare state involved the development of extensive areas, a practice that until then had been uncommon to the tourist business. Gradually, new modalities of tourism appeared (sun and beach, residential, time sharing, all-inclusive, rural, etc.) and the fine line separating these new developments from real estate business became blurred.

The issues of rapid tourism growth and urbanization are discussed in the present article by focusing on the events of the last 20 years along the Mediterranean coasts of Spain and the Canary Islands and, especially, analysing the different behaviour observed between the mainland and the islands.

Objectives and hypotheses

The relationship between tourism and the coast encouraged urbanization and the increase of artificial surface[1] along the Mediterranean coastline, which overlapped with the earlier relationship between coastal and insular spaces. Indeed, insular forms have a very favourable ratio between shoreline and surface. Hence, a short-sighted argument suggests a transitive relation linking tourist promotion and the islands, via urbanization.

However, with few exceptions, this is not the real issue. For quite some time, biogeographers have been warning that small islands are not prone to biodiversity. Similarly, many economists have argued that insularity limits the number of companies able to achieve economies of scale. In other words, isolation is a constraint for the impact of continental influences because of transport costs and insufficient size to sustain a certain level of economic and (or) biological diversity. Certainly, the development of air transport has partially equalized transport costs to continental and island destinations. But insular remoteness remains a barrier to the development of both real estate and residential tourism at the scale undertaken on the continent.

By measuring the degree of urbanization of the continental and insular Spanish touristic coasts, we will attempt to prove one basic hypothesis: despite the significant expansion of urbanization in our study area during the second half of the twentieth century, the degree of urban transformation of island coasts is lower than that of mainland areas in the same region. Insular isolation is one of the main factors explaining this lower level of urbanization, but not the only one. Seasonality and urban planning in the Balearic case, or other physical or socioeconomic factors, also help to explain the differences.

Both isolation and these other determinants, therefore, should be known. Comparative analyses are undertaken to prove the hypothesis and clarify the determinants.

Literature review

The rapid expansion of urbanization experienced in the West in the second half of the twentieth century has caught the

[1]The term “artificial surface” is used in the CORINE Land Cover nomenclature and refers to “continuous and discontinuous urban fabric (housing areas), industrial, commercial and transport units, road and rail networks, dump sites and extraction sites, but also green urban areas. The concept of urbanization is used in this paper as synonymous with the surface artificialization process.

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attention of many scholars (Turner et al. 1990; Prud'homme & Lee 1999; Catalan et al. 2008; Valera et al. 2007; Burchell et al. 2005; Levine 2006). It is a metamorphosis that reflects the significant socioeconomic transformations that the capitalist world has experienced in recent decades. This trend has been widely studied under the heading of urban sprawl (Bruegmann 2005; European Environment Agency 2006b; Ewing 1997; Ewing et al. 2002; Fulton et al. 2001; Galster et al. 2001; Lopez & Hynes 2003), a tendency which in many areas of the Mediterranean has been based on coastal tourism and real estate business (Baron-Yelles 1999; Coccossis & Constantoglou 2005; Krakover 2004; Karplus & Krakover 2005; Rutin 2010; Sharpley 2001). A similar path has been followed by other regions (Meyer-Arendt 2001; Bachvarov 1999; Scheyvens & Russell 2012; Gladstone 1998).

Historical context

Since the second half of the twentieth century, American and European cities have grown at an accelerated pace and have been transformed in the process. This is a result of the economic transformation after the Second World War (Arrighi 1994; Harvey 1985; 2002; 2005) and the parallel development of new transportation systems and the large-scale consumption of fossil fuels.

Since 1958, when William H. Whyte coined the term urban sprawl (Whyte 1958), this issue has been examined by many authors in regions as varied as Abu Dhabi (Mohammad & Sidaway 2012), China (Yeh & Wu, 1996), and the United States (Gutfreund 2004). The Mediterranean coast, as an important tourist region, has not been omitted from this expansion, certain regions having played an advanced position in this global phenomenon. Many coasts have been transformed into a continuous urbanized area and their growth rate has been higher than inland areas (European Environment Agency 2006a). The expansion of leisure activities, tourism, and residential areas are the main key drivers of coastal urbanization growth. As Harvey (1989, 2003) points out, urbanization aims to reinvest surpluses into the real estate sector when business perspectives begin to decrease in the sectors in which accumulation has occurred. On the Mediterranean coast, property revaluation often presents better prospects than that of inland suburbs, as tourism and housing investments on the *Mare Nostrum* have been a strong lure for European investors from cooler latitudes.

All the processes taking place in the western Mediterranean area come under the rubric of the so-called Third and Fourth Coastal Tourist Periphery according to Gormsen's (1997) model of the historical development of coastal tourism. In line with this theoretical framework, this study attempts to analyse the more touristic Spanish coastal development in recent decades, differentiating between and comparing the continental and island coasts.

Geographical context: continental nature, insularity and urbanization

As demonstrated by economists and biogeographers for at least a century (Brunhes 1920), islands and their continental neighbours do not necessarily behave identically (Baldacchino 2004; 2007; 2012; Clark 2004). This fact reflects a major difficulty for integrating isolated island economies into more internationalized economic models (Baldacchino 2004, pp. 272-273). The economic and geographic literature very often considers such integration as negative in terms of cost (Murray 2012, p. 991), specifically attributable to the increase in transport costs (Bjarnason 2010; Spilanis et al. 2012): "One of the most negative effects that insularity entails is that it represents a rift from the continental territory" (Navinés 2010, p. 14). Along these lines, insularity is understood as a barrier to free circulation and trade as "geographical discontinuity challenges the unification of Community [EU] territories and prevents the goal of free movement from being fully achieved. On the other hand, it is a source of disadvantages, even if only in terms of accessibility costs" (Fazi 2010, pp.23-24).

Conversely, some authors have emphasized the comparative advantage of tourist island destinations in comparison to continental destinations (McElroy 2006; Baldacchino 2006; Hamzah & Hampton 2013; Kim 2012). The myth of the island (Péron 2004) is linked to a calm, sedentary lifestyle, relaxation and so on, as opposed to the myth of the road, which represents nomadism, motion, action. Therefore, some authors have specifically stressed the competitive advantage of islands as tourist destinations or, at least, the need to weigh the substantial recreational benefits of the insular condition against the costs of isolation (Murray 2012, p. 992).

However, the concept of the island is relative because insularity features decline as the size of the island increases (Jędrusik 2011, p. 206; Baldacchino 2004, p. 273). Generally speaking, the larger the island, the smaller its insular traits, and both its internal structure and social behaviour draw closer to the patterns of continental regions. But remoteness, isolation and low accessibility are considered negative only if what comes from continental centres is considered positive. Opposite views to this approach often understand insolation derived from the island condition as a sort of protection against continental predators presented in the form of corporations, external investments, or even tourists when they exceed the environmental carrying capacity of the island or the psychological capacity of the natives. Therefore, the argument is asymmetric, depending on the initial position in valuing the island–continent relationship. These aspects are not alien to the different approaches to the insularity question (Jędrusik 2001; Jędrusik 2011, pp. 207–208).

The measurement of artificiality

Many scholars and institutions have focussed on the measurement of the artificiality of the European territory related to the most recent phase of urban expansion in Europe (1987–2006). The most important instrument, for the purposes of this study, is the Corine Land Cover (CLC) developed by the European Environment Agency (EEA). Other projects worth mentioning are MURBANDY/MOLAND (Valera et al. 2007) and LUCAS (SIGMA, 2010).

In Spain, some of the studies on the changes produced by the growth of urbanization in metropolitan areas are focussed on: Barcelona (Marull et al. 2010; Catalan et al. 2008), Madrid (García-Zaldivar & Naredo 2008), and Granada (Aguilera et al. 2011). In the latter case, moreover, Aguilera et al. (2011) model future urban expansion scenarios.

There are also many studies related to urban development in the Spanish coastal areas that have a closer relationship with this article: Costa Brava (Emmi & Santigosa 1989); the Valencian coast (Ezquerra et al. 1999; Martí & Nolasco 2011); the Andalusian coast (Villar 2011; Almeida & Cortés 2011; García & Delgado 2011); the Canary coast (González & Sobral 2011; Simancas et al. 2011). Many studies have also focussed on the Balearic Islands (GAAT 1996; Pons 2003, 2010; Murray el al. 2010).

Methods

For the present study, artificial land cover is calculated for 1, 2, and 10-km wide coastal strips for the period 1990–2006, with the purpose of analysing and comparing the degree of urbanization of coastal Spanish islands with other Spanish Mediterranean coastal areas.

Although CLC 1990 (raster data - version 15), using aerial photography of 1987 and CLC 2006 (seamless vector data - version 15) were conducted with different methodologies, the data obtained can be implemented to compare the results. The

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Table 1. Extent of urbanization of the Spanish Mediterranean coast and the Canary Islands, 1990 and 2006

1990	1 km Strip		2 km Strip		10 km Strip	
	Artificial Land Cover km²	**%**	**Artificial Land Cover km²**	**%**	**Artificial Land Cover km²**	**%**
Continental Coast	425.1	28.2%	612.1	21.2%	1,258.2	9.5%
Island Coast	218.0	11.2%	297.3	8.5%	472.9	4.5%
Total	643.2	18.6%	909.4	14.3%	1,731.2	7.3%
2006	**Artificial Land Cover km²**	**%**	**Artificial Land Cover km²**	**%**	**Artificial Land Cover km²**	**%**
Continental Coast	567.3	37.6%	841.0	29.2%	1,791.1	13.5%
Island Coast	326.4	16.8%	457.8	13.1%	759.3	7.3%
Total	893.7	25.9%	1,298.8	20.4%	2,550.5	10.8%

Source: own, from the CLC project.

Table 2. Extent of urbanization of the western Mediterranean coast of Europe and the Canary Islands, 1990 and 2006

1990	1 km Strip		2 km Strip		10 km Strip	
	Artificial Land Cover km²	**%**	**Artificial Land Cover km²**	**%**	**Artificial Land Cover km²**	**%**
Continental Coast	1,227.77	29.15%	1,780.36	21.70%	3,580.19	10.37%
Island Coast	812.57	15.73%	1,129.87	12.27%	1,946.40	6.16%
Total	2,040.34	21.76%	2,910.23	16.72%	5,526.59	8.36%
2006	**Artificial Land Cover km²**	**%**	**Artificial Land Cover km²**	**%**	**Artificial Land Cover km²**	**%**
Continental Coast	1,448.18	34.38%	2,112.81	26.67%	4,441.21	12.86%
Island Coast	953.40	18.46%	1,331.01	14.46%	2,325.56	7.36%
Total	2,401,58	25.61%	3,443.82	20.11%	6,766.77	10.23%

Source: own, from the CLC project.

data was downloaded from the EEA website (http://www.eea.europa.eu/data-and-maps/).

The analysis was implemented through a geographic information systems (GIS) model with the calculation of buffers of 1, 2 and 10 km from the coastline, after which the surface area taken up by artificial land cover was calculated. Calculations were carried out on Nomenclature of Territorial Units for Statistics (NUTS-3 are small regions and NUTS-2 are basic regions, according to Eurostat).

Results

The comparative analysis provides some results that show different behaviour between continental and island coasts.

Coastal urbanization in the Spanish Mediterranean and the Canary Islands grew steadily from 1990 to 2006. In the 1-km coastal strip, artificial land cover increased from 643 km² in 1990 to 893 km² in 2006 (39%). In 2006, artificial land took up 25.9% of the surface in the first kilometre buffer from the shoreline. However, in the 10-km coastal strip, artificial land cover rose from 7.3% to 10.8% between 1990 and 2006 (Table 1). These data clearly show a lengthier process of urbanization of the land a few kilometres from the coastline, but in recent times the further inland areas have received higher urban pressure because of different factors. These include the higher price of coastline land, environmental regulations, and more available land for urban purposes in the inland areas.

In general, the process reflects the economic impact of property revaluation on the Spanish landscape, from the second half of the 1990s to the 2008 crisis.

As shown in Table 1 and Fig. 1, in Spain, island regions have a lower degree of coastal artificiality compared to nearby continental areas, whether we observe 1, 2, or 10-km ranges. Moreover, the rise in coastal urbanization between 1990 and 2006, both in absolute and relative terms, is higher on the mainland than on the islands. From the same data from CLC, this same behaviour can be seen for all the European Western Mediterranean in both 1990 and 2006 and for the same coastal strips of 1, 2, and 10 km (Table 2, Figs. 2 and 3).

On the other hand, especially in the insular case of the Balearic and Canary islands, the artificial land cover results of 1990 and 2006 are very similar and significantly lower than the rest of the Spanish territories analysed (Table 1 and 3 and Fig. 1).

Since islands are surrounded by the sea, the area included in the coastal strip is greater than in similar-sized mainland areas. Consequently, islands submit higher absolute values of artificial land cover compared with the equivalent administrative units on

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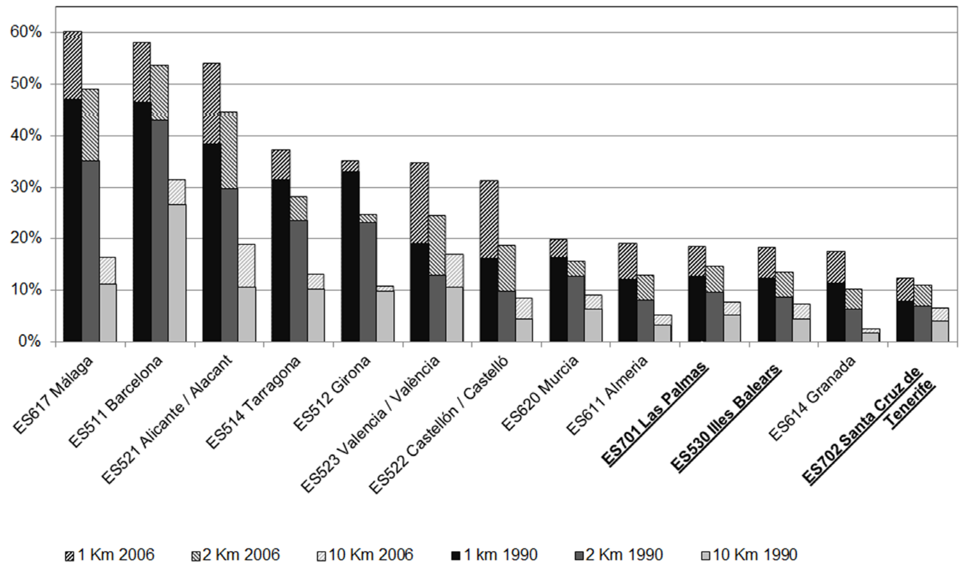

Figure 1. Percentage of artificial land cover in the 1, 2, and 10-km coastal strips in 1990 and 2006 (NUTS-3, Mediterranean Spain and the Canary Islands)
Source: own, from Corine Land Cover 1990 and 2006

Table 3. Degree of urbanization of the Balearic and Canary Islands coasts, 1990 and 2006

		1 km Strip		2 km Strip		10 km Strip	
		Artificial Land Cover km²	**%**	**Artificial Land Cover km²**	**%**	**Artificial Land Cover km²**	**%**
Balearic Islands	1990	95.6	12.2%	116.2	8.7%	169.3	4.4%
	2006	143.4	18.4%	180.8	13.6%	284.2	7.4%
Canary Islands	1990	122.4	10.5%	181.1	8.4%	303.6	4.6%
	2006	183.0	15.7%	276.9	12.9%	475.1	7.2%

Source: Own, from the CLC project

the continent. For this reason, in the first coastal strips results can only be compared in percentage terms because, in absolute terms, we are comparing regions with very different areas. It should be kept in mind that large continents and peninsulas, as with large circles, have a lower perimeter per unit area than small circles, such as islands. Therefore, under conditions of similar population density, islands will experience lower demographic pressure on the coast because their coastline is relatively longer. In other words, pressure on islands measured as potential population per unit of coastal length will always be lower than on the mainland, where the latter's larger surface implies higher population pressure in relation to coastline length.

Urban pressure on island coastlines increases when the connection to the mainland is higher – to the extent that, when islands increase their connectivity with the mainland, they have almost the same urban pressure as the mainland, and therefore urbanization rates are similar to those of the continent. Sicily, with an area of 25,708 km^2, is not a "real island" according to François Doumenge (Jędrusik 2011, p. 202) but is a good example of what we are arguing. Indeed, Sicily presents (Figs. 2 and 3) a more continentalized model because the distance between the mainland and the island is relatively small (3 km). There is even a rail line that connects the island with the mainland using ferries. It can also be seen that the NUTS-3 coasts (1 km coastal strip) that are closer to the mainland present greater artificiality percentages than the NUTS-3 coasts further away. In fact, there are plans to construct a bridge linking the island to the Italian mainland across the Strait of Messina, and this will most likely result in the continentalization of Sicily.

Another example to illustrate this phenomenon is the Galician island of Arousa on the Atlantic coast. In 1985, a bridge was opened linking the island with the Spanish province of Pontevedra. Census data from 2001[2] show that housing on the island, in the 1980s, increased by 26%, whereas over the same time period across the mainland province of Pontevedra there was a 32% decrease in housing construction activity.

When one compares the differences in artificial land cover in the first kilometre from the coastline in the two years of the CLC for NUTS-3 (1990 and 2006), the main growth rates that occur along the Spanish Mediterranean coast and the Canary Islands can be observed (Figs. 2 and 3). Las Palmas, Tarragona, Almeria, Granada, and the Balearic Islands experienced an increase in the rate of artificial land cover close to 6 percentage points between 1990 and 2006. This is considerably lower than those of Barcelona (11.61 percentage points), Malaga (13.18 percentage points) and the three provinces in the Region of Valencia: Alicante

[2] http://www.ine.es/censo2001/asi_fueron.htm

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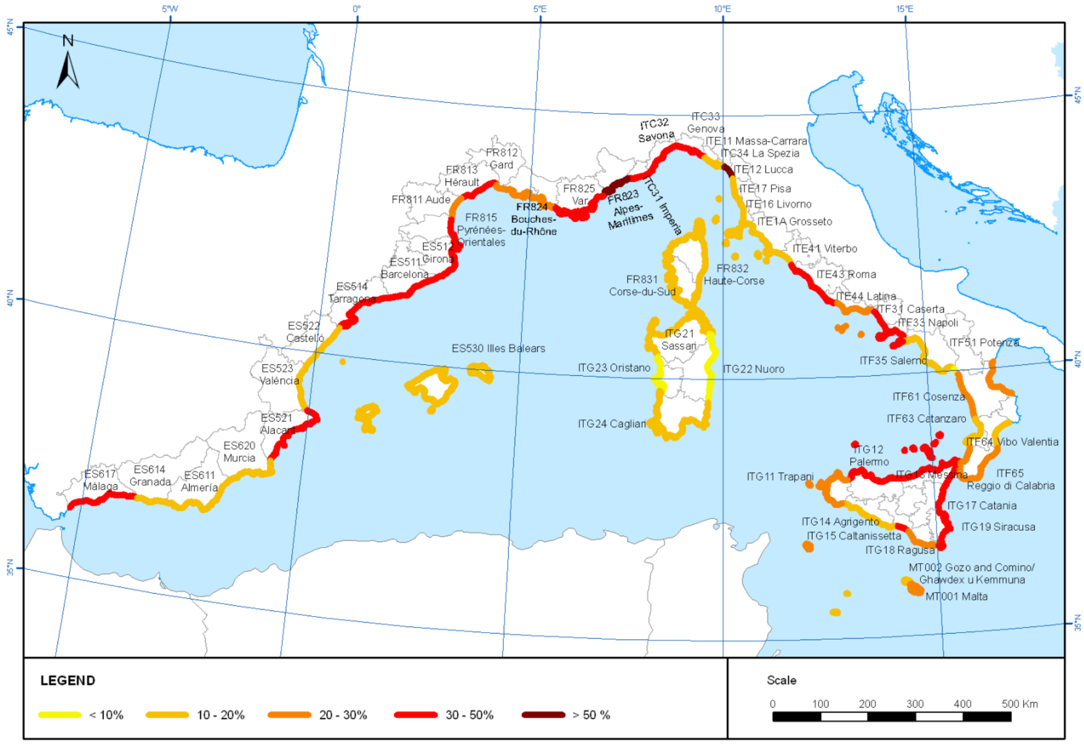

Figure 2. Artificial land cover rate in the 1-km strip from the coastline in 1990 (NUTS-3, Western Mediterranean)
Source: own, from Corine Land Cover 2006

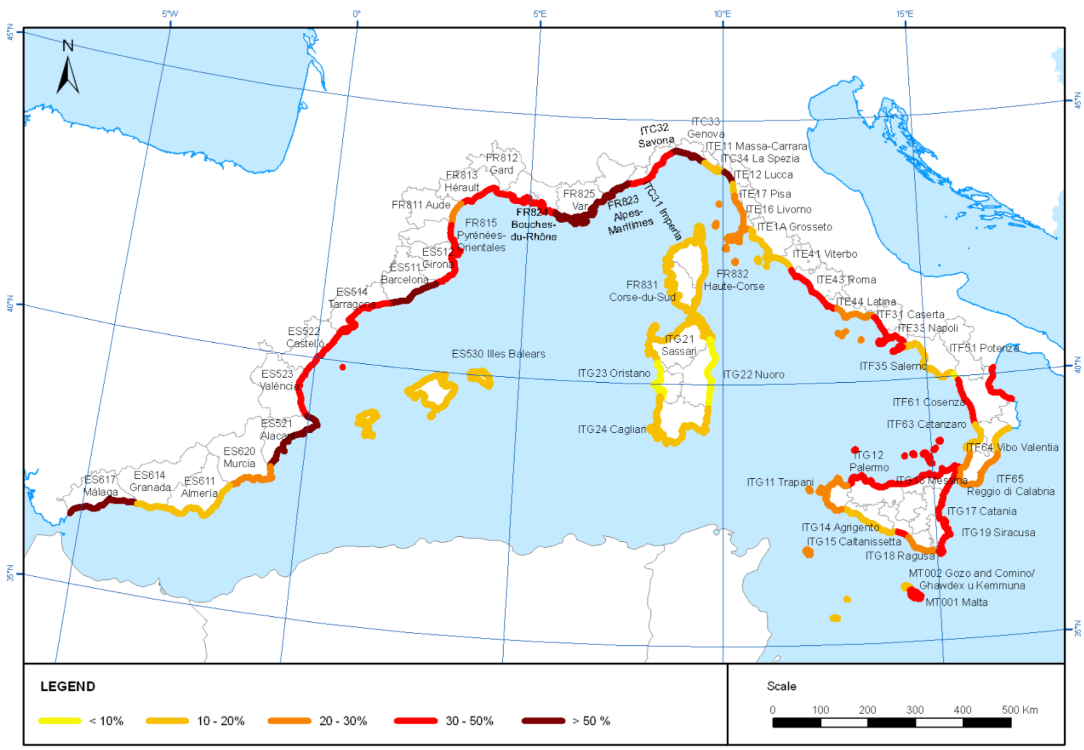

Figure 3. Artificial land cover rate in the 1-km strip from the coastline in 2006 (NUTS-3, Western Mediterranean)
Source: own, from Corine Land Cover 2006

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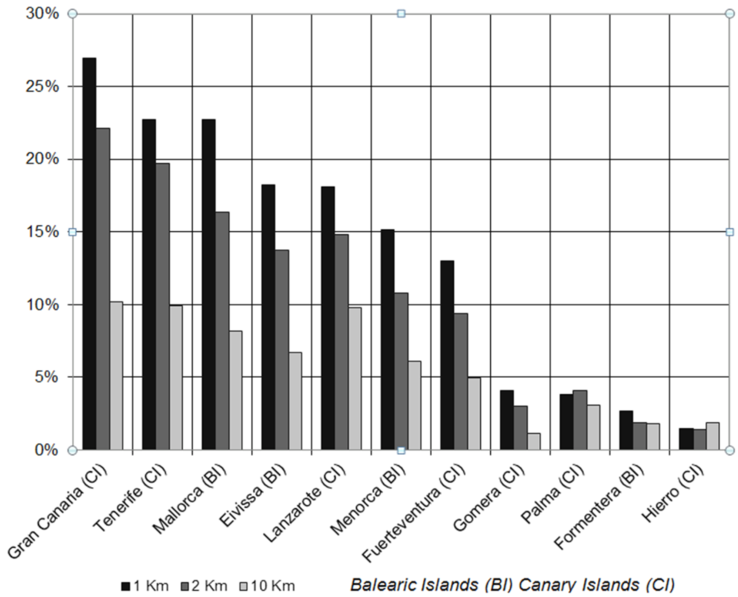

Figure 4. The percentage of artificial land cover according to distance from the coastline in 2006 on the Spanish islands
Source: own, from Corine Land Cover 2006

(15.68 percentage points), Castellon (14.98 percentage points) and Valencia (15.64 percentage points). These figures show the importance of the Spanish housing bubble encouraged by the relaxation and liberalization of urban policies (Romero et al. 2012; García 2010).

The percentage of artificial land cover, in 2006, in the 1-km coastal strip of the Canary Islands NUTS-2 (15.72%) was slightly lower than that of the Balearic Islands NUTS-2 (18.42%) as shown in Table 3. However, there are internal differences between the islands of each archipelago (Figs. 4 and 5). The rate of artificial land cover in the 1-km coastal strip of Las Palmas NUTS-3 (18.54%), in 2006, was very similar to the Balearics, whereas Santa Cruz had a relatively lower rate (12.46%). This difference is because the province of Santa Cruz de Tenerife, as well as Tenerife, which is the largest island, is also made up of three other smaller, much less transformed islands: La Palma, La Gomera, and El Hierro. This fact offsets the higher percentages of Tenerife's artificialized land. Indeed, the island of Tenerife surpasses the degree of artificiality found in Mallorca, the most artificialized island in the Balearic archipelago, as can be seen in Figs. 4 and 5.

Three different groups of Spanish islands are clearly marked by their degree of artificiality: the three majors that have the best air connections (Gran Canaria, Tenerife, and Majorca), the medium (Ibiza, Lanzarote, Menorca, and Fuerteventura) with good air connections, and the smaller (Gomera, La Palma, and El Hierro Formentera) with connections to the outside more difficult.

In 1990 and 2006 the Balearic Islands coast was among the least artificialized in comparison to other coasts in the Spanish Mediterranean and the Canary Islands. The Balearic Islands have one of the lowest rates of coastal artificial areas. The 1980s were years of high urbanization; however, since the second half of the 1990s, urbanization has slowed down as a result of the introduction of regional and urban planning measures that restrained urbanization, as discussed below.

Discussion

Although the process of urbanization since the second half of the twentieth century has been significant, one can conclude, observing the results presented, that most of the island coasts analysed present a lower degree of urbanization than the nearby continental coasts. Despite the differences between two of the most important tourist destinations such as Costa del Sol (Malaga), on the mainland, and Magaluf (Calvià), on the island of Mallorca, differences in scope between the two types of coastal urbanization are clearly shown (Fig. 6).

The determining causes of this phenomenon are diverse and varied, ranging from purely physical factors to socioeconomic ones. In the following paragraphs, in accordance with the available data, the most decisive causes are explained.

For an island, the *breaking bulk* entailed by transporting goods and persons by air or sea is understood as an important barrier to certain types of activities because of the increase in transport costs, as many studies have repeatedly reported (Bjarnason 2010; Spilanis et al. 2012). Nevertheless, this is not an obstacle to mass tourism, which is heavily dependent on air transportation, real estate activities and the construction industry in general, which are more exposed to higher transport costs than on the mainland. On islands, these activities have the handicap of road network discontinuity, disconnecting them from nearby continental metropolitan areas, potential major real estate markets and main suppliers of goods. These filters do not affect the demand for high quality real estate.

The rate of artificialization of the coast in the Balearic Islands, despite being a major mass tourism region, is lower than most Western European and Spanish sun-and-beach tourism regions. The disconnection from the continental terrestrial transport network that insularity implies is perhaps the most important explanation. Even when each island is studied individually instead of analysing the archipelago as a unit, clear differences can be observed between them. These differences are attributable to different degrees of isolation, which are associated with the strength of port and airport flows that bring the islands closer to the mainland.

In Fig. 4 it can be seen, on the one hand, that Mallorca – the largest island and the one with the most extensive infrastructure – presents higher artificialization percentages in the 1-km coastline strip than the rest of the islands. Formentera, on the

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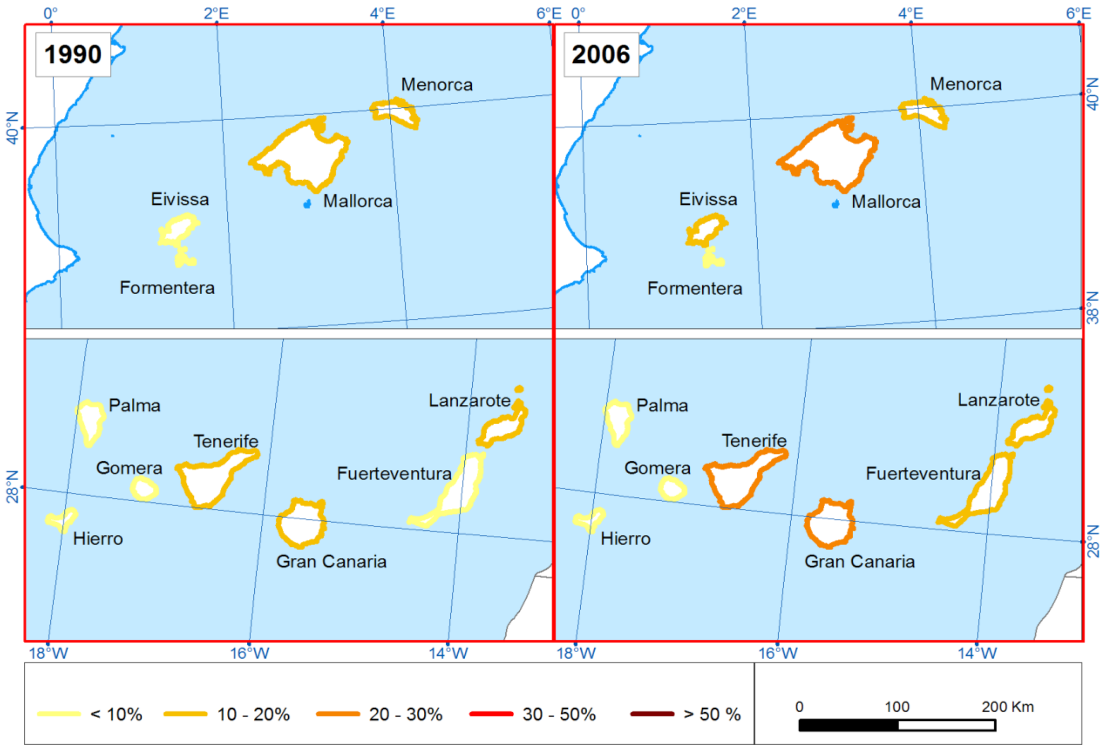

Figure 5. Artificial land cover in the 1-km coastal strip (NUTS 3) on the Spanish islands
Source: own, from the CLC 2006 and CLC 1990

Figure 6. Artificial land cover in the first km coastal strip on Costa del Sol (Málaga) and Magaluf (Calvià, Mallorca) in 2011
Source: The authors' from photographs taken by Antoni A. Artigues (top) and Onofre Rullan (down)

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Table 4. Size, air connection, and urbanization on the Balearic and Canary Islands. Source: Own, from AENA and CLC project.

Island	Arrivals in 2006	Size of the island (km^2)	Artificial surface of the island	Artificial surface in the 1st km of the island	Artificial % in the 1st km of the island
Ibiza	2,581,870	572.56	38,411,084	23,849,862	18.92%
Formentera	581,398	83.24	1,485,524	1,485,524	2.86%
Fuerteventura	2,171,951	1,659.74	81,229,980	32,017,239	13.20%
Gran Canaria	4,982,335	1,560.10	120,438,705	46,425,902	27.29%
Hierro	141,886	268.71	4,921,539	1,258,383	1.56%
La Gomera	622,804	369.76	4,272,787	3,078,005	4.18%
La Palma	555,141	708.32	21,566,652	4,336,797	3.90%
Lanzarote	2,751,216	845.94	82,567,644	33,092,082	18.69%
Mallorca	11,723,947	3,640.11	238,533,212	85,343,951	23.57%
Menorca	1,421,091	701.8	42,349,533	25,509,515	15.81%
Tenerife	6,249,122	2,034.38	166,052,908	55,587,355	22.93%

Table 5. Correlations between size, air connections and urbanization in the populated Spanish islands

ISOLATION	**Pearson correlation coefficient**
Passengers arriving in 2006/Artificial surface of the island	0.97
Passengers arriving in 2006/Artificial surface in the 1st km of the island	0.96
Passengers arriving in 2006/Artificial % in the 1st km of the island	0.75

SIZE	
Size of the island (km^2)/artificial % in the 1st km of the island	0.69

Source: Own

other hand, is the island with the highest degree of insularity of the archipelago since, among other reasons, it is the only inhabited Spanish island without an airport. This greater degree of insularity helps to explain why the extent of artificialization of the Formentera coast is the lowest in the Balearics.

The added costs related to the insular condition of the Balearics would therefore be an important reason to explain their lower degree of urban development. This has even been recognized in some Spanish laws (specially the 30/1998 Act, of 29th July, of the Special Regime of the Balearic Islands). This law aims to reduce the costs of insularity, liberalize certain sectors, achieve "sustainable growth", and diversify the economy. But, as has already been mentioned, there are significant discrepancies between economic and environmental approaches in relation to the consideration of so-called insularity costs. Therefore, from an economic point of view, insularity is often considered a disadvantage: an added cost for entrepreneurship; from the point of view of protecting the territory from the expansion of urbanization, it is undoubtedly a valuable protective barrier.

For biogeographers, the decrease of the island biodiversity is directly proportional to the distance from the mainland and inversely proportional to the size of the island (MacArthur & Wilson 1967). On the other hand, the discussion about island economies can be synthesized by the premise that the small size of the market means greater difficulty in obtaining large-scale economies in internal sales (Pintado & Fernandez 2010, p. 165). Lack of biodiversity and economies of scale for both types of analysts is a weakness, not a strength.

In order to check if the biogeographers' and economists' statements can be transferable to what we have discussed in this paper, several rates have been calculated for the eleven Balearic and Canarian populated islands. The first rate is the correlation between coastal development and size of the island. The second rate is the correlation between coastal development and distance from the mainland, measured as the number of passengers arriving at the airports of each island. Table 6 shows these data and Table 7 shows the Pearson correlation coefficients.

Several correlations between the biogeography and island economy theories, and the statements of coastal urbanization of the populated Spanish islands, can be validated by this analysis.

On the one hand, the greater the number of passenger arrivals at island airports (meaning that the isolation is smaller), the larger the artificial surface on the island in general ($r = 0.97$) and in the first kilometre of the coast in particular ($r = 0.96$). The artificial percentage of the coast correlation is somewhat lower ($r = 0.75$), but also relevant. On the other hand, the size of the island is also positively correlated ($r = 0.69$) with the percentage of artificial surface in the 1st km of the coast.

Following this reasoning, the Canary Islands – located further away from the tourist source markets than the Balearics – should present a lower coastal urbanization degree, yet it is very similar to that of the Balearics, or even higher in some cases. The artificial land cover rate of the 1 km coastline strip of Gran Canaria is 26.96%, higher than the rate of Tenerife (22.74%), which is the same as the Majorcan rate. The two largest islands in the Canary archipelago, Gran Canaria and Tenerife, have a higher artificialization rate of the 1- to 10-km coastal strips than Mallorca (Fig. 4).

Based on the idea that the insular condition of the Canary Islands is higher than the Balearics, because their distance to/

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from tourist source markets is significantly higher, other key explanatory facts must be taken into account to explain the high rate of coastal urbanization that places the Canary Islands at the same level as the Balearics. Seasonality, which is also crucial for tourism in other regions (Krakover & Cukier 2006), is non-existent in the Canary Islands and very much present in the Balearic Islands. Therefore, seasonality acts as a counterpoint, explaining the similar percentages of both coastal artificialized lands.

Seasonality, measured by the Gini index, based on different variables such as the number of tourist establishments, tourist beds, and workers in the tourism sector (Lopez & Lopez 2006), ranges from 0, the lowest degree of seasonality, to 1, maximum seasonality. Table 4 clearly shows a greater seasonality of tourism in the Balearic Islands for all the variables considered. The similar levels of coastal urban development in the Balearics and Canary Islands, despite the greater insular condition of the Canary Islands, can be explained by the reinforcement to tourism implied by the lack of seasonality in the Canary Islands, with their more tropical climate enabling tourism activity throughout the year.

In the case of the Balearic Islands, another factor should be taken into account to explain the deceleration of the land artificialization process: the land protection policies promoted since the constitution of the regional government of the Balearic Islands (1983) in the context of the Spanish State. Since the constitution of the Autonomous Community, environmental and land conservation has been the main political cornerstone. The result of this political struggle is reflected in different regulations addressing the protection of natural areas and the containment of tourism. The latter policy has been approved by the hoteliers' lobby because it is an essential tool to block any further competition. After the crisis of the 1970s, most of the small hotel companies were absorbed by hotel chains and these began expanding their tourist production beyond the insular territory. Nonetheless, local hotel owners committed to halting any potential competition in the archipelago because at that time tourist supply was already oversized (Buades 2006). Many of the regulatory measures adopted have enforced this aim.

In 1991, after some previous experience in the protection of specific natural areas, the 1/1991 Act on Natural Areas and Urban Regime of Special Protection Areas was approved, establishing several natural protection types. These areas are completely protected from any urban development and more than one-third of the Balearics surface area and between 55% and 62% of the coast, depending on the island, were exempted from urbanization (Table 5).

Table 6. GINI indicators of tourist seasonality 2001-2004

	Tourist establishments	Tourist Beds	Workers
Balearic Islands	0.4361	0.3566	0.3576
Canary Islands	0.0104	0.0077	0.0098

Source: (López and López, 2006)

Four years later, in 1995, the Tourism Supply-side Regulation Plan of Mallorca (54/1995 Decree) divided the island into 37 tourist coastal zones where Coastal Protection Areas would be approved in the 1-km strip from the shoreline and the parallel areas classified as nonurban land. These areas were located at the lateral margins of the tourist coastal zones, which functioned as a wedge between them. The aim of this protection plan was to prevent the formation of a continuous building fringe along the coast. Two years later, in 1997, another plan for Ibiza and Formentera was approved with the same parameters (42/1997 Decree).

In 1999, the Regional Planning Guidelines of the Balearic Islands (6/1999 Act**)** promoted another protected area category that had to be added to the protection figures. This category is the so-called Coastal Land Use Protection Area, which establishes a buffer of 500 m width from the shoreline where urban development is prevented. The Regional Planning Guidelines also slowed down, temporarily or permanently, with around 4,500 hectares of urban land already planned for urban development at that time.

However, construction activity did not decrease between 1990 and 2006; the existence of available land in already developed areas was enough to meet the demand. This fact also helps to explain, in part, the deceleration of new urban development and the lower transformation of rural or natural areas into artificialized land. Moreover, a significant stock of developable land was classified before 1990 and a significant part of that stock was built in the last phase of the housing bubble.

There may also be topographical reasons that help to partly explain the data. This issue could lead to other future research. But the simple observation of the Spanish regions analysed above suggests that this influence is relatively small.

Conclusion

Insularity has conditioned the degree of coastal urbanization, but it does not necessarily suppose the development of tourist activity. This is, firstly, because the island regions analysed have lower rates of coastal artificialized land than nearby continental regions; secondly, because the artificialization differences between islands also respond to different degrees of isolation. The latter is clearly evident both in the Balearics and the Canaries where the largest and best connected islands (Mallorca, Tenerife, and Gran Canaria) also have the highest levels of coastal development.

It is useful to address this issue from a transdisciplinary approach, taking into account some lessons from biogeography and economics. The lack of biodiversity stated by biogeographers (lack of species) may be equivalent to a lack of diversification for economists (lack of companies belonging to different sectors).

The insular condition has delayed islands' entrance into the international tourism circuits compared to the continental tourist areas of the same region because of higher transport costs to the mainland. This delay also affects the lower level of urbanization

Table 7. The percentage of areas protected by the 1/1991 Act.

	Mallorca	Menorca	Ibiza	Formentera
Protected area %	36.92%	40.14%	43.03%	42.08%
Protected area in the 1 km coastal strip %	62.05%	62.14%	51.94%	58.53%

Source: Own, based on 1/2000 Act, of March 9, modifying the 1/1991 Act, of January 30, on Natural Areas and enlargement of some special natural protected areas of islands compared to regions with a longer tourism history. All in all we interpret it, among other reasons, as the greater difficulty of reinvesting surpluses in business developments (Harvey 1989, 2003). This is a situation that occurs especially in isolated regions, the normal condition of many islands.

Without contradicting the above, the regional planning policies undertaken in the Balearic Islands, unparalleled in other Spanish regions, also contributed to a slowdown of urbanization in the period 1992–2006, by redirecting new construction demand to land available in already developed areas.

In addition, other factors were suggested that may determine the degree of coastal urbanization. In the Balearic Islands, tourism seasonality is concentrated in the summer months and therefore the accumulation of capital is also focussed in that period. Thus, during the rest of the year, capital accumulation decreases and, as a result, so does real estate investment. The Canary Islands, however, without seasonality, offset their greater degree of insulation with non-seasonal tourism, which generates a high level of coastal urbanization. This is at a greater level than would be expected in comparison with the Balearic Islands, given its remoteness from tourist source markets.

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