



**ESaTDOR**  
**European Seas and Territorial**  
**Development, Opportunities and Risks**

ANNEX 6 to the Scientific  
Report:  
**Mediterranean Sea**  
**Regional Profile**

Applied Research 2013/1/5

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# Regional Sea Profile: the Mediterranean Sea

## 1. Introduction

In the last few years there has been growing acknowledgement that the seas which surround Europe offer significant opportunities for - and potential risks to - territorial development. The sea provides resources on and in its waters and on and under the sea bed that can be harnessed as the basis for territorial development; it enables the flow of goods, services and people, connecting different parts of Europe to each other and the wider global community; and it provides an important environmental asset that needs careful management not least because the health of the sea is critical to efforts to combat climate change. However, different stakeholders have different priorities in terms of what uses and priorities should be privileged in different parts of the maritime environment and few have an overview of the range of issues that require consideration in making such judgements in an informed way.

Whilst there has been a growing recognition of the need for improved planning of maritime space, as exemplified by the growth of integrated coastal zone management and marine spatial planning, more broadly little has yet been done to explore the potentials and challenges of planning for these areas, particularly in relation to their transnational and cross border dimensions. As a step forward, this ESPON project aims to explore the territorial development opportunities and risks facing the seas of Europe by distilling key land/sea and transnational interconnections. Each European regional sea has its own specific characteristics in terms of territorial development opportunities and risks, and uses different governance structures to manage competing claims. This report focuses on one of the six regional seas which are covered by the project and provides a profile of the Mediterranean Sea.

Each Regional Sea Profile report is subdivided into two parts. The first part seeks to provide a detailed characterisation of the regional sea as it exists today. The second part starts to look to the future and describes the potential opportunities and risks pertaining to each sea, and sets out policy recommendations that can help guide territorial development within the region.

Part 1 begins with a brief section which provides contextual information including a description of how the boundaries of the regional sea have been defined for the purposes of this project. In some instances this has been relatively straightforward. In others we have had to make pragmatic decisions as varying boundary definitions are in use and in some areas are still very much contested. The second section then describes in more detail key thematic characteristics of each regional sea focusing on the maritime economy, transport, energy and undersea infrastructure and the environment. This characterisation reflects the existing situation and is based around a standardised series of maps which draw upon the limited number of data sets we have uncovered that relate to these themes where there is good European wide coverage. The maps have, in some cases, been supplemented by local information which is seen as being an exemplar of good practice and which might have relevance to other European regional seas in terms of improving data coverage and mapping to inform policy development.

One of the critical characteristics of all of the regional seas is that the effective management of both the opportunities and risks will require cross boundary and transnational cooperation between the members states of the EU, members of the European Economic Area and potential accession countries and other countries who share a common interest in a particular sea. The configuration of interested nation states varies from regional sea to regional sea, although how transnational and cross boundary issues are being managed at the present time is reflected on in the governance section. Here a limited number of case studies are used to explore the effectiveness (or otherwise) of various maritime governance regimes designed to address specific cross border and transnational issues.

The final section of the first part provides an overall characterisation of the regional seas based on composite maps of flows, economic significance and environmental pressures. The purpose of these composite maps is to characterise the maritime regions covering both land and sea in terms of intensity of use and land sea interactions. Drawing upon these composite maps a baseline typology of maritime regions is presented which classifies these areas as European Core, Regional Hub, Transition, Rural and Wilderness based on their current attributes.

In the second part of the report the focus shifts to the future and it comprises two elements. First we summarise key opportunities and risks for future territorial development for the regional sea based on the understanding of current and potential land sea interactions. Second this assessment leads to a set of policy recommendations targeted at different stakeholder groups related to future planning and development in the region.

## 2. Context

The political shape of the Mediterranean region is characterised by a clear division between the north and south coasts, the first comprised, to a large extent, of EU Member States, thus implying greater cohesion and the existence of common policies, and the latter (the North African coast) with a weak political structure. Nonetheless, in terms of the maritime map, national interests predominate both north and south, with a resulting mosaic of jurisdictions that facilitates neither bilateral nor multilateral agreements.

The legal framework of the UN Convention on the Law of the Sea [UNCLOS] (1982) provides jurisdictional structure to the maritime space. Alongside the jurisdictional spaces defined in UNCLOS (internal waters, territorial sea and contiguous zone, continental shelf, exclusive economic zone and high seas), the coastal states of the Mediterranean Sea have also established fisheries protection zones (FPZ) and ecological protection zones (EPZ). Most of the Mediterranean states have signed and ratified UNCLOS. Those that have not include Morocco and Libya (which have signed but not ratified) and Israel, Syria and Turkey. Although Morocco and Syria have not ratified UNCLOS, both have the principles and norms of international law, as established in UNCLOS, enshrined in their national legislation. However, for Syria to be able to accede to UNCLOS, it would have to abandon its claim to a 35-mile territorial sea, as well as a 41-mile contiguous zone.

Governance in the Mediterranean takes place at different levels, depending on the jurisdictional structure of the maritime space – with responsibilities on the part of coastal and third countries – and the different levels of political-administrative (supranational, regional, sub-regional) organisation.

On a supranational level, the recent (2008) creation, in Paris, of the Union for the Mediterranean was formed of 43 countries, 27 of them from the EU plus countries along the south coast of the Mediterranean (with the exception of Libya) and some of the Balkan states. This body has improved political, economic and social relations between the EU and the rest of the Mediterranean countries.

The expansion and consolidation of the European Union has encouraged the creation of a web of intermediary-level political structures in the northern arc of the Mediterranean, for example the Intermediterranean Commission, whose interaction and dialogue with other levels of government forms a more organised governance system. This contrasts with the south coast of the Mediterranean (North Africa), which is less structured at this intermediary political level. This increases the gap between the two coasts in terms of their capacity to manage the marine environment.

The limited size of the Mediterranean Sea is such that if the states were to claim full jurisdiction of their waters, the whole sea would be under national jurisdiction. Some states have not proclaimed their sovereign rights, however, and this means that a considerable proportion of the waters do in fact remain high seas. In the Mediterranean basin, no state can declare the maximum 200 nautical mile breadth of exclusive economic zone or fishery zone because at no point is the Mediterranean more than 400 miles wide. The relative position of a state determines the number of its boundaries



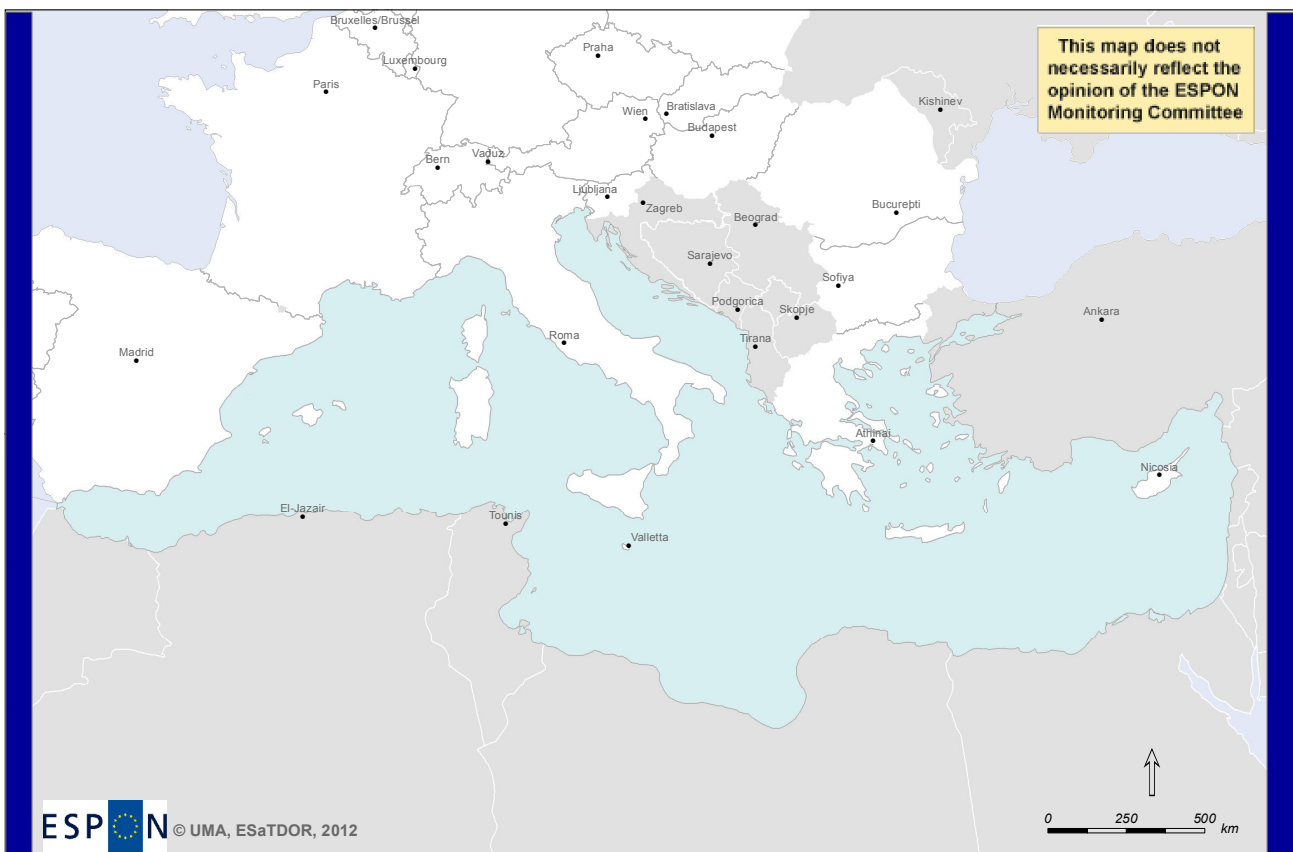
which, for the maritime space, include both those established between adjacent states and those created between opposite states.

In addition, the Mediterranean Sea is the source of a number of different disputes between coastal states. Some of these are historic in nature; in others the process of extending sovereignty over their maritime space has given rise to new disputes between states, caused by overlapping jurisdictions and the creation of new boundaries.

The coastal states of the Mediterranean have not, for various reasons, generally claimed Exclusive Economic Zones, which is why there is still an area of high seas. These reasons include a desire to preserve freedom of navigation and access to fishery resources and also to avoid delimitation disputes in a relatively small sea.

The Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention) provides a basis for defining the western limit of the Mediterranean. However, the eastern limits of the Mediterranean under the Barcelona Convention exclude the Dardanelles Strait which crosses North West Turkey and provides a link to the Black Sea through the Sea of Marmara and Bosphorus Strait. As this marine region falls into neither the Barcelona nor Black Sea Convention boundaries, a decision has been taken to allocate the Dardanelles and Sea of Marmara as part of the Mediterranean maritime region, see Map M1 below.

## Mediterranean Boundaries

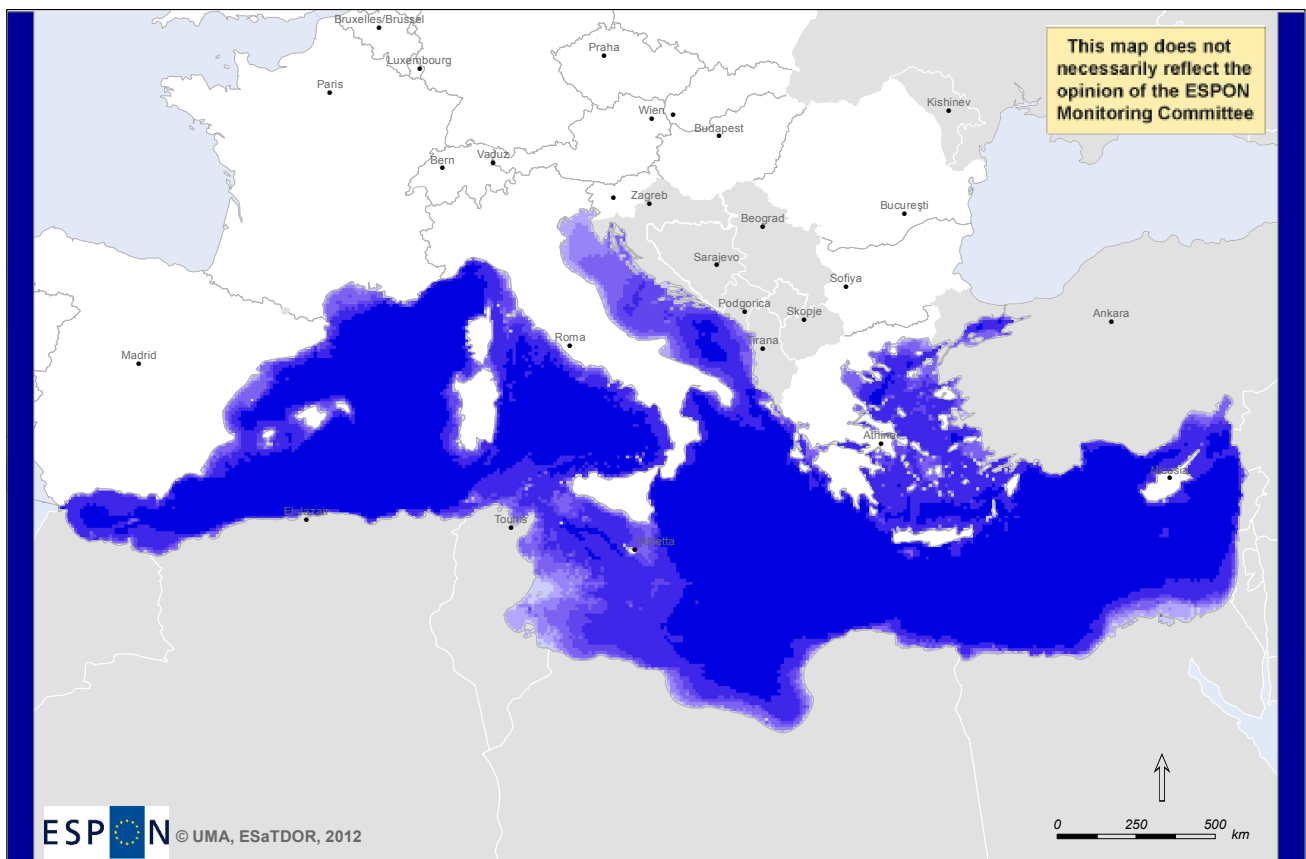


**Map M1.** Mediterranean Sea Boundaries (defined for ESaTDOR project).

This definition of the eastern boundary of the Mediterranean also corresponds with the Mediterranean Large Marine Ecosystem (LME) defined by UNEP, the extent of which is shown in Map M3 below.

With generally shallow waters, the Mediterranean sea reaches an average depth of 1500 m with a maximum depth of approximately 5150 m in the Southern coast of Greece. The Bathymetry of the Mediterranean is shown in Map M2. An underground barrier divides the Mediterranean between Tunisia and Sicily into two large basins: west and east. The western basin can be sub-divided into the Straits of Gibraltar, the Alboran Sea, the Balearics (Iberian Sea) and the Ligurian Sea. The eastern basin can be sub-divided into the Tyrrhenian Sea, the Straits of Sicily, the Adriatic Sea, the Ionian Sea and the Aegean Sea.

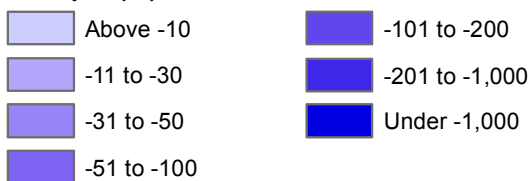
## Sea Depth (Bathymetry)



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Thematic data: Sea Depth, GEBCO.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

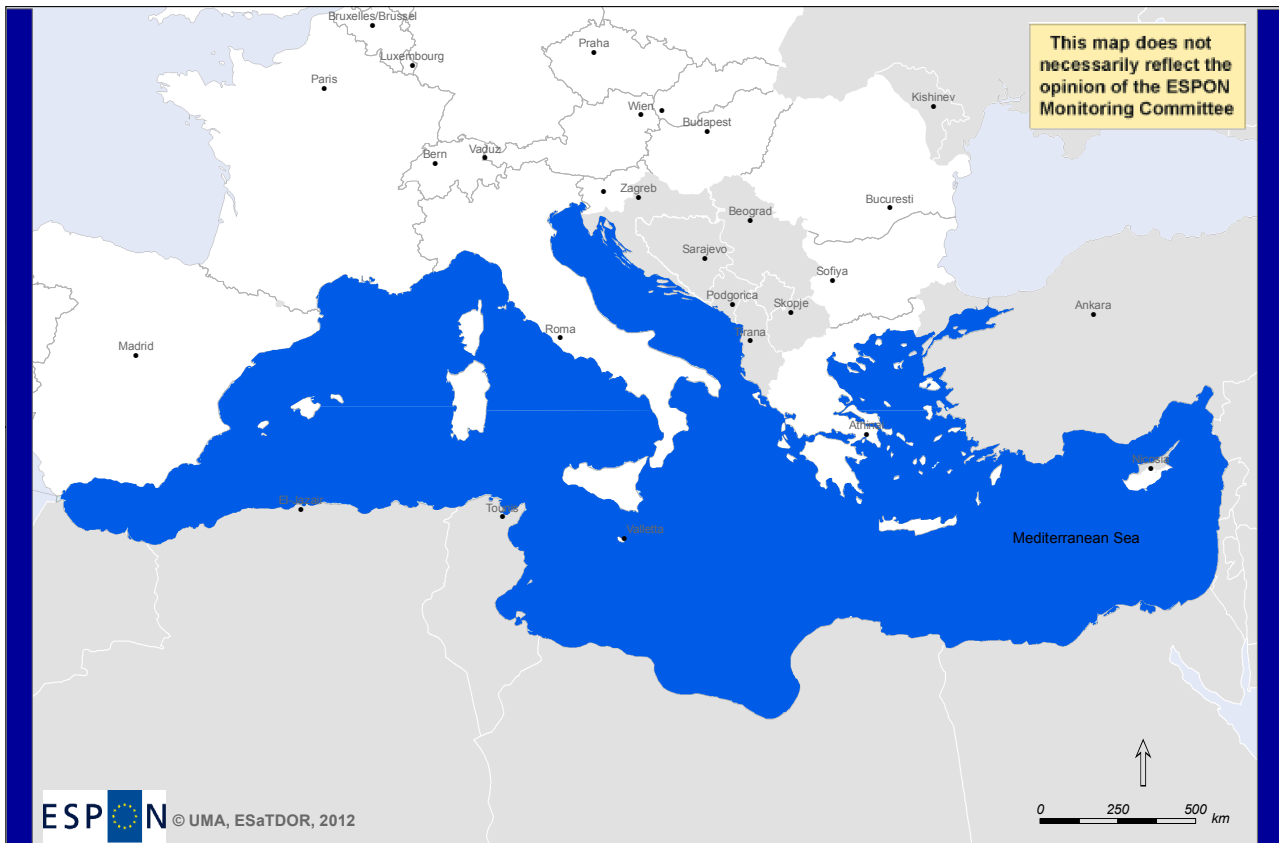
### Sea depth (m)



**Map M2.** Sea depth (bathymetry), Mediterranean Sea

The Mediterranean Sea region is considered to be one of the most important ecological areas of unique biodiversity in its waters, a host of a variety of species and environmentally critical areas and hot spots under human pressure.













# Mediterranean Marine Ecosystems



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Thematic data: UNEP, WCMC.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

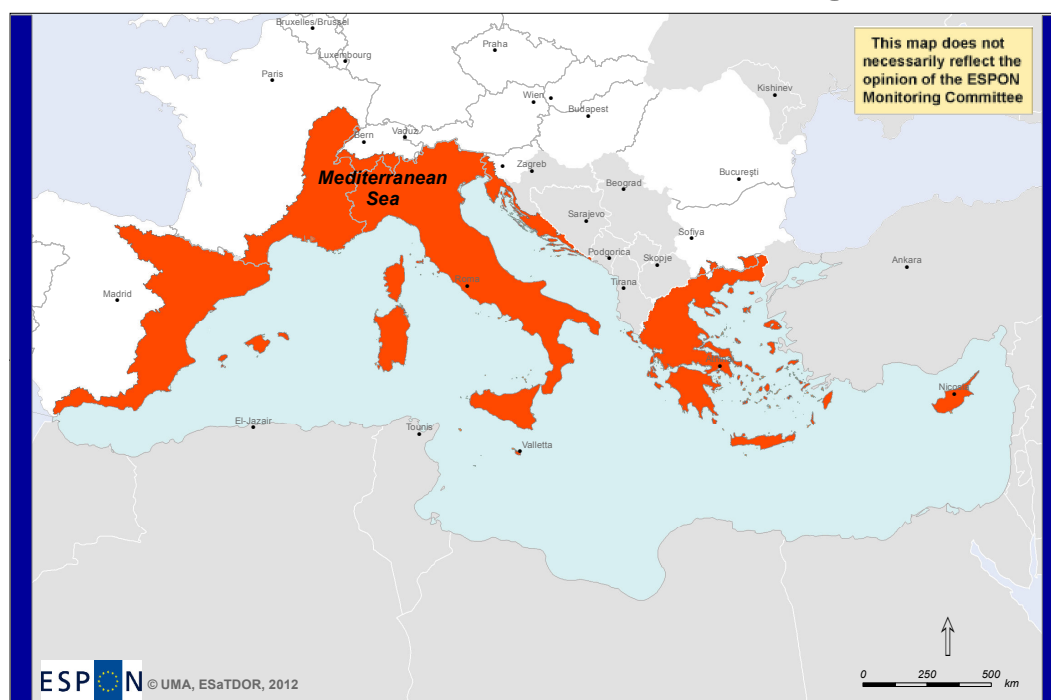
## Large Marine Ecosystems

	Baltic Sea		Faroe Plateau
	Barents Sea		Iberian Coastal
	Black Sea		Iceland Shelf
	Canary Current		Mediterranean Sea
	Celtic-Biscay Shelf		North Sea
	East Greenland Shelf		Norwegian Sea

**Map M3.** Large marine ecosystems in the Mediterranean.

According to Blue Plan (2009), the coastal northern Mediterranean involves small catchments with high populations living near the coast and a low water balance, however in the southern and eastern Mediterranean the lack of water combined with high population leads to water stressed catchments. On average, population density within the Mediterranean catchment is approximately 164 persons/km<sup>2</sup> (shown in Map M4a), however this does not include population figures for all of the Mediterranean countries. On a national level, per capita resources of available renewable water are highest for Croatia, Montenegro and Albania (over 10,000 m<sup>3</sup> per person per year), while Algeria, Tunisia, Libya and Israel have the lowest levels (less than 500 m<sup>3</sup> per person per year).

## Inland Catchment and Population Density



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 Thematic data: Water catchments, UNEP; EUROSTAT, 2008.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS3.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

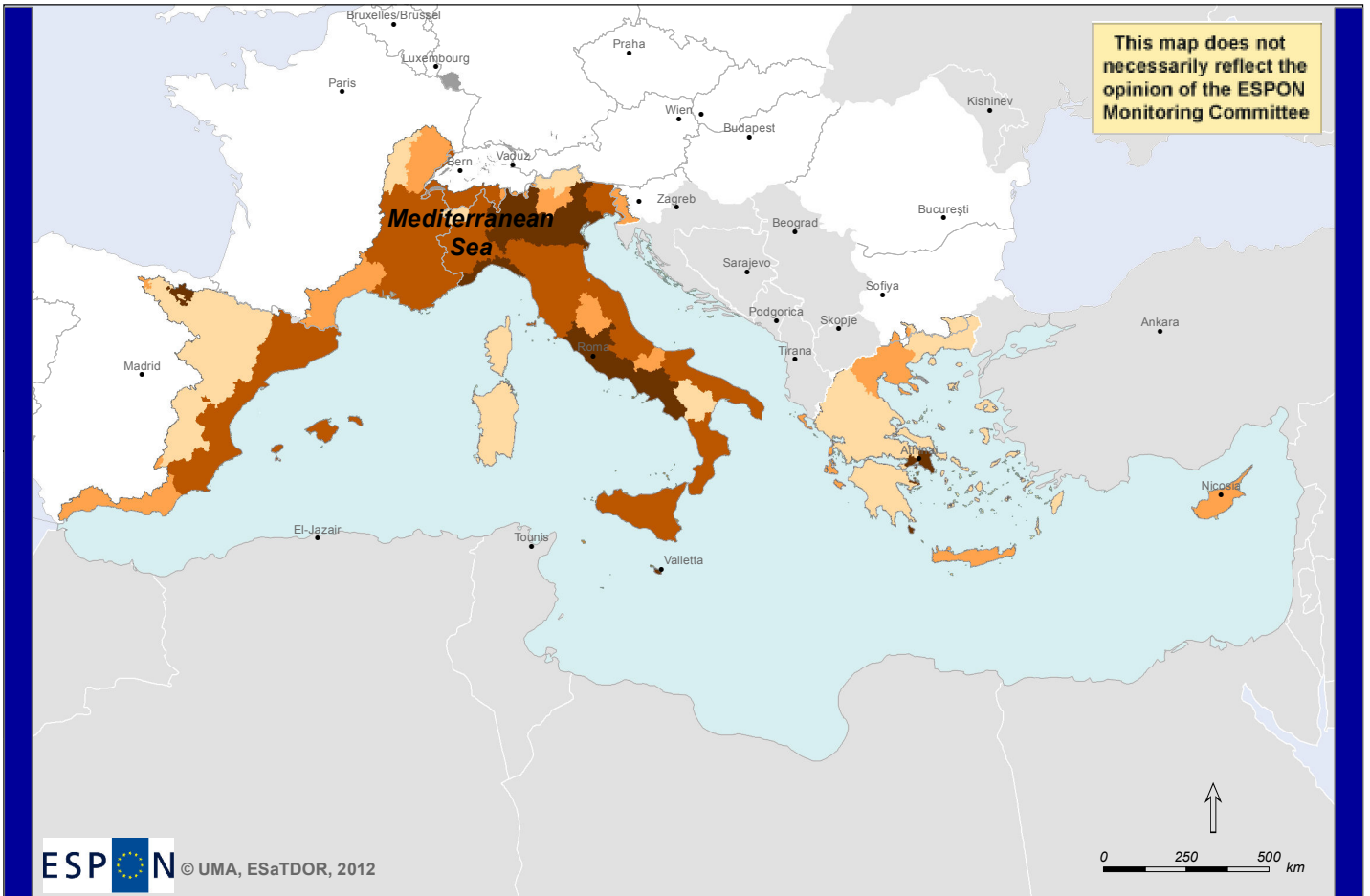
### Population density within catchment (persons/km<sup>2</sup>)



**Map M4a.** Inland catchment area and population density, (northern) Mediterranean.

The Mediterranean region has experienced intense human development through the last decades causing a series of pressures and impacts, especially in coastal areas while external factors such as climate change have exacerbated the situation. Over one third of the Mediterranean population lives on the coast (in less than 12% of the countries' total area) while the urbanization rate has increased during the last twenty years. Map M4b shows that some of the most densely populated regions in the Mediterranean are those surrounding large port cities and capital cities such as Barcelona, Valencia, Genoa, Naples, Rome, Venice, Athens, Istanbul and the island of Malta. Despite the rapid urbanisation of the Mediterranean many regions still have a population density below their national averages, e.g. Andalucía (Spain), Provence (France), plus large parts of Italy, Greece and Turkey (Map M4c).

# Population Density at NUTS2 Level

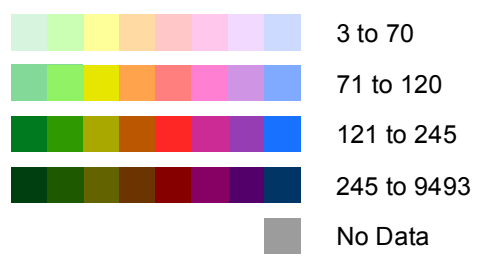


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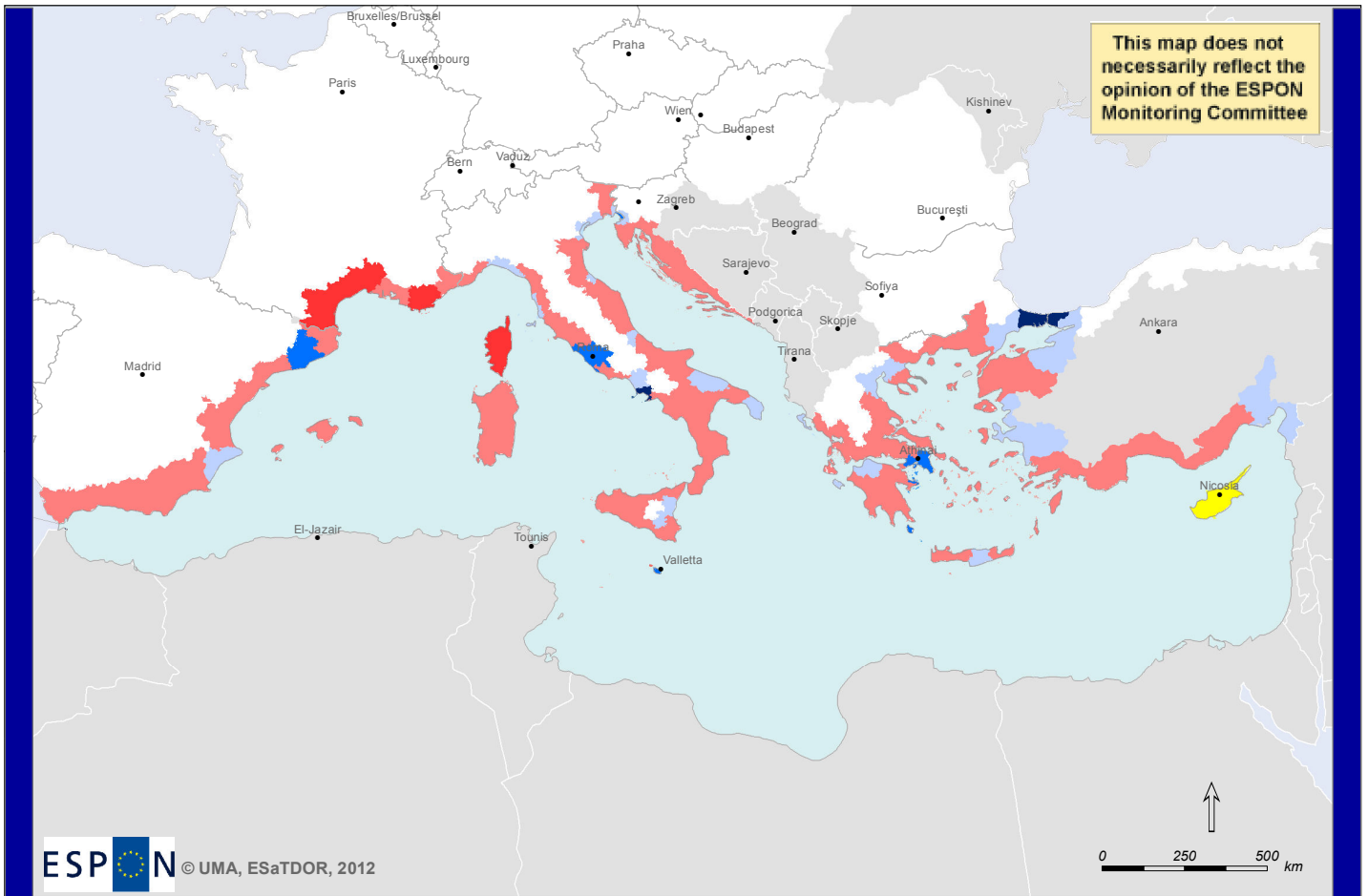
Thematic data: Water catchments, UNEP; EUROSTAT, 2008.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Population density per NUTS2 within catchment (persons/km<sup>2</sup>)



Map M4b. Population density at NUTS2 level (2008), Mediterranean Sea.

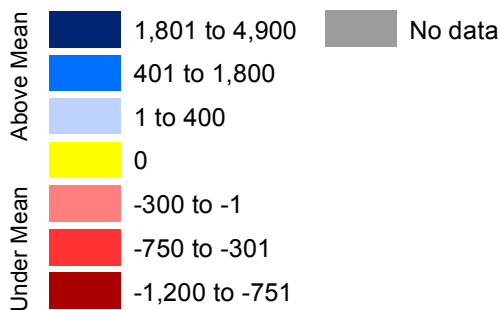
# Population Density in Coastal Regions



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Thematic data: Population density, EUROSTAT, 2008  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS3.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Population density in coastal regions 2008 (number of persons compared to national averages)



Map M4c. Population density in coastal regions relative to national averages (2008), Mediterranean Sea.

In 2007, the GDP of EU regions on the Mediterranean coast was 1 715 billion PPS (purchasing power standard, shown in Table 1 below), or 13.9 % of the European Union's GDP. On that date, average GDP per capita in these regions was 23 100 PPS per capita, lower than in the European Union (24 900 PPS per capita). Between 2004 and 2007, average GDP in these regions followed the same pattern as EU GDP, consequently it continued to lag behind.

**Table 1.** EU's Mediterranean coastal regions GDP at current prices in Purchasing Power Standard (in billion PPS)

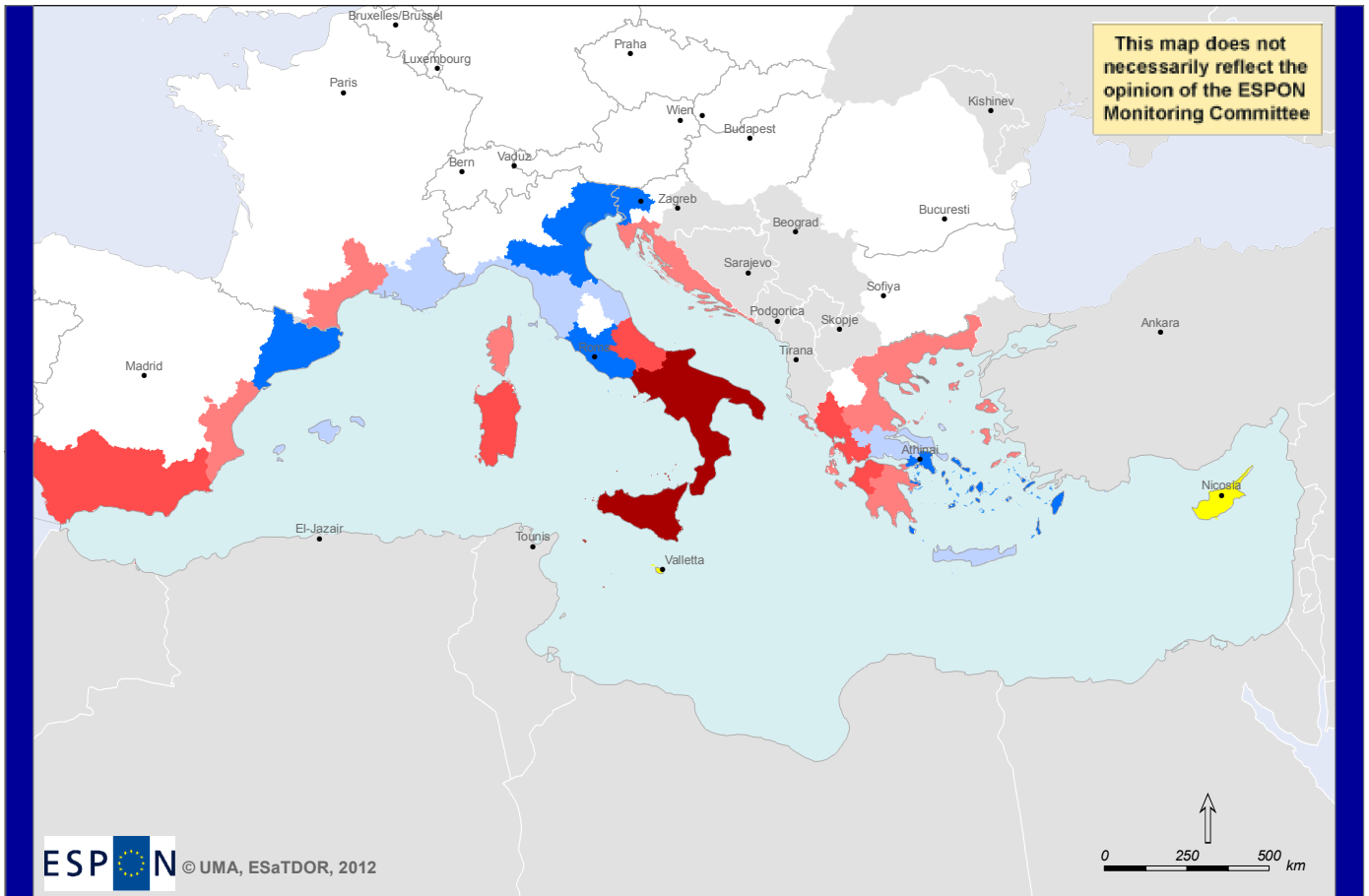
EU coastal regions by MS	2004	2005	2006	2007	Share 2007
CY	14.5	15.5	16.6	18.3	0.1%
ES*	374.3	400.2	438.9	471.8	3.8%
FR*	140.3	149.1	155.9	164.5	1.3%
EL	214.4	218.2	233.2	246.5	2.0%
IT	701.8	723.1	760.2	800.6	6.5%
MT	6.7	7.1	7.4	7.8	0.1%
SI	4.9	5.1	5.4	5.9	0.0%
<b>Mediterranean coastal regions</b>	<b>1 456.9</b>	<b>1 518.2</b>	<b>1 617.7</b>	<b>1 715.4</b>	<b>13.9%</b>
BG	7.7	8.4	9.1	9.7	0.1%
RO	8.3	8.8	10.	10.5	0.1%
<b>Black Sea coastal regions</b>	<b>16.1</b>	<b>17.2</b>	<b>19.1</b>	<b>20.2</b>	<b>0.2%</b>
<b>EU-27</b>	<b>10 607.9</b>	<b>11 062.</b>	<b>11 683.8</b>	<b>12 362.8</b>	<b>100%</b>

\*Mediterranean coastal regions only

Source: EUROSTAT, 2007

Within the countries of the northern Mediterranean, the regions with highest GDP compared to national averages (shown in Map M5a) are those of northern Italy (which may be connected to non-maritime industries given its importance for Europe's industrial sector as a whole), Catalonia and the Balearic Islands (Spain), Provence-Alpes-Côte d'Azur (France), Athens Prefecture and Central Greece, the south Aegean islands and Crete (Greece). These areas all close to main ports and have a large coastal tourism industry.

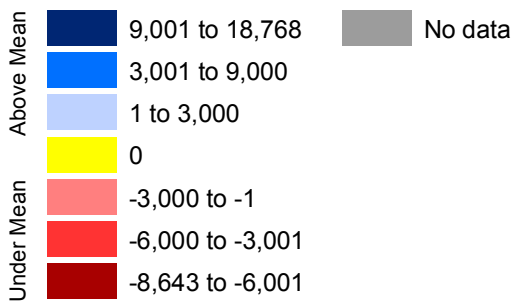
# GDP Compared to National Averages




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Thematic data: GDP, EUROSTAT, 2009; STATISTICS NORWAY, 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

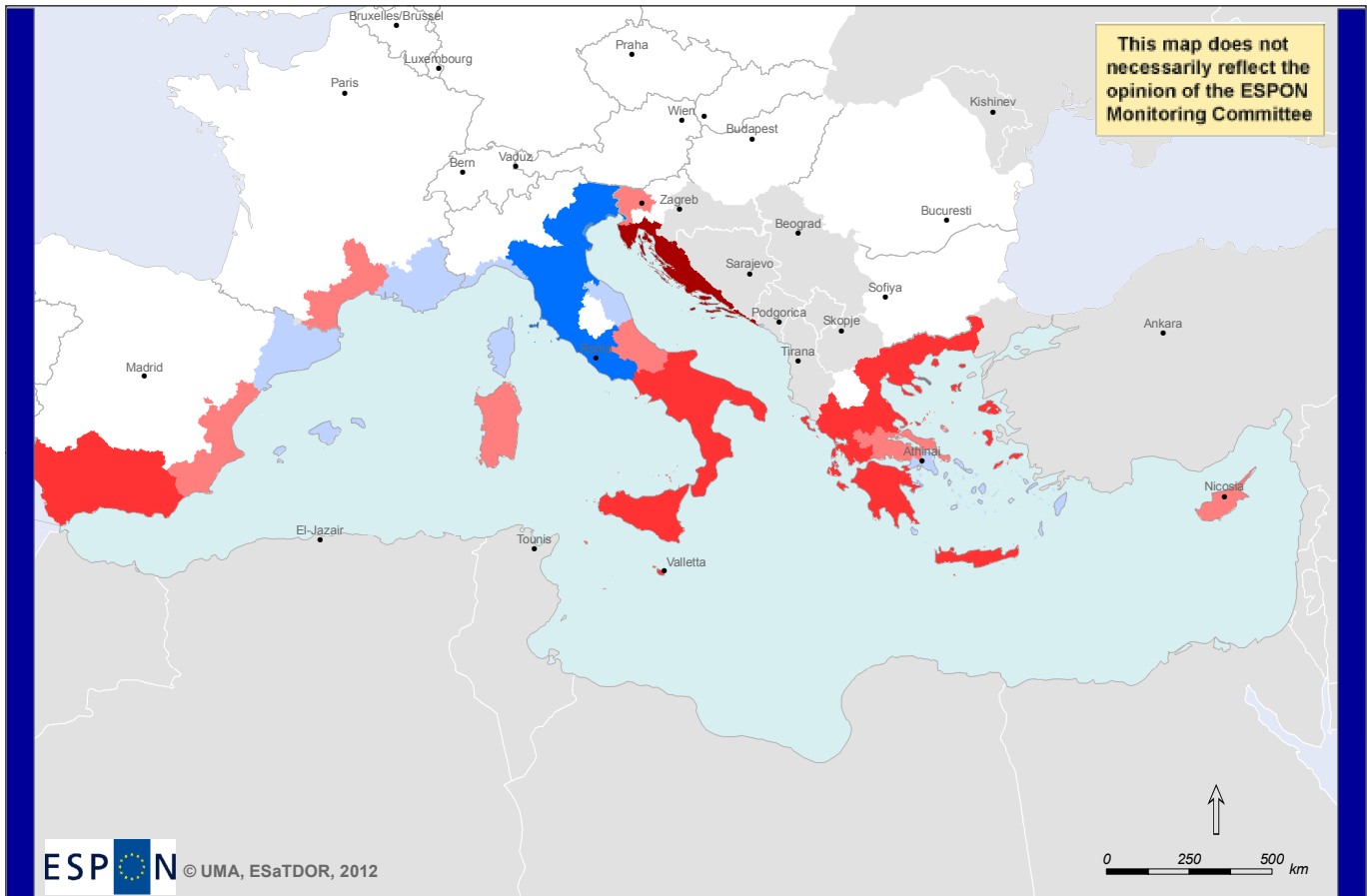
## GDP in coastal regions (Euros/person compared to national averages)



**Map M5a.** GDP in coastal regions compared to national averages (2009), Mediterranean Sea.



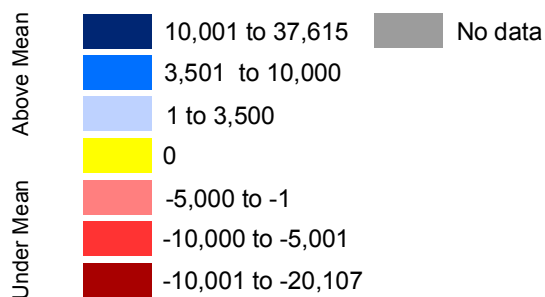
# GDP Compared to Coastal Average



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Thematic data: GDP, EUROSTAT, 2009; STATISTICS NORWAY, 2009.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## GDP in coastal regions (Euros/person compared to ESPON Seas coastal regions average)



**Map M5b.** GDP in Mediterranean Sea coastal regions (2009) compared to average across ESPON coastal regions.

### 3. Thematic Sections

#### Maritime Economy

The most important economic activities connected with the European Seas are the traditional maritime sectors (shipbuilding, marine equipment, maritime services, exploitation of marine aggregates, offshore supply, maritime works, navy and coastguard, inland navigation, recreational boating, seaports and shipping) together with coastal tourism and fisheries.

Table 2 below shows the Mediterranean's relative strength in the maritime economy lies in recreational boating, navy and coastguard.

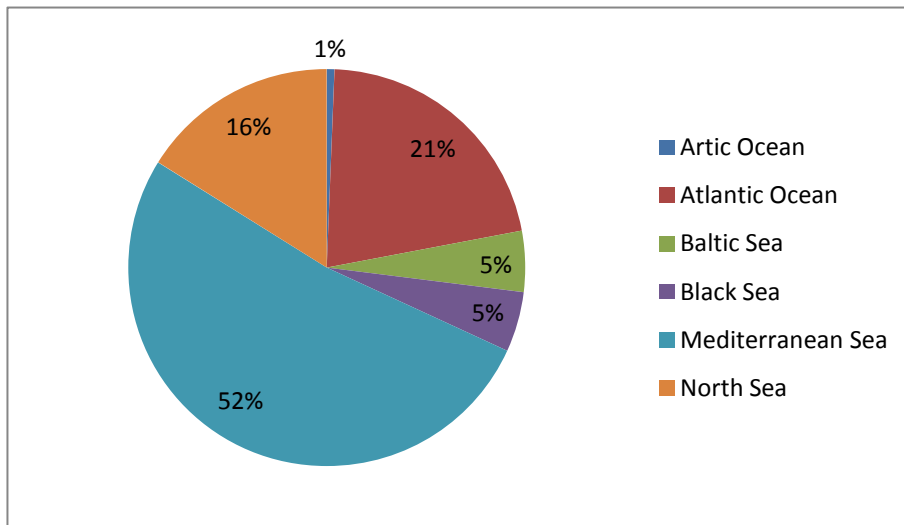
**Table 2.** Persons employed in traditional maritime sectors–EU27 and Norway–divided by the different seas. Approximate number and percentages.

	Mediterranean Sea	Number Of employees
Seaports and maritime services	20	398 100
Navy and coastguard	32	318 800
Shipping	28	278 700
Marine equipment	18	254 400
Shipbuilding	18	243 400
Recreational boating	53	157 600
Offshore supply	5	148 800
Inland navigation	11	36 300
Maritime works	7	21 800
Exploitation of marine aggregates	3	2 800
Total	446800	1.86 million
Distribution of traditional maritime activities among the seas. Percentages	24	100

Source: ESPON-ESaTDOR Interim Report, 2011

It has also become apparent that activities with relatively high value added per employee tend to be located around the Arctic Ocean, the Baltic Sea and the North Sea, whereas activities with relatively low high value added per employee to a higher degree are located around the Atlantic Ocean, the Black Sea and the Mediterranean Sea. Figure 1 below shows the estimated employment in coastal and marine tourism, divided by the different European seas. The Mediterranean Sea employs the greatest share (52%) of people working in this sector.

**Figure 1.** Employment in coastal and marine tourism – EU27 and Norway–divided by the different seas. Total: 2.42 million persons.



Source: ESPON-ESaTDOR Interim Report, 2011

In the study Economic impact of maritime industries in Europe, carried out by Policy Research on behalf of the EC, the fisheries sector was also included as part of the traditional maritime sectors; furthermore, differences exist per country with regard to the ‘scope’ of the maritime industry; the members of the European Network of Maritime Clusters regard eight sectors as part of the maritime cluster from a narrow perspective: shipping, shipbuilding, marine equipment, seaports, maritime services, yacht building, offshore services and fishing; three sectors could be added from a national, broader perspective: Navy and coastguard, inland navigation and maritime works.

Fishing in the Mediterranean is characterized by its biodiversity which allows the development of region-specific fauna and fisheries. Production is essentially concentrated on the continental shelf and capture fishing on the coasts.

The distribution of catches (mostly capture fishes and aquaculture) within the Mediterranean (Mediterranean Partner countries, EU-27 and the remaining countries) in 2006 is analyzed in Table 3 below.

**Table 3.** Catches in the Mediterranean in 2006 (tones live weight)

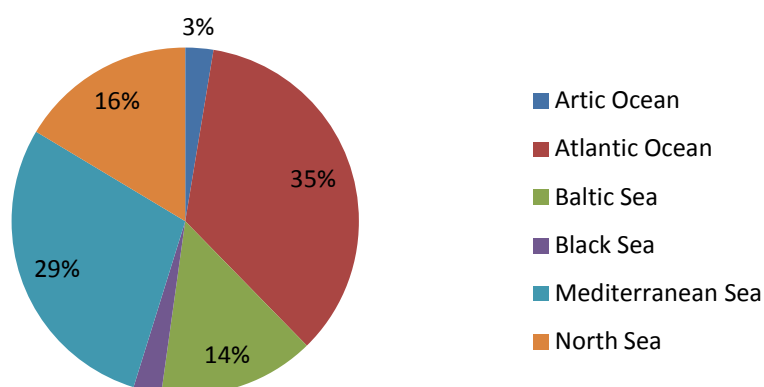
MPCs	878 720	EU-27	564 577	Others	175 381
Algeria	145 764	Bulgaria	5 628	Albania	3 287
Egypt	72 667	Greece	92 549	Bosnia	5
Israel	2 145	Spain	130 723	Croatia	37 830
Jordan	-	France	32 306	Georgia	2 948
Lebanon	3 541	Italy	298 307	Japan	161
Morocco	48 815	Cyprus	2 135	Korea Rep	68
Occupied Palestinian territory	2 324	Malta	1 330	Libya	40 297
Syria	3 395	Portugal	54	Monaco	1
Tunisia	110 903	Romania	614	Montenegro	501
Turkey	489 166	Slovenia	931	Russian Fed.	31 850
				Serbia	-
				Taiwan	9
				Ukraine	58 424
<b>1 618 678</b>					

Source: Eurostat, 2006

Partner countries were responsible for 54% of the total catch of 1.6 million tonnes from the Mediterranean in 2006, with one of these countries alone (Turkey) accounting for 30% (489 thousand tonnes) of the total (see Table 1). EU-27 Member States caught 565 thousand tonnes – 35% of the total. The remaining 11% (175 thousand tonnes) were mostly caught by other coastal states. The non-coastal states fishing in the Mediterranean (Japan, Korea and Taiwan) were principally targeting tuna and other large pelagic species.

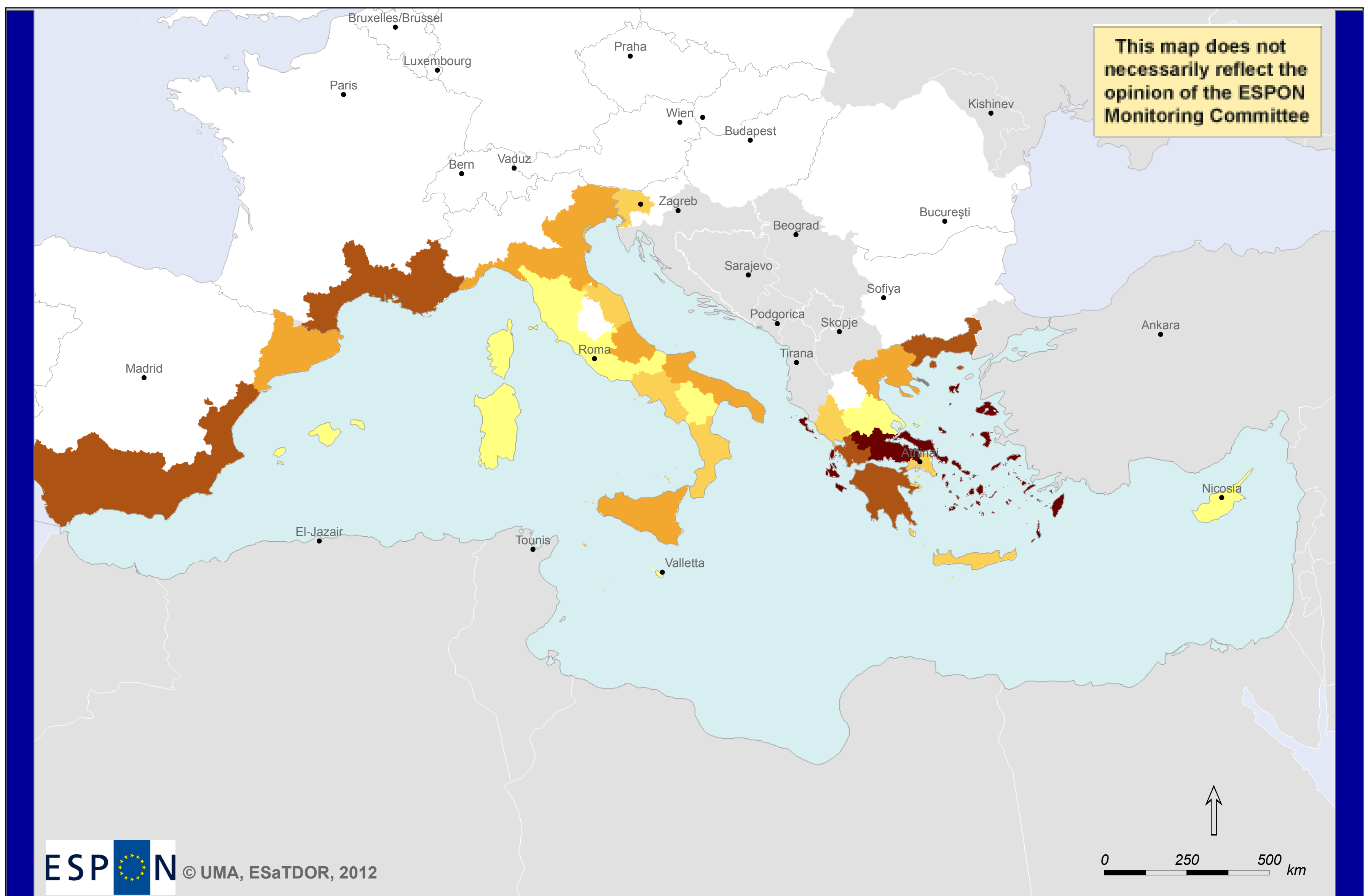
As is noticeable from Figure 2 below, the most important destination for employment in the fisheries sector in EU27 and Norway are the Atlantic Ocean (35%) and the Mediterranean Sea (29%). The figures do not include Iceland. With Iceland included in the Arctic Ocean, this sea would have contributed to a larger part of European employment in fisheries. The distribution of employment in fisheries is shown in Map M6 below.

**Figure 2.** Employment in fisheries in EU27 and Norway—divided by the different seas. Total: 440900 persons.



Source: ESPON-ESaTDOR Interim Report, 2011

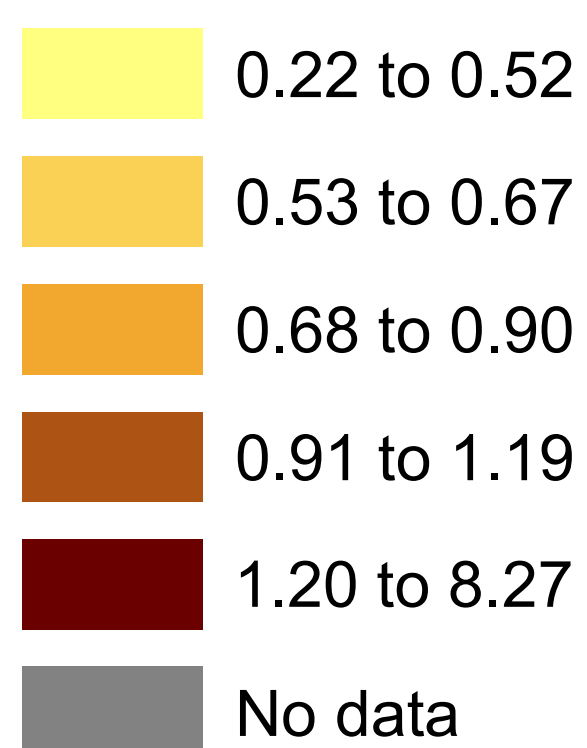
# Employment in Fisheries, 2009




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Thematic data: Economic Use, European Cluster Observatory, 2011.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Employment in Fisheries 2009 (percentage of total employment).

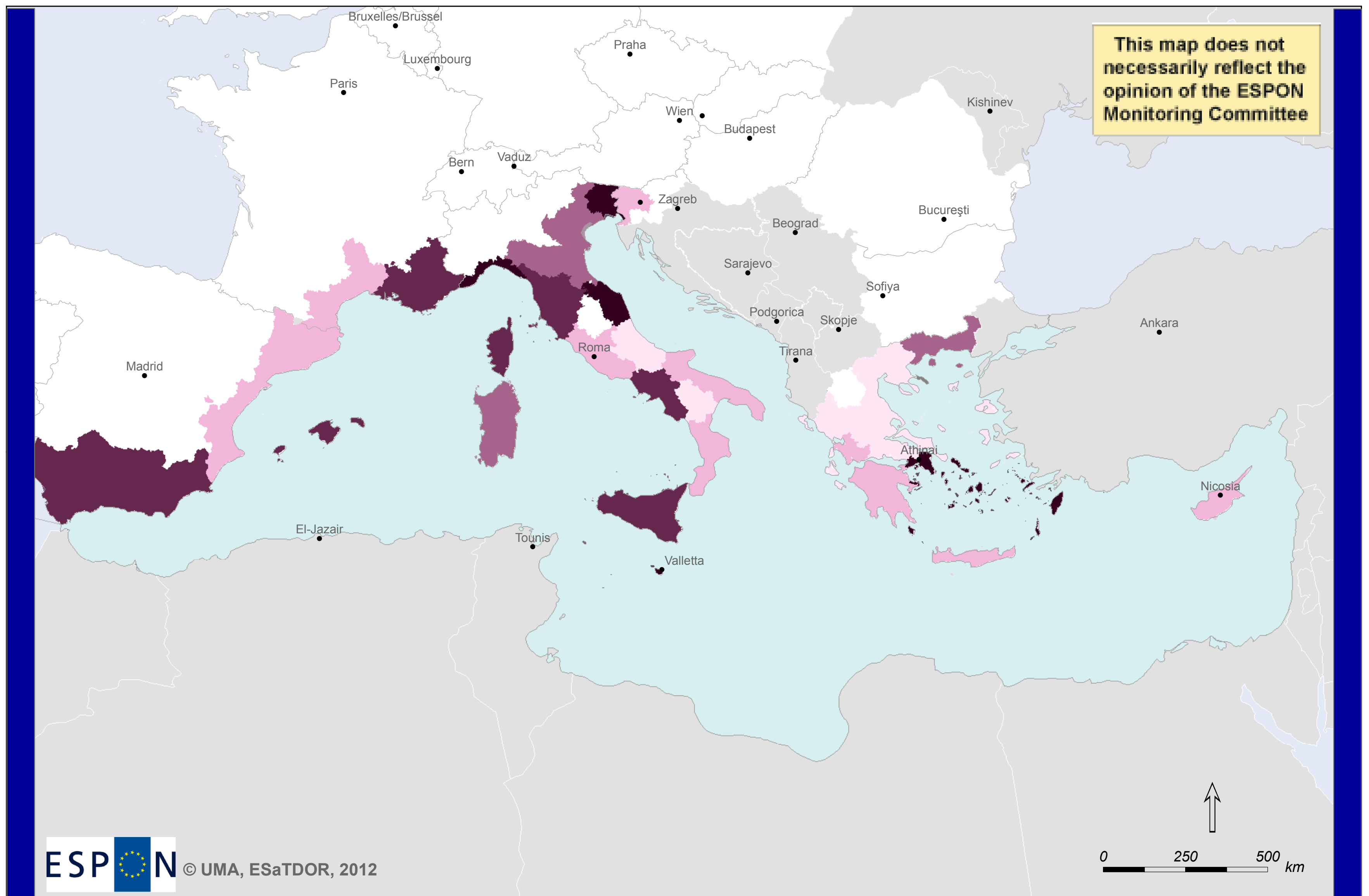


**Map M6.** Employment in Fisheries, 2009 (as a percentage of total employment), Mediterranean Sea.

As previously mentioned, the Mediterranean Sea has its relative strength in recreational boating, navy and coastguard with more than 83 000 employees and more than 81 000 employees respectively. Nevertheless, the most important sector, when it comes to employment is navy and coastguard with nearly 102 000 employees. Furthermore, shipping employs almost 78 000 people and marine equipment and shipbuilding together approximately 90 000 people. Map M7 shows that some of the main clusters of employment in shipbuilding are located in Andalucía (which may be associated with naval activity in Gibraltar and Cadiz, as well as shipping at Algeciras and recreational boating) and the Balearic islands (Spain), Provence (France), the Italian regions of Liguria, Marche, Friuli-Venezia and island of Sicily (a home for both shipping and naval activities) and Athens-Piraeus (Greece). It should be noted that since 2010, shipbuilding activities on the island of Malta have ceased and ship repair activities have transferred from the government-owned Malta Shipyards company to a smaller, privately owned company (Times of Malta, 2010).

The clusters of maritime activities in the Mediterranean relate mostly to coastal tourism, recreational boating, navy and coastguard, shipping/marine equipment and shipbuilding, aquaculture. Map M8 shows that besides shipbuilding, other clusters of traditional maritime activities (including manufacture and sale of engineering equipment, machinery, tools, navigation aids and other instruments, construction and engineering) are located mainly in the north east and west coasts of Italy (close to regions with a high proportion of people employed in shipbuilding), with further areas of high employment in Catalonia. In terms of other industries associated with the maritime sector, such as manufacturing of metal and electrical products, insurance and legal services, this cluster includes a broader range of services that may have a more ambiguous connection with maritime activity, and thus a greater number of regions have a relatively high proportion of employees. Map M9 shows high levels of employment in this cluster in Murcia, Spain, across several regions of Italy, Slovenia, and central Greece.







# Employment in Shipbuilding, 2009




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Thematic data: Economic Use, European Cluster Observatory, 2011.  
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 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

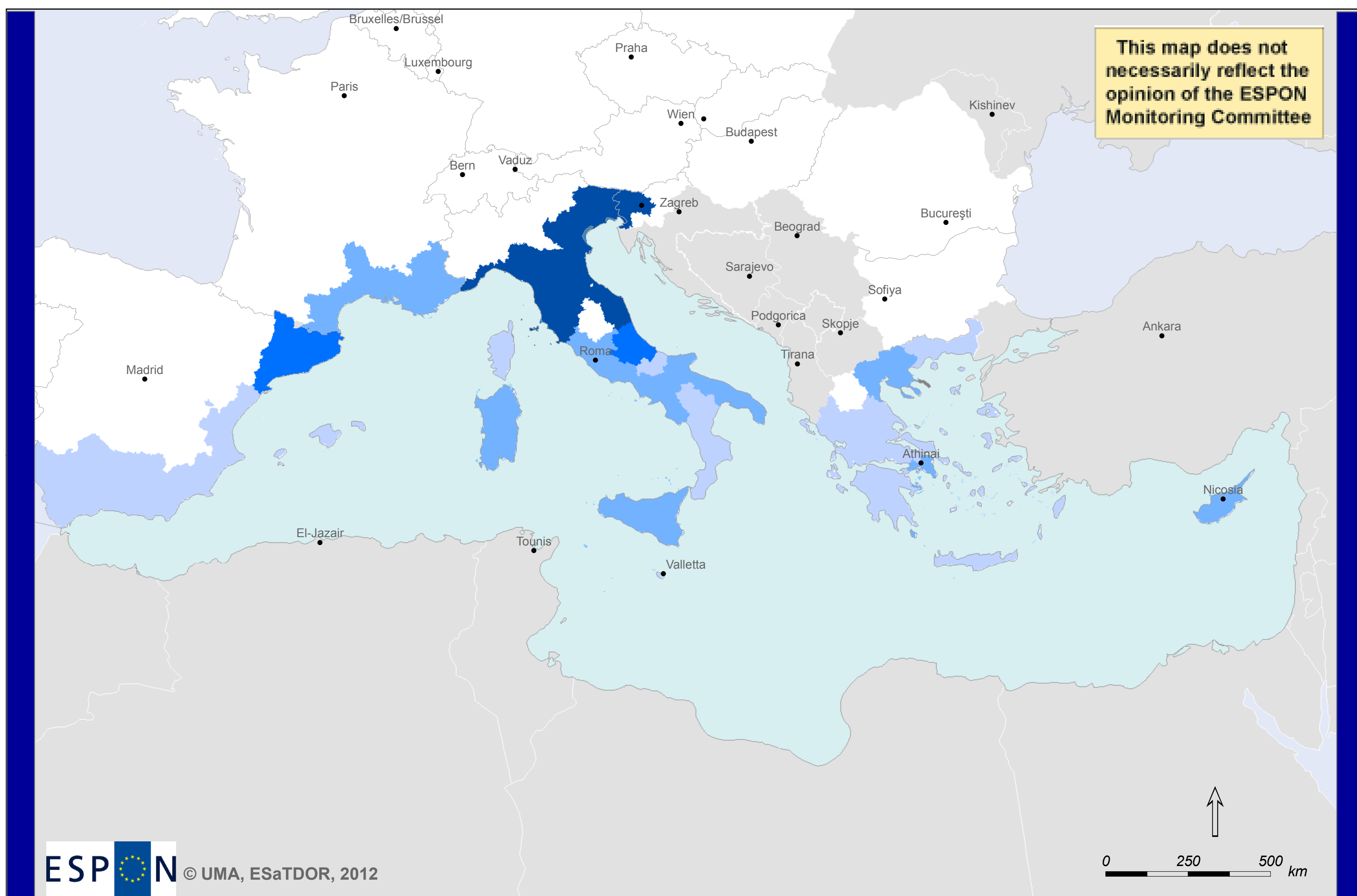
## Employment in Shipbuilding 2009, (percentage of total employment).

-  0 to 0.04
-  0.05 to 0.10
-  0.11 to 0.17
-  0.18 to 0.37
-  0.38 to 3.05
-  No data

**Map M7.** Employment in shipbuilding, 2009 (as a percentage of total employment), Mediterranean Sea.



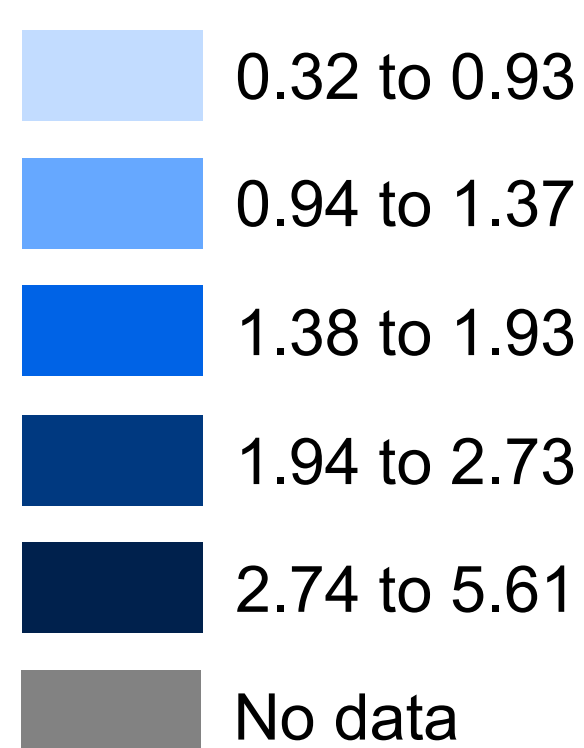
# Employment in other Traditional Maritime Sectors, 2009



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Thematic data: Economic Use, European Cluster Observatory, 2011.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

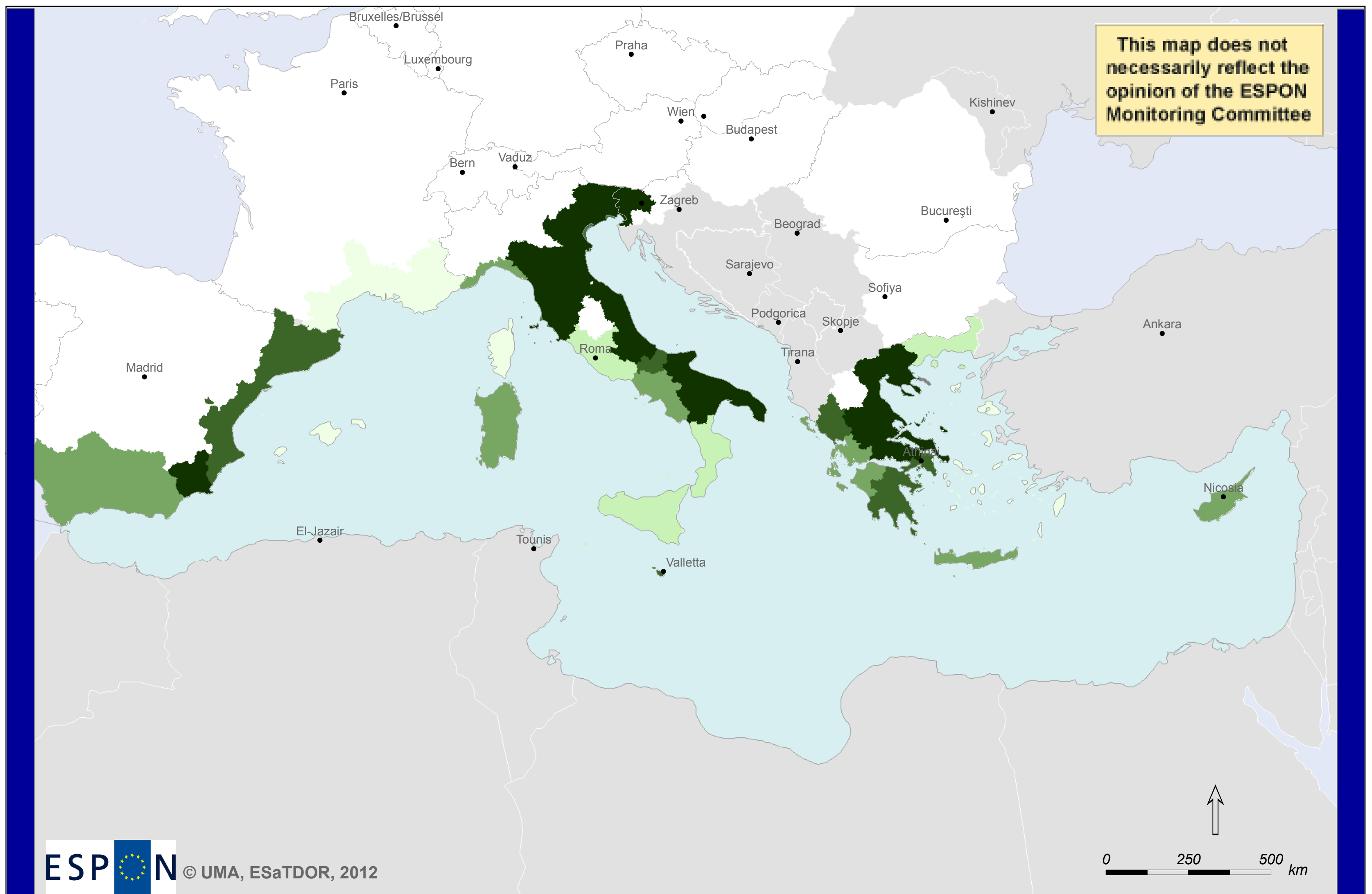
## Employment in other traditional maritime sectors 2009, (percentage of total employment).



**Map M8.** Employment in other traditional maritime sectors, 2009 (as a percentage of total employment), Mediterranean Sea.



# Employment in Other Sectors Associated with the Maritime Cluster, 2009

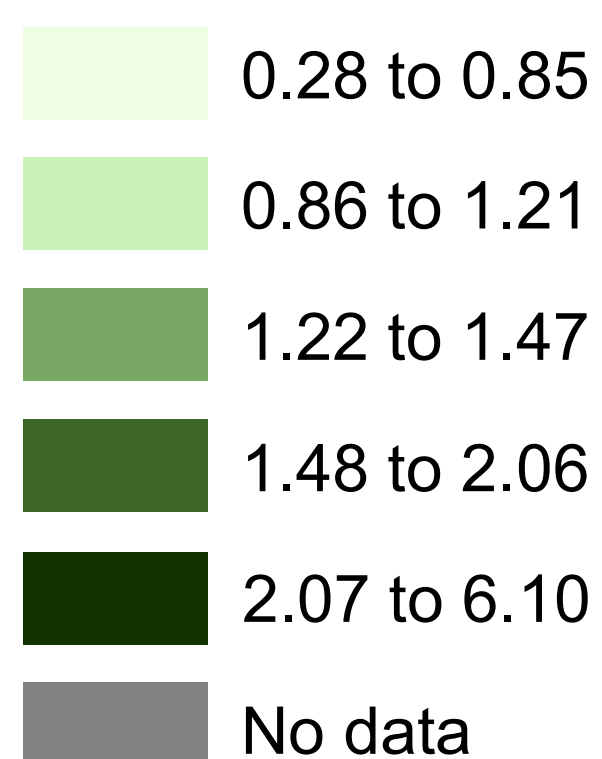



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Thematic data: Economic Use, European Cluster Observatory, 2011.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Employment in other sectors associated with the maritime cluster 2009,

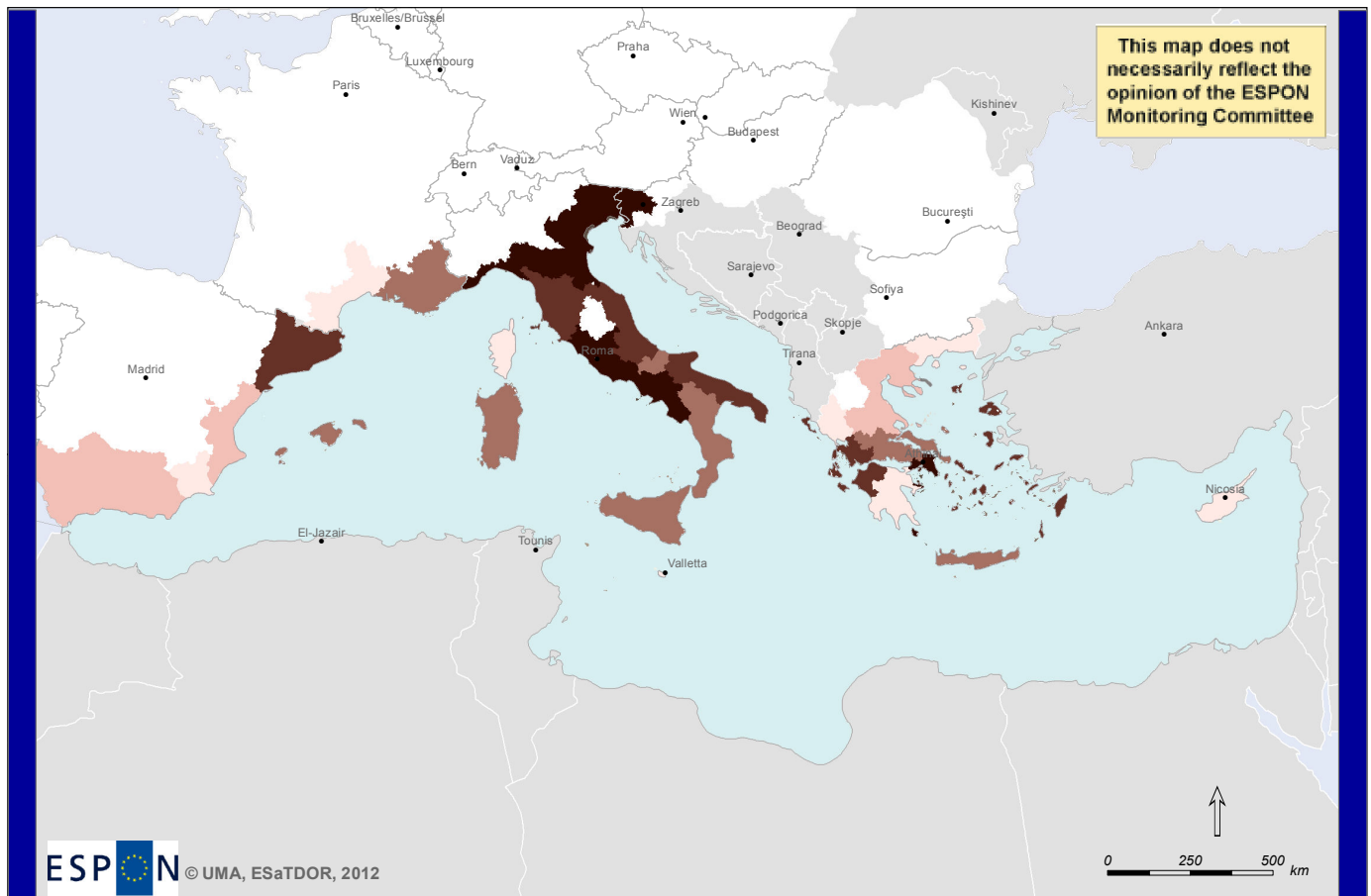
(percentage of total employment).



**Map M9.** Employment in other sectors associated with the maritime cluster, 2009 (as a percentage of total employment). Mediterranean Sea.

According to the 2011 Transport White Paper, Europe (EU/EEA) has the world's largest shipping fleet, representing 41.6% of world's (measured in GT) directly employing some 300,000 seafarers on board merchant vessels and another three million in related jobs. Map M10 shows employment in Transport, with a high proportion of employment in shipping around the coasts of Italy, central and eastern Greece and Catalonia.

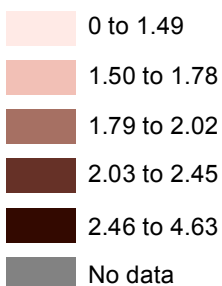
## Employment in Transport, 2009



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Thematic data: Economic Use, European Cluster Observatory, 2011.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

### Transport 2009 (percentage of total employment).



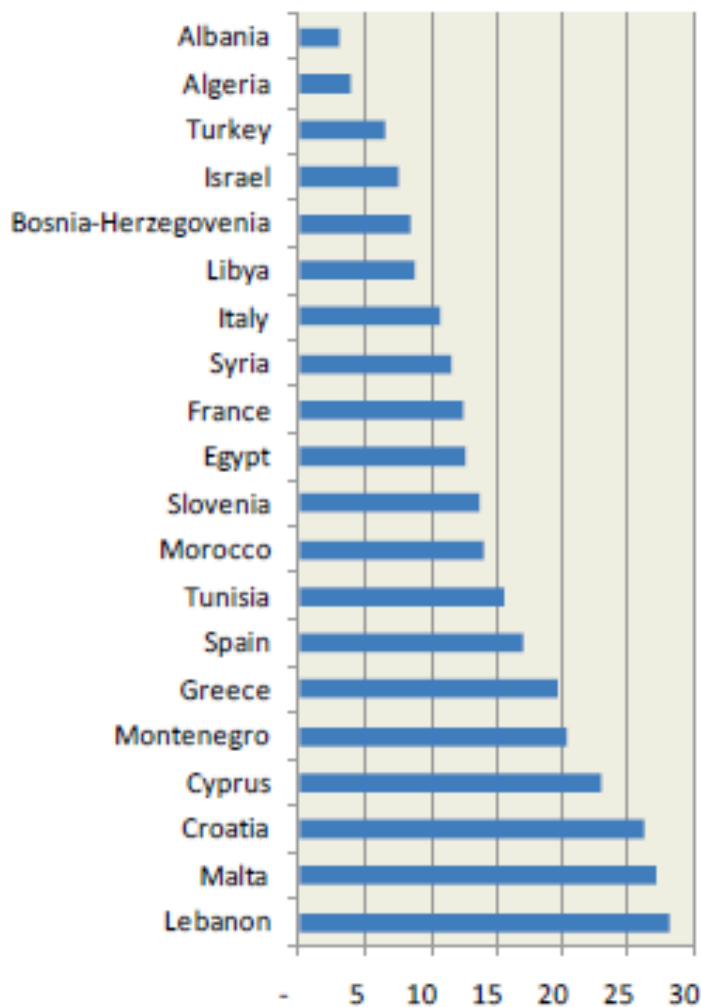
**Map M10.** Employment in transport, 2009 (as a percentage of total employment). Mediterranean Sea.

Tourism is an essential economic activity in all riparian countries of the Mediterranean and attracts 30% of the world's international tourism. In 2007 alone, the Mediterranean attracted close to 275 million international visitors. Figure 3 (below) demonstrates the importance of tourism as a generator of employment in Mediterranean countries.

The seasonal and spatial concentration of touristic activities strongly amplifies their impacts on the environment, generating pressures on water resources and natural environments (coastal construction), and increasing waste production. Tourism in non-coastal areas is still much less developed.

However, the economy of highly specialized destinations where tourism is the dominant economic sector is highly vulnerable to downturns in tourism activity. Therefore, recently, the economic crisis has negatively impacted the activity of this sector.

**Figure 3.** Estimation of the share of employment in the tourism sector in 2009 (%)



Source: UNEP/MAP-Plan Bleu, 2009

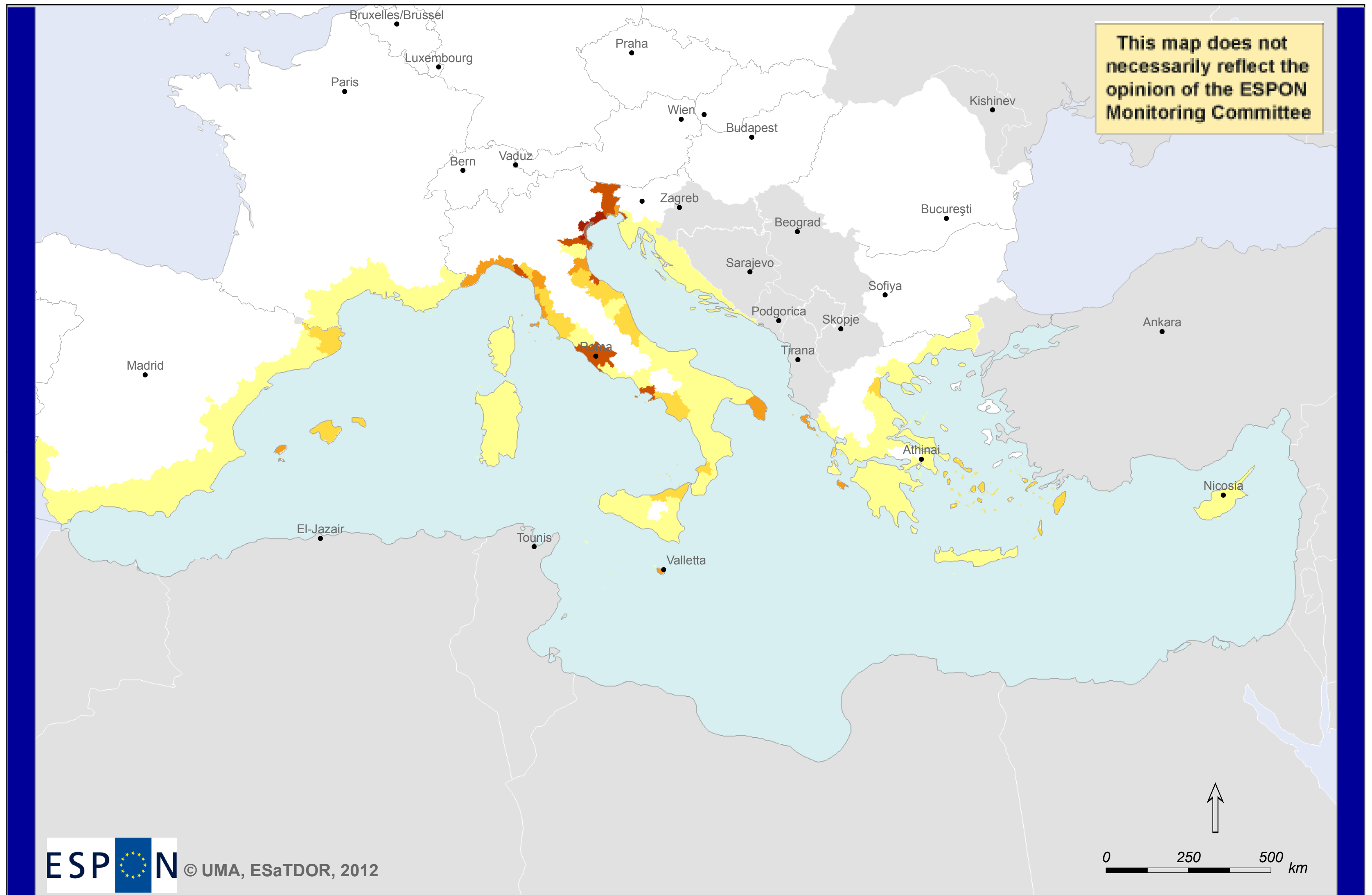
There are 4000 marinas and 6 million leisure boats associated to recreational activities in Europe, linked to sports and tourist activities. Leisure ports in the Mediterranean are a controversial issue due to the fact that they contribute to tourist economies but also have a significant impact upon coastal dynamics and the marine environment. In the Spanish Mediterranean coast, there are some

350 recreational ports, with capacity for more than 100,000 boats, and planned infrastructure would represent a 50% increase with respect to the current situation.

In 2009, approximately 122 800 accommodation facilities (hotels, campsites and other tourist accommodation) were housed in the EU's Mediterranean coastal regions, including 38 200 hotels (or similar establishments), accounting for around 19.0 % of hotels in the European Union. From 2008 to 2009, the total number of accommodation facilities in these regions increased by 3.6 %. This increase is essentially due to the increase in types of accommodation other than hotels: during this period the number of hotels increased by 0.7% and the number of other accommodation facilities increased by 5.0 %. From 2008 to 2009, the density of tourism capacity, measured as the number of tourist beds per km<sup>2</sup>, developed in quite a diverse way throughout the Mediterranean basin; nevertheless, the average figure is approximately 16 beds per km<sup>2</sup> (see Map M11).

Since the mid '90s employment generated by the tourism industry within the Mediterranean area has been generally increasing. Employment in the tourism sector involves direct employment (such as beach attendants, travel agents, hotel services) and indirect employment (e.g. banking services). Tourism is considered a very labour intensive activity, especially for the Mediterranean. In countries with a diversified economy, such as the Mediterranean countries, the share of tourism employment depends not only on the level of development of the tourist activity but also on the economic activity as a whole. Therefore, Mediterranean countries are particularly vulnerable to economic changes such as the current economic crisis. According to World Travel and Tourism Council, travel and tourism has created 7,378,000 jobs directly in 2011 (4.4% of total employment) and this is forecast to grow by 1.0% in 2012 to 7,454,000 (4.4% of total employment). This includes employment by hotels, travel agents, airlines and other passenger transportation services (excluding commuter services). It also includes, for example, the activities of the restaurant and leisure industries directly supported by tourists. Employment in tourism in the Mediterranean is shown in Map M12.

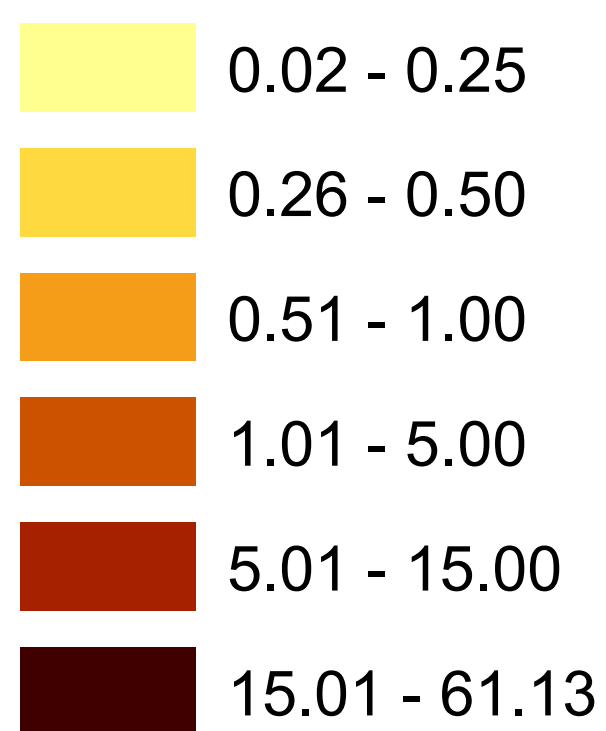
# Tourism Intensity




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Thematic data: Tourism Intensity, EUROSTAT, 2009  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS3.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

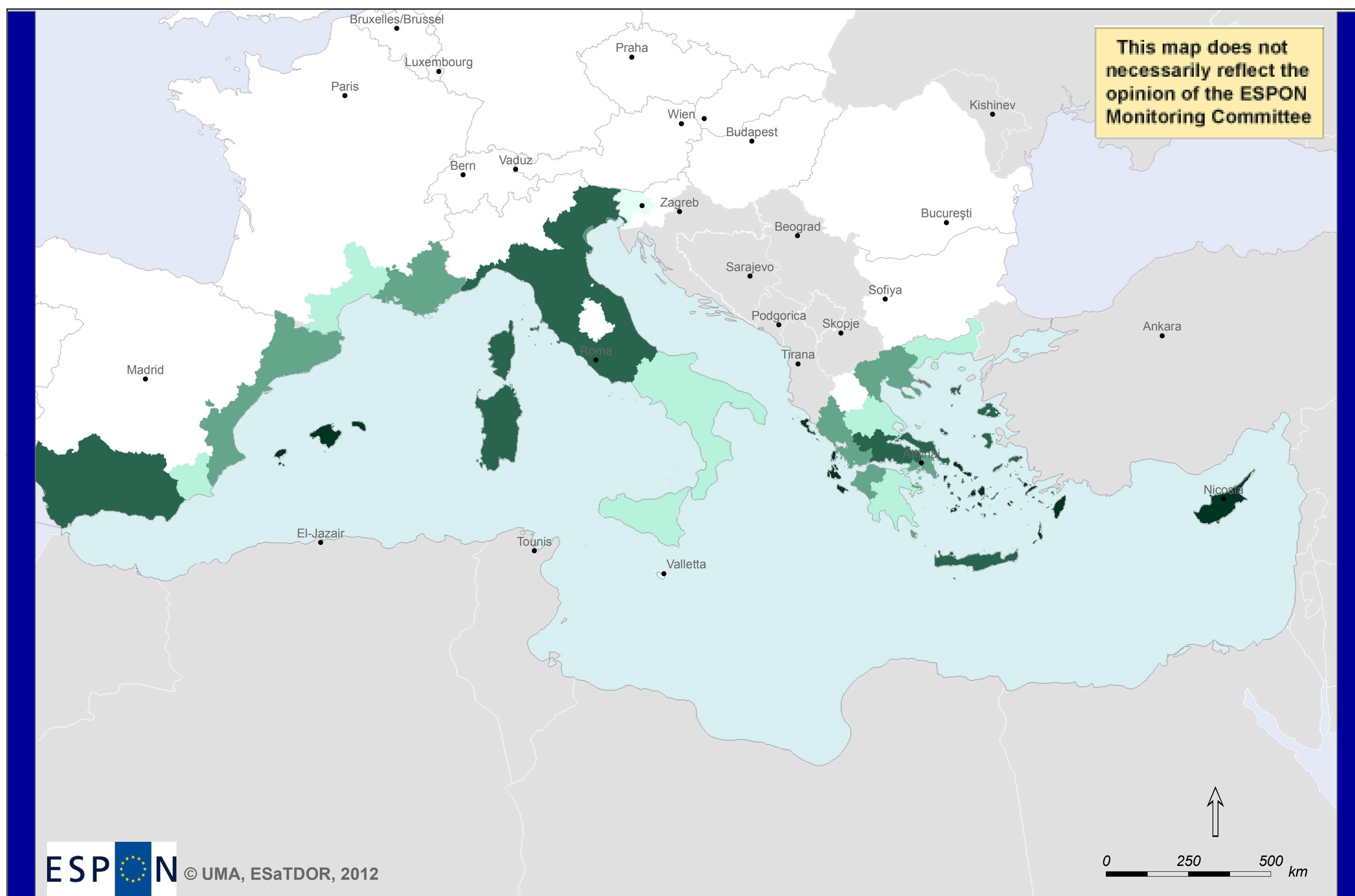
## Tourism Intensity (establishments, bedrooms and bedplaces/km<sup>2</sup>)



**Map M11.** Tourism intensity, measured as number of establishments, bedrooms and bedplaces per km<sup>2</sup>, Mediterranean Sea.



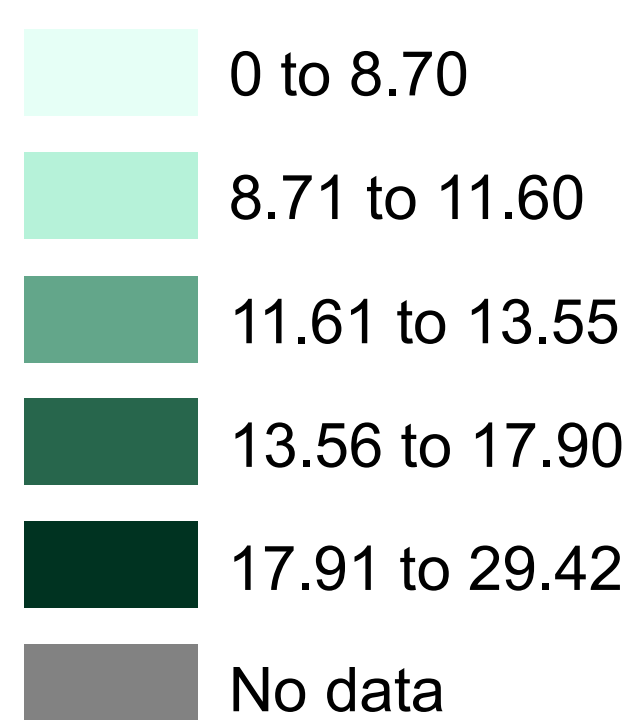
# Employment in Tourism, 2009




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Thematic data: Economic Use, European Cluster Observatory, 2011.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Employment in Tourism 2009 (percentage of total employment)



**Map M12.** Employment in tourism, 2009 (as a percentage of total employment). Mediterranean Sea.

## Transport

As a zone of transit between Europe and Asia, the Mediterranean has seen, over the past 15 years, an intensified flow of goods combined with the effects of demographic pressure, economic growth and trade liberalisation. In response to the growth of long-distance exchanges, ship size has significantly increased, driving countries to seek to equip themselves with appropriate port infrastructures.

The traffic intensity in the Mediterranean accounts for 30% of total World maritime traffic, with more than 200,000 vessels over 100 tonnes crossing the sea annually. The total volume of cargo handled at Mediterranean ports is shown in Map M13a, which indicates a large number of ports handling a relatively small tonnage (1-25 million tonnes), with a much smaller number of ports handling between 25 and 100 million tonnes.

Most of the traffic in the Mediterranean is passing, as only 25% of the Asiatic traffic resulting from globalisation enters Europe through Mediterranean ports after passing through the Suez Canal, while 75% of freight continues through Gibraltar up to Northern European ports. Most of the largest Mediterranean ports have a major transshipment component, especially Algeciras (93% in 2010, Spain), Gioia Tauro (80,4% in 2004, Italy), Marsaxlokk (95% in 2008, Malta), but also more recently Valencia (51% in 2010, Spain). Map M13b indicates that despite the large volume of "passing" traffic, Mediterranean ports are vital for the flow of goods into the region as in the majority of cases these ports handle a greater volume of inbound than outbound cargo.

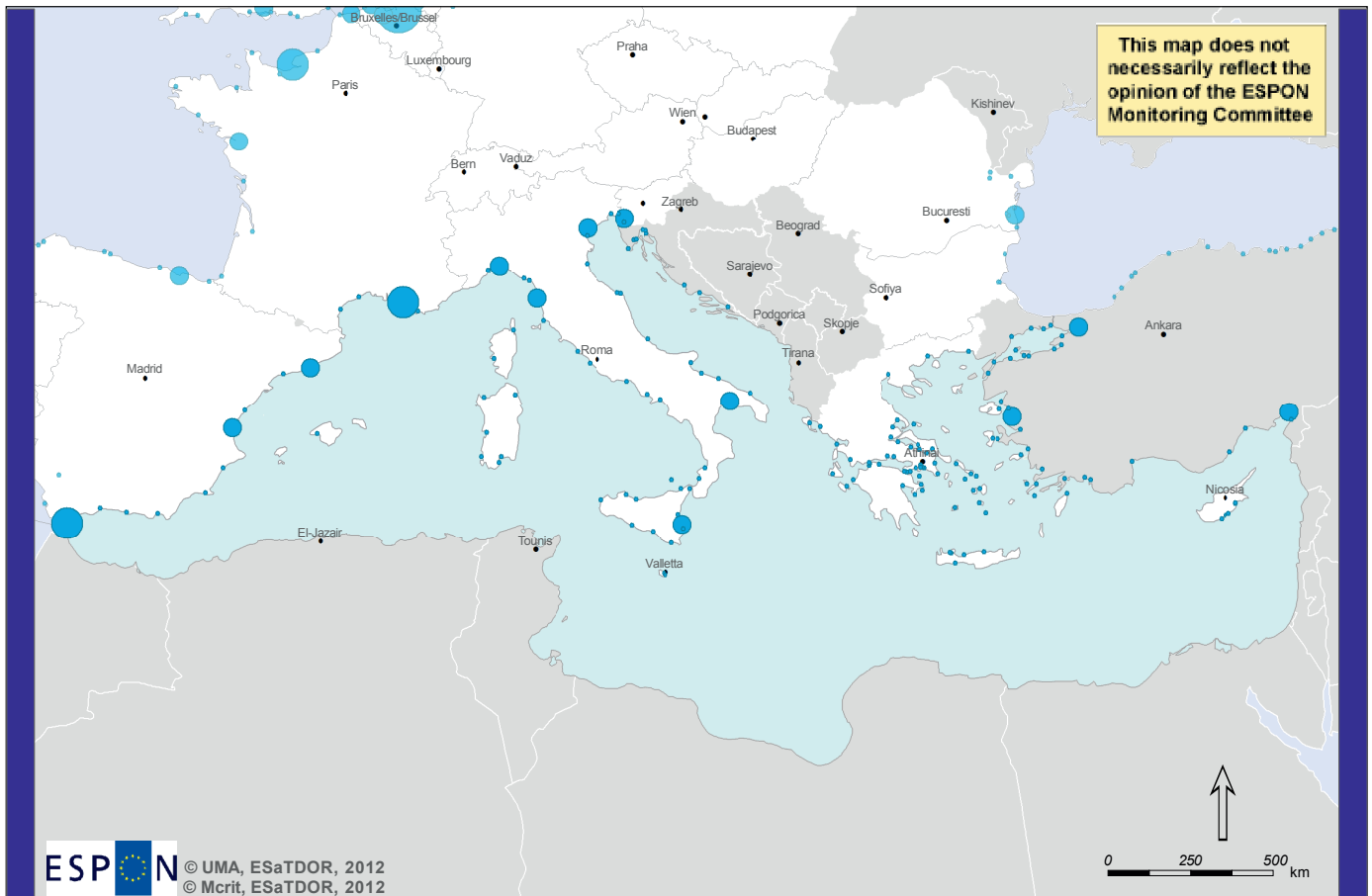
Although there is a lack of data and indicators, studies show that individual mobility is rapidly increasing regionally, particularly through air transport, for international travel, and road domestically, and sea transport has seen a marked growth for international freight.

It is reported that there was a 50% growth rate in maritime transport between 1997 and 2006, 6% for oil transport, 7-8% for LNG transport, 10% for container traffic (due to the development of trade with Asia) and 5% for Ro-Ro. However, Map M13c shows that overall from 2004 to 2008 there has been a major decline in shipping at ports throughout the Mediterranean, perhaps associated with the recent financial crisis and decreasing demand for goods in those countries which have been most badly affected.

Between 1997 and 2006, container port traffic increased by 71% and the average ship size reported a 55% growth rate. More recent trends in container shipping are shown in Map M14c, which shows highest levels of growth (over 30% increase from 2004-2008) in the Italian ports of Brindisi and Catania, the Greek ports of Athens and Thessaloniki, and Algeciras and Malaga in Spain, though this growth must be considered in tandem with the picture of relative shipping decline overall as shown in Map M13a.

Mediterranean ports are unable to compete with northern European ports and are characterised by a low level of integration, especially with regard to the Southern European trade. Goods from Asia are preferentially disembarked in the ports of the northern zone. The same applies to the trade from the Southern and Eastern Mediterranean Countries (SEMCs), for which Hamburg is the first exchange and trans-shipment port. Intra-Mediterranean flows account for a quarter of traffic. The volume of exchanges between the SEMCs is low, and the flows follow a North-South axis with, however, a dominant South-North direction connected with oil and gas exports.

# Total Shipping, 2008




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Thematic data: Gross weight of goods handled in all ports, EUROSTAT, 2008.  
 Iceland data: EUROSTAT, 2006.  
 Port locations: Eurostat - GISCO (European Commission), 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

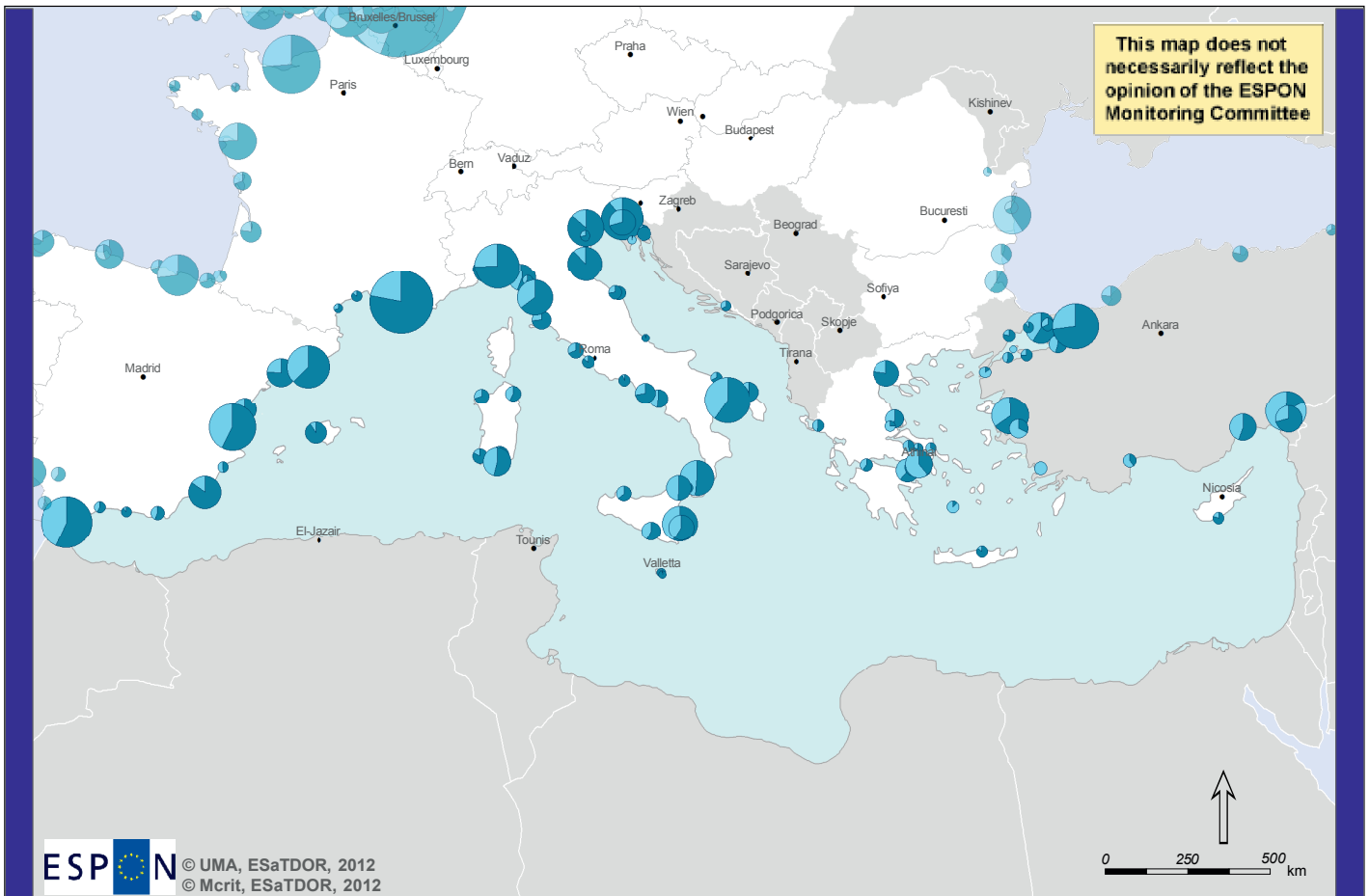
## Total shipping at ports, 2008 (million tonnes). All ports.

- 1 - 25
- 25 - 50
- 50 - 100
- 100 - 200
- > 200

## Map M13a. Total shipping (million tonnes) at Mediterranean ports, 2008





# Shipping by Direction, 2008




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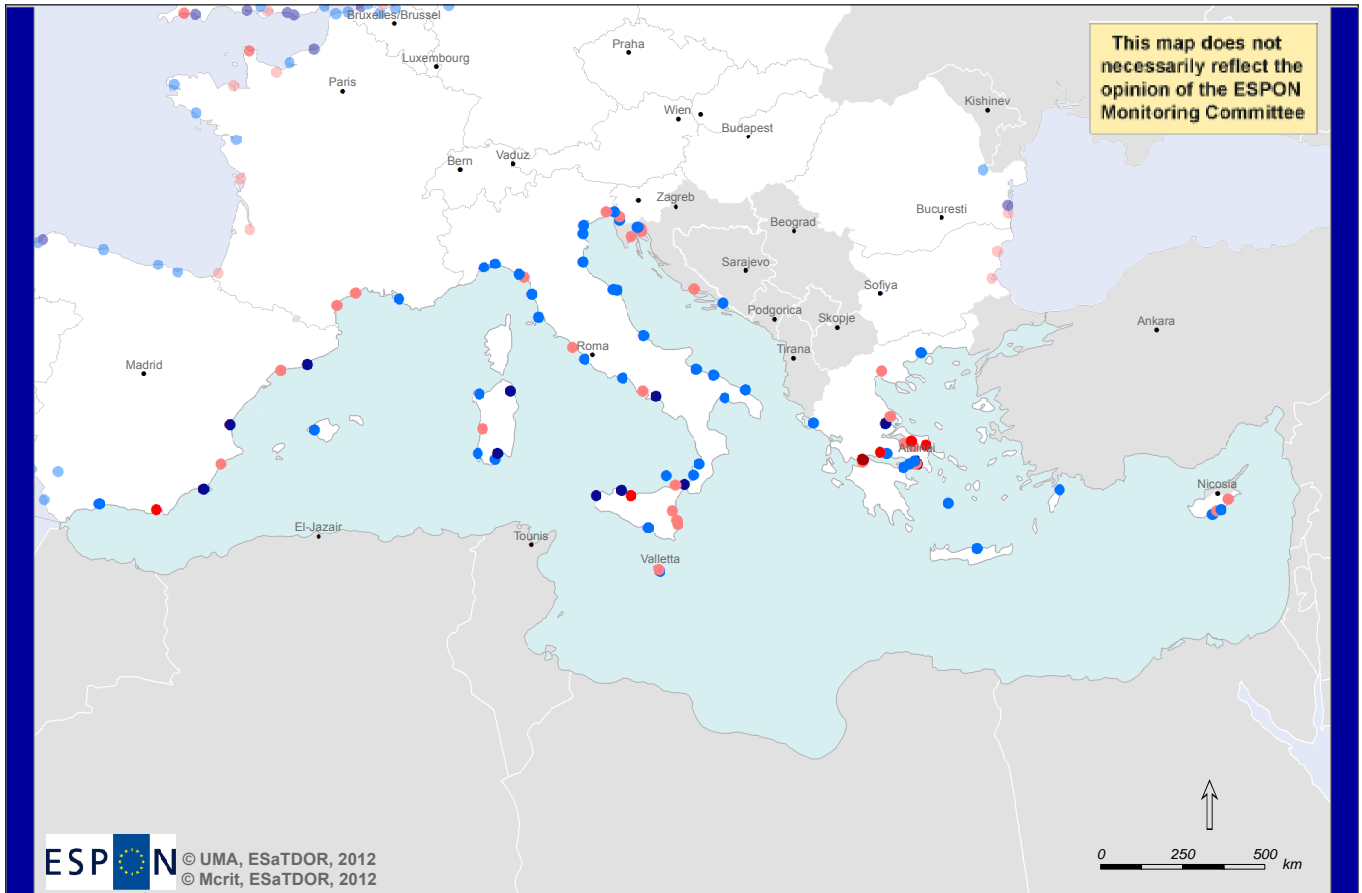
Thematic data: Gross weight of goods handled in all ports by direction, EUROSTAT, 2008.  
 Port locations: Eurostat - GISCO (European Commission), 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Total shipping at ports by direction, 2008.

-  Inward direction
-  Outward direction

**Map M13b.** Total shipping at Mediterranean ports (million tonnes) by inward/outward direction, 2008.

# Shipping Trends, 2004-2008




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Thematic data: Gross weight of goods handled in all ports by direction, EUROSTAT, 2004 - 2008.  
 Port locations: Eurostat - GISCO (European Commission), 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

- < -20%
- -20% to -10%
- -10% to 0%
- 0% to 10%
- > 10%

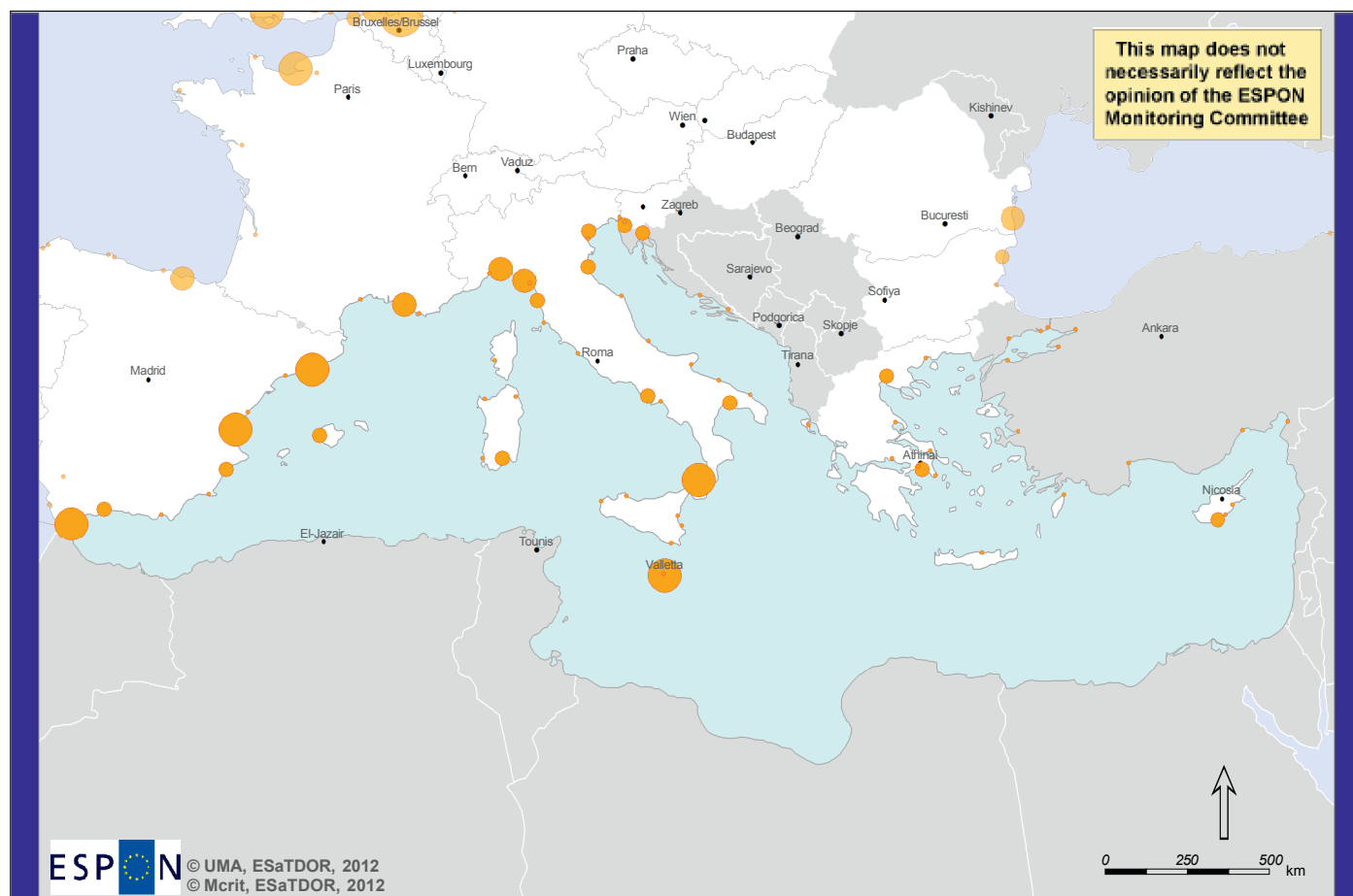
**M13c. Total shipping at Mediterranean Sea ports. Average annual traffic increase, 2004 - 2008 (%).**

As with goods shipping in general in the Mediterranean, there are a large number of container ports but the greatest volume of container traffic is handled in a few key locations such as Marsaxlokk (Malta), Algeciras, Valencia and Barcelona (Spain), Genoa, La Spezia and Gioia Tauro (Italy) being the biggest container ports in 2008 (see Map M14a). The flow of container shipping in 2008 shows a roughly equal proportion of inward and outward movements (Map M14b).

Between 1997 and 2006, container port traffic increased by 71% and the average ship size reported a 55% growth rate. More recent trends in container shipping are shown in Map M14c, which shows highest levels of growth (over 30% increase from 2004-2008) in the Italian ports of Brindisi and Catania, the Greek ports of Athens and Thessaloniki, and Algeciras and Malaga in Spain, though this growth must be considered in tandem with the picture of relative shipping decline overall as shown in Map M13a.

Mediterranean ports are unable to compete with northern European ports and are characterised by a low level of integration, especially with regard to the Southern European trade. Goods from Asia are preferentially disembarked in the ports of the northern zone. The same applies to the trade from the Southern and Eastern Mediterranean Countries (SEMCs), for which Hamburg is the first exchange and trans-shipment port. Intra-Mediterranean flows account for a quarter of traffic. The volume of exchanges between the SEMCs is low, and the flows follow a North-South axis with, however, a dominant South-North direction connected with oil and gas exports.

# Container Shipping, 2008




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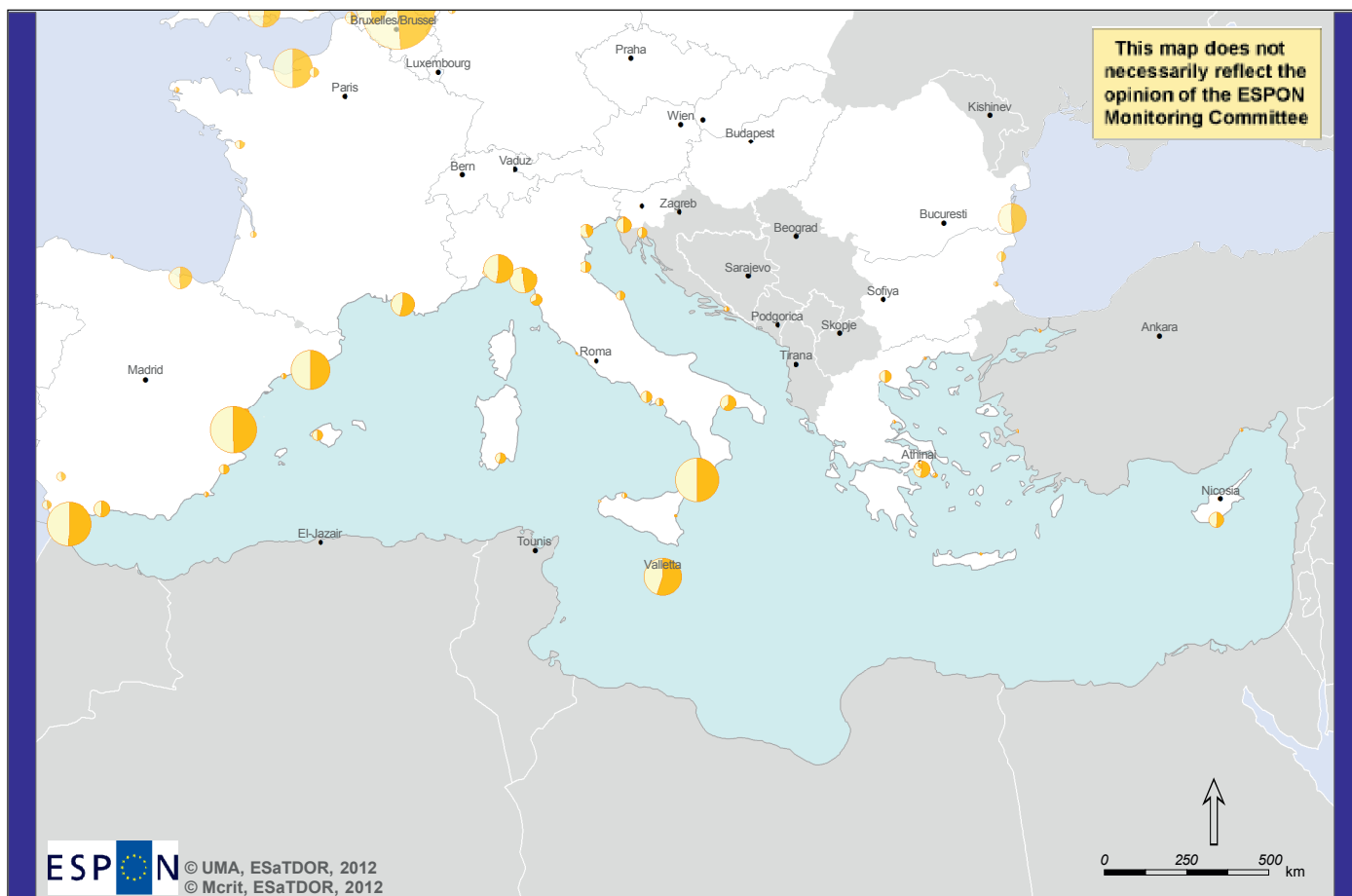
Thematic data: Containers handled in all ports by direction, EUROSTAT, 2008.  
 \*Marsaxlokk data: Freeport Malta, 2008.  
 Port locations: Eurostat - GISCO (European Commission), 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Container shipping at ports, 2008 (million TEU). All ports.

- 0 - 0.15
- 0.15 - 0.70
- 0.70 - 1.6
- 1.6 - 5.5
- > 5.5

**Map M14a.** Container shipping (million TEUs) at Mediterranean Sea ports, 2008.

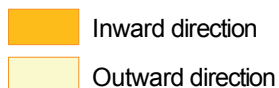
# Container Shipping by Direction, 2008



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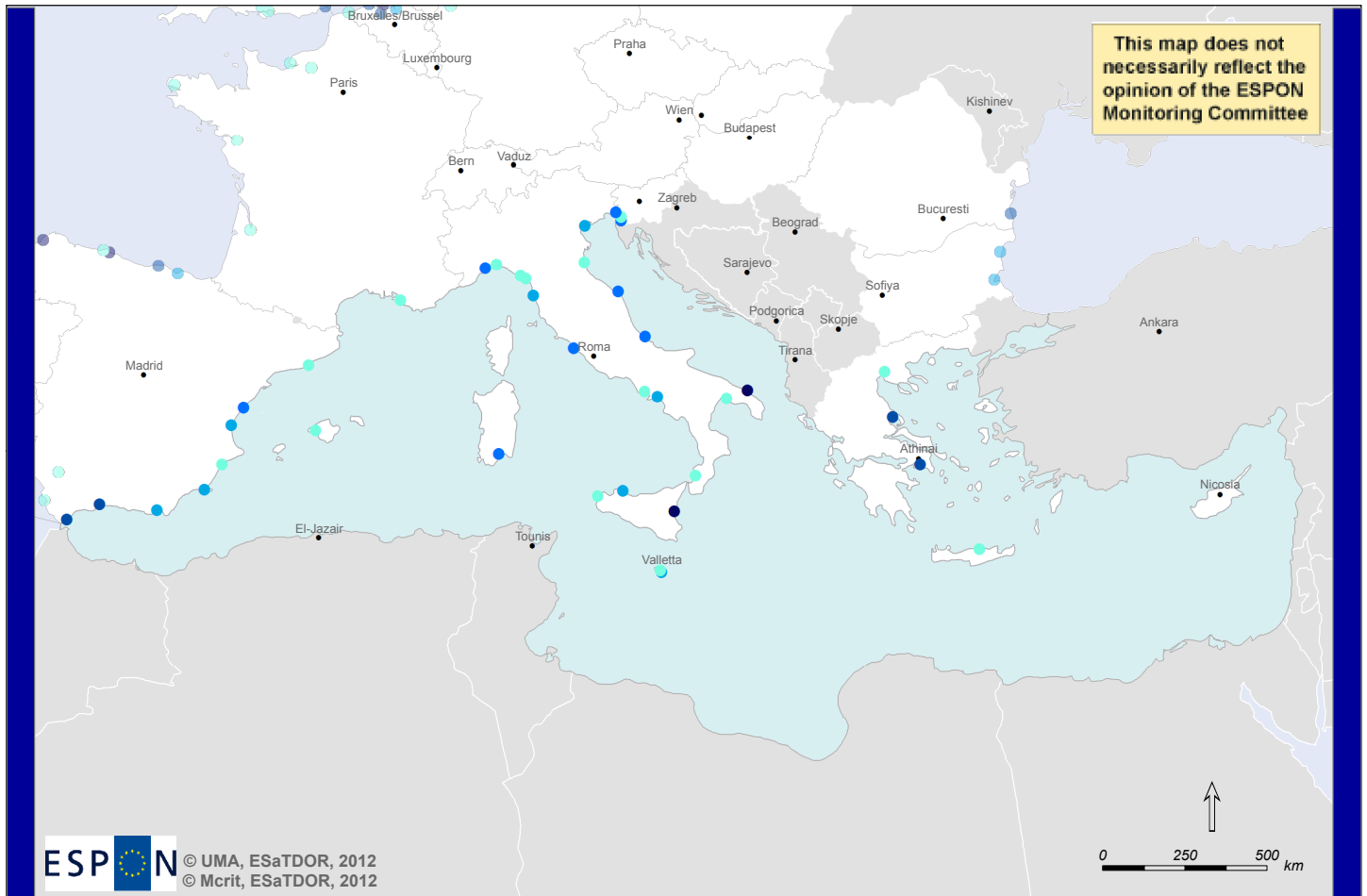
Thematic data: Containers handled in all ports by direction, EUROSTAT, 2008.  
\*Marsaxlokk data: Freeport Malta, 2008.  
Port locations: Eurostat - GISCO (European Commission), 2009.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Container shipping at ports by direction, 2008.



**Map M14b.** Container shipping at Mediterranean Sea ports (Million TEUs) by inward/outward direction, 2008.

# Container Shipping Trends



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Thematic data: Containers handled in all ports by direction, EUROSTAT, 2008.  
\*Marsaxlokk data: Freeport Malta, 2008.  
Port locations: Eurostat - GISCO (European Commission), 2009.  
Land boundaries: © EuroGeographics Association and ESRI, Regional level: NUTS0.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Container shipping at ports. Average annual traffic increase 2004 - 2008 (%).

- 0% - 10%
- 10% - 20%
- 20% - 30%
- 30% - 50%
- > 50%

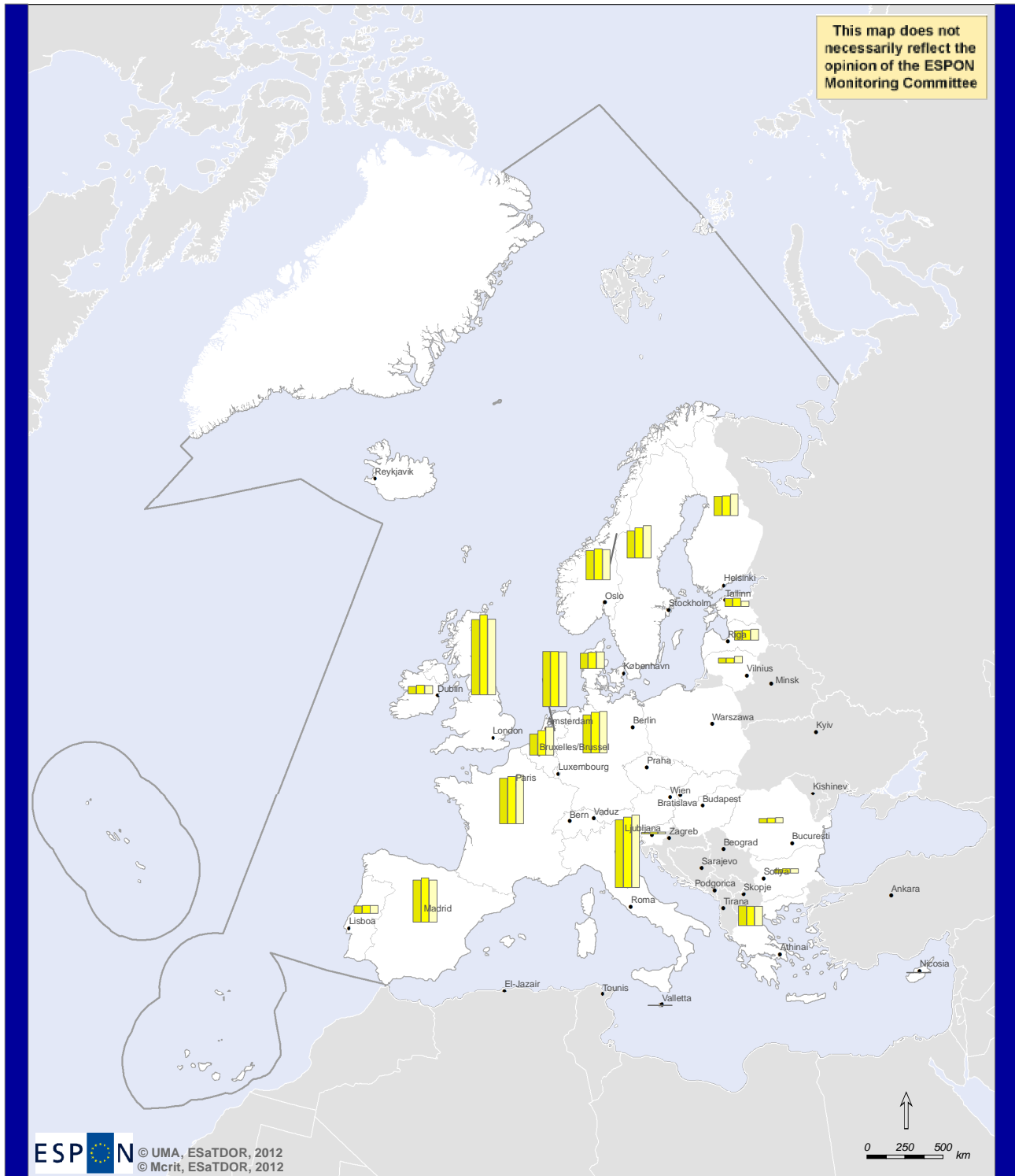
**Map M14c.** Average annual traffic increase in container shipping (% of containers handled) at Mediterranean Sea ports, 2004-2008.

Today, 40% of intra-European freight is carried by short sea shipping. Shortsea shipping plays a vital role in the international movement of goods and passengers within the Mediterranean, a role that is increasingly recognized and understood by the European Union. The Mediterranean Sea has one of the largest shares of short sea shipping shipments (Map M15 shows trends in short sea shipping from 2004-08, the Mediterranean share in 2006 was 560 million tonnes in 2006 and increased to 570 million tonnes in 2010). In the Mediterranean, two submarkets can be identified. The Western area involving the Italian west coast and the strait of Gibraltar characterized by major developments since the 1990's and the Eastern area including all the ports and sea areas between Israel and the east coast of Italy along with Malta. The Western submarket consists of large hubs (such as Algeciras, Gioia Tauro, Taranto, Cagliari) as well as small ports while the Eastern is characterised by equal sized and dynamic ports with few exceptions (Piraeus port). Malta is situated in the middle of the previous categories. More specifically, it is considered that short sea shipping is important between Spain and Italy, in the Adriatic and Ionic seas, as well as between the northern Mediterranean rim and the Maghreb while, according to literature, the major short sea shipping ports on the Mediterranean Sea are Barcelona, Marseille, Valencia, Izmir, Piraeus, Algeciras, Genoa, Marsaxlokk, Tunis and La Spezia.

According to Eurostat, short sea shipping is the only transport mode that has managed to follow the successful course of road transport during the recent years. More specifically, for the decade 1995-2005, road transport use has increased with a rate of about 50%, while short sea shipping has followed closely with 40%. In terms of internal and external trade, short sea shipping has a share of 42% of the total freight tonne-kilometres (for the year 2005) in the internal trade and a high percentage of 69% in the external trade.

Maps M16a and M16b show ferry traffic in the Mediterranean, with a dense network of ferry routes around the coasts of Italy, the Balkan states, Greek Islands and connecting the Balearics with mainland Spain. Between 2004 and 2008 there is a very mixed pattern of changes in passenger activity, with all the states of the northern Mediterranean experiencing increases and decreases in passenger numbers at different ports. However, the largest decreases in passenger numbers were experienced at Barcelona, Marseille and Soudas (Crete).

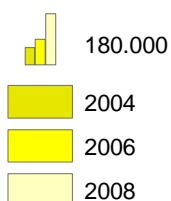
# Short Sea Shipping Trends



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Thematic data: Short Sea Shipping at country level by direction, EUROSTAT, 2004 - 2006 - 2008.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

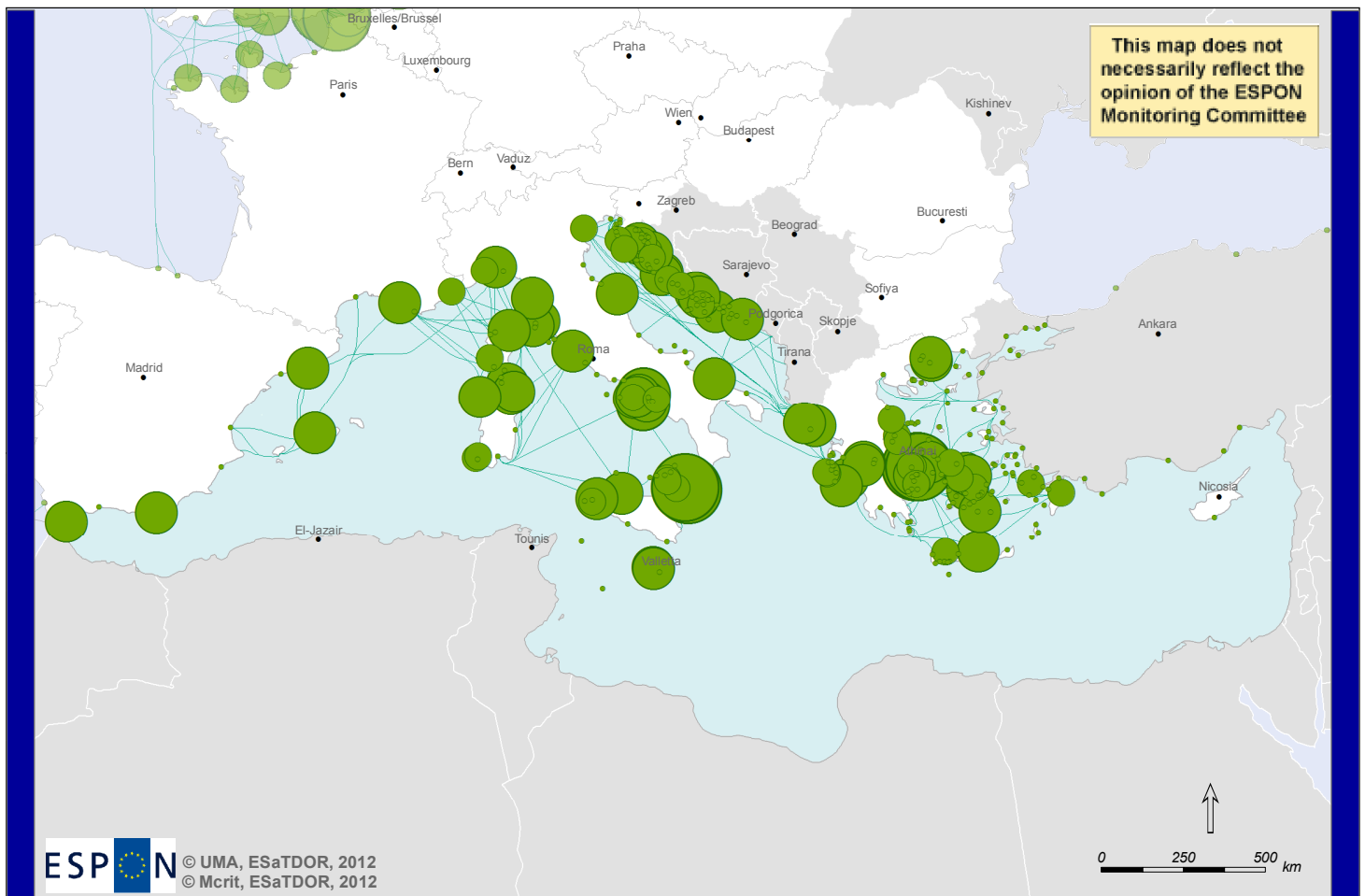
## Short Sea Shipping at NUTS0 level time series, 2004 - 2008 (1000T).



**Map M15.** Growth of Short Sea Shipping in Europe (thousands of tonnes), 2004-2008.



# Ferry Passengers, 2008




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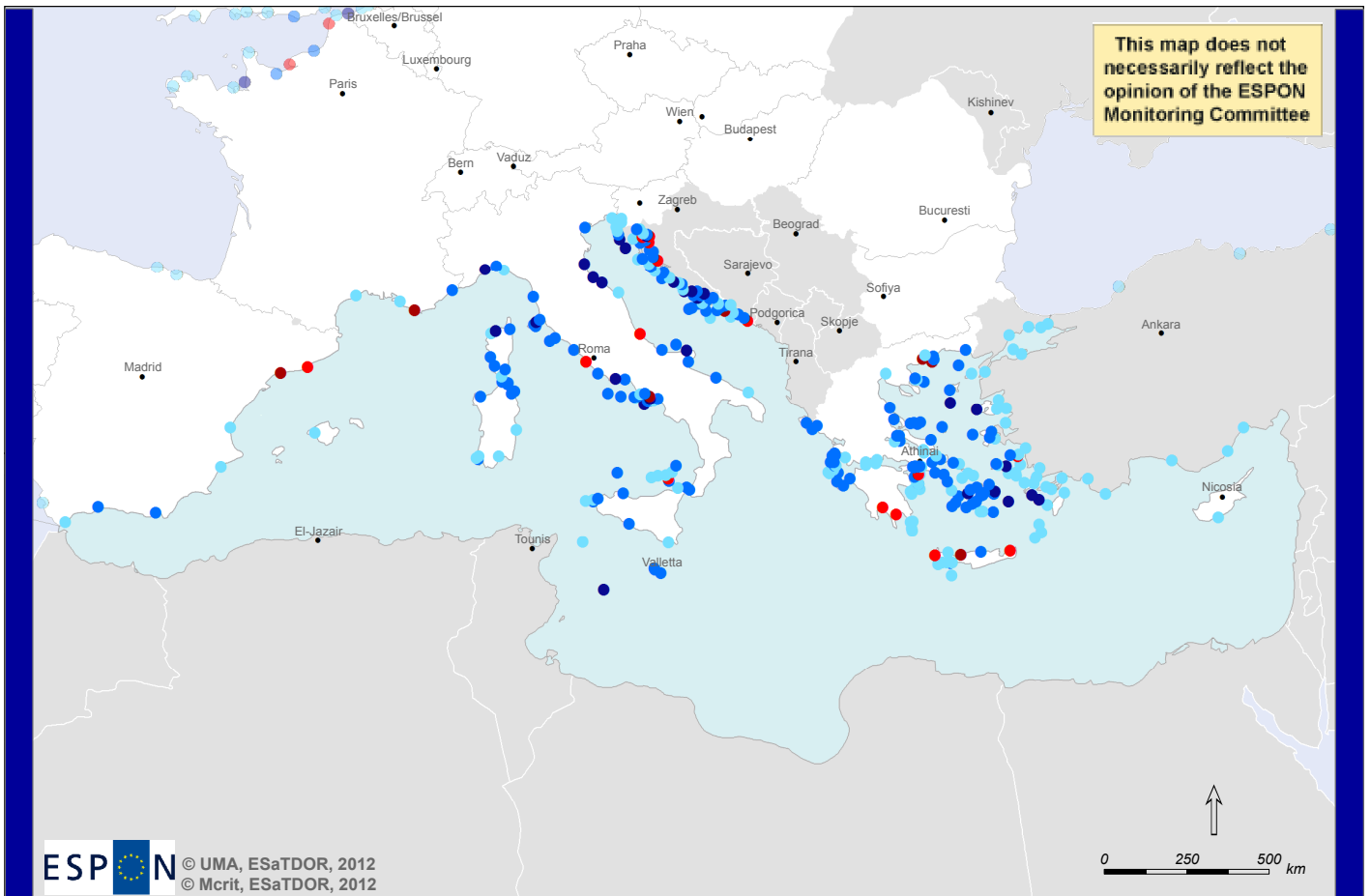
Thematic data: Passengers maritime transport by direction and type of traffic, EUROSTAT, 2008.  
 Ferry routes: TRANS-TOOLS (European Commission), 2005.  
 Port locations: Eurostat - GISCO (European Commission), 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Ferry passengers at ports, 2008 (Mpx).



**Map M16a.** Ferry passengers (millions) at Mediterranean Sea ports, 2008

# Ferry Passenger Trends




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Thematic data: Passengers maritime transport by direction and type of traffic, EUROSTAT, 2004 - 2008.  
 Port locations: Eurostat - GISCO (European Commission), 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Ferry passengers at ports. Average annual traffic increase of ferry passengers 2004 - 2008 (%).

- > -35%
- -35% to -15%
- -15% to 0%
- 0% to 15%
- > 15%

**Map M16b.** Average annual increase in ferry passengers at Mediterranean Sea ports, 2004-2008.

According to the European Cruise Council (ECC), the European cruise industry continues to increase its share of the global cruise market with 25.2 million passengers visiting a European port in 2010; 5.2 million passengers joined their cruise in Europe in the same year with the industry generating €35.2 billion of goods and services and providing almost 300,000 jobs. In 2010 there were 198 cruise ships operating in Europe ranging in size from 3,600 passengers to less than 100.

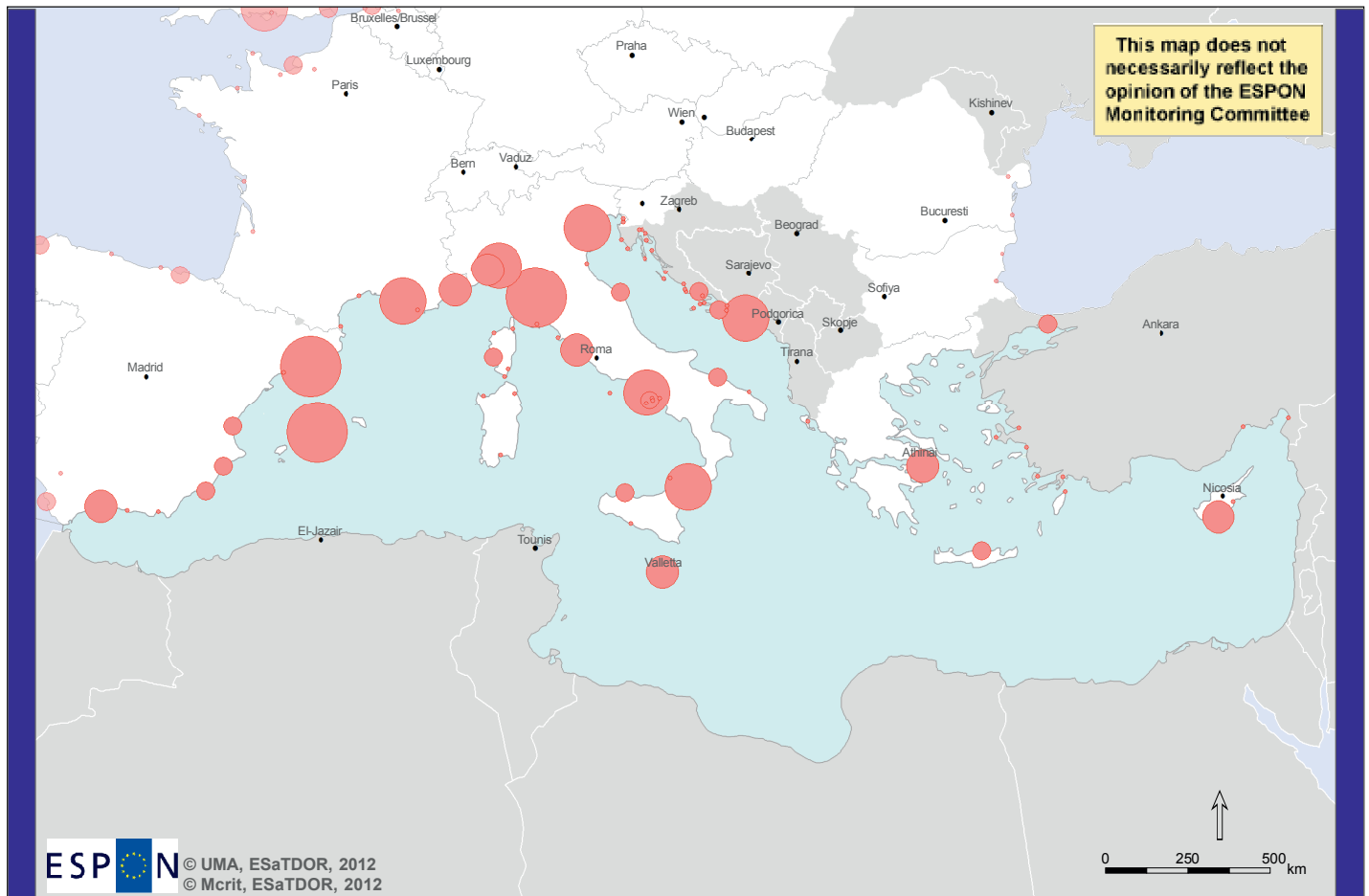
The Port of Barcelona is the largest cruise port in the Mediterranean, with around 2.3 million passengers per year, followed by Civitavecchia (Italy), Palma de Mallorca (1.5 million passengers, Spain) and Venice. Map M17a shows the distribution of cruise ports (and activity) in the Mediterranean for 2008. Map M17b indicates which cruise ports have the greatest share of “turnaround” activity (that is, passengers embarking or disembarking a cruise) such as Venice, Civitavecchia, Naples, Barcelona, and Palma de Mallorca, and those ports which are more popular for excursions only, such as Dubrovnik (Croatia), Valletta (Malta), Marseille (France) and Limassol (Cyprus).

Map M17c shows trends in cruise passenger numbers from 2005 to 2008, with a variable picture for Mediterranean Sea ports. Whilst some ports, most notably in Italy, experienced passenger number increases in excess of 20%, there were also significant decreases in passengers, particularly from ports in Turkey and Croatia.

In 2009, cruise passengers accounted for approximately 3.0 % of passenger traffic in Europe's Mediterranean ports but their relative significance varied considerably, accounting for all passenger traffic in Cyprus and 13.0 % in Slovenia, but only 1.0 % in Greece and 0.4 % in Malta. However, in terms of volume, the breakdown of these passengers is different: in 2009, 60.0 % of cruise passengers departed or arrived in Italy, 27.0 % in Spain and 8.0 % in Greek ports. The main ports of departure and destination for cruises in the Mediterranean are: Barcelona (ES), Napoli (IT) and Genova (IT).

From 2008 to 2009, the number of cruise passengers in EU ports in the Mediterranean increased dramatically by 56.0 %, mainly due to the increase of cruise passengers in Italy (+150.0 %) and in French Mediterranean ports (+15.0 %). Nevertheless this trend is not consistent: the number of cruise passengers fell by 35.0 % in Cyprus and by 7.0 % in Greece.

# Cruise Shipping, 2008



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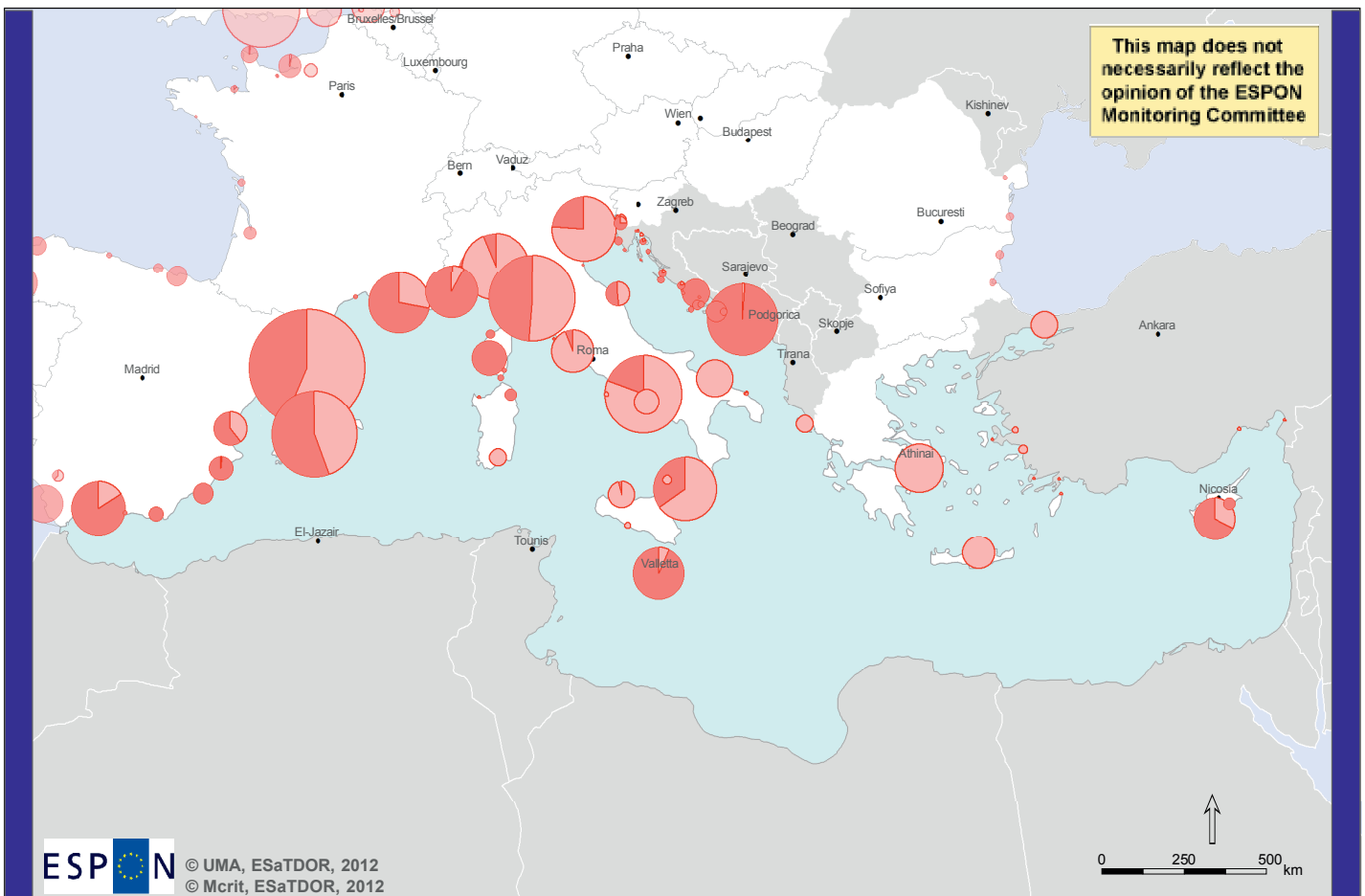
Thematic data: Passengers maritime transport by direction and type of traffic, EUROSTAT, 2008.  
Port locations: Eurostat - GISCO (European Commission), 2009.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Cruise activity at ports, 2008. (Thousand passengers). All ports.



**Map M17a.** Cruise activity (thousands of passengers) at Mediterranean Sea ports, 2008.



# Cruise Shipping by Passenger Type, 2008




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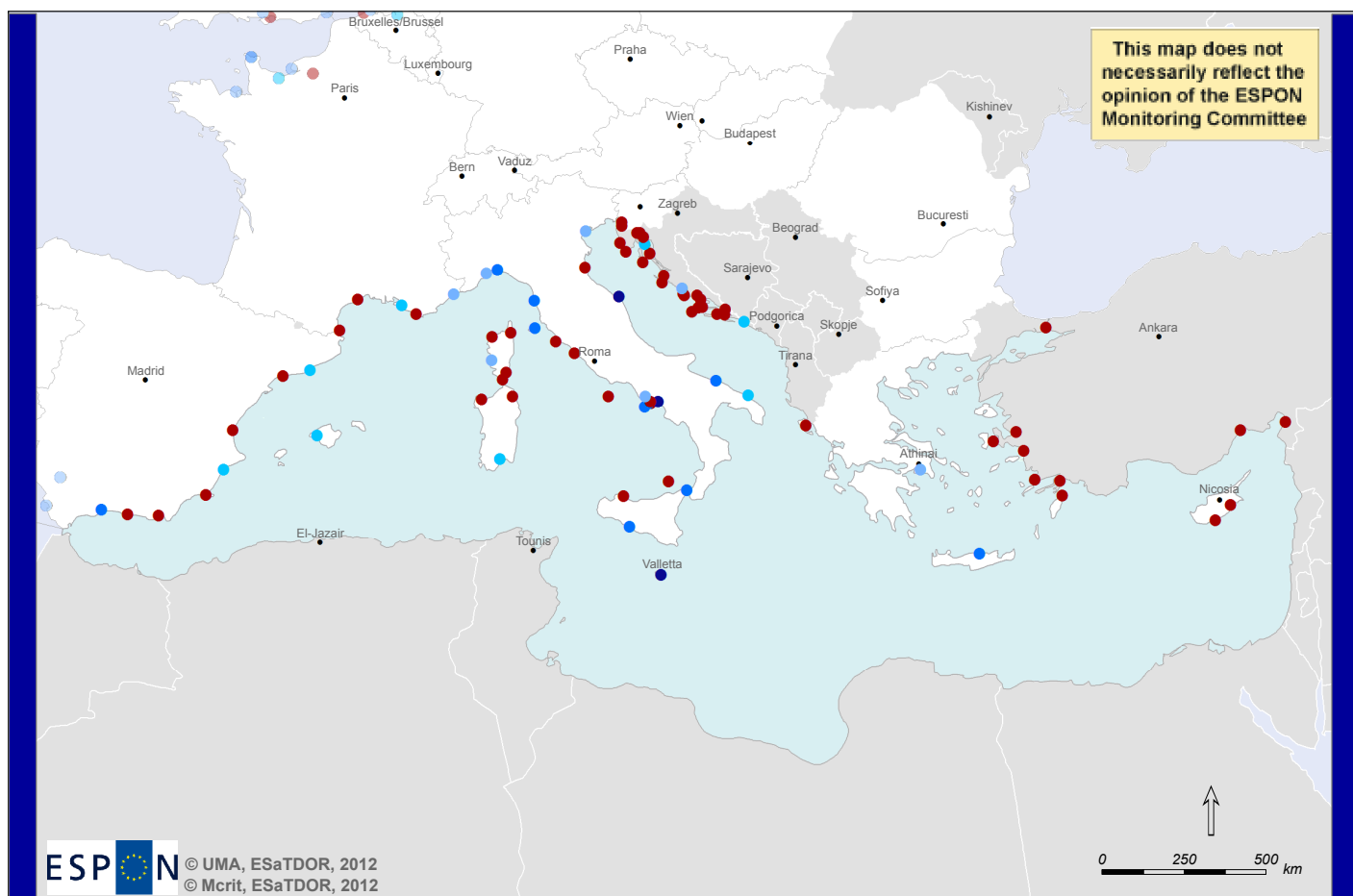
Thematic data: Passengers maritime transport by direction and type of traffic, EUROSTAT, 2008.  
 Port locations: Eurostat - GISCO (European Commission), 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTSO.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Cruise activity at ports by passenger type, 2008.

-  Starting or ending a cruise
-  On excursion

**Map M17b.** Cruise shipping activity by passenger type (thousands of passengers) at Mediterranean ports, 2008.

# Cruise Passenger Trends




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Thematic data: Passengers maritime transport by direction and type of traffic, EUROSTAT, 2004 - 2008.  
 Port locations: Eurostat - GISCO (European Commission), 2009.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Average annual passenger increase of cruise passengers, 2005 - 2008 (%).

- < 0%
- 0% - 10%
- 10% - 20%
- 20% - 30%
- > 30%

**Map M17c.** Average annual increase in cruise passengers at Mediterranean Sea ports, 2004-2008.

## Energy and Undersea Infrastructure

The Mediterranean region accounted for 8% of world energy consumption in 2007. Per capita, consumption is 13% higher than the world average. Total energy demand is marked by the growth of demand in electricity, at a much faster pace than GDP. In the northern countries, final demand per sector shows that transport has recorded the strongest rise in consumption in the last 30 years. In the south, consumption has increased in all sectors, and is highest in the industrial and residential sectors. Electricity consumption has grown strongly between 1971 and 2007, with a four-fold increase. In terms of consumption per capita, the ratio between North and South has declined from 8 in 1971 to 3.6 in 2007.

The structure of energy demand has also changed radically over the last three decades. The Mediterranean has become a more balanced consumption, where transportation and residential sectors have seen their shares grow. The region emitted nearly 8% of global CO<sub>2</sub> emissions in 2006. The Northern Mediterranean Countries (NMCs) account for 2/3 of emissions, but growth of CO<sub>2</sub> emissions in the Southern and Eastern Mediterranean Countries (SEMCs) is two times faster than the global rate. The Mediterranean energy mix emits more CO<sub>2</sub> than the European mix. Fossil fuels account for 80% of supply. Renewable energy (solar, wind, hydro, biomass) represents only 6.7% of regional energy balance. Energy dependence reached 35% in 2007.

The energy resources of the Mediterranean are essentially composed of oil and gas (5% of the world's reserves, concentrated in the South). In 2006, fossil energy (gas, oil, coal) accounted for 80% of the energy supply in all Mediterranean countries, and up to 94% in SEMCs (75% in NMCs). Over the past three decades, the share of natural gas and of nuclear energy (from 1 to 3%) has grown steadily, while the share of oil has dropped to 43% from 68% in 1971. Despite the considerable potential in renewable energy and the spectacular growth in wind-produced electricity, reaching 21 GW in 2007 compared to 3 GW in 2000, these forms of energy still only represent 6% of the regional energy balance.

Hydrocarbons are exported from four Mediterranean countries (Algeria, Libya, Egypt and Syria) accounting for 22% of oil and 35% of gas imports throughout the Basin in 2005. All other countries in the region are net energy importers.

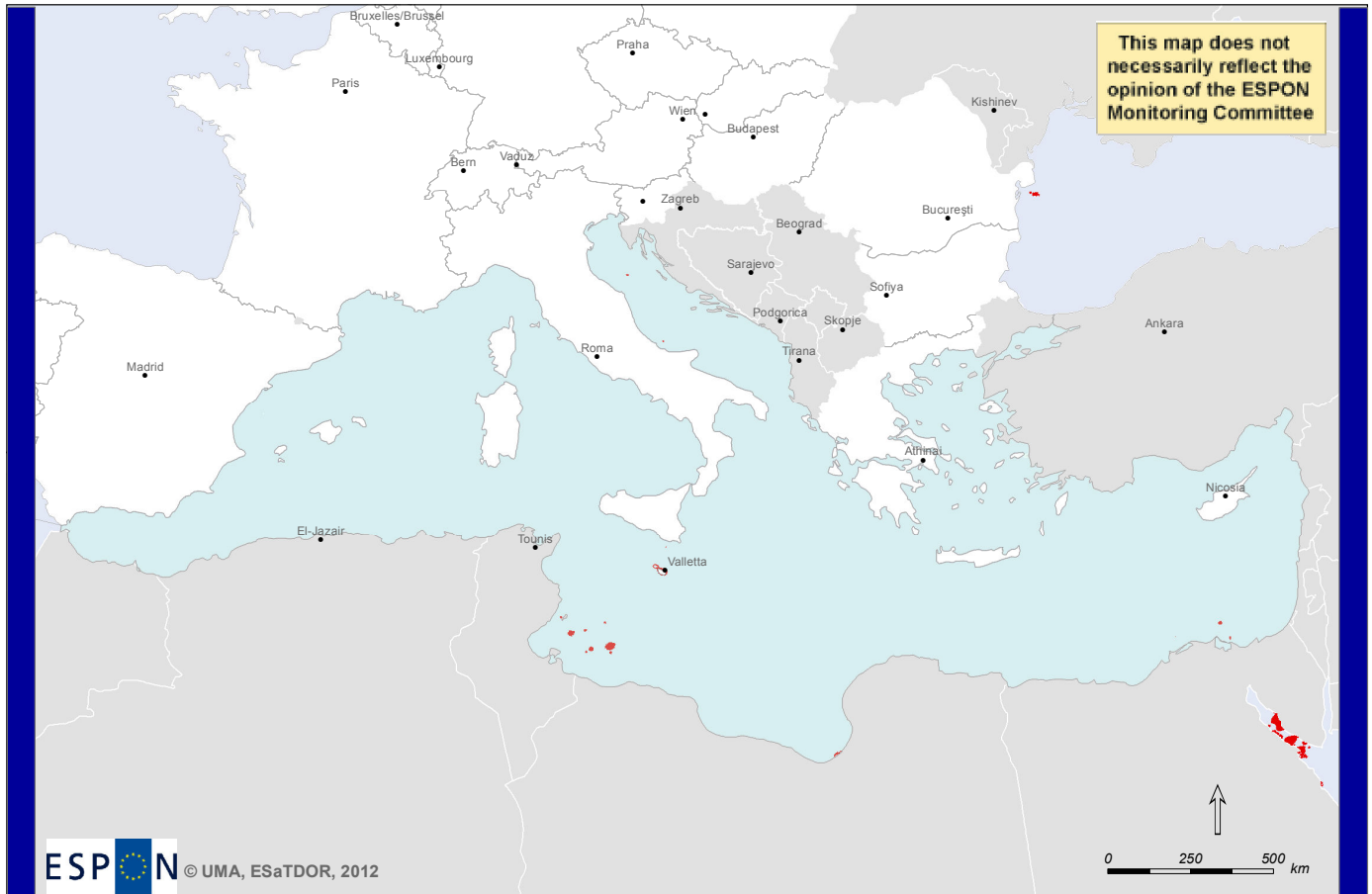
The Mediterranean region contains major centres of oil and gas production, though these are mostly land-based in North African countries; there are offshore fields, though these are relatively small, especially the few that are in the waters of EU countries. The Mediterranean Sea is more important as a zone of transit for oil and gas, with major, mostly gas, pipelines connecting North African supply to European demand; new pipelines are also under construction or being planned, with the aim of increasing and diversifying gas supply to Europe.

Offshore oil and gas reserves are located along the Adriatic coast of Italy and in the Greek Aegean, but the most important areas are offshore of Tunisia and Libya. Map M18a shows the location of oil and gas platforms in the Mediterranean, and the distribution of oil and gas related employment is shown in Map M18b. Exploration is taking place off the coasts of Israel, Turkey and Morocco. Oil refineries are distributed all around the Mediterranean Basin, but with most operating in northern countries. There are more than 40 refineries with a combined capacity (in 2000) of around 458 million tonnes per annum.

Up to now no offshore wind plants are operating in Mediterranean waters even though projects have been authorized for Spanish and Italian coasts, where in the Brindisi deep waters a tension leg

floating platform with an 80 kW wind turbine was tested in 2008 as a prototype for a 90 MW offshore wind farm.


## Location of Oil and Gas Rigs




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*Thematic data: National Center for Ecological Analysis and Synthesis based on data from NOAA's National Geophysical Data Center, 2008; HELCOM and LOTOS Petrobaltic S.A., 2011.*  
*Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.*  
*Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.*

### Oil and gas rigs

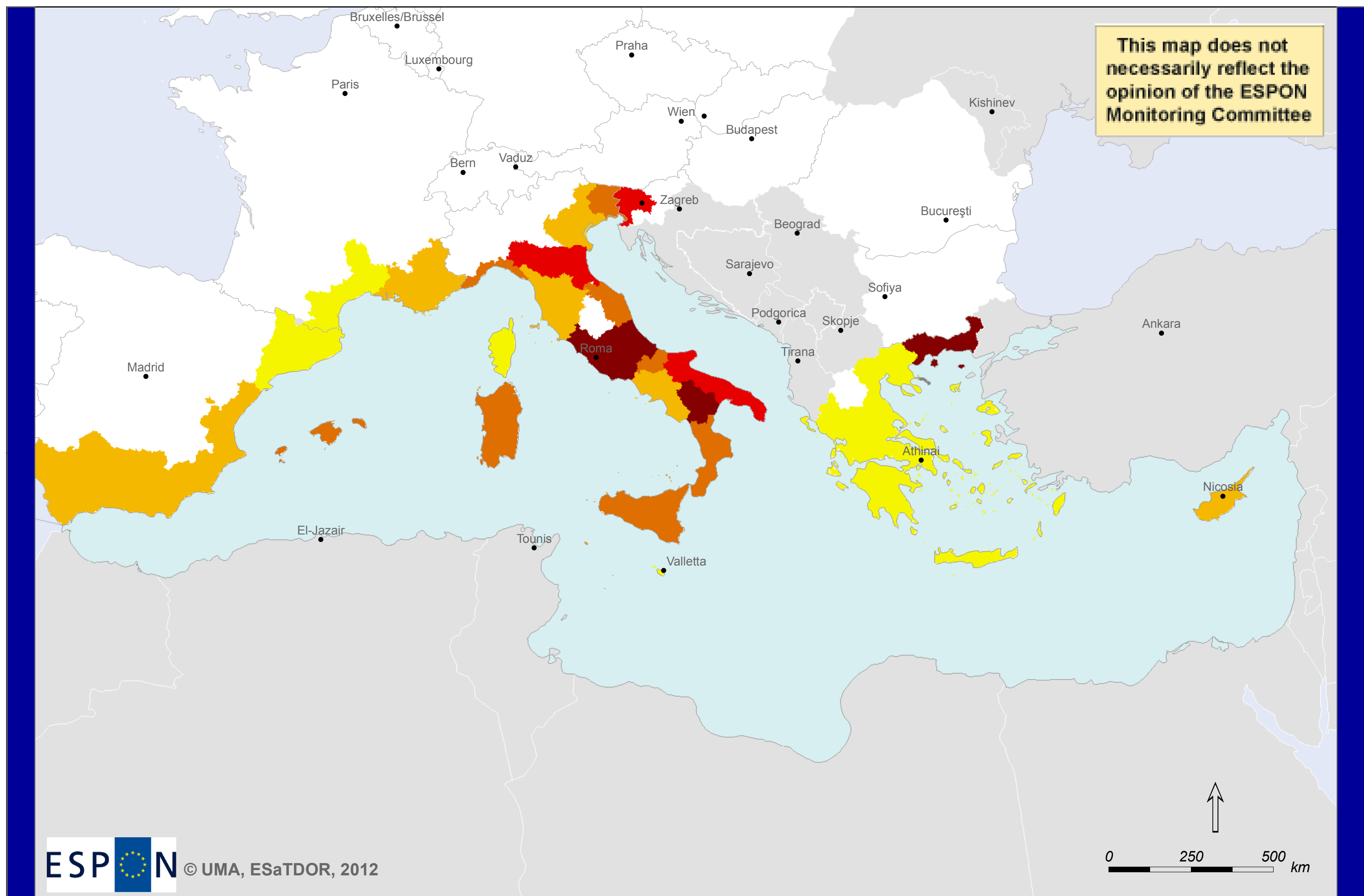
 Oil and gas rigs

This map is produced using data on the location of stable lights at night (the Stable Lights of the World dataset) of a NOAA program with ephemeral sources of lights (e.g. fires, mobile structures) removed. Data represents presence/absence of light in a resolution of 30 arc-second for 2003. This has been integrated into a 10x10km grid based on the presence or absence of light in every cell, which does not mean that the whole cell is occupied by oil or gas rigs.

**Map M18a. Location of oil and gas rigs in the Mediterranean Sea**



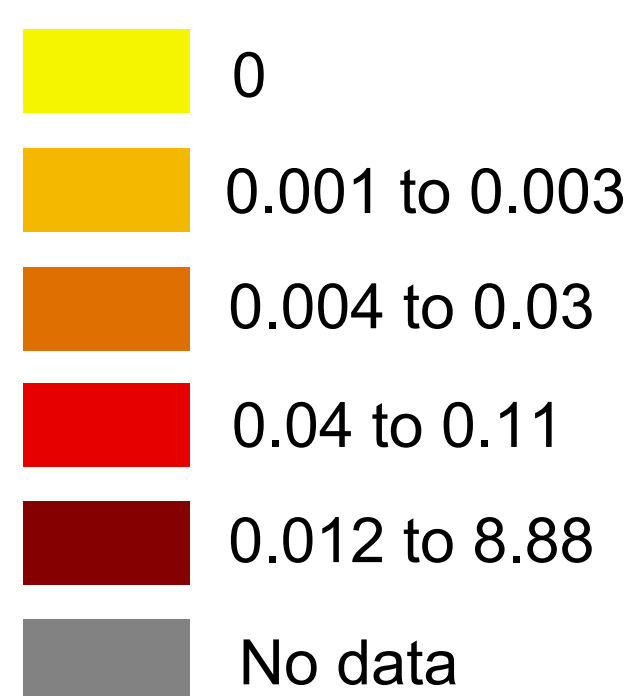
# Employment in the Oil and Gas Sector, 2009



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Thematic data: Economic Use, European Cluster Observatory, 2011.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

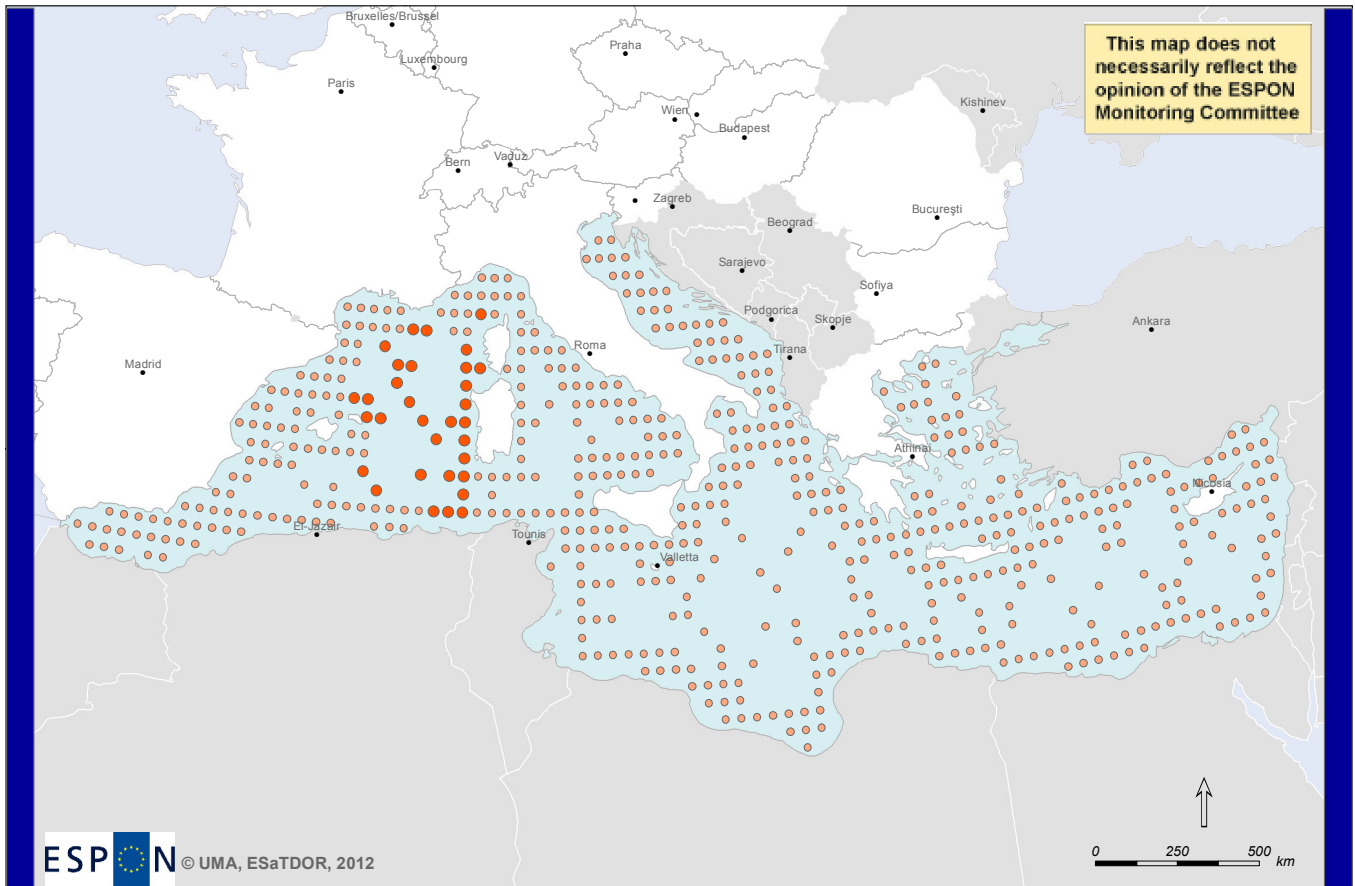
## Employment in Oil and Gas 2009 (percentage of total employment)



**Map M18b.** Employment in the oil and gas sector, 2009 (as a percentage of total employment). Mediterranean Sea.

There is relatively little marine renewable energy activity in the Mediterranean, partly due to relatively poor resources, given the enclosed nature of the sea (hence limited wave size, tides and currents) and generally low wind speeds. However, there are some areas with good wave power potential in the western Mediterranean (see Map M19), and there have been proposals to exploit currents in the Strait of Gibraltar. But the scope for development of energy resources in the Mediterranean is generally limited to coastal waters due to the lack of agreed Exclusive Economic Zones.

# Wave Power Potential




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Thematic data: Fugro OCEANOR, Worldwaves, 2008.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

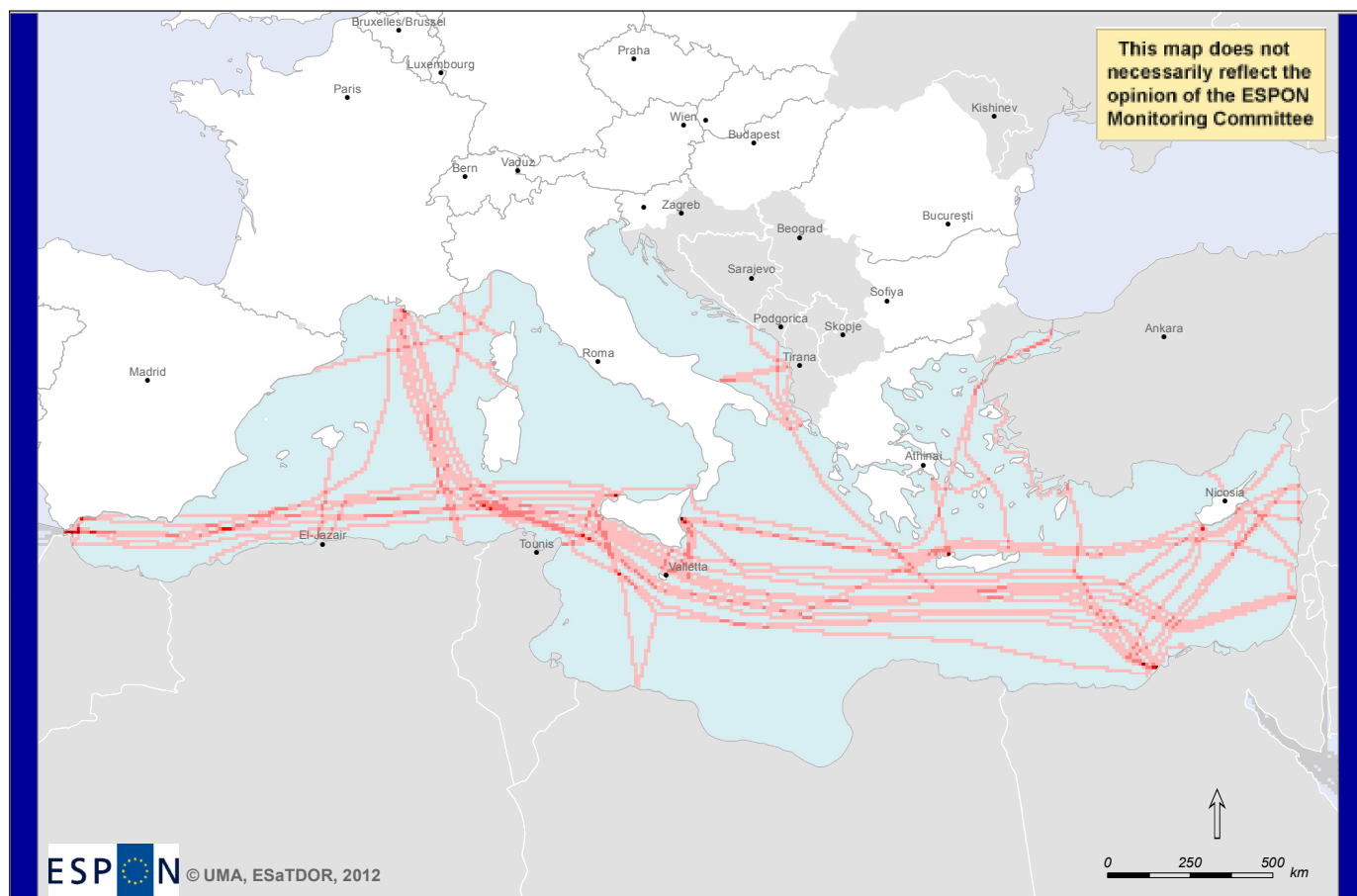
## Wave power potential (KW/m)

- 0.5 to 11.0
- 11.1 to 24.3
- 24.4 to 39.0
- 39.1 to 55.9
- 56.0 to 81.6

**Map M19.** Wave power potential in the Mediterranean Sea

There are also important international telecommunications cables running through the Mediterranean. Maps M20a and M20b show that these mainly run in an east-west direction, although there are also some significant north-south connections, notably between France and north Africa and lines linking Turkey with east-west cables.

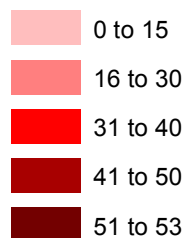
## Undersea Cables (Length)




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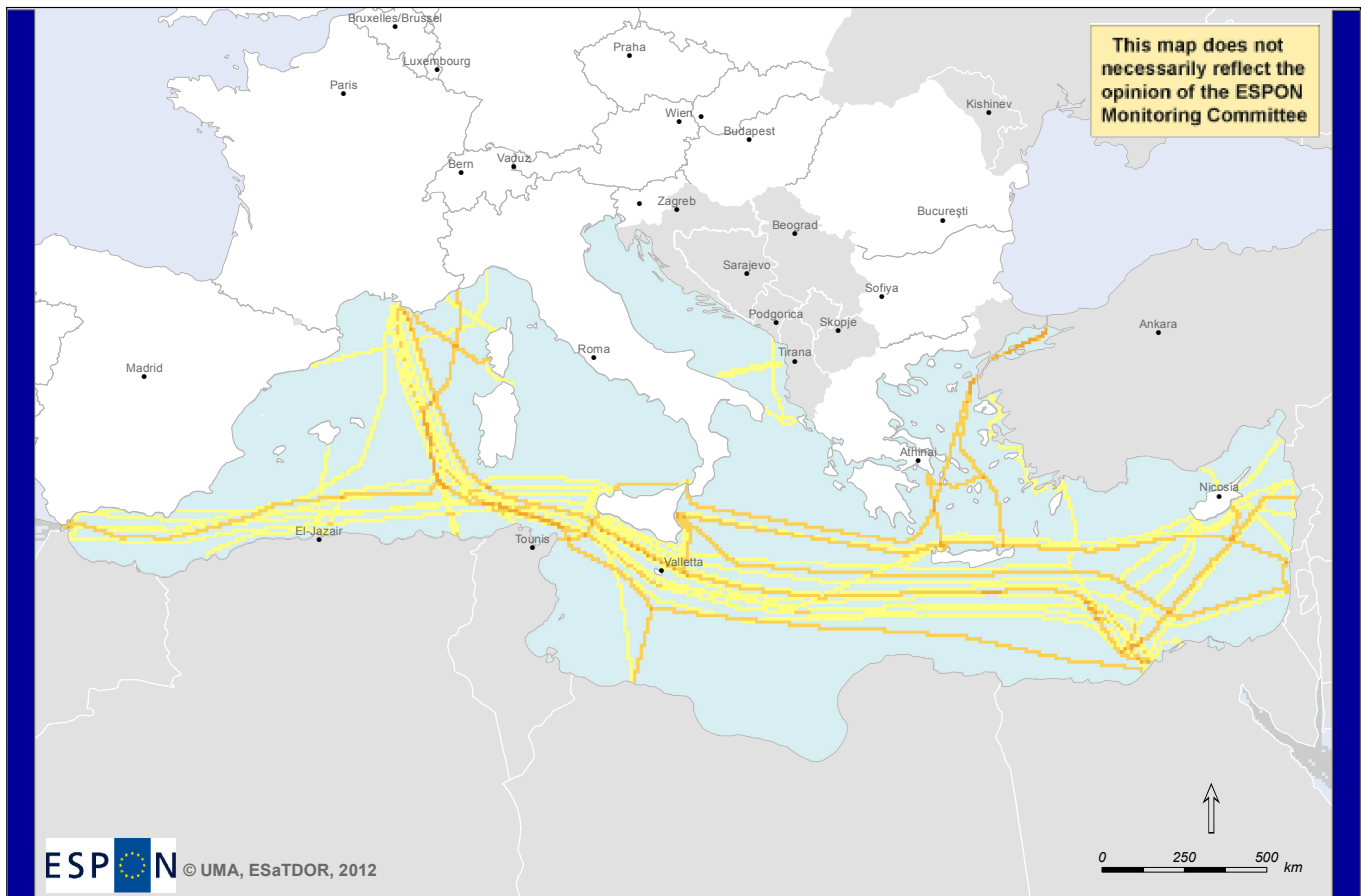
Thematic data: Greg Mahlknecht, [www.cablemap.info](http://www.cablemap.info), updated 22-02-12  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

### Cable length (Kilometers per 10km grid square)



**Map M20a.** Undersea telecommunications length (per 10 km grid square), Mediterranean Sea

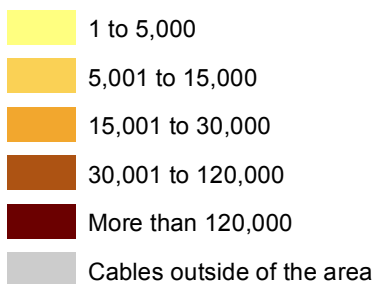
# Undersea Cables (Capacity)




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Thematic data: Greg Mahlknecht, [www.cablemap.info](http://www.cablemap.info), updated 22-02-12  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTSO.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Cable capacity (Gigabytes/s per 10km grid square)



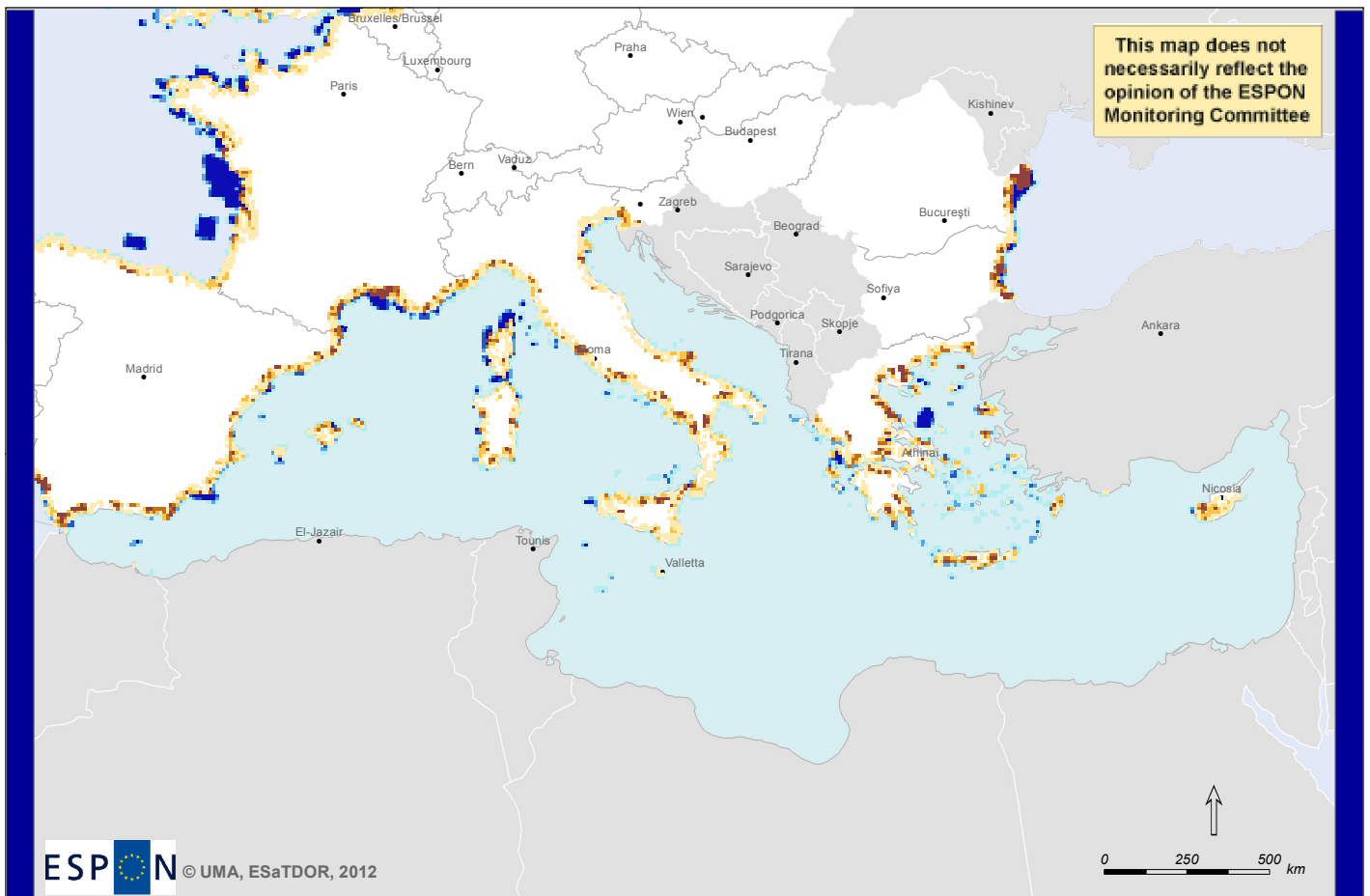
**Map M20b.** Undersea cable capacity (Gb/s per 10km grid square), Mediterranean Sea.

## Environment

The Mediterranean, a biodiversity hot-spot, is home to 78% of known marine species, while only representing 0.8% of the planet's ocean surface. Diversity is essentially concentrated in the West of the basin and in shallow depths (between 0 and 50m deep). 19 % of known Mediterranean species are threatened both locally and worldwide. For surface coastal ecosystems, the most serious threat is posed by the construction of facilities and artificial surfaces, leading to the loss of ecosystems with a high level of biodiversity (coastal ponds and lagoons, Posidonia beds and surface bio-concretions) and coastal erosion. 63 % of the fish and 60% of the mammals listed in the Protocol concerning Specially Protected Areas and Biological Diversity (SPA), adopted in 1995 by the Contracting Parties to the Barcelona Convention, have endangered status, from increasing pressures (construction/disappearance of such ecosystems as lagoons, grassbeds), coastal erosion, over-exploited marine resources and expansion of invasive species. There are today 800 Specially Protected Areas covering 144 000 km<sup>2</sup>, almost 2/3 of which are marine areas.

These SPAs are very unequally distributed between the western and eastern basins of the Mediterranean, (82% and 18% of SPAs respectively), but also between the European (712 SPAs) and non-European states (131 SPAs). This marked difference is partly due to the fact that the European states have designated sites of community importance within the framework of the implementation of the Habitats Directive (Directive 92/43/EEC) and the *Natura 2000* network, sites which Spain and France have included in their SPA lists. Moreover, with the exception of the Pelagos sanctuary for marine mammals set up in 1999 by France, Monaco and Italy, the SPAs basically cover wetlands and coastal habitats as well as shallow seawaters; only the Pelagos sanctuary includes, in its territory, waters outside the national jurisdiction of any of its three founding states. Map M21 shows the distribution of *Natura 2000* sites in the Mediterranean, both marine and on land. The greatest concentrations of marine *Natura 2000* sites can be seen along the northern coast and to the north east of Corsica (part of the Pelagos reserve), adjacent to the Mar Menor lagoon in the Murcia region of Spain, the Camargue Natural Park area in the south of France and around the national Marine Park of Alonissos, in the Aegean.

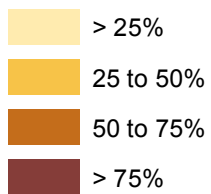
# Protected Areas



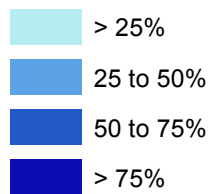

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Thematic data: Natura 2000 Network, European Commission - European Environment Agency, 2010.  
 CAFF Arctic Protected Areas, CAFF and PAME Arctic Council, 2011.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Percentage of grid size (Land)



## Percentage of grid size (Sea)

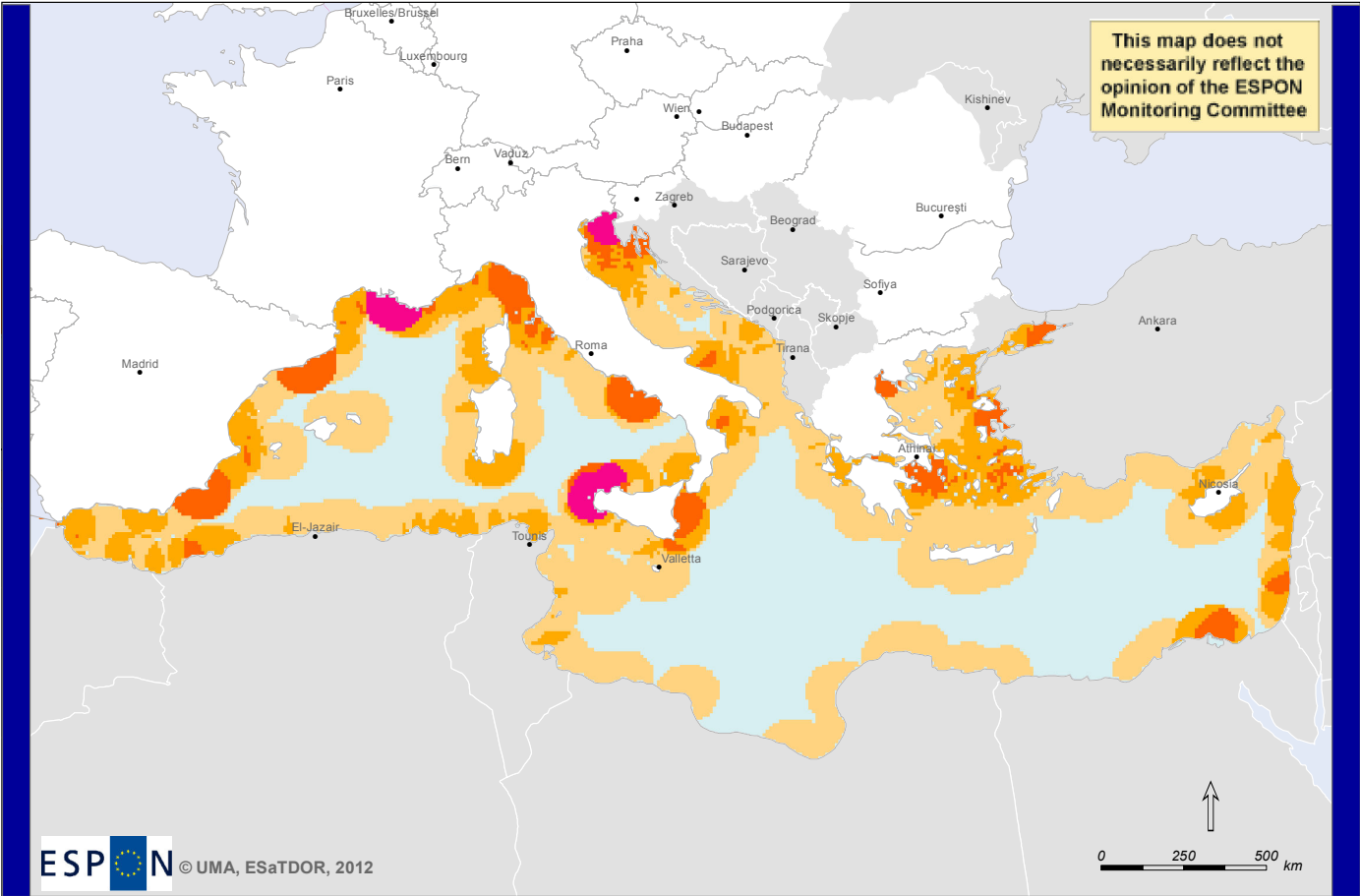


**Map M21.** Protected areas (Natura 2000 and CAFF sites), percentage designated per 10km grid square. Mediterranean Sea.

The role of hydro-climatic variations in regulating the abundance of fish stocks is now a known fact. Thus, the structure and dynamics of fish stocks on the Mediterranean continental shelf are likely to react both to the effects of human activity (fishing) and to climate change (warming, sea level rise, decreased rainwater run-off, etc.), with consequences for the fisheries which subsist on them. The dominant or most observable impacts of these releases on the marine environment concern: eutrophication and the formation of Harmful Algal Blooms' (HAB), as well as the number of intoxication incidents from the consumption of toxic sea food; or the decrease in fish stocks and biodiversity.

A classification according to the means of introduction shows that the majority of alien species in the Mediterranean entered through the Suez Canal (47%), followed by vessels (28%) and aquaculture (10%). The majority of aliens in the Eastern Mediterranean entered through the Suez Canal, whereas Aquaculture and shipping are powerful means of introduction in the North-Western Mediterranean and in the Adriatic Sea as can be seen in Map M22 where there are high incidences of invasive species around the ports of Valencia, Barcelona, Marseille and Venice, Trieste and Trapani. The increase in vessel-transported aliens may be attributed to the increase in shipping volume throughout the region, due to the development of the Middle Eastern oil fields and later, the ascendance of the South-East Asian economies. Similarly, the increase in intentional and unintentional commercial introductions (primarily mariculture, but also ornamental, bait and edible species) follows the rise of shellfish production.

# Invasive Species




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Thematic data: Invasive Species, National Center for Ecological Analysis and Synthesis, 2008  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Total number of invasive species per grid (October 2004 - October 2005)



**Map M22.** Incidence of invasive species (per 10km grid square), Mediterranean Sea.



The northern Mediterranean countries, due to the intensive industrial activity, are affected by the presence of substances, such as total dissolved solids, ions (such as sodium, calcium, magnesium, bore), organic compounds (such as phenols, pesticides, chlorinated hydrocarbons) and metals (cadmium, zinc, nickel, and mercury, etc). These substances are particularly worrying in view of their toxicity and their resistance to conventional wastewater treatment methods. Map M23 shows inputs of organic pollution (from pesticides) in the Mediterranean.

In past decades, concern about risks posed to public health as a result of human exposure to polluted seawater through bathing and other forms of marine recreation, has risen increasingly. In the Mediterranean, the rapid development of coastal tourism has resulted in deterioration of the bathing water quality. Such intensive increased municipal sewage discharges cause adjacent water bodies pollution.

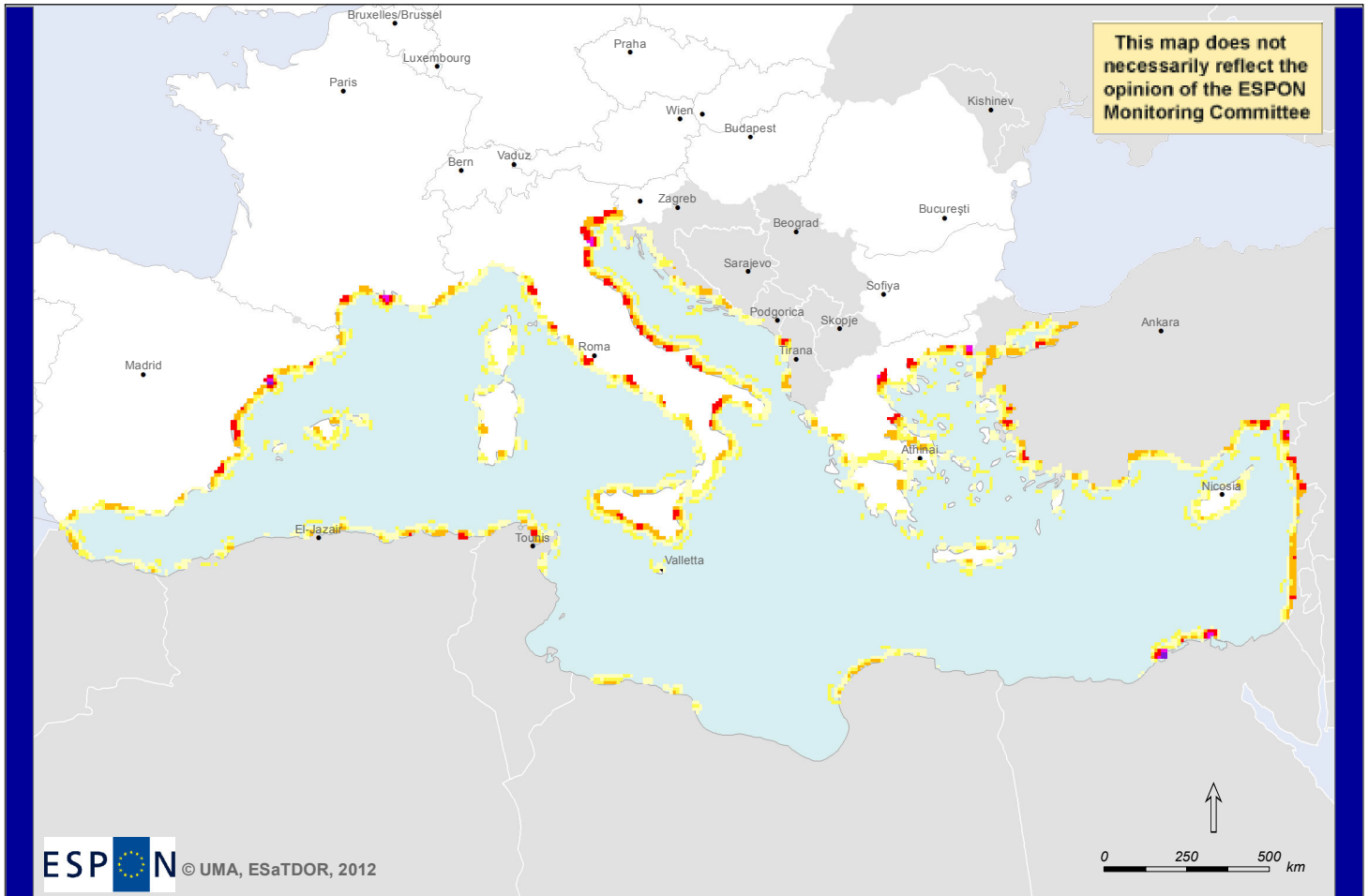
Since the 90s, Mediterranean countries have been monitoring the microbiological quality of coastal waters, increasing the global number of sampling points over the years. Between 1996 and 2005, the percentage of bathing waters in compliance with national norms has remained stable (from 92.3 % to 92.8 %). Nonetheless, despite clear improvement in the application of monitoring programs, further progress is required in the Eastern and Southern Mediterranean Basin countries.

Beach quality has a major impact on the value of the coastal zone to both residents and visitors. This can be seen in high property values, development, tourism, employment and tax revenues. The beach has a primary importance for the bulk of holiday tourists. Beaches bring in tourists, which equates to money.

Repeated surveys have shown that five factors are extremely important in determining safe and pleasant beach enjoyment. These are safety, water quality, facilities, scenery and litter. A new system for beach evaluation - BARE the Bathing Area Registration and Evaluation system - has been developed in 2001 and applied ever since mainly in the Mediterranean region. The system evaluates beaches, among others, based on its nature values, safety, water quality, facilities, scenery, litter and carrying capacity. The system also classifies beaches into five main categories, based on their accessibility and coastal scenery (remote, rural, village, urban and resort bathing areas).

General trends show that the bathing water is improving in number of Mediterranean countries (European in particular), mainly due to improved sewage treatment systems. However, big pollution hotspots still remain in areas with high eutrophic conditions. Map M24 shows the status of bathing waters classified according to the Bathing Water Directive (Directive 2006/7/EC) for 2008. Whilst this shows a majority of sites are compliant with the mandatory and guideline values of the Directive, there are some clusters of non-compliant sites in Andalucía, Provence, and the Campania region of Italy.

# Organic Pollution




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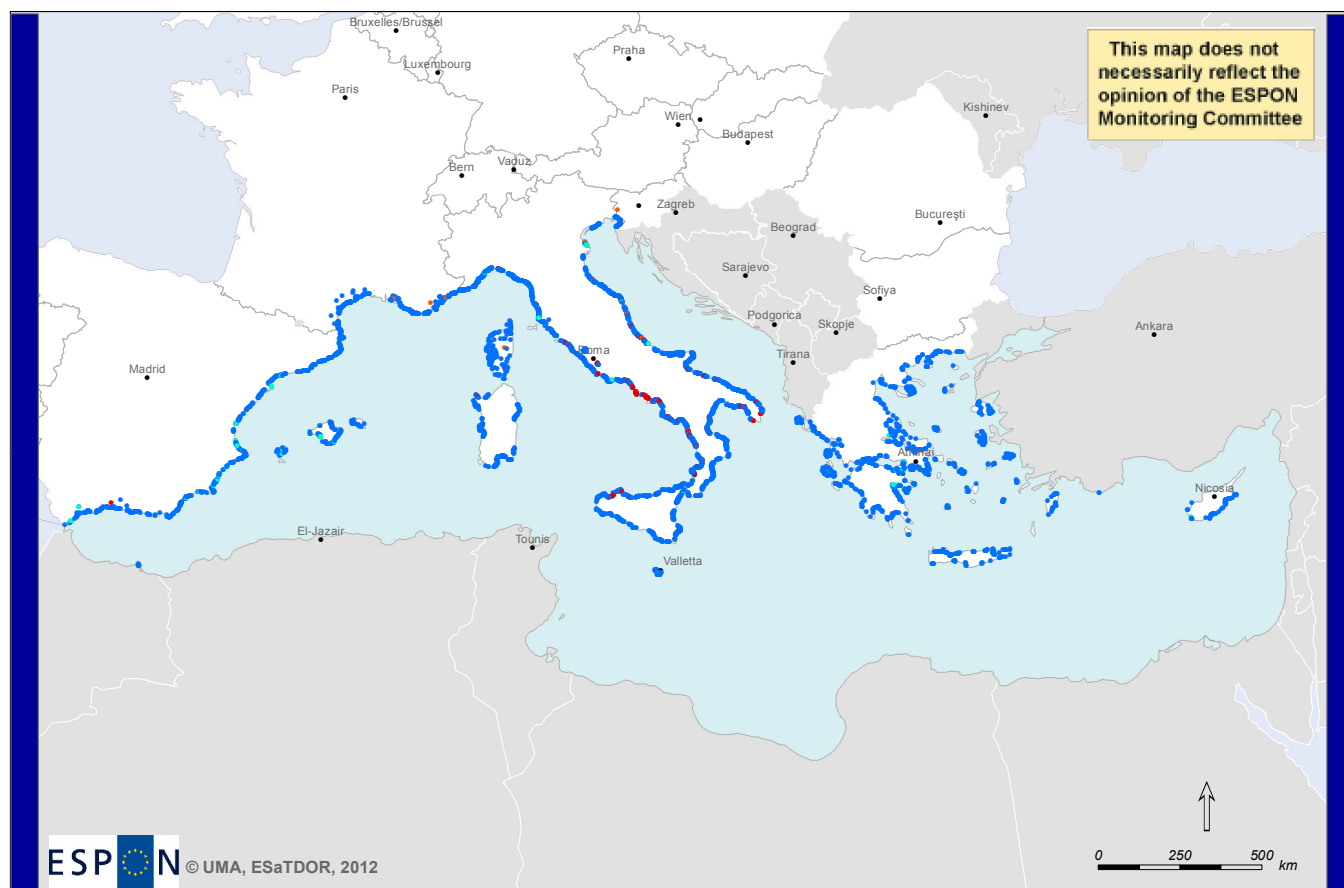
Thematic data: National Center for Ecological Analysis and Synthesis, Organic Pollution, 2008.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Organic pollution (total kg of pesticides per year)



**Map M23.** Organic pollution (total kg of pesticides per year), Mediterranean Sea.

# Bathing Water Quality




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Thematic data: European Commission, Bathing Water Directive 76/160/EEC Report, 2010  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Status of bathing water for year 2008

(Please note: symbols of upper categories are placed on top)

- Banned or closed (temporarily or throughout the season)
- Not compliant with the mandatory values of the Directive
- Compliant with the mandatory values of the Directive
- Compliant with the mandatory and the guide values of the Directive

**Map M24.** Bathing water quality in the Mediterranean Sea, 2008, relative to the Bathing Water Directive.

Climate change may have a wide range of negative consequences on the Mediterranean coastal area including sea level rise potentially leading to coastal erosion. Sea-level rise is likely to cause an inland migration of beaches and the loss of up to 20% of coastal wetlands. Coasts, deltas, estuaries, lagoons are vulnerable coastal systems that are affected by sea level rise. Moreover, these vulnerable coastal ecosystems can be used as indicators of climate change, and can help further understand effectiveness of adaptation and mitigation strategies for climate change.

Constructions and modifications of ecosystems are detrimental to future coastal resilience. Estimations highlight that 1,000 million tons of sediments are carried to the sea by running water every year, 45% of which are retained in dams or extracted from river beds to exploit sand and gravel, thus disrupting the sedimentary balance and causing coastal erosion.

The historical vulnerability of Mediterranean cities (climatic events, earthquakes, coastal erosion, ...) has increased under the impact of climate change: threats from rising sea levels (in the South and East, 50% of the urban population reside in areas located less than 10 m away from current sea levels); public health risks (pollution, higher mortality risks); climatic migrations. More vulnerable than other regions worldwide, Mediterranean cities are prime candidates for the development of adaptation strategies to face climate change.

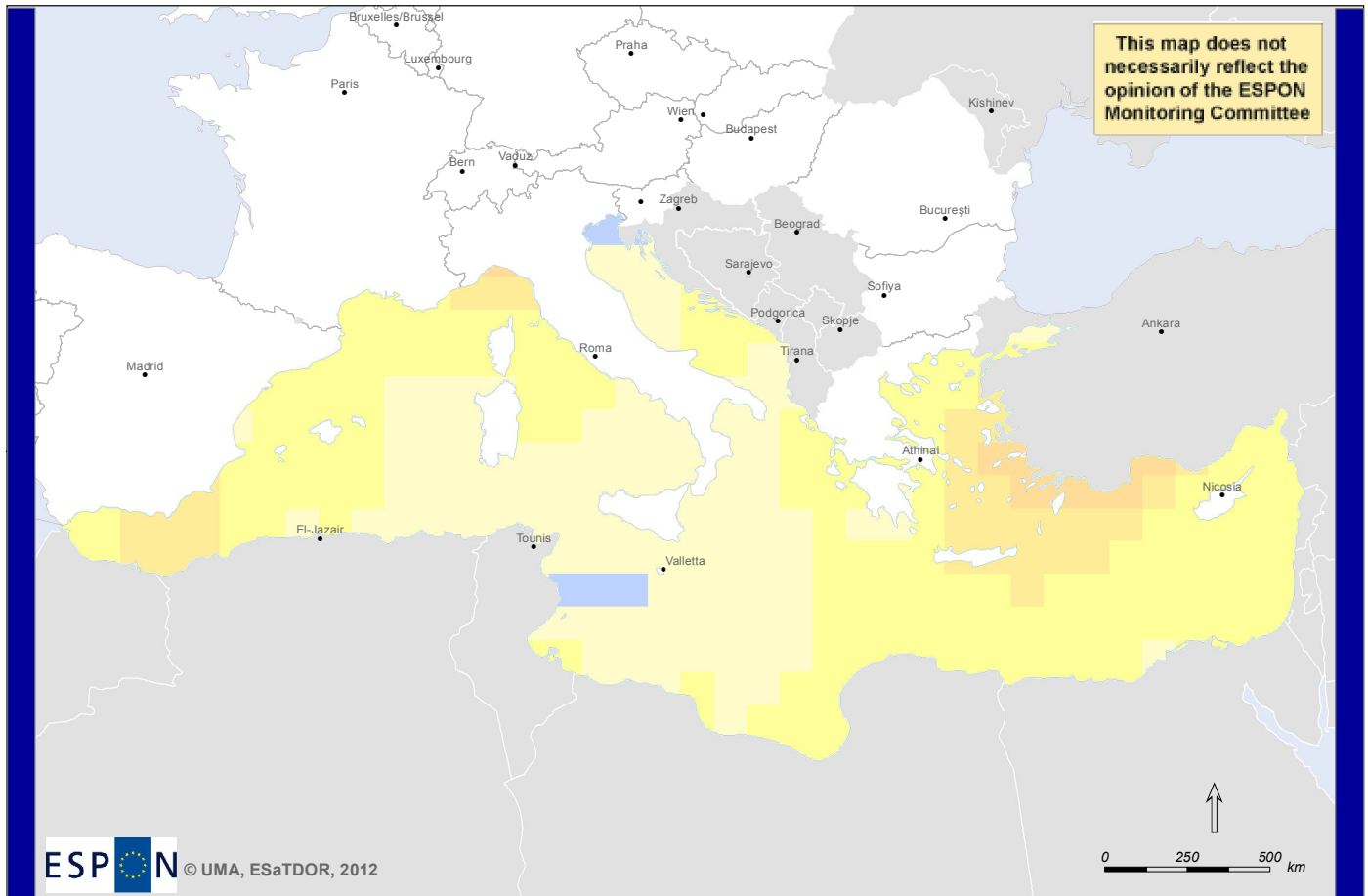
The main risks from coastal erosion are for the Mediterranean are:

- Worsening flooding along low-lying coasts, particularly in delta areas, lagoon coasts, tideland and some islands
- Accelerated beach erosion
- Increased salination in the estuaries;
- Shrinkage of freshwater water-tables and saltwater infiltration in the aquifers as well as groundwater salination issues.

Based on results of the EuroSION Project (2005), approximately one fourth of the EU coastline suffers from erosion. However, these data differ from country to country. In the Mediterranean for example, Cyprus has 37.8% of eroding coastline, Greece 28.6%, France 24.9%, Italy 22.8% and Spain 11.5%.

Due to its size and limited exchange at the Gibraltar Strait, the Mediterranean Sea is particularly sensitive to climate change. Several studies have shown the rapid surface warming of the Mediterranean sea during the last decades, some pointing an increase of about 0.06°C/year for the whole Mediterranean (from 1992-2005) and some a rise of about 0.03°C/year for the western and 0.05°C/year for the eastern Mediterranean over the 1985-2006 period. According to European Environment Agency, in the Western and Eastern Mediterranean, the average increase in Sea surface temperature (SST) has been 2.2 and 2.6 °C between 1982 and 2003 respectively (Map M25). An important factor for heat in the basin has been the North Atlantic inflow of surface waters at the Gibraltar strait along with the large terrestrial warming of the adjacent coastal areas.

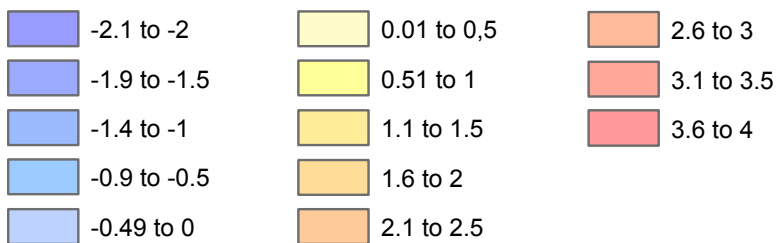
# Increase in Sea Surface Temperature




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Thematic data: National Oceanic & Atmospheric Administration (NOAA), Optimum Interpolation (OI) Sea Surface Temperature (SST) V2, 2012  
 Land boundaries: © EuroGeographics Association and ESRI, Regional level: NUTS0.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Increase in sea surface temperature between 1981-2011 (degrees Celsius)



**Map M25.** Increase in sea surface temperature (degrees Celsius), 1981-2011. Mediterranean Sea.

#### 4. Governance Case Studies

##### The Protocol on ICZM of Barcelona Convention for the Mediterranean Sea

*The Protocol on ICZM of Barcelona Convention for the Mediterranean Sea* (Protocol on Integrated Coastal Zone Management in the Mediterranean –ICZM Protocol) is the 7<sup>th</sup> Protocol in the framework of Barcelona Convention of 1975 but revised in 1995. ICZM Protocol was signed on 20-21 January 2008 in Madrid. Seven countries have ratified the Protocol so far: France (2009), Slovenia (2009), Albania (2010), Spain (2010), the EU (2010), Syria (2010) - Syria will enter history for being the sixth and "enter-into-force" country for the ICZM Protocol - and Montenegro (2011). Consequently, on 24 March 2011 the Protocol entered into force. It is a very special legally binding instrument about coastal management (the first significant step in the development of international legislative instruments for ICZM) that should lead to Mediterranean States (both sides) and the EU to better managing their coastal zones, as well as dealing with the emerging coastal environmental challenges, such as climate change.



**Map M26.** Coastal regions covered by the ICZM Protocol to the Barcelona Convention. Equivalent NUTS 3 at Mediterranean Basin level. Source: UNEP/MAP (2005)

At this moment an Action Plan for the Implementation of the ICZM Protocol in the Mediterranean has been established for the period 01/01/2012–31/12/2019. The New Mediterranean Action Plan 2012-19 is articulated around 3 main objectives all of them closely related to ICZM:

1. Support the effective implementation of the Protocol at the regional, national and local level
2. Strengthen the capacities of Contracting Parties to implement the Protocol and use in an effective manner the ICZM policies, instruments, tools and processes
3. Promote the ICZM Protocol and its implementation within the region, and promote it globally by developing synergies with relevant Conventions and Agreements

Relationships between both fields, Environment (the real origin of Protocol) and Spatial Planning (not only more appropriate but also necessary for the newly enforced Green Economy and Ecosystem Based Approach -EBA) should be decidedly reinforced. This new EBA is much closer to spatial/regional than sectoral environmental planning. The key question is not new: How to mix/coordinate both fields in national and regional administration bodies?

A list of key messages and issues from the ICZM Protocol case study, on the sustainability of this governance arrangement in terms of continuing its work into the future, its power and what conflicts this arrangement may have with other agencies, interests or governance arrangements, include:

- ✓ Well structured and complementary collaboration among all levels, from international to local (with clear top-down approach)
- ✓ Enhances cooperation among States (under the 1982 LOS Convention but also UNEP-MAP and EU initiatives and projects)
- ✓ Problems of binding nature and national government role for implementation.
- ✓ Experience for plans and strategies for ICZM is regional (middle size, equivalent to NUTS 2, corresponding with small and middle sized countries) rather than national or transboundary.
- ✓ More efforts to integrate Climate Change into the ICZM planning process should be supported in Mediterranean area.
- ✓ According with EC-DG Environment several critical barriers must be overcome to move towards a sustainable coastal development in the Mediterranean, among them the following: *"...the remaining lack of appropriate national legal frameworks for ICZM; the need to re-assert ICZM as the powerful arbiter it is between the land and sea issues and interests; the short-term, stop-go nature of the individual projects based on the project funding cycles that has led to a loss of essential continuity and capacity; the relentless and overwhelming pace of development along the coast that has led to a gap between the rapid, exponential rate of development with its consequent environmental degradation, and the capacity of ICZM to deal with the development-management gap; the stubbornly persistent perception of ICZM as an environmental management activity - a pressing need exists to embed ICZM into other areas of policy"*.
- ✓ Little or no implementation of marine spatial planning neither at national nor at the sub-regional and regional levels.
- ✓ Traditional instruments for Territorial Cooperation objectives, and future developments in the new framework for Territorial Cohesion Policy (art. 174), can be very useful (particularly in territorial and contiguous waters).
- ✓ Coincident with the argument of DG Mare (2009), due to geographic and political difficulties associated with overlapping boundaries, it seems useful to adopt a gradual and constructive approach beginning with solutions that do not require delimitation of maritime boundaries, such as developing joint management or common zones between neighboring states (as it is already done in a bilateral or trilateral way).



## The Adriatic-Ionian Initiative & Adriatic Sea Partnership

The Adriatic and Ionian Initiative (All) was established at the Summit on Development and Security on the Adriatic and Ionian Seas, held in Ancona (Italy) on 19th/20th May 2000 and attended by the Heads of States and Governments of Italy, Albania, Bosnia and Herzegovina, Croatia, Greece and Slovenia. The Initiative was later extended to the federative union of Serbia and Montenegro, and after the referendum in Montenegro both States remained All Participating Countries. Today, the All counts eight Members: Albania, Bosnia and Herzegovina, Croatia, Greece, Italy, Montenegro, Serbia and Slovenia. The overall objective of the initiative was the “determination to improve cooperation among the local and regional level of authorities within the All”. Its fields of action are: Small and medium sized enterprises, Transport and maritime cooperation, Tourism, culture and inter-university cooperation, Environment and protection against fire.

Originally a Slovenian initiative in cooperation with the Regional Environmental Center, the Adriatic Sea Partnership (ASP) was launched at the Mediterranean Action Plan (MAP) sub-regional conference on the Sustainable Development Strategy for the Adriatic in Portoroz, Slovenia, June 5-6, 2006. Financial support for the first phase of ASP has been provided by the Italian Ministry for the Environment, Land and Sea and the Slovenian Ministry of the Environment and Spatial Planning. In order to reach these goals, Slovenia developed the ASP concept with the support of the Regional Environmental Center, based on the successful case of the Sava River Basin Initiative, where four countries joined together to establish new institutional arrangements including a river basin commission to ensure joint management and protection of the river basin leading towards sustainable development.



**Map M27.** the Adriatic Sea region. Source: Laboratory of Environment and Spatial Planning, 2012.



In the framework of the AII's round tables a document called the Adriatic Action Plan (AAP) was adopted at the environmental ministers' meeting in June 2003 in Zadar, Croatia. The Adriatic Action Plan aimed to link together the AII Countries in efforts to reduce the negative impacts of human activities in the Adriatic-Ionian basin. Due to the closed nature of the two seas and increasing pressures on the environment from economic activities, negative pressures are increasing and becoming an ever more serious threat to the sustainable development of the region. Three projects are in the heart of the environmental aspect of the Adriatic Sea case studies, the Contingency Plan for the Adriatic aiming at improving sub-regional cooperation in the prevention of, and response to, maritime pollution from shipping, the Ballast Waters Management Plan, foreseeing the implementation of preventive activities related to the introduction of ballast water into the Adriatic ecosystem and the Integrated Coastal Zone Management in order to implement sustainable development. Finally, within AII, the establishment of an EU Strategy for the Adriatic Ionian Macro-Region was launched.

At the moment the process is ongoing and gaining the approval and the support not only from the government of the 8 AII member Countries, but also by local institutions, associations and different stakeholders coming from the area.

#### The MEDGOVERNANCE project

The MEDGovernance Partnership was launched in 2009 in the context of the MED Programme. The objective of MEDGovernance is to promote the role of regional authorities in a Euro-Mediterranean multi-level governance framework through: coordinated effort of Mediterranean regional authorities, cooperation between regional authorities with national and European institutions, cooperation with different stakeholders: as civil society organisations and enterprises. MEDGovernance comprises six regions of France, Italy and Spain (Tuscany, Lazio, Piemonte, Catalunya, Andalucía and PACA, see map M28) and high level research institutes charged by regional authorities to provide a scientific and technical foundation to common orientations (Plural-European Study Centre, CeSPI-Centro Studi di Politica Internazionale, Paralleli-Istituto Euromediterraneo del Nord Ovest, Institut de la Mediterranee, Tres Culturas, CPMR-Conference of Peripheral Maritime Regions of Europe, IEMed-European Institute of the Mediterranean and Network of Mediterranean Universities and other Academic Institutes).

The aim of the partnership is to synthesize the work and relations established in the past 20 years among partner Regions. These relations are not limited only to Regional authorities but also involving different levels of Local Governments such as Provinces, Departments and Deputaciones regrouped in Arco Latino Association in the Western Mediterranean area.

The activities of the MEDGovernance initiative include an analysis of regional policies for environment, transport and energy, migration, mobility and other topics, which will feed into the perspectives adopted by the Conference of Peripheral Maritime Regions (CPMR) on territorial cohesion. MEDGovernance also facilitates the coordination of regional plans towards a single Mediterranean framework, and builds capacity for collaboration on Mediterranean issues by offering training to public administrators, and through a social and economic forum (meeting) to compare and disseminate the actions of governance and to elaborate common policies at EuroMediterranean and global level.



**Map M28.** the MEDGovernance programme area. Source: <http://www.medgov.net/pages/regions>

The Mediterranean Governance Report has given evidence of an increasing role of regions in the implementation of European policies. It has also identified the constitution of a “regional influence capacity”. The formulation of EU policies derives from a very complex decision-making process involving a wide range of public and private stakeholders competing/cooperating with one another. In this context, numerous organisations have been set up to foster the regions’ influence in European policy-making and to work as much as possible with the European Commission because of its initial role at the beginning of the decision-making process.

On the basis of the debate on macro-regions, the “enquiry” carried out by the projects partners led to the identification of three different scenarios that could lead to the emergence of a Mediterranean Strategy based on macroregional approach. In the **first scenario** the European Union would become an archipelago of integration subprocesses. In the **second scenario**, a macro-regional Strategy is drawn up for the whole Mediterranean area that could be drafted for the whole Mediterranean area, including all Southern and Eastern countries and territories. In the **third scenario**, the integration approach is led by a “bottom-up” process and by the development of macro-projects integrating European and Mediterranean strategies within local or regional priorities.

The programme addresses marine planning through the transport field and particularly by focusing on the development of Motorways of the Sea (MOS). Motorways of the Sea are an innovative concept that requires above all a reflection on the strategic importance of shipping, given the benefits it can bring: less congested roads, fewer accidents, and lower environmental pollution. At the same time, it is an idea that requires a huge logistics evolution that not all countries are ready to implement or have immediate interest to do. It is also a central issue for the interests of a combination of very different actors, each with their own priorities and often uncoordinated with each other.

**Table 4.** Summary of Governance Case Studies

	<b>ICZM Protocol</b>	<b>Adriatic Sea</b>	<b>MEDGovernance</b>
<b>Drivers</b>	Global sea-borne trade, maritime traffic, fishing activities	International trade, growth of ports, aquaculture development, fishing overexploitation, motorways of the sea	Cultural heritage, Natura 2000 areas and protection against forest fires, technology transfer and information society, migratory flows, motorways of the sea
<b>Challenges</b>	Climate change, infrastructure, tourism and leisure facilities, high pressures on coastal resources	Energy demand, maritime safety, climate change, random urbanization, socioeconomic disparity	Social division, rural poverty, environmental degradation, underemployment, climate change, pollution from shipping, preservation of biodiversity and conservation of wildlife
<b>Legal Status</b>	Legally binding	Not legally binding	Not legally binding
<b>Effectiveness</b>	High	Medium	Low
<b>Stakeholder involvement</b>	High (21 countries and EU)	High (8 at a level of ministries)	Medium (3 countries and their institutions)

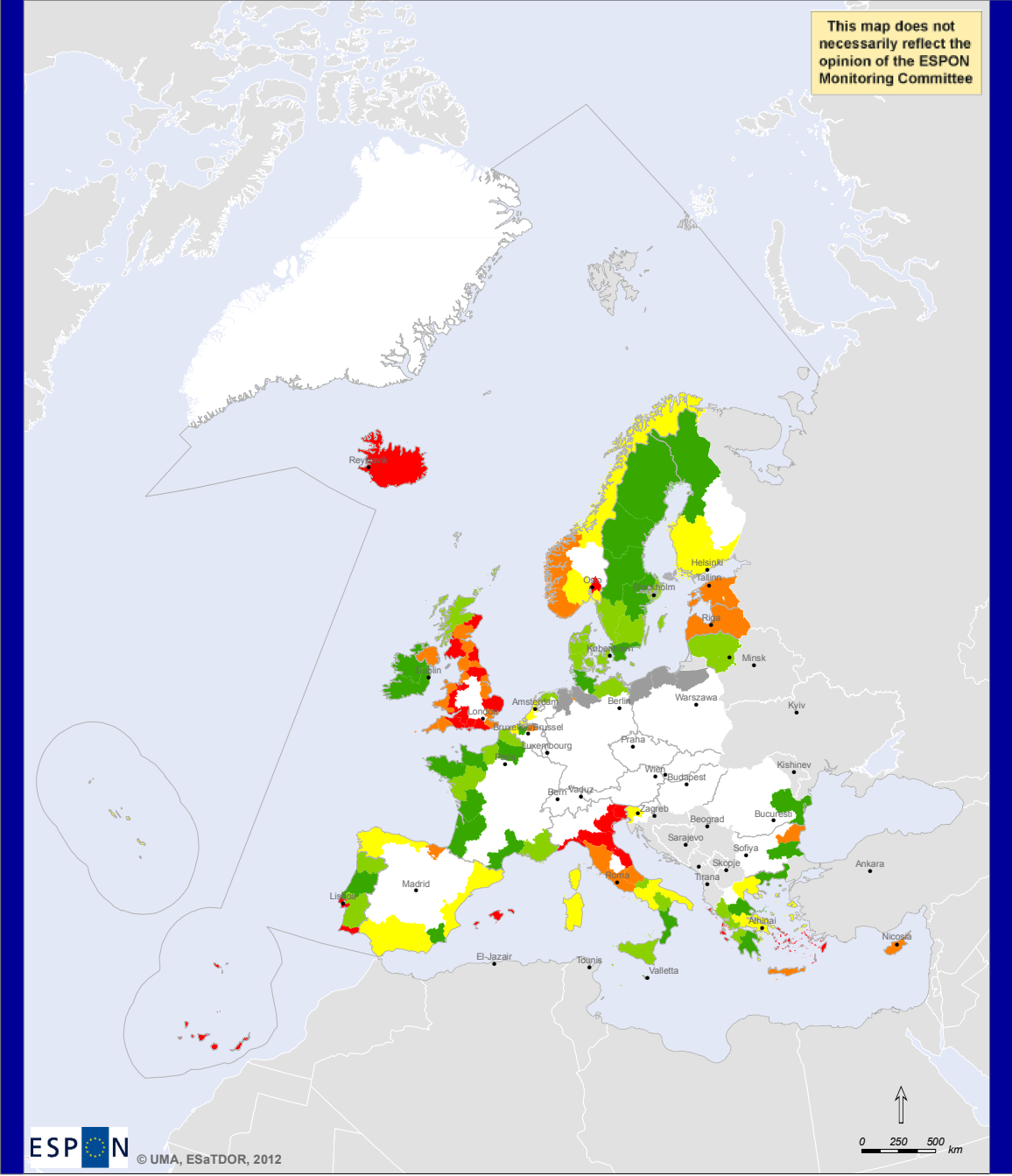
## 5. Characterisation of the Sea

It can be seen from the above account that the Mediterranean Sea, which is the largest enclosed European sea area defined by this project, is profoundly interwoven with the economic, social and environmental wellbeing of adjacent terrestrial regions and indeed of Europe as a whole. The previous maps which are based upon selected European wide data sets related to: economic use; transport; energy, cables and pipelines; and the environment highlight key land sea relationships and show that the marine environment supports a wide range of maritime activities and uses. What is clear from this account is that the nature of land sea interactions varies across the region, so before looking to the future it is helpful distil some of the main distinctions, with a particular emphasis due to data availability on the northern Mediterranean, which is part of the EU.

The Blue Growth report has identified shortsea shipping, oil and gas, coastline tourism and yachting, cruise and port cities, aquaculture and fisheries as the most important maritime economic sectors for the Mediterranean basin. According to Eurostat, 30% of all European shortsea shipping takes place in the Mediterranean Sea, resulting in a total volume of 500 million tonnes. Activities concerning offshore oil and gas are mostly found in the Adriatic Sea while recently gas has been found near Cyprus and most notably off the Israeli and Lebanon coasts. In terms of tourism, Mediterranean countries attract 30% of international tourism arrivals, however, having generated overcrowded destinations in search of alternative forms of tourism development such as nautical, wine-tasting, gastronomy, health and wellbeing and green tourism. Fishing also experiences changes and pressures due to the rapid rise in intensive fish farming and in fish activity. This causes environmental pressures such as species in danger of extinction, over-fishing etc.

Many parts of the Mediterranean show a relatively high dependency on maritime related employment (see Map M29), especially tourism. This is particularly evident in western Spain, central Italy, Cyprus and the Greek Islands. This dependency also makes the economy vulnerable to changes. On average, the active population in Mediterranean coastal regions is at greater risk of unemployment. According to Eurostat, the average rate of unemployment in European regions on the Mediterranean coast is higher than for the European Union. Specifically, in 2009 the unemployment rate was on average 12.9 % for these regions and 8.9 % for the European Union. Moreover, since 2008 the gap has widened. However, trends in unemployment vary significantly in different countries and regions.

# Employment in the Maritime Sector, 2009 (as a % of Total Employment)



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Thematic data: Economic Significance Composite Map.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

**Total Maritime Employment Composite Map (percentage of total employment within each NUTS2 region)**

- Very Low (5.42 - 15.52)
- Low (15.53 - 17.60)
- Medium (17.61 - 21.06)
- High (21.07 - 24.69)
- Very High (24.70 - 36.35)
- No data

*NOTE: This composite map consists of data from the European Cluster Observatory on persons employed in fisheries, shipbuilding, other traditional maritime sectors, sectors associated with the maritime cluster, tourism and transport as a percentage of total employment within each NUTS2 region.*

**Map M29.** Total maritime cluster employees (as a percentage of total employment) per NUTS2 region, 2009

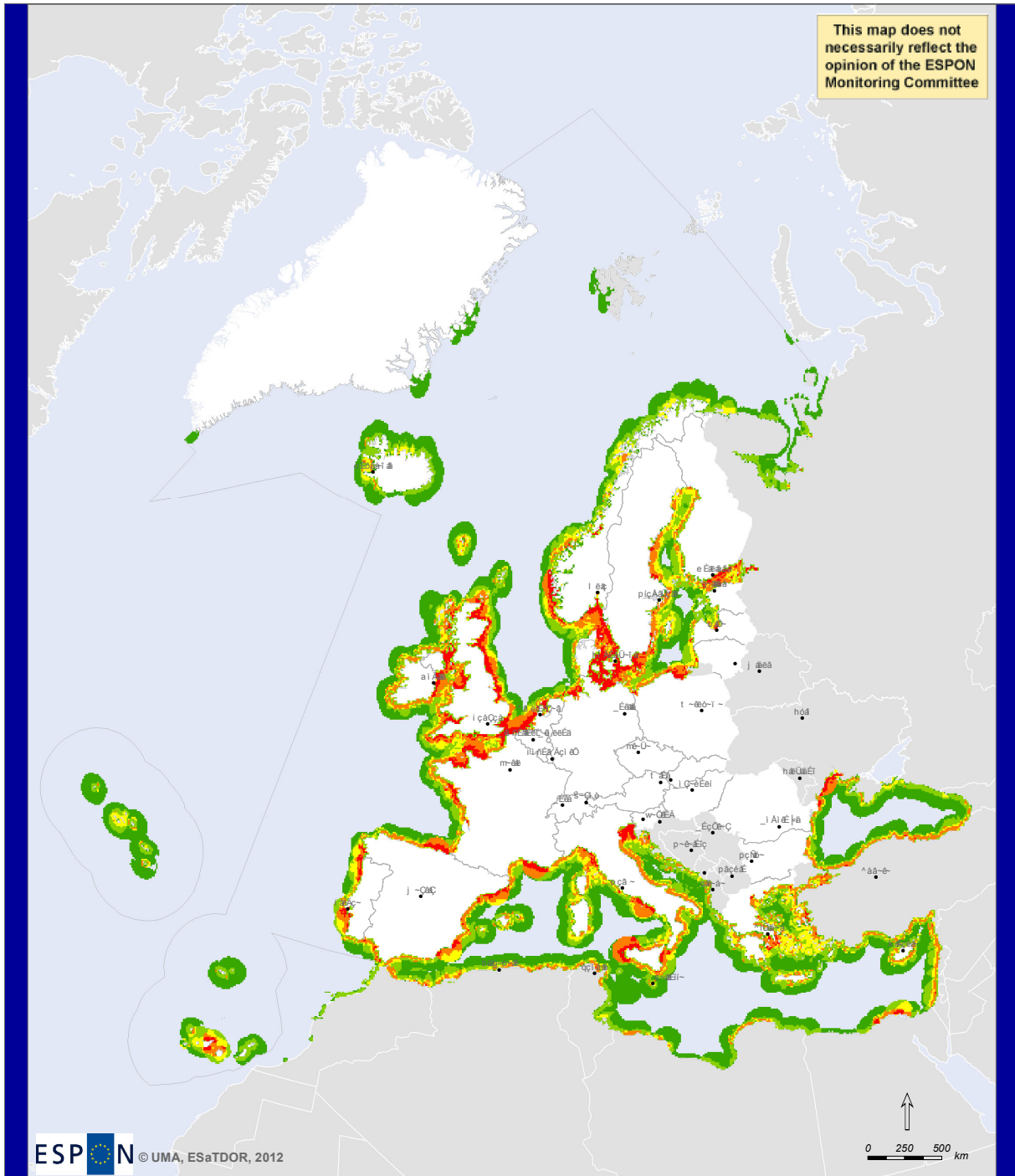
Pressures and impacts on coastal and marine biodiversity often stems from the growing presence of invasive species and biological processes that often have cumulative effects on native species and habitats that can be dramatic. These processes are also enhanced by climate change and other environmental disturbances such as pressures from fishing. As consequence of climate change on coastal ecosystems, a possible scenario foresees that North-western Mediterranean warm sensitive species would be confined in deeper (cooler) water, as occurs in South-eastern basin, or would disappear. The Mediterranean Sea, which is the result of a complex geological and biological history, is widely recognized as an area among the most sensitive to climate change. Data recorded in the Mediterranean Sea shows that sea temperature is increasing and extreme climatic events are becoming more and more frequent. In particular, temperature rise caused by human activities, acts synergistically with many other source of disturbance (other human pressures, changes in water physical and chemical features, etc.) and strongly affects Mediterranean marine biodiversity.

According to UNEP/MAP (2010), areas of significant environmental pressure are located mostly at the Alboran sea including the Strait of Gibraltar, the Gulf of Lion, the Strait of Sicily, Northern Adriatic, and the Levantine Sea. This largely corresponds with the areas of environmental pressure identified in Map M30 below, although further areas of pressure can be seen in the Tyrrhenian Sea (associated with population pressures and shipping in the Bay of Naples) and around the entrance to the Suez Canal.

The Eastern Mediterranean basin is the part that the aforementioned changes become more obvious, as it is a crossroads where tropical species converge and are distributed through the basin. This areas of high environmental risk is closely linked to the development of maritime economic activities.

Therefore, the major pressures on the Mediterranean coastal and marine environment are mostly related to urbanisation and industrial activities, overexploitation of fisheries resources, the intrusion of invasive species and the alterations that these issues cause to coastal and marine habitats.

# Environmental Pressures



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Thematic data: Environmental Pressures Composite Map.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Environmental Pressures Composite Map

- s'Écōt çĩ
- i çĩ
- j ÉÇa ā
- e āÜ
- s'Écō-e āÜ

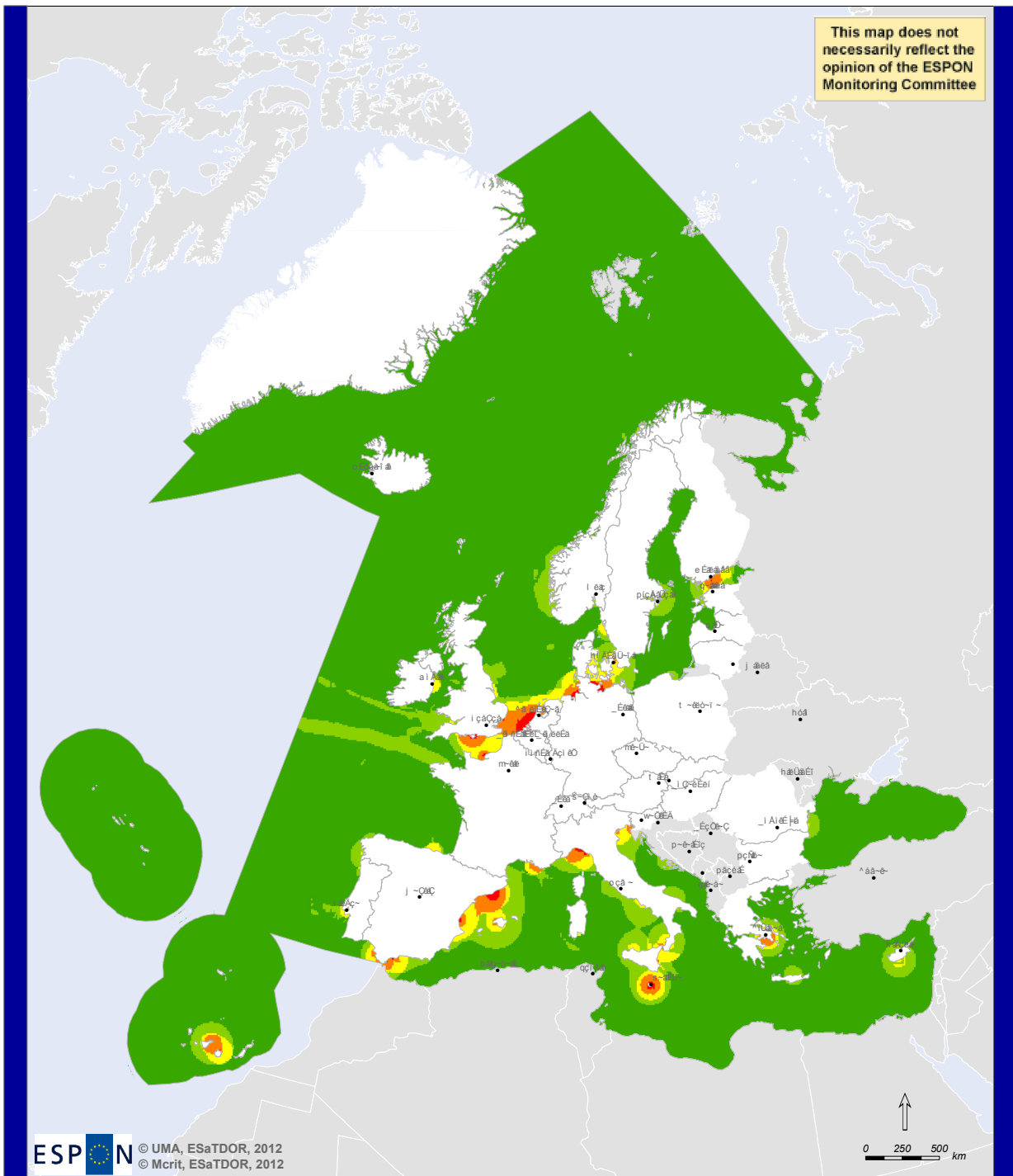
*This map is based on three data sets: incidence of invasive species, organic pollution (pesticides) and inorganic pollution (fertilisers).*

**Map M30** Environmental pressures in Europe's coastal and marine regions (composite map)

Globalization has strengthened the role of the Mediterranean region in terms maritime transport, especially of goods. However, traffic growth refers mostly to transit flows while the intra-Mediterranean flows constitute less than a quarter of the total flows. It seems that the development of traffic in the Mediterranean has contributed more to the integration between Asia and Europe than among the Mediterranean Sea bordering countries. Map M31 shows the major areas of flows in the Mediterranean are concentrated mainly around Malta (connected with the Malta Freeport terminal at Marsaxlokk) and the western Mediterranean.



# Flows




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Thematic data: Flows Composite Map.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Flows Composite Map

-  sÉó# çĭ
-  i çĭ
-  j ÉÇa ā
-  e ðŰ
-  sÉó-e ðŰ

*The Flows composite map is a proxy to land-sea interactions of goods, people, energy and information based on the analysis of flow magnitudes and interchange nodes. Influence of interchange nodes is higher with proximity to node and size of associated flow (container traffic, cruise traffic and LBK traffic plus Gb/s through cables).*

**Map M31.** Flows composite map

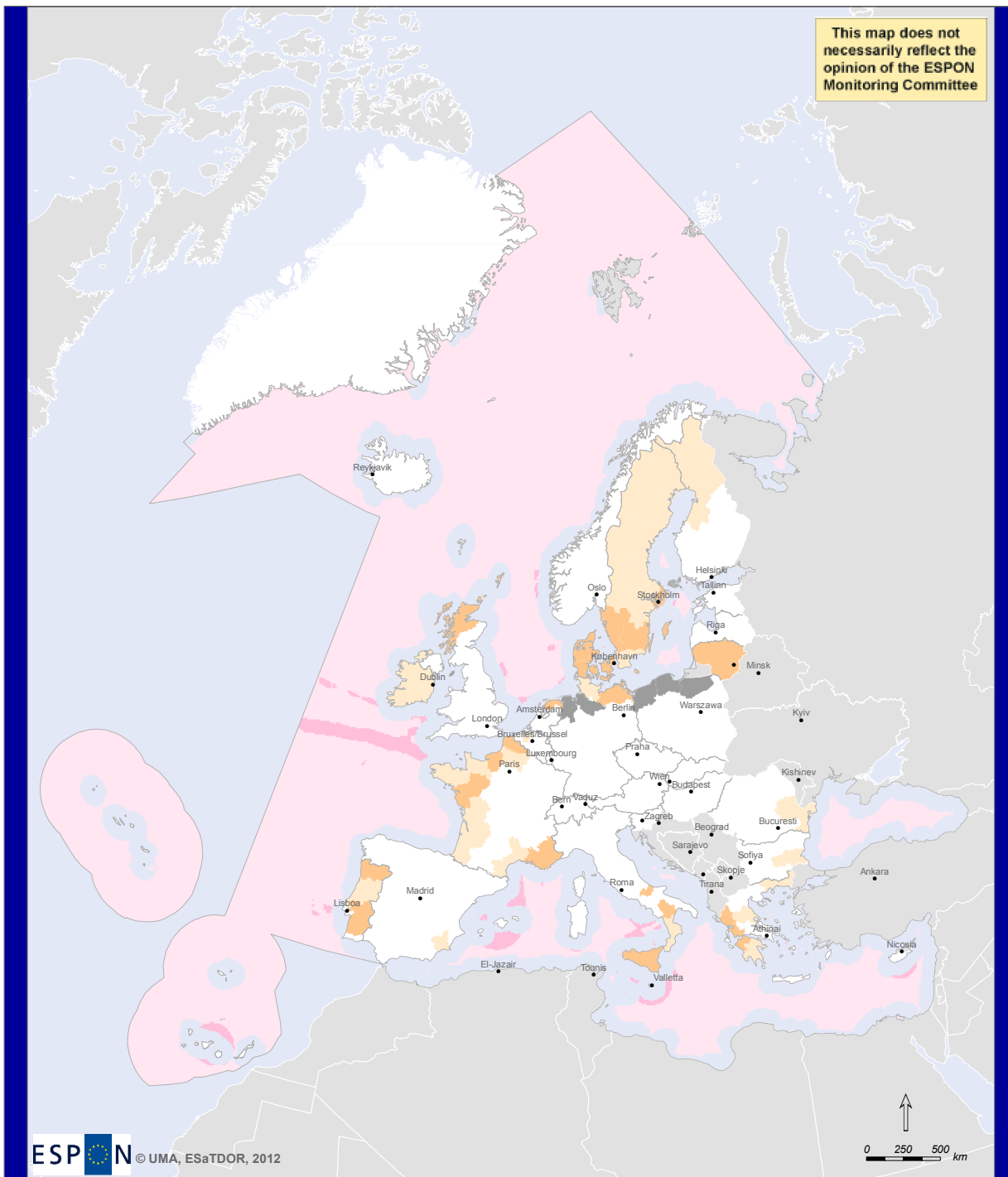
## 5.1 Towards a marine typology

Combining the composite pictures of economic use, transport flows and environmental pressures shown above has enabled maps showing coldspots (Map M32a) and hotspots (Map M32b) for maritime related activity within Europe's regional sea areas to be produced. This sets the background for the final step towards a maritime typology shown in Map M33 which categorises maritime regions into a five-way typology: European Core, Regional Hub, Transition, Rural and Wilderness. The typology map is a simplified graphic presentation of the pattern of broad divisions evident from the data. The zones identified cover both land and sea and have deliberately 'fuzzy' boundaries reflecting data quality and availability issues which are discussed in more detail in the Data and Mapping project report.

One of the premises for these maps was the selection of European data sets to ensure Europe wide comparability of maritime characteristics. For many sectors (such as fisheries) and issues (such as underwater noise, dredging and eutrophication) adequate information was not available on a European level although very good data exists in relation to some regional seas. For example data collected for OSPAR purposes provides a very good basis for understanding many aspects of the Atlantic and North Sea marine environment, but compatible data is not available for other European seas. The picture presented is therefore less than ideal and Maps M32a, M32b and M33 should be understood as a first iteration of a European maritime typology demonstrating how this concept could be developed over time as data improves.

The overall picture in the Mediterranean is shaped by partial data, particularly from southern Mediterranean countries. This then creates hotspots and coldspots which are European focused in character. What emerges is a distinction between the more developed western Mediterranean which we have described as a regional hub. This area has a number of nodes of intense activity centred around the Mediterranean ports including Barcelona, Marseilles, Naples, etc which brings pressure to bear on the adjacent maritime regions. Also intense tourism activities provide a close association between the land and the sea, although as has been noticed elsewhere this is an economic dependence which is vulnerable to changes in European trends and fashion. The Straits of Gibraltar, may also be another hub, but the lack of available data makes this a provision characterisation at this time. By describing the western Mediterranean as a regional hub the focus is on the intensity of land based activities and the threats to the maritime environment, we are not suggesting that there is a great deal of connectivity which makes this a coherent integrated regional economy, although there could be strong connectivities between various elements within it. In the eastern Mediterranean, much of the regional sea has been characterised transitional. Here the intensity of maritime land based activities is less (or the data is missing) and the subsequent negative impact on the marine environment is lower. Once again there is no suggestion that there is a great coherence between regions within this single identified region, but as has been noted elsewhere individual sub-sea basins are beginning to work together most notably in the Adriatic. Elsewhere in the Mediterranean the lack of data, both land based data and coastal means it is difficult to characterise the land sea interactions although the gateways to the Mediterranean, the Straits of Gibraltar and entrance to the Suez Cannel in Egypt are likely to be important relatively self contained regional hubs.

# "Cold Spots" of Land-Sea Interactions




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Thematic data: Typology Map.  
 Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
 Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Typology Map (coldspots)

### Sea (Environmental Pressures and Flows)

- Very low intensity
- Low intensity

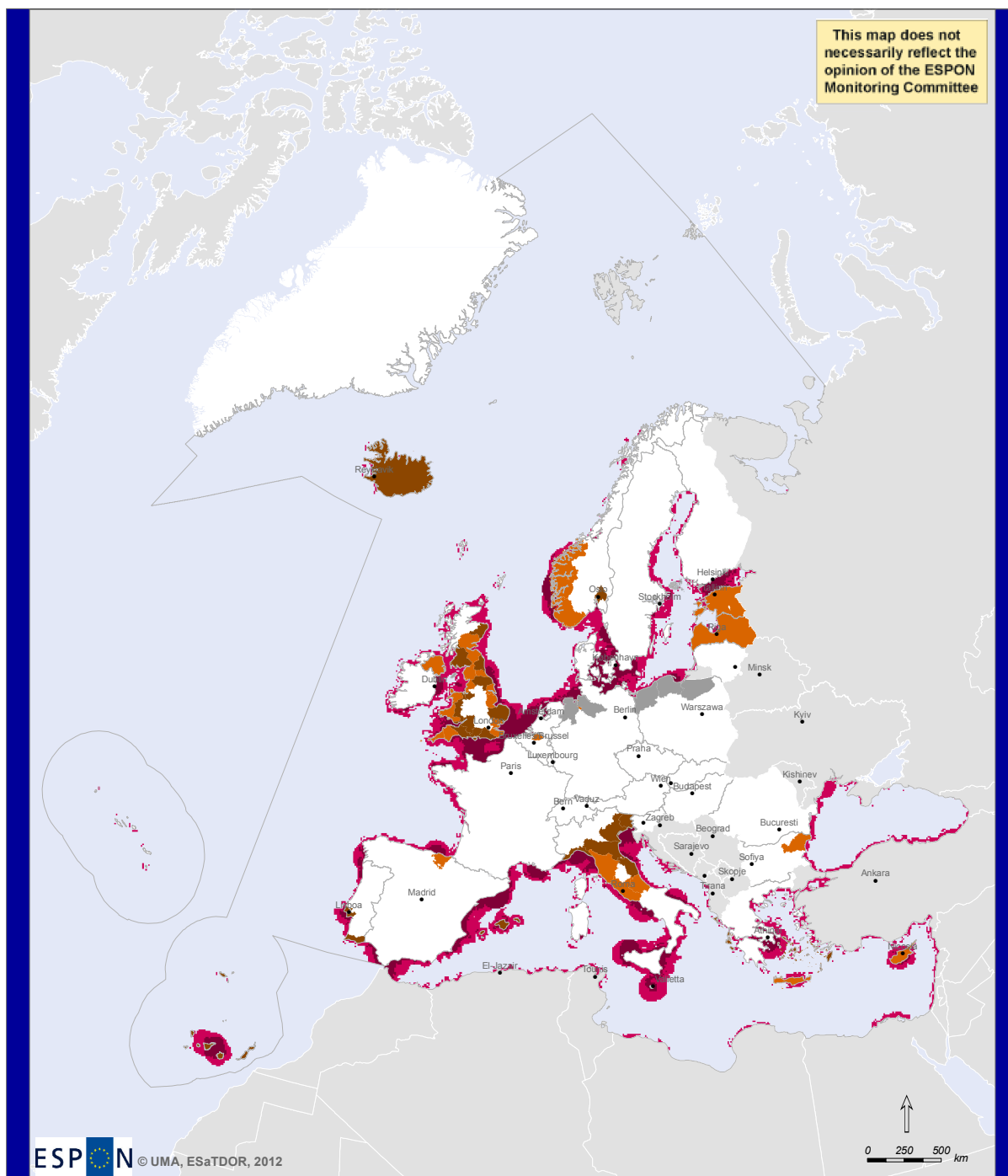
### Land (Economic Significance)

- Very low intensity
- Low intensity
- No Data

*This map shows where land-sea interactions are at their least intense in Europe's seas. The effect of the sea on the land is measured in terms of economic significance (employment in maritime sectors) and the effects of anthropogenic activities on the sea are resented by environmental pressures (pollution from pesticides and fertilisers, incidence of invasive species introduced by shipping) and flows (of goods, including container traffic and liquid energetic products, people, from cruise ships and information, from telecommunications cables).*

Map M32a. "Cold spots" of land-sea interactions (low intensity)

# "Hot Spots" of Land-Sea Interactions



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Thematic data: Typology Map.  
Land boundaries: © EuroGeographics Association and ESRI. Regional level: NUTS2.  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Typology Map (hotspots)

### Sea (Environmental Pressures and Flows)

- High intensity
- Very high intensity

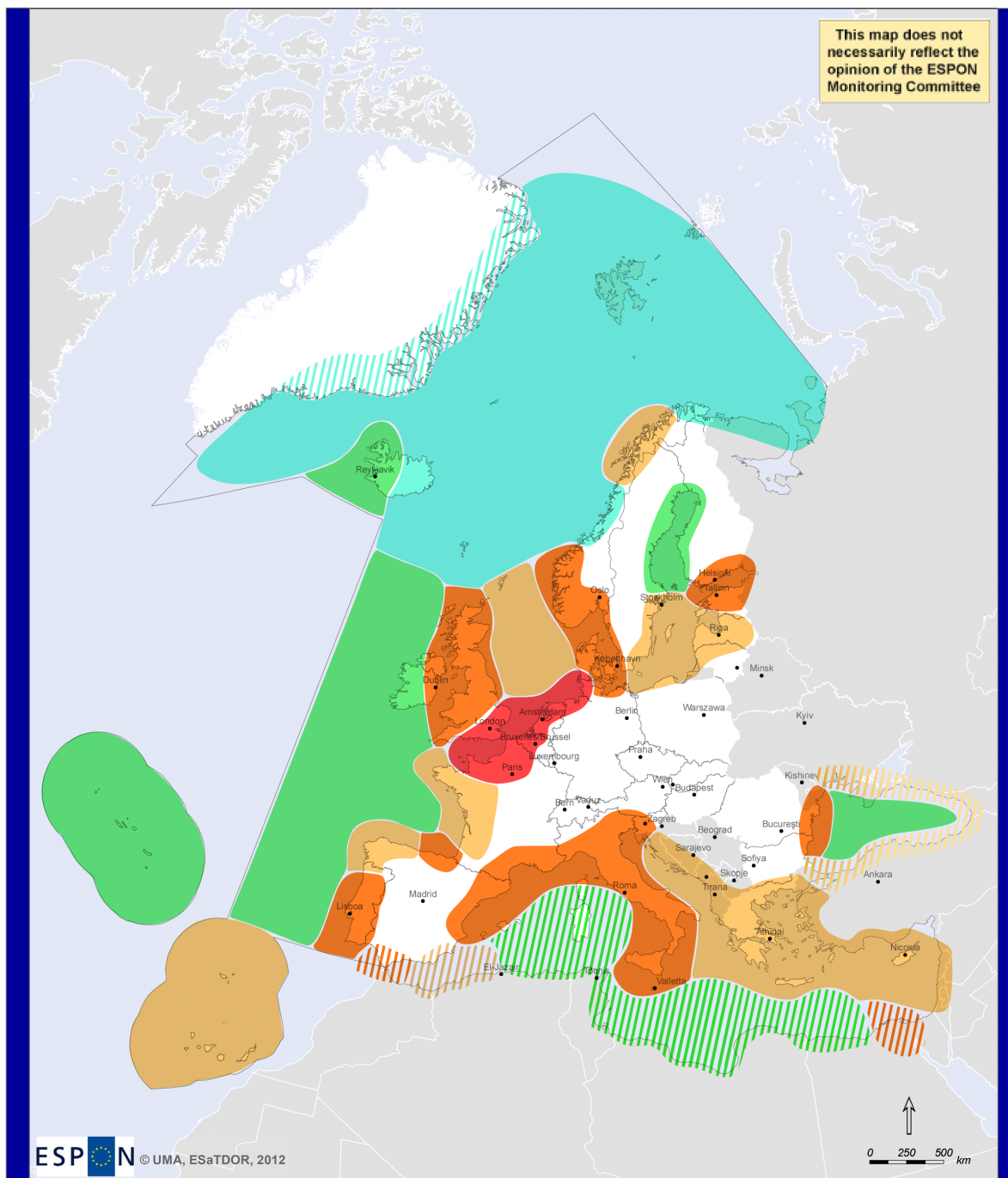
### Land (Economic Significance)

- High intensity
- Very high intensity
- No Data

*This map shows where land-sea interactions are at their most intense in Europe's seas. The effect of the sea on the land is measured in terms of economic significance (employment in maritime sectors) and the effects of anthropogenic activities on the sea are resented by environmental pressures (pollution from pesticides and fertilisers, incidence of invasive species introduced by shipping) and flows (of goods, including container traffic and liquid energetic products, people, from cruise ships and information, from telecommunications cables).*

Map M32b. "Hot spots" of land-sea interactions (high intensity)

# Typology of European Maritime Regions



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Thematic data: Typology Map, Economic Significance and Environmental Pressures Composite Maps  
Land boundaries: © EuroGeographics Association and ESRI, Regional level, NUTS2  
Sea boundaries: OSPAR Convention, EU Integrated Maritime Policy and EEZ.

## Regions derived from typology map

- European Core
- Regional Hub
- Transition
- Rural
- Wilderness
- Typology influenced by lack of data

*This schematic typology map shows how Europe's coastal and maritime regions may be classified based on the intensity of land-sea interactions (economic activities, flows of goods, people and information and environmental pressures). These interactions are greatest in the European Core and at their lowest in the Wilderness.*

**Map M33.** Typology of European maritime regions (schematic map)

## 6. Key Territorial Development Opportunities and Risks

The existence of an articulated system of Mediterranean institutions and binding commitments for environmental protection under the Barcelona Convention provides opportunities for sustainable development initiatives between Mediterranean countries and the strong presence of governance mechanisms such as Euro-Mediterranean Partnership and the Adriatic-Ionian Initiative promotes the need and development of an integrated Mediterranean strategy.

However, the negative impacts stemming from the unresolved conflicts and issues of boundaries in the region could often act as a deterrent to cooperation and progress. A good example is the case of the development of energy resources in the Mediterranean that is generally limited to coastal waters due to the lack of agreed Exclusive Economic Zones.

Although it appears difficult for Mediterranean countries to adjust to globalization in terms of traditional economic sectors and the region is characterized by a variety of gaps concerning territorial planning, there is also a lot of potential through cross border cooperation in a series of economic sectors such as agro-industry, tourism, innovation and research and activities such as urban regeneration programmes on both shores.

Fisheries in the Mediterranean constitute an important activity due to the sea's distinctive biodiversity (30% of endemic fauna and approximately 78% of all the marine species known worldwide) that is often met with sustainability issues related to a strong demand over limited resources, poor governance and failure of institutions and policies in most Mediterranean countries. On the other hand, richness and variety of species lead to outstanding aesthetic values that are a vital resource for coastal tourism development. Although a significant source of economic activity, tourism has a strong impact on the fragile natural and historical resources linked mostly to the development of tourism infrastructure in the coast and increasing waste production, especially in destinations where tourism constitutes the dominant economic sector. These destinations are also vulnerable to economic risks such as downturns of tourism activity.

In terms of energy, the Mediterranean Sea shows a growing regional role of energy flows, especially in the global oil market, constituting an important zone of transit for oil and gas, with major, mostly gas, pipelines connecting North African supply to European demand. New pipelines are also under construction or being planned, with the aim of increasing and diversifying gas supply to Europe. There are also important international telecommunications cables running through the Mediterranean. Although the development of marine renewable energy activities is limited due to relatively poor resources, given the enclosed nature of the sea (hence limited wave size, tides and currents) and generally low wind speeds, there are some opportunities for the use of wind resources and proposals to exploit currents in the Strait of Gibraltar.

Maritime transport and competitiveness of freight transport could be particularly improved through Motorways of the Sea (MOS) that link the Baltic, Barents, Atlantic, Mediterranean, Black and the Caspian Sea areas as well as the countries within the sea areas and with extensions through the Suez Canal towards the Red Sea. This set of key sea routes between EU Member States which, combined with other modes of transport, are to provide regular, high-quality services which offer an effective

alternative to transporting goods only by road. The threats for MOS are related to administrative barriers to short sea shipping, the continuous prevailing of road transport in Europe and the complexity and long process for the development of the logistical conditions for MOS.

There is a potential for Mediterranean ports to increase their share in the European maritime import/export sector (new rail infrastructure is planned to connect them to Europe core areas). This action would provide a more balanced port system in Europe and would allow for shorter shipping distances and time savings for a substantial number of destinations, having a relevant effect on transport emissions.

A major threat for the Mediterranean is climate change and environmental deterioration due to desertification, floods, fires, coastal vulnerability etc. The most vulnerable areas of the Mediterranean are in North Africa, bordering on deserts, the major deltas, the coastal zones as well as socially vulnerable areas and those with rapid demographic growth (southern and eastern banks, dense towns and suburbs). The risks stemming from the impacts of climate change with major direct physical consequences for human activity concern water resources, agriculture and fishing, the attractiveness of tourist destinations, coastal zones and port infrastructure and drops in hydro-electric potential and the cooling potential of thermal plants.

The main beneficiaries of good environmental quality in the region are also those at risk from poor environmental quality. These are fisheries, (eco)tourism, coastal protection and society as a whole. The opportunities could result from marine protected areas, which are expected to support fish stocks and to maintain marine biological diversity and achieving Good Environmental Status, as required by the MSFD while, at the same time, in terms of new economic developments and future environmental quality, non-indigenous species (largely linked to shipping and aquaculture sectors) and marine litter (from all marine and coastal activities but particularly from fisheries) could act as the main potential sources of future poor environmental quality.



## 7. Initial Policy Recommendations

A major challenge for the Mediterranean has been the **disputes** created due to the complexity of maritime jurisdictions. This 'jurisdictional asymmetry' creates a heterogeneity that is not only an issue for the involved countries' legal systems (exclusive economic zone, fisheries zones, fisheries protection zones and ecological protection zones) but can also be transposed in other aspects of maritime environments including socioeconomic and environmental dimensions.

The **improvement of capacity** in the Mediterranean along with the enhancement of public participation processes especially in a local and regional level could prove to be essential for the effective implementation of policies and the improvement of the decision making procedures. Such capacity building could provide people with vision and experience to enhance governance in a European level.

The analysis of the case studies has proved that there is a need for a **common strategy** for the Mediterranean to solve common problems and work on projects on priority areas such as the protection of the environment, the strengthening of transport systems, development of green energy, the protection of the common cultural heritage etc. Considering that the Mediterranean basin depends a lot on the development of coastal areas, it seems obvious that there should be a clear link between the Integrated Coastal Zone Management Recommendation and Integrated Maritime Policy in the context of maritime spatial planning.

In the case of the Mediterranean Sea, **data collection and availability** is also a challenge. Some data are available (such as MEDSTAT) but seem to be more focused on socio-economic issues whereas limited availability can be found in other thematic areas namely transport, energy and network sources. Additionally, the incorporation in the Mediterranean sea of non-EU countries outside the ESPON Network (Albania, Croatia, Bosnia & Herzegovina) along with Mediterranean Partner Countries (Egypt, Israel, Jordan, Lebanon, Morocco, Palestine, Syria, Tunisia, Turkey) forms a differentiated macro-region where data collection and integration is extremely uncoordinated and difficult.

**Opportunities** identified for the Mediterranean, such as the development of Motorways of the Sea and their integration to TEN-T priority axes, the energy potential and alternative and more sustainable ways for development should also not be neglected given that they could bring integration between European seas.



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