Meeting the challenges of Mediterranean maritime traffic: supporting and implementing a collective and sustainable vision/strategy by 2031

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Introduction:

Although it only covers 2.5 million km2, the Mediterranean Sea is nevertheless significantly affected by the growth of maritime flows crossing it. Indeed, located at a strategic crossroads between the Strait of Gibraltar, opening onto the Pacific Ocean and the Suez Canal, it is home to an area of intense transit and activity, this pressure space now faces many challenges. During the period 2010-2019, maritime trade to and from Mediterranean countries thus increased by 284 million tonnes.

As maritime traffic and offshore oil and gas (O&G) exploration and production have thus reached significant levels, their pollution generates a variety of different pressures on the marine environment: loss or discharge of solid waste contributing to pollution by marine litter, emissions of gaseous pollutants and particles into the atmosphere, emission of continuous and impulsive underwater noise and vibrations, discharge of oil and other contaminants, introduction of invasive species through ballast water and hull fouling. While it now appears more important than ever in the context of climate change to provide an effective and coordinated response to these key issues for present and future generations, the various transport players in the Mediterranean have decided to turn to a common vision: the Mediterranean Strategy for the prevention, preparedness, and response to marine pollution from ships (2022-2031)[1].

This strategy, in the extension of the theoretical and practical contributions of the last biennium, makes it possible to continue to progress on this element with a new level of coordination and effective implementation thanks to an action which is intended to be reinforced with the actors. This regional strategy is to be understood within the framework of international developments for the Sustainable Development Goals developed by the United Nations. In particular, in the Mediterranean, action should be taken within the framework of objective 13 in order to combat climate change and its repercussions, and objective 14 in order to conserve and sustainably exploit the oceans, seas and marine resources for the purposes of sustainable development.

[1] Mentioned next as "the Strategy (2022-2031)"

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If this strategy (2022-2031) responds to a coordinated vision necessary at the present moment in order to address current and rapidly coming challenges, this paper is also an opportunity to question its practical deployment over the long term, the 2031 horizon, in particular, thanks to its action plan and the key elements of the response proposed in technical sessions with experts. A more specific example is that of the potential establishment in 2022 of a Med SOx ECA zone as part of the prevention of air pollution causing many negative externalities on health and the environment.

I) From the recognition of the challenges in the Mediterranean in the light of the environmental question to a vision for the Mediterranean: the strategy (2022-2031).

a. Building a sustainable vision for the Mediterranean

Firstly, the effective implementation of the preservation of the Mediterranean environment linked to anthropogenic actions resulting from maritime navigation responds to a vision for the Mediterranean by 2031. Adopted by the Contracting Parties to the Barcelona Convention in 2021 (Decision IG.25/16)[2] at the 22nd meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, the Strategy (2022-2031) offers a common thread in the active approach to the preservation of this space backed by a concrete Action Plan.

Aiming to produce clear guidelines, this Strategy (2022-2031) is broken down into a series of common objectives (CSOs) to be achieved by 2031. This Strategy (2022-2031) aims to guide the work of the Contracting Parties to the Barcelona Convention towards the leadership embodied by the United Nations 2030 Agenda for the sustainable development and good environmental status (GHG) of the Mediterranean Sea and coastline.

In order to prevent, reduce and control pollution of the marine environment, the Strategy (2022-2031) applies to a set of key operational players in the region: ships, port reception facilities, terminals, offshore facilities, handling facilities and seaports.

Backed by the Strategy (2022-2031), an Action Plan defines a series of specific actions necessary to achieve the seven CSOs of the Strategy (2022-2031). These are broken down into actions on people, infrastructure and in the context of sharing information and knowledge.

More particularly, these actions make it possible to support and encourage open and collaborative networks between all stakeholders, to build capacity, to help Contracting Parties ensure that they have the knowledge, expertise and experience needed to implement the Strategy (2022-2031). It should also

[2] Decision IG.25/16 Mediterranean Strategy for Pollution Prevention, Preparedness and Response Marine from Ships (2022-2031) September 27, 2022, https://wedocs.unep.org/bitstream/handle/20.500.11822/37138/21ig25_27_2516_eng.pdf?sequence=1

be ensured that the means of monitoring and control necessary to prevent and detect illicit discharges and emissions from ships, to exchange control information and to help combat pollution incidents navy, are available and strategically placed throughout the Mediterranean region.

b. From the study of trends in the Mediterranean to a need for a response

The need to implement a sustainable operational vision in the Mediterranean area is explained by the fact that maritime traffic in the Mediterranean is not without significant and harmful effects on health and the environment, to be stopped.

Indeed, according to the "Study on trends and outlook for marine pollution from ships and activities as well as maritime traffic and offshore activities in the Mediterranean"[3] published by REMPEC in December 2021, maritime traffic constitutes a real vector of marine pollution in the Mediterranean basin (discharge of solid waste and hydrocarbons, emission of particles into the atmosphere, emission of underwater noise, invasive species). This study defines five axes corresponding to frameworks affecting more particularly the Mediterranean correlated to the main subjects mentioned.

The increase in maritime traffic leads to a higher risk of pollution caused by shipping. Although environmental regulations are strict, particularly within the framework of the MARPOL convention (International Convention for the Prevention of Pollution from Ships), polluting substances continue to be discharged into the sea. Shipping activities generate various pollution pressures chemical through the release of hydrocarbons and other chemicals. Spills can occur in accidents, during routine operations, in ports, as well as at sea. They can be intentional or accidental, resulting from human decision, human error, or a technical failure.

Marine litter is a real regional issue, from its origin to its dissemination in the marine environment. It is estimated that more than 90 million tonnes of plastics have accumulated in the world's oceans, with around 5 to 13 million tonnes being added each year. In fact, marine debris enters the seas from land and sea sources and around 60-80% of it comes from plastic. They have various potentially harmful implications on marine ecosystems and human activities at sea. Every year, millions of species that live in the oceans are weakened, maimed, and killed by marine litter. Marine litter also poses a risk to human health and has significant implications for human well-being, negatively impacting vital economic sectors, such as tourism, fisheries, or aquaculture.

Shipping is heavily dependent on fossil fuels. About 3.5 million barrels of high sulfur residual fuel oil (bunker fuel) per day were consumed by the sector in 2017, representing about 50% of global fuel oil

[3] STUDY ON TRENDS AND OUTLOOK OF MARINE POLLUTION by ships and activities and maritime traffic and offshore activities in the Mediterranean. (2022-2031) December 2021, http://www.rempec.org/en/knowledge-centre/online-catalogue/etudetendances2022.pdf/view

demand. Most of these fuels have a high sulfur content, which leads to the emission of sulfur oxides into the atmosphere. Emissions from ships are dispersed into the atmosphere for hundreds of kilometres, contributing to the deterioration of air quality on land, even if they are emitted at sea. They come mainly from the exhaust gases of ships.

With the increasing mobility of people and goods globally, the spread of invasive species (NIS) has accelerated over the past decade with a 200% growth rate over ten years. The Mediterranean Sea is one of the seas most affected by NIS, in terms of high rate of introduction, number of taxa recorded and duration of permanence (macrophytes, fish, molluscs, polychaetes, bryozoans and crustaceans).

Changes in terms of Mediterranean marine biodiversity linked to the introduction of NIS have been reported in recent years, mainly linked to maritime transport, the main route of introduction, mainly in ballast water or as fouling on the hulls of ships. NIS impact both the environment, human health and activities. For example, the jellyfish Rhopilema nomadica has been reported to negatively affect coastal power generation facilities, as well as impacting fisheries, human health, and tourism.

Noise from human activities at sea travels long distances underwater, causing increases and changes in ocean noise levels. Increased noise levels can negatively impact marine species and ecosystems that can reduce the species' ability to hear environmental cues that are vital for its survival, ranging from a temporary reduction in hearing sensitivity and the effects behaviours to more dramatic effects such as death.

Thus, the response to environmental challenges in the physical Mediterranean space in terms of transport is embodied in the Strategy (2022-2031) and is put into practice thanks to an Action Plan regularly revised and adapted to the contextual evolution and environment of this space.

II) An example of implementation integrating with this vision: the designation of the Med SOx Eca

Then, this vision for the Mediterranean makes it possible to theorize and propose appropriate measures to current issues. This coordinated effort, making it possible to propose a common approach is reflected in multiple decisions such as the decision by the International Maritime Organization (IMO) in June 2022 to set up a Mediterranean Sea emission control area for sulfur oxides and the particles. This decision, which is part of the strategy (2022-2031), allows significant progress for a more sustainable maritime sector in terms of transport-related pollution and opens the way to new, more sustained environmental prospects.

a. From tangible health and environmental impacts to a coordinated air quality transition of the transport sector

Among these issues previously identified by the study on trends, the issue of air pollution occupied a large part of the decisions related to the Mediterranean this year and the agenda for 2025, due to the decision to discuss the adoption of a SOx reduction zone at the next MEPC 79 in December 2022.

This specific issue produces many effects on health and the environment that must be curbed in the long term. Near densely populated coastlines, ship pollutants and particulate matter (PM) from fuel combustion, including sulfur oxides (SOx), pose serious hazards to human health and marine ecosystems. Emissions produced by ships are transported directly into the atmosphere over several hundred kilometres, causing deterioration of air quality on land and at sea.

One of the effects of this pollution generated during the combustion of marine engines is the formation of SO4 aerosols interacting with other particles (PM), which can deeply penetrate our lungs as well as those of other living organisms causing risks such as lung cancer, cardiovascular disease or asthma. Regarding the environment, this pollution contributes through the deposition of wet and dry sulphates to the acidification of aquatic systems and general visibility through the appearance of fog. WHO reports also indicate that in the Mediterranean the levels of air pollution are among the highest, hence an increase in the level of risk.

b. Designate the Mediterranean Sea as an Emission Control Area (Med SOx ECA), within which specific requirements will be imposed (Dec. 2022)

A solution currently being implemented in the context of reducing the level of pollution and the effects mentioned above, within the framework of the general objectives of sustainable development of the Strategy (2022-2031) is the designation of an enlarged control zone regarding the level of SOx, ECA and PM emitted, or effective establishment and monitoring measures may emerge.

b.1 The Med SOx ECA, from its training to effective practice

The Med SOx ECA is the result of several years of coordinated work with all the Mediterranean actors concerned. To understand its practical implications, it is important to look at the construction of this specific regime.

In February 2022, a joint and coordinated proposal on the designation of the Med SOx ECA was submitted to IMO, followed by the approval of the said proposal and a draft amendment to Annex IV of MARPOL relating to the designation of the Med SOx ECA proposed during the MEPC 78 Committee. In the coming months, this decision to bring into force the amendment to regulation 14 of MARPOL Annex VI will be examined for approval in December 2022 during of the MEPC 79 Committee, for an application date scheduled for January 1, 2023.

These advances follow several years of progress and strengthening coordination capacities for collective decision-making. 2020 notably saw the entry into force of a new global regulation limiting the sulfur content in fuel oil used on board ships to 0.5%, this is the IMO sulfur limit and it resulted in tangible global benefits. Notably, the annual reduction is approximately 8.5 million metric tons of sulfur oxides released into the atmosphere and further results are now expected from the implementation of the new limit. The idea is to reduce emissions by 79% for sulfur oxides and 24% for particulates.

With a proposal for entry into force of the Med SOx ECA on January 1, 2025, no ship entering the Mediterranean Sea would use fuel with a sulfur content greater than 0.1% m/m and monitoring will apply on compliance with this rule. The reduction in emissions is correlated with the need for countries to implement this decision, assisted by REMPEC, and then for shipping companies and other key players in Mediterranean industry to make the shift to sustainability with upgrades technology and cleaner energy sources.

In understanding its practical application, as ship exhaust contributes to global air and sea pollution, ships are faced with an increasing number of rules and regulations, as well as than to voluntary remedies by international, national, and local legislations. Some solutions have been proposed to improve air quality in coastal areas and ports. These include establishing reduced speed zones, emission control zones and adapting dockside electrification technologies for ships when docked.

b.2 The effects of these measures

In addition to the impact that this measure will have in terms of practical implementation in terms of regulations and adaptations required for ships, the Med SOx ECA is part of the objectives for the Strategy (2022-2031) within a framework wider. Indeed, this practice allows a general improvement of the air quality and to prevent several affections in terms of health and environment.

In the technical and feasibility study conducted by REMPEC[4], the conclusions showed that the Med SOx ECA allows the improvement of air quality with an annual reduction of approximately 8.5 million tons of SOx released into the atmosphere (emissions lower by 78.7% for SOx and by 23.7% for PM2.5, compared to the IMO sulfur ceiling (0.5%)). In this sense, it would prevent 1100 premature deaths linked to air pollution and 2300 cases of childhood asthma each year.

This would also allow the prevention of acidification and its impacts on aquatic systems through wet and dry sulphate depositions which would be reduced by 1.16%. and 1.95% respectively. In terms of

[4] The technical and feasibility study for the designation of Med SOx ECA, REMPEC, December 2021, https://www.rempec.org/en/knowledge-centre/online-catalogue/2019/rempec-wg-45-inf-9-technical-and-feasibility-study-to-examine-the-possibility-of-designating-the-mediterranean-sea-or-parts-thereof-as-sox-eca-s-under-marpol-annex-vi-english-only

the risks identified for navigation, this would allow a reduction in haze with improved visibility, thus avoiding maritime incidents and improving tourist attractiveness.

Thus, the implementation of the Med SOx ECA makes it possible to set an effective example on the implementation of the Strategy (2022-2031) by putting into practice CSO 3: Reduce and monitor atmospheric emissions from ships to a level that is not harmful to the marine environment or the health of the Mediterranean coastal population.

Conclusion:

In recent years, several coordinated initiatives have emerged in the Mediterranean allowing, thanks to the collective mobilization of key players, several theoretical advances to be implemented by 2031. These measures are contained in the development of the Strategy (2022-2031) for the Mediterranean highlighting the priorities for reducing pollution and its consequences in terms of pollution by hydrocarbons, marine litter, invasive species, particularly from Ballast waters, underwater noise, and air pollution. This last point has also seen an increase this year concerning the reduction of SOx and PM that we have had the opportunity to develop in this paper. Reducing emissions from ships is correlated with the need for countries to implement the Med SOx ECA regulations in a coordinated manner, including ship operations and wider industry, in order to emphasize a coordinated and convenient transit transition with technology upgrades and cleaner energy sources, leading to cleaner air and better health for people and nature.

Going further in this sustainability approach for cleaner navigation in the Mediterranean means considering the implementation of this vision for the Mediterranean and its follow-up. This is made possible in particular thanks to the Action Plan backed by the Strategy (2022-2031). This Action Plan defines the specific measures to be implemented within the framework of each CSO according to "areas of influence" (People, institutions, infrastructure; and information and knowledge sharing) which are informed by objectives of support. for each of the areas. These CSOs are guided on an ongoing basis according to the results linked to the objective during the biennial meeting, the first year of each biennium. In particular, this makes it possible to report on and assess the progress made in the implementation of the Strategy (2022-2031). This is complemented by a mid-term review and evaluation through regular follow-up through a consultative process with Contracting Parties to the Barcelona Convention[5] and relevant regional and international organizations. At the end of each period of five (5) years, the Strategy (2022-2031) and its Action Plan will be revised on the basis of an analysis of the state of progress of its implementation and the results of discussions on emerging issues. In this

[5] The 22 Contracting Parties to the Barcelona Convention are: Albania, Algeria, Bosnia and Herzegovina, Cyprus, Croatia, Egypt, Spain, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Morocco, Monaco, Montenegro, Syrian Arab Republic, Slovenia, Tunisia, Türkiye, and the European Union.

sense, the current vision for 2031 will be assessed in 2026, with a view to possibly adopting a revised strategy in 2027.

The key to this transition towards a Mediterranean transport that is more respectful of people and ecosystems is thus embodied by reinforced inter-partner action, in order to move towards this common objective for present and future generations of "a clean Mediterranean marine and coastal environment with a healthy, sustainable and pollution-free maritime sector, supported by a rigorous enforcement system and enhanced multi-sectoral cooperation, for the benefit of present and future generations".

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