

UNEP

(United Nations Environment Program)

*Promoting sustainable marine tourism in the
Mediterranean sea in the context of climate change*



PyrenMUN 2024

Research Report

June 3rd, 2024



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Forum : UNEP (United Nations Environment Program)

Issue : Promoting sustainable tourism in the Mediterranean sea in the context of climate change

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Introduction and Historical Context

The Mediterranean invented modern tourism. Over the years it has become the first destination for coastal tourism in the world with 400 millions of international arrivals per year. Over the past decades the cruise industry has built on the attractiveness of the Mediterranean and has changed the nature of tourism in the area.

Modern cruise ships evolved from ocean liners, which were the most common form of transport between Europe and the Americas until the rise of commercial aviation in the 1950s. Airplanes drastically reduced transatlantic travel times and provided unbeatable competition for ocean liners in terms of speed. In order to survive, the industry began to convert its ocean liners into cruise ships in the mid-1960s, attracting passengers by making the journey more about leisure and sightseeing rather than getting travelers from point A to point B.

At a time when the effects of global warming have never been more visible, with pessimistic forecasts predicting a temperature rise of more than 4 degrees by 2100, cruise ships are becoming more and more successful, more and more numerous, more and more imposing and, above all, more and more polluting.

Like floating cities and theme parks, these giant liners are designed for mass tourism, accommodating from 500 to over 7,000 passengers. They produce an enormous amount of pollution with toxic emissions that affect not only marine life but also the air, at levels never before reached by any other vehicle, both in terms of volume and toxicity.



Definition of Key Terms

Climate change :

The term climate change is commonly used to describe global warming - the continued rise of average global temperatures - and how it affects the Earth's climate system.

ECAs zones :

Emission Control Areas (ECAs) are sea areas in which stricter controls on ships have been established by the International Maritime Organization (IMO) to reduce emissions of sulfur oxides (SO_x), nitrogen oxides (NO_x) and particulate matter. These zones are called SECA (acronym for *Sulphur Emission Control Area*), NECA (acronym for *Nitrogen Emission Control Area*), or simply ECA when they regulate these three types of pollutants.

Heavy Fuel Oil :

Heavy Fuel Oil (HFO) is a category of fuel oils with a tarry consistency. Also known as bunker fuel or residual fuel oil, HFO is the result or residue of the distillation and cracking process of petroleum. As a result, HFO is contaminated with several different compounds, including aromatics, sulfur and nitrogen, making the emissions during combustion more polluting than other fuel oils. HFO is mainly used as a fuel source for marine propulsion using marine diesel engines due to its relatively low cost. The use and carriage of HFO on board ships raises several environmental concerns, namely the risk of oil spills and the emission of toxic compounds and particulates, including black carbon.

The Mediterranean Sea :

The Mediterranean Sea is an almost completely enclosed intercontinental sea, bordered by the coasts of Southern Europe, North Africa and Western Asia, from the Straits of Gibraltar in the west to the entrance to the Sea of Marmara (Dardanelles) in the east to the Suez canal in the south-east. It is approximately 3,860 km long and covers an area of around 2.5 million Square kilometers. At its narrowest point, the Strait of Gibraltar is 14.3 km wide. While the Mediterranean is an economic lung for a number of countries in the region, it is also one of the most polluted seas, particularly in terms of plastic pollution. Thus, the need to promote 'sustainable tourism', particularly in coastal areas, is increasingly emphasized by those living along its shores.

Sustainable tourism :

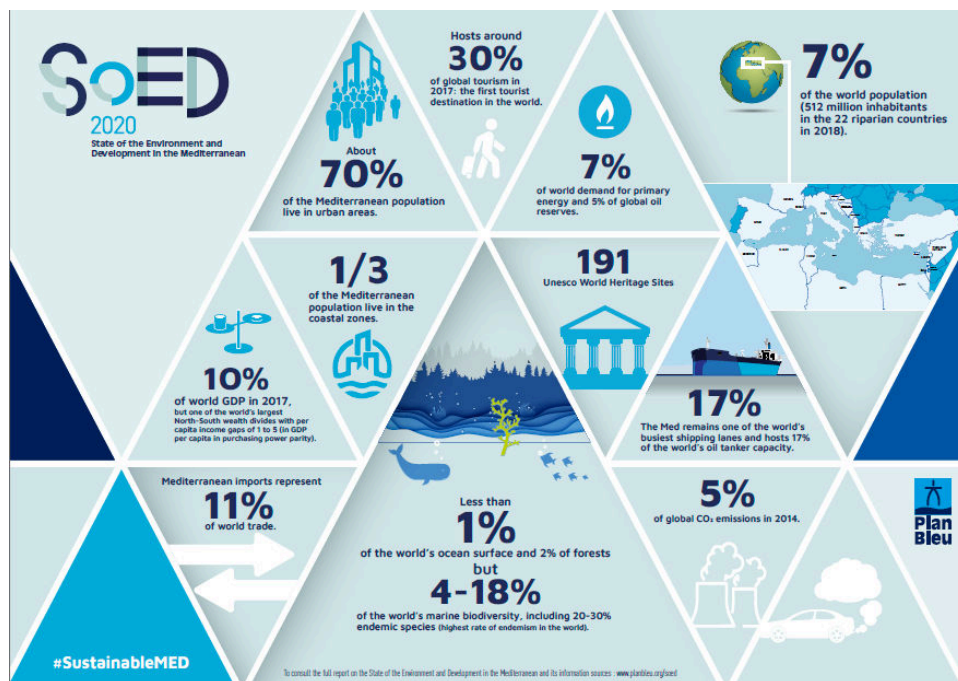
Sustainable tourism is a concept that encompasses the entire tourism experience, including concern for economic, social and environmental issues; as well as attention to the improvement of the tourist experience, and addressing the needs of host communities. Sustainable tourism should embrace concerns for environmental protection, social equity and quality of life, cultural diversity, and a dynamic, viable economy that provides jobs and prosperity for all. It has its roots in sustainable development.

General Overview

1) What is the impact of climate change on the natural environment: the marine environment, coasts ?

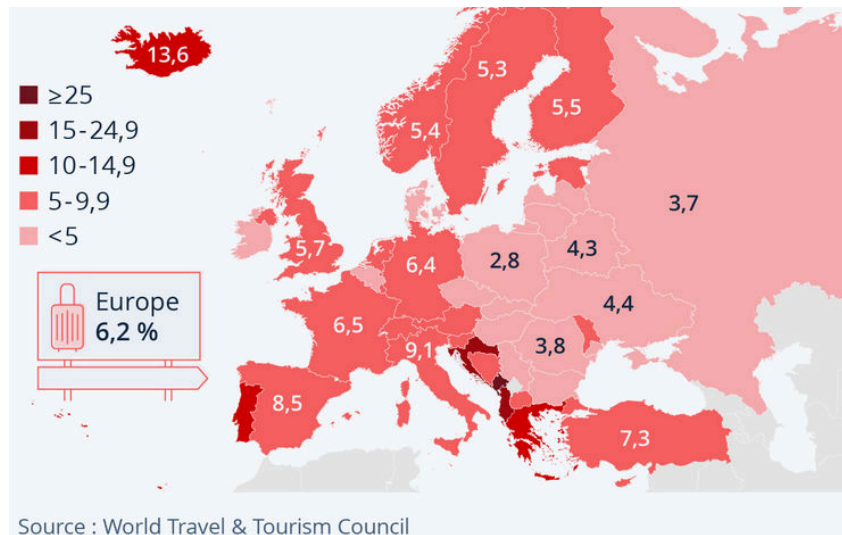
- The Mediterranean region is warming 20% faster than the global average.
- Impacts will exert additional pressure on already strained ecosystems and on vulnerable economies and societies.
- Coastal zones face heightened disaster risks, including flooding and erosion, and the salinization of river deltas and aquifers that sustain food security and livelihoods.
- The Mediterranean is home to more than 510 million people.
- By 2050, water demand is projected to double or even triple.
- 2°C global warming will reduce precipitation by ~10 to 15%.
- An increase of 2°C to 4°C would reduce precipitation by up to 30% in Southern Europe.
- Water temperature is expected to rise by between 1.8°C and 3.5°C by 2100 with hotspots in Spain and in the Eastern Mediterranean.

Vulnerable Ressources Under Pressure



2) How important is maritime tourism in the European economy ?

Travel and tourism as a percentage of GDP by country (in %)



3) What are the impacts of hydrocarbons?

The environment

Greenhouse gas emissions: In total, ships calling at ports in the EU and the European Economic Area generated around 140 million tonnes of CO₂ emissions in 2018 (around 18% of all CO₂ emissions generated by maritime transport worldwide in that year).

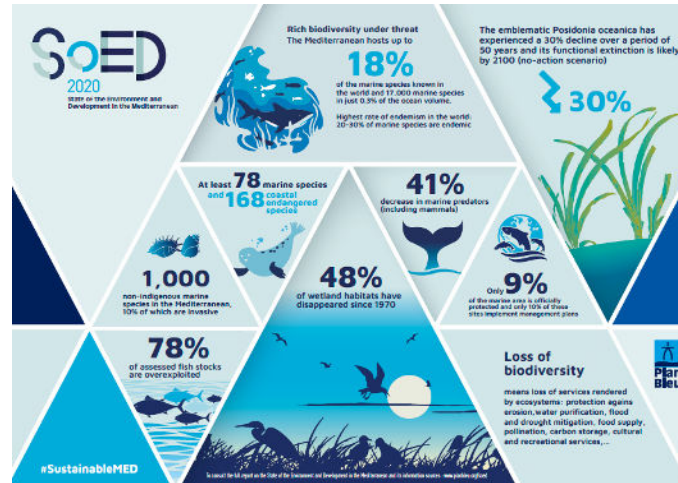
Air pollution: In 2019, sulfur dioxide (SO₂) emissions from ships calling at European ports were around 1.63 million tonnes, about 16% of global SO₂ emissions from international shipping.

Underwater noise: Ships generate noise that can affect marine life in a variety of ways. It is estimated that between 2014 and 2019 the total accumulated underwater radiated sound energy in EU waters will more than double. Container ships, passenger ships and tankers generate the highest noise energy emissions from propeller use.

Non - indigenous species: Overall, the maritime transport sector has been responsible for the largest proportion of non-indigenous species introduced into EU seas since 1949 - almost 50% of all species, with the largest number found in the Mediterranean. A total of 51 species are all classified as having a high impact, meaning that they can affect ecosystems and native species. The report also notes the limited data available to assess the full impact on habitats and species.

Oil pollution: out of a total of 18 major accidental oil spills in the world since 2010, only three were in the EU (17%); better monitoring, enforcement and awareness are helping to reduce oil pollution incidents, even though the amount of oil transported by sea has steadily increased over the past 30 years.

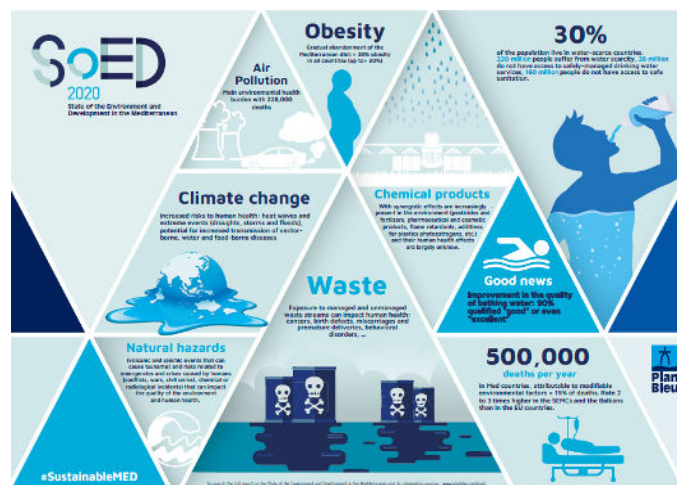
Biodiversity



Human health

Sulfur oxide (SOx) emissions form sulfate (SO4) aerosols that contribute to human health risks. SOx, particulate matter (PM2.5) and nitrogen oxides (NOx) cause premature death from a variety of causes including lung cancer, throat cancer, chronic obstructive pulmonary disease (COPD), cardiovascular disease and morbidity such as childhood asthma. Transport & Environment estimates that around 50,000 people die prematurely each year in Europe as a result of pollution from the shipping sector as a whole. In some cruise ports, such as Southampton, children may be exposed to polluted air if school playgrounds are located near the docks. In Marseille, residents have been diagnosed with respiratory cancers at abnormally high rates after the cruise industry boomed.

Aside from locals, measurements have shown that passengers themselves are exposed to elevated levels of nitrogen oxides during their voyages. For example, Canadian environmental researchers who secretly conducted air quality tests at various times and locations aboard four Carnival Corporation cruises reported in 2019 that they 'found levels of ultrafine particulate matter at the back of the ship behind the smokestacks while the ship was moving that were comparable to some of the world's most polluted cities, such as Beijing and Santiago'.



Damage to buildings

Cruise ships damage building foundations in historic Venice, a World Heritage Site.


In addition to causing the third worst air pollution of any port city in Europe,[3] cruise ships passing through the Giudecca Canal damage building foundations in historic Venice, a World Heritage Site, and block the view of residents and other tourists. [12] A week after the Costa Concordia disaster on 12 January 2012, UNESCO urged the Venetian authorities to restrict future cruise ship access to Venice and other Italian ports with vulnerable cultural-historical architecture.[13] This year, over 600 passenger ships docked in Venice, about 300 of which were classified as mega-cruises (with thousands of passengers and ten decks), carrying between 1. 6 to 2 million passengers."[12][14] In the following years, the city of Venice, for which tourism is crucial, tried to reach a compromise with the cruise lines, but in August 2014 the Italian government intervened by banning ships weighing more than 96,000 tonnes from approaching the historic center in 2015. [12] Plans to divert a third of cruises were announced by Transport Minister Danilo Toninelli in August 2019 after the MSC Opera crashed into a smaller river cruise ship and a quay in Venice on 2 June 2019, injuring five people, but Toninelli's plans have been criticized as unrealistic by activists and other politicians.

4) What are the actual international and European regulations and actions ?

MARPOL :

The IMO's International Convention for the Prevention of Pollution from Ships, better known as MARPOL (in force since 1983 and later extended), sets the main international standard to limit pollution created in shipping. Among other things, it banned all dumping within three nautical miles of a coastline and set limits on sulfur and nitrogen oxide emissions from ships.

The Plan Bleu :



PLAN BLEU
A REGIONAL ACTIVITY CENTER

Plan Bleu acts as an environment and development observatory in the Mediterranean. It is a regional activity center among 6 others in the Mediterranean, working within the Mediterranean Action Plan (MAP) under the United Nations Environment Program (UNEP). Plan Bleu is the regional activity center of the Barcelona Convention hosted by France.

About ten experts including scientists, analysts and economists, helped by support functions, make up the Plan Bleu team.

In 1976, the countries bordering the Mediterranean and the European community adopted the Barcelona Convention, to protect the maritime environment and its coastal areas. The need to jointly understand development and environment to build a sustainable future in the Mediterranean is already fully integrated by the signatory countries.

OUR VALUES

- Sharing knowledge, expertise and skills.
- Respect for differences.
- Solidarity between countries, between institutions, between people.

OUR MISSIONS

- 1. Observe the environment and development to inform decision-makers
- 2. Designing possible futures for sustainable development
- 3. Monitor the implementation of the Mediterranean Strategy for Sustainable Development
- 4. Integrate climate change as a priority
- 5. Supporting the transition to a green and blue economy
- 6. Provide socio-economic insight for appropriate management of Mediterranean resources
- 7. Alerting decision-makers and stakeholders to environmental and sustainable development issues in the Mediterranean

www.planbleu.org



Major Parties Involved

The CLIA :

The Cruise Lines International Association (CLIA) is the world's largest cruise industry trade association, providing a unified voice and leading authority of the global cruise community. On behalf of its members, affiliates, and partners; the organization supports policies and practices that foster a secure, healthy, and sustainable cruise ship environment; promoting positive travel experiences for the more than 30 million passengers who have cruised annually.

The IMO :

The International Maritime Organisation (IMO), a specialized agency of the United Nations, sets international standards to ensure the safety, security and environmental performance of shipping. The primary role of the IMO is to provide a regulatory framework for the shipping industry that is fair, effective, universally accepted and universally applied.

The UNWTO :

As the leading international organization in the field of tourism, UN Tourism promotes tourism as a driver of economic growth, inclusive development and environmental sustainability and offers leadership and support to the sector to advance knowledge and tourism policies worldwide. UN Tourism encourages the implementation of the Global Code of Ethics for Tourism, to maximize tourism's socio-economic contribution while minimizing its possible negative impacts, and is committed to promote tourism as an instrument in the achievement of the Sustainable Development Goals (SDGs), geared towards reducing poverty and fostering sustainable development worldwide.

European countries most exposed to cruise ship pollution :

According to a 2019 study by Transport and Environment, the following European countries were the most exposed to air pollution from cruise ships (2017 data):

- Spain: 14,496 tonnes of SO
- Italy: 13,895 tonnes of SO
- Greece: 7,674 tonnes of SO
- France: 5,950 tonnes of SO
- Norway: 5,261 tonnes of SO

Possible Solutions

Docking restrictions :

When docking, berthing or mooring in populated areas for several hours, cruise ships such as Harmony of the Seas are required to use auxiliary engines that burn low-sulfur fuel, or use abatement technologies, to reduce the amount of air pollution they cause to the detriment of local residents. However, critics say these measures are not enough to ensure their health.

Activists have pushed for cruises to use electricity from the shore (known as "shore power" or "cold ironing") during docking hours, but cruise lines have resisted this alternative



Shore power is already common in the United States, Canada, and some European ports (however, as of April 2019, only two European ports are able to generate enough electricity to fully power cruise ships with their engines turned off), and Southampton planned to become the first port in the UK to introduce it in 2020. [According to CLIA, 28% of cruises used shore power in April 2019] The European Commission has ordered all ports in the European Union to make shore power available by 2025, unless there is no demand or the cost outweighs the environmental benefits.

Emissions and waste reduction :

Catalytic converters can be installed to reduce ship emissions, known in the shipping industry as scrubbers. According to the Cruise Lines International Association (CLIA), as of April 2019, 60% of cruise ships already had a scrubber installed, which could be made mandatory by the EU. MSC Cruises claims that its MSC Grandiosa (built 2016) has multiple filters that reduce its gas oil sulfur oxide emissions by 97% and nitrogen oxide emissions by 80%. However, in October 2019, The Independent warned that most recently installed scrubbers (3,756 on ships, including many cruise ships) were "open-loop scrubbers", which allow the sulfur extracted from the exhaust to be converted into a liquid that can be illegally discharged into the sea. These were therefore "fudge devices" designed to give the appearance of compliance with the IMO 2020 regulation, when in fact they were in breach. Only 65 of the 3,756 scrubbers were closed-loop and could not be used to discharge sulfur extracts at sea, but had to be opened on land for safe disposal.

There are also oil water separators. According to CLIA, 62% of cruises filtered their waste water (gray water) in April 2019.

Relocating terminals :

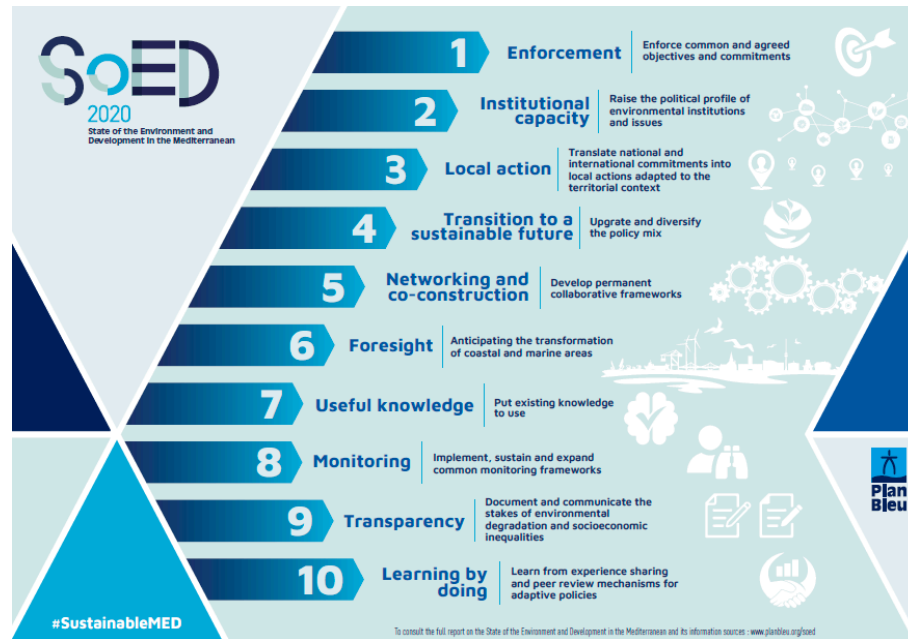
In ports such as Venice, Antwerp and Amsterdam (Piet Heinkade), the relocation of cruise ship passenger terminals away from densely populated areas and close to surrounding towns or villages has been proposed in order to reduce the number of local residents exposed to air pollution (and to spread mass tourism more evenly). However, this has been met with protests from the surrounding towns and villages who don't want the pollution and over tourism to come to them instead, and the port cities themselves fear losing the economic benefits of tourism if the cruises dock too far from where visitors want to spend their money.

Electric engines :

It's possible to run ships on electricity alone, especially for shorter distances such as between Sweden and Denmark. Electric engines don't emit harmful gasses (provided the electricity is clean), are quiet, eliminating the noise pollution caused by internal combustion engines, and require much less maintenance. On the other hand, electric batteries are relatively heavy, produce less power and speed overall, and require frequent recharging, making them less suitable for longer distances.

To reduce electricity consumption, some modern ships use only LED lights.

Profound changes for sustainable development :



Sources

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<https://www.grida.no/resources/5937>

Reducing emissions from the shipping sector - European Commission

News and Activities - Watch the webinar on the 'Extension of the EU Emissions Trading System (ETS) to maritime transport - EMSA

Zone de contrôle des émissions atmosphériques — Wikipédia

International Convention for the Prevention of Pollution from Ships (MARPOL)

About UN Tourism

Video :

How cruise ships became a catastrophe for the planet – video | Environment | The Guardian