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【欧州】【海事】

Maritime Issues - Internal regulation of gas emissions: Mediterranean Sea Emission Control Area for SOx and PM (Med SOx ECA) to become the worldwide fifth SECA in 2025

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【概要：Summary】

The exhaust gases of vessels in maritime transport contain significant amounts of sulphur oxide (SOx), nitro oxides (NOx) and particle matter (PM) emissions, posing a negative impact of human health and the environment.

To reduce air pollution from vessels, the International Maritime Organisation (IMO) introduced Emission Control Areas (ECAs) in some regions, where only marine fuels with a sulphur content of 0.1% are allowed since 1 January 2015. Furthermore, the IMO's Marine Environment Protection Committee (MEPC) 70 decided to implement the general 0.5% global sulphur cap on marine fuels in all areas outside emission control areas (ECAs), from 1 January 2020. Accordingly, outside SECAs/ECAs, the vessels have to use fuels with 0.5% m/m (percentage mass of sulphur dioxide gases in the total mass of the emission) at global level, unless the vessels are equipped with exhaust gas cleaning systems to clean the sulphur emissions.

In Europe there exist two SECAs so far, in the Baltic Sea, and North Sea and English Channel. These two SECAs also became NOx emission control areas in 2021.

Regarding the introduction of a sulphur emission control area in the Mediterranean Sea, in March 2018, France announced it was looking into the possibility of establishing a Mediterranean Sea SECA. At the IMO's Marine Environment Protection Committee's 79th session (MEPC 79) in December 2022, the Mediterranean Sea was finally designated as Emission Control Area for sulphur oxides (SECA) and particulate matter (PM). Accordingly, as of 1 May 2025, ships will be required to use marine fuel with a reduced permissible sulphur content of 0.1% in the Mediterranean Sea, down from the current limit of 0.5%. Thereby, the Mediterranean Sea will become the worldwide fifth Emission Control Area for Sulphur Oxides and Particulate Matter.

While it is an important step to introduce the Med SOx ECA in 2025, the decision makers missed the chance of also regulating the NOx emissions in the Mediterranean Sea. They could have decided to introduce a full ECA also covering nitrogen oxides from the start, like in case of the North American ECA's. Instead, this decision has been postponed to a later date like in the case of the SECAs in the North Sea and English Channel and the Baltic Sea. Due to such a delay in decision making regarding the introduction of a Mediterranean NOx ECA and due to the lengthy period, a fleet renewal will take, it will need decades until a future NECA will show effects also in case of the Mediterranean Sea.

【記事：Article】

1. Background of the introduction of Emission Control Areas for SOx, NOx, and PM

The exhaust gases of ships in maritime transport have a direct impact on air quality of many coastal cities. These emissions are a significant source of air pollution and have a negative impact of human health and the environment.

Sulphur Oxide (SOx) emissions from ships' combustion engines cause acid rain and generate fine dust that can lead to respiratory and cardiovascular diseases, as well as reduced life expectancy (European Commission 2020). Until 2020, in most regions of maritime transport outside emission control areas, ships used fuel oil with a sulphur content of up to 3.50% (European Commission 2020).

The International Maritime Organisation (IMO) has been working to reduce the negative impacts of shipping on the environment and on 2 November 1973, it adopted the "International Convention on the Prevention of Pollution from Ships", MARPOL 73/78, and the 1978 MARPOL Protocol, which absorbed the original Convention and the combined instrument entered into force on 2 October 1983 (IMO n.d.a). In 1997, a new Annex VI on the Prevention of Air Pollution from Ships was added to the MARPOL Convention and Protocol, which seeks to control airborne emissions from ships, including sulphur oxides (SOx), nitrogen oxides (NOx), ozone depleting substances (ODS) and volatile organic compounds (VOC) and PM among others (IMO n.d.a). In 2008, Annex VI to the MARPOL Convention was revised and requirements were significantly strengthened, setting new limits on SOx, NOx and PM. The revised Annex VI entered into force on 1 July 2010.

Based on the IMO's MARPOL 73/78, the 1997 MARPOL Protocol and the new Annex VI, Emission Control Areas (ECAs) for SOx, NOx, and Particle Matters (PM) were established to minimize airborne emissions from ships in specified areas. There were set up two Sulphur Emission Control Areas (SECAs) in Europe and a North American ECA. Since 1 January 2015, there exist a new sulphur limit of 0.1% sulphur limit of marine fuels in ECAs/SECAs. In Europe, SECAs were established in the Baltic Sea (as of 19 May 2006) and the North Sea and English Channel (as of 22 Nov 2007) (European Commission 2020). From 1 March 2019, the North Sea ECA was extended to include the entire Norwegian world heritage fjord area.

The North American ECA came into effect on 1 Aug 2012 and includes SOx, and NOx and PM in Canada and the US, whereas the US Caribbean Sea ECA (SOx, NOx, and PM) came into effect 1 Jan 2014.

In the SECAs, the sulphur limits were gradually reduced over time, from 1.50% m/m (mass by mass, percentage mass of sulphur dioxide gases in the total mass of the emissions) to 0.10% m/m, from 1 January 2015 onward (IMO n.d.b, European Commission 2020).

Furthermore, as of 1 January 2020, a new global sulphur cap of 0.5% was introduced for all areas outside SECAs and ECA regions, down from the previously permitted 3.5% sulphur contents. According to IMO estimates, the 0.50% sulphur limit for marine fuels in 2020 affects as many as 70,000 ships (European Commission 2020). While this improvement in fuel quality will bring about huge benefits to human health in coastal areas not protected by ECAs, it will also reduce shipping's impacts on acidification of the ocean.

In response to the joint request of the littoral states bordering the Baltic Sea and the North Sea, the IMO designated both, the Baltic Sea and North Sea and English Channel regions, as "Nitrogen Oxides Emission Control Areas" (NOx-ECAs) in July 2017 and as of 1 January 2021, ship constructed on or after 1 January 2021 and operating in these ECAs will have to comply with NOX Tier III standards defined in regulation 13.5 of MARPOL Annex VI (IMO n.d.b, (COM/2018/188 final). NOx emissions are expected to be reduced by 80% compared to the previous NOx emission level (IMO n.d.d).

Therefore, there are now existing four SECAs/ECAs including the Baltic Sea, the North Sea, and English Channel, the North American ECA, including most of the US and Canadian coast, and the US Caribbean ECA.

Meanwhile, the EU has been working on its support for introducing also new SECA in the Mediterranean Sea, in the context of the Barcelona Convention and the IMO's Marine Environment Protection Committee (MEPC), at its 79th meeting between 12 - 16 December 2022, adopted the resolution to designate the Mediterranean Sea as a Sulphur Emission Control Area (SECA).

2. The EU's Sulphur Directive and preparatory work on a Mediterranean SECA

Since 2012, the EU has taken firm action to reduce the sulphur content of marine fuels through the Sulphur Directive (2012/33), which was revised in 2016 (European Commission 2020).

The EU's 2012 revision of the Sulphur Directive, "Directive 2012/33/EU of the European Parliament and of the Council of 21 November 2012 amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels " aimed to reduce the emissions of this air pollutant by setting maximum sulphur content levels for marine fuels. It also incorporated the transposition of the IMO's new standards for SECAs into EU law, notably the 0.10% sulphur in fuel requirements applicable as of 2015 (Directive 2012/33/EU).

Thereafter, in 2016, the IMO took the landmark decision to maintain the year 2020 as entry-into-force date of a new global sulphur cap and to reduce it from 3.5% to 0.50% in areas outside SECAs/ECAs.

Accordingly, the EU repealed Directive 2012/33/EU by Directive (EU) 2016/802 of the European Parliament and of the Council of 11 May 2016 relating to a reduction in the sulphur content of certain liquid fuels (codification) (Directive (EU) 2016/802). Based on this Directive (EU) 2016/802, not only the new sulphur limit of 0.1% in EU SECAs as of 2015 but also the new global sulphur limit of 0.5% outside SECAs to be introduced by 2020 was included into EU law.

However, also other future developments for SECAs were discussed and, in particular, France took the lead in proposing the implementation of a Mediterranean emission control area.

In March 2018, France announced it was looking into the possibility of establishing a 0.1% SECA in the Mediterranean Sea. On 25 October 2018, at the side-lines of the IMO's 73rd Marine Environmental Protection Committee meeting (MEPC 73), France presented the results of its impact assessment of the possible implementation of a fifth SECA, in the Mediterranean Sea.

In 2017, the French National Reduction Plan of Atmospheric Pollutants Emissions (PREPA) was adopted in the French law and envisaged the implementation of new low emission zones in the Mediterranean Sea. Accordingly, the French Ministry for the Ecological and Inclusive Transition (MTES) was interested in assessing the feasibility and the potential benefits of the implementation of a NECA (NOx emissions control area) or/and SECA (SOx emissions control Area) in the Mediterranean Sea (INERIS 2019). A feasibility study, the ECAMED report, was presented in 2019, with emissions and air quality modelling tools to elaborate a diagnostic on the benefits of air quality in the Mediterranean with emission reduction scenarios associated to maritime shipping (INERIS 2019). These scenarios included a reduction of the Sulphur content in fuels used from 0.5% (as of 2020) to 0.1% to reduce SOx and PM emissions from ships (INERIS 2019). Another scenario considered the reduction of NOx emissions by equipping a certain amount (50% or 100%) of engines with Selective Catalytic Reduction (SCR), which reduced tailpipe emissions of NOx (INERIS 2019).

The results indicate the essential need to develop combined SECA and NECA strategies to maximise achievable health benefit, and to have the greatest positive effect in reducing air pollution while bringing socio-economic and ecological benefits for the Mediterranean countries (INERIS 2019, Manifoldtimes 25 Oct. 2018). The report concluded that in the worst-case health benefits of implementing a SECA/NECA in the Mediterranean Sea are 3 times higher than the costs, demonstrating the relevance of this strategy for protecting health of citizens in the Mediterranean countries (INERIS 2019).

Furthermore, also in 2019, the outcome of the European Commission-funded impact assessment was produced by the International Institute for Applied Systems Analysis (IIASA). The IIASA study on "The potential for cost-effective air emission reductions from international shipping through designation of further Emission Control Areas in EU waters with focus on the Mediterranean Sea" (IIASA), explores the impacts of alternative emission control interventions for international shipping on the European Seas. Its findings were aligned with the French ECAMED report. According to the IIASA impact assessment, SO2 emissions decrease by -80% already in 2020, thanks to the new global sulphur limit of 0.5%. However, this could further decrease by another 80% if a Mediterranean SECA is imposed (IIASA 2019). It found that further controls of SO_2 emission reduction by the introduction of SECAs could avoid by 2030 up to 4,000 cases of premature deaths annually, and 8,000 to 11,000 in 2050 (IIASA 2018). In the longer run, by 2050, application of Tier III NOx standards could double the health benefits. Regarding the designation of the Mediterranean Sea as an Emission Control Area could cut emissions of SO2 and NOx from international shipping by 80 and 20% by 2030, respectively, compared to current legislation (IIASA 2018). Even with the most conservative assumptions for health valuation, monetized benefits, the benefits of a Mediterranean SECA/NECA outweighs costs by on average a factor of 7 in 2030 and a factor of 12 in 2050 (IIASA 2019). Even with the most conservative assumptions for health valuation, monetized benefits are on average 4.4 times higher than the costs in 2030 and 7.5 times higher in 2050 (IIASA 2019).

In December 2021, the Barcelona Convention on the Protection of the Marine Environment and the Coastal Region of the Mediterranean with its 22 Contracting Parties including Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syrian Arab Republic, Tunisia, Turkey, and the EU signed a declaration endorsing a new strategy for 2022 to 2027 to achieve a healthy, clean, sustainable and climate resilient Mediterranean Sea (European Commission 2021).

The preparatory work on the introduction of a Mediterranean ECA, undertaken by the Contracting Parties to the Barcelona Convention, encompassed several studies and in a final step, a coalition of Mediterranean countries submitted an application to the IMO's MEPC to ask for the introduction of an emission control area for SOx, NOx, and particle emission limits for international ships in the Mediterranean Sea.

3. The new Mediterranean Sea emission control area, Med SOx ECA

The submission to the IMO for setting up a new Mediterranean sulphur emission control area was agreed within the framework of the Mediterranean Action Plan of the UN Environment Programme (UNEP/MAP) at the 22nd meeting of Convention of the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) (COP22), which took place on 7-10 December 2021 (UNEP 2021). All contracting Parties COP 22 agreed to support the designation of an emission control area in

the whole Mediterranean Sea for SOx emissions and PM, the Med SOx ECA (UNEP 2021).

At the IMO's Marine Environment Protection Committee's 78th session (MEPC 78) from 6 to 10 June 2022, delegates approved the draft amendments to MARPOL Annex VI to designate the ECA for SOx and PM for the Mediterranean Sea, under regulation 14 of Annex VI to the International Convention for the Prevention of Pollution from Ships (MARPOL) (IMO n.d.c). The MEPC 78 granted its approval after considering the joint and coordinated proposal submitted by all Mediterranean coastal States, along with all EU Member States, and the European Commission (UNEP 2022a). The Mediterranean Sea was formally designated and adopted as Med SECA at the 79th session of MEPC from 12 to 16 December 2022.

In fact, limiting the sulphur content in fuel oil used by ships operating within the Med SOx ECA to 0.10% m/m means a further reduction of the sulphur contents to one fifth of the current global limit. It is expected that by the introduction of the Med SOx ECA, sulphur emissions are cut by 78.7%, and PM2.5 are cut by 23.7%, bringing considerable benefits for human health and the environment (UNEP 2022a).

Furthermore, the North-Western part of the Mediterranean Sea has, in principle, been designated as a Particularly Sensitive Sea Area (PSSA). It aims to protect marine cetaceans that are breeding and feeding in the PSSA. The PSSA covers waters off the coastlines of France, Italy, Monaco, and Spain (UNEP 2022a). The MEPC 79 decision of creating a PSSA in the North-Western Mediterranean Sea was made subject to the further development and approval of the proposed associative protective measures. The measures will be discussed at the next meeting of the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) and it is expected that the final adoption of the PSSA will take place during MEPC 80.

This designation of the Mediterranean Sea as an Emission Control Area for sulphur oxides (SECA) means that the Mediterranean Emission Control Area will enter into force on 1 May 2024. Thereafter, as of 1 May 2025, ships will be required to use marine fuel with reduced sulphur contents of 0.1% (UNEP 2022a, IMO 2022).

While the already existing Emission control areas for sulphur in the EU in the North Sea and the Baltic Sea have proven to be successful, their scope has been extended and rules are now in force since 2021 to also cover nitrogen oxides (European Commission 2022).

The European Commission welcomes the agreement reached by the IMO on the designation of the Mediterranean Sea as an Emission Control Area for sulphur oxides (SECA), which is expected to eventually cut sulphur emissions by almost 80%, and also emissions of harmful fine dust (PM2.5) by almost a quarter (European Commission 2022).

The Commission will continue to prepare for the implementation of the Mediterranean SECA and similarly, the Commission will also continue to support future initiatives by the littoral EU States aiming at creating additional ECAs to cover all EU waters (European Commission 2022).

4. Conclusion

In the EU, after the successful introduction of an ECA in the North Sea and Baltic Sea, it was one main goal to create an ECA in the Mediterranean Sea. France presented the conclusions of an impact assessment during the MEPC 73, revealing that the greatest positive effect would be achieved for the Mediterranean Sea if a combined SOx and NOx ECA would be implemented. The introduction of the "MED SOx ECA" with marine fuels of a 0.1% sulphur content by 2025, instead of the current levels of 0.5% since the 1rst of January 2020, is a turning point for maritime transport in the Mediterranean Sea, one of the busiest regions for maritime transport worldwide, with an estimated 24% of the global

ship fleet and 17% of the worldwide cruises being located in the Mediterranean Sea in 2019.

The Mediterranean Sea will become the fifth area worldwide to be designated as an Emission Control Area for Sulphur Oxides and Particulate Matter. Since the global sulphur limit is applied also in the Mediterranean since 2020, the reduction to 0.1% sulphur contents will add to this positive effect to reduce air pollution by further lowering sulphur contents by 2025. While this stricter sulphur limit in the Mediterranean Sea is expected to bring benefits to human health in coastal areas, ahead of its introduction, it will be necessary for the shipping industry, for ports and refineries to prepare for the change and resolve some important practical issues.

However, the new Mediterranean SECA falls short of regulating the NOx emissions, which would have been a necessary step to achieve a full ECA. Instead, decision makers missed their chance to introduce from the start a full ECA, like in North America. In case of the Med SECA, the Barcelona Convention signatories have agreed to discuss the establishment of the NECA zone in the next two years as a next step, separated from the designation of the Mediterranean Sea as SECA. The chance to introduce a NECA in the Mediterranean Sea from the start has been missed.

However, since fleet renewal is a lengthy process, which only would start after a NOx emissions control area was introduced, as new builds have to be equipped with catalysts or use LNG fuels to comply, it could take more than a decade until the positive effect of a NECA would become visible in the Mediterranean Sea.

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