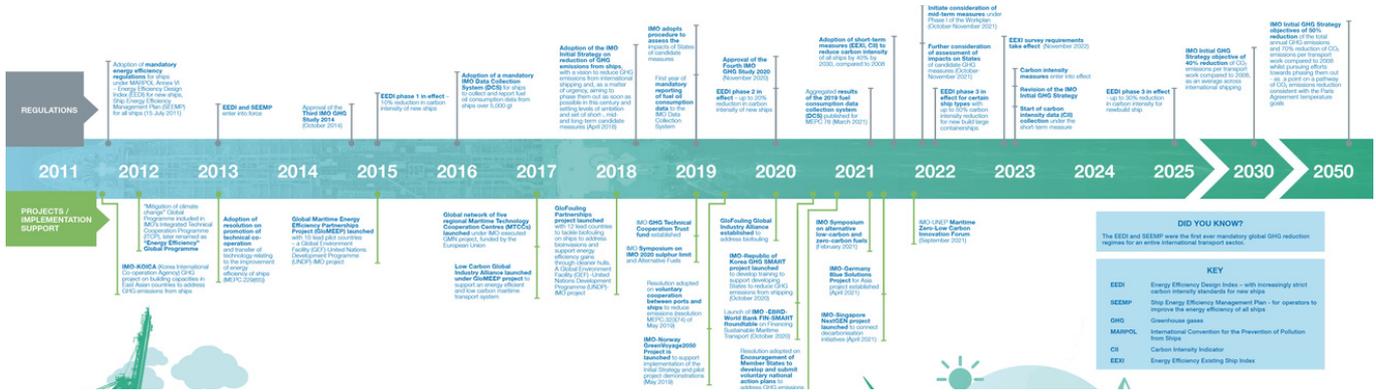




Evaluation, control and Mitigation of the Environmental impacts of shipping Emissions



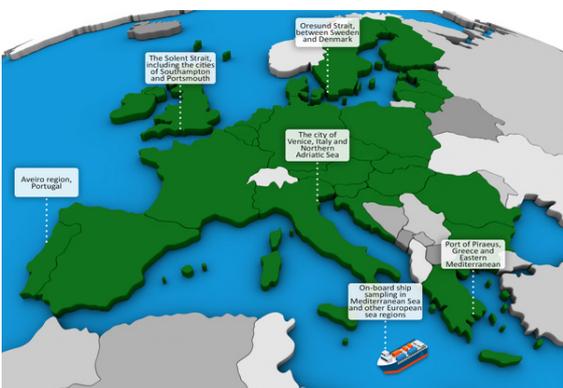
Source: *IMO's work to cut GHG emissions from ships*

In This Issue

- Project Updates
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PROJECT UPDATES

Overall, the progress of the measurement campaigns was affected by the COVID-19 pandemic and recent technical upgrades were made to the computing systems. These unforeseen circumstances have resulted in delays in data delivery to Work Packages 4 and 5, which in turn impact the progress of Work Packages 6 and 7. Despite these challenges, all EMERGE partners have been making every effort to minimize the risk of additional delays to the progress of the project and to ensure that the project's objectives are met according to the original plan.



With respect to the case studies, despite the disruptions caused by the COVID-19 pandemic, the advancement in the field of water and air quality modeling has been sustained at a commendable level. It is determined that the results of the ecotoxicological examination indicate a significant potential for the effluent discharged from scrubber systems to adversely affect the populations of crucial organisms within marine food chains. Consequently, it is imperative that this information be considered in ongoing discussions regarding the utilization of scrubber technology.

Moreover, it is to be noted that all partners associated with the IMO EMERGE project have been diligently engaged in the preparation of the 2nd Mid-term Review Report in anticipation of the upcoming virtual meeting with the new European Commission Project Officer, scheduled to take place on March 14th, 2023.

Finally, the General Assembly meeting is also scheduled and will take place between 7-9 of June 2023 in Helsinki.

NEWS

CONSORTIUM UPDATES

It is with both sadness and gratitude that we announce the retirement of Jaakko Kukkonen from his role as project coordinator of the EMERGE project. We extend our warmest appreciation for his valuable contributions and dedication to the project. His leadership and guidance will be greatly missed. However, Prof. Kukkonen will continue to be involved in the project in 2023 as a Prof. Emeritus, ensuring a smooth transition and continuity of the project objectives.

As we say farewell to Jaakko, we are excited to welcome Dr. Jukka-Pekka Jalkanen as the new project coordinator of EMERGE, effective September 2022. We are confident that under his leadership, the project will continue to progress towards its objectives.

We would also want to highlight that Prof. Jens Borcken-Kleefeld has taken on a new role as Professor for Transportation Ecology at the Technical University of Dresden/Germany as of September 2022. As a result, Prof. Wilfried Winiwarter and Mr. Samuel Gueret have taken over as leaders of WP7. We extend a warm welcome to both Prof. Winiwarter and Mr. Gueret and look forward to a productive collaboration with them as part of the EMERGE team.

PROJECT DELIVERABLES

We are happy to share that nine deliverables were accepted by the EC, the seven out of them are available to the public.

Below the list with the deliverables:

- 1.D1.3 Emission values based on the STEAM model
- 2.D2.2 : Report on measurements of dissolved and particulate contaminants in case study regions
- 3.D2.3 : Report on scrubber water whole effluent toxicity testing, at different geographical regions
- 4.D3.1: Compilation and analysis of experimental data from on-board campaigns, including emission and activity data and profiles
- 5.D3.2: Improved emission factors and emission profiles for use in the STEAM model
- 6.D3.3: Dataset of emission factors
- 7.D5.1 Shipping emission dataset for air quality models

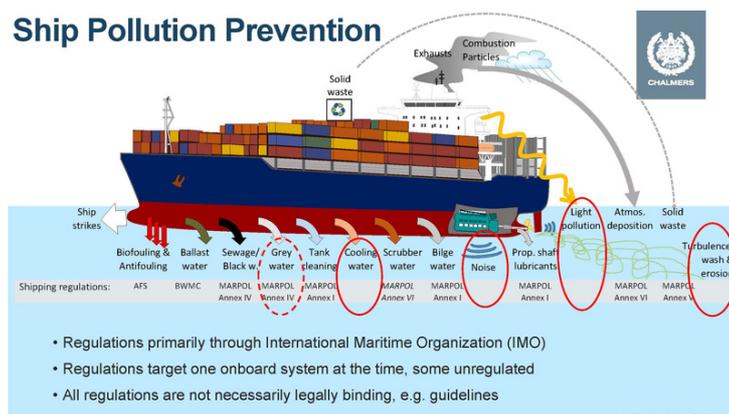
In case you wish to have access to the above-mentioned deliverables, please contact Dr. Androniki Maragkidou (androniki.maragkidou@fmi.fi).

SCRUBBERS WEBINAR: A FALSE SOLUTION TO THE IMO'S SULPHUR CAP

Ida-Maja Hassellöv our EMERGE partner from Chalmers University of Technology had a presentation with topic 'On scrubbers' impact on the marine environment' during an online event organised by the Clean Arctic Alliance and WWF-Canada on 6th of December 2022.

She presented some of our continued work within EMERGE regarding ecotoxicology, confirming previously published scientific data on scrubber water toxicity. Find her presentation [here](#).

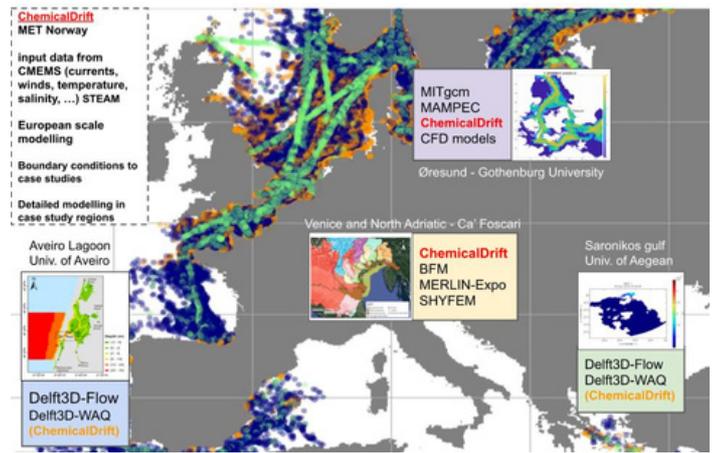
You can watch the webinar by visiting [here](#).



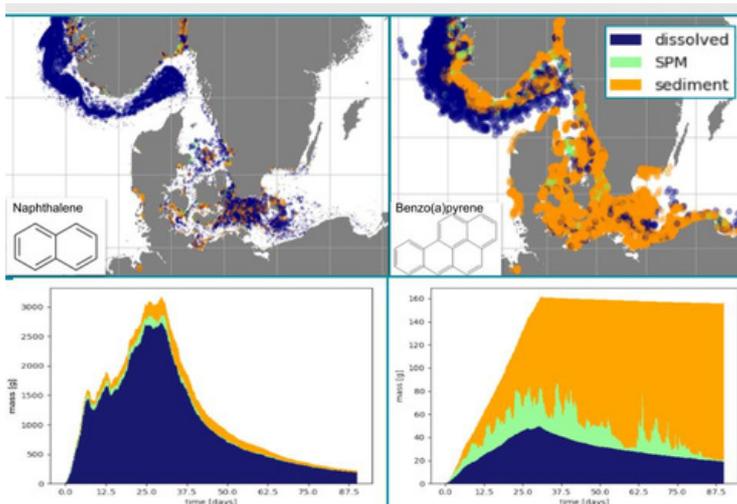
Ship Pollution Prevention, Modified from I-M. Hassellöv 2020

Our project partner from Norwegian Meteorological Institute, Dr. Manuel Aghito gave a presentation entitled "Modelling shipping emissions with STEAM and ChemicalDrift: Some outcomes of the EMERGE EU H2020 project" during the EuroGOOS, European Global Ocean Observing System webinar on 10 January 2023.

Manuel presented the modelling chain, that will be utilized in WP4 to predict the environmental concentrations of pollutants emitted from scrubbers into European waters.



EMERGE WP4 -Case studies and models



Chemical Drift. Naphthalene, Benzo(a)pyrene from OL scrubbers

The newly developed model ChemicalDrift includes dynamic partitioning, volatilization, and degradation of target chemicals, and is integrated in the Lagrangian trajectory tracking framework OpenDrift.

The ChemicalDrift model will be applied to process emissions data from the STEAM model (FMI), simulate the dispersion and fate of metals and PAHs at European scale, in the North Adriatic, in the Øresund, and provide lateral boundary conditions to the models utilized in the Saronikos gulf and Aveiro lagoon.

INTERVIEW ON TRADEWINDS

Maria Granberg, a senior researcher at IVL Swedish Environmental Research Institute, and EMERGE partner, was interviewed regarding the project by the shipping web magazine TradeWinds.

She told that all five research institutes studying the scrubber discharges in the EMERGE project found negative impacts at concentrations as low as 0.001%.

"The EMERGE research adds new insight to the discussions around exhaust gas cleaning systems — the kits known as scrubbers that allow ships to continue to burn cheaper heavy fuel oil while still complying with the 2020 sulphur cap, as they face continued scrutiny over their discharges into the sea.

Among their findings, the scientists learned that the fertilisation process that allows some organisms to reproduce is sensitive to exposure to scrubber discharge, even at very low concentrations.

And EMERGE researchers have found that the larvae of different types of animals — from mussels to worms to crustaceans — are sensitive to the scrubber pollution even when their adult stages show less of an impact, Granberg said."

Read the full interview [here](#).

- Aghito, M., Calgaro, L., Dagestad, K.-F., Ferrarin, C., Marcomini, A., Breivik, Ø., and Hole, L. R.
ChemicalDrift 1.0: an open-source Lagrangian chemical fate and transport model for organic aquatic pollutants, Geoscientific Model Development Discuss. [preprint], in review, 2022

Read [here](#)

A new model for transport and fate of chemicals in the aquatic environment is presented. The tool, named ChemicalDrift, is integrated in the open-source Lagrangian framework OpenDrift, and is hereby presented for organic compounds.

- Xion D., Williams I.D., Hudson M.D., Osborne P.E., & Zapata-Restrepo L.M.
The impact of an annual major recreational boating event on water quality in the Solent Strait, Marine Pollution Bulletin, Volume 186, 114450, January 2023

Read [here](#)

A long-term historical analysis of the impacts of recreational boating on marine surface water quality during a regatta (Cowes Week) in an internationally crucial waterway, the Solent Strait (Hampshire, UK) is presented. Water quality indicators studied included nitrogen concentration, bacterial indicators, and oxygen saturation, at three sampling sites at/near Cowes during 2001–2019. Findings include that sewage discharge from recreational boats is the key contributor to localised faecal contamination of marine surface waters, putting bathers and shellfisheries at risk.

- Lasse Johansson, Ari Karppinen, Mona Kurppa, Anu Kousa, Jarkko V. Niemi, Jaakko Kukkonen
An operational urban air quality model ENFUSER, based on dispersion modelling and data assimilation, Environmental Modelling & Software, Vol. 156, October 2022, 105460 (19 pp.)

Read [here](#)

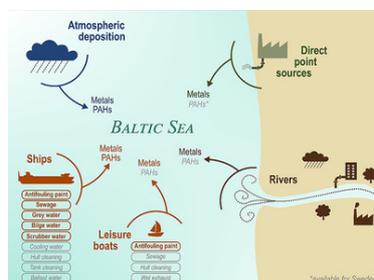
An operational urban air quality modelling system ENFUSER is presented with an evaluation against measured data.

- Erik Ytreberg, Katarina Hansson, Anna Lunde Hermansson, Rasmus Parsmo, Maria Lagerström, Jukka-Pekka Jalkanen, Ida-Maja Hassellöv

Metal and PAH loads from ships and boats, relative other sources, in the Baltic Sea, Marine Pollution Bulletin, Volume 186, 114450, January 2023

Read [here](#)

The Baltic Sea is a sensitive environment that is affected by chemical pollution derived from multiple natural and anthropogenic sources. The overall aim of this study was to estimate the load of metals and polycyclic aromatic hydrocarbons (PAHs) from shipping and leisure boating, relative other sources, to the Baltic Sea and to identify possible measures that could lead to major reductions in the loads of hazardous substances from maritime shipping and leisure boating.



Graphical abstract

- Manshausen, P., Watson-Parris, D., Christensen, M.W. et al.
Invisible ship tracks show large cloud sensitivity to aerosol, Nature 610, 101–106 (2022)

Read [here](#)

Ship tracks, long lines of polluted clouds that are visible in satellite images, are one of the main tools for quantifying aerosol–cloud interactions. However, only a small fraction of the clouds polluted by shipping show ship tracks. Here we show that even when no ship tracks are visible in satellite images, aerosol emissions change cloud properties substantially. This paper reports larger aerosol cooling effect on the climate, potentially masking a higher climate sensitivity than observed temperature trends would otherwise suggest.

FUTURE EVENTS

ICCE 2023 | 11-15 June 2023

18th International Conference on Chemistry and the Environment- Venice, Italy

INFORMATION & REGISTRATION

To register to the Conference or for any information you may require concerning ICCE 2023 please visit www.icce2023.com or contact the ICCE 2023 Secretariat at info@icce2023.com.



SUBMIT YOUR ABSTRACT

We hope to see you in Venice during midsummer 2023!



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EMERGE project under the Policy Area Ship was granted a Flagship status



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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 874990

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