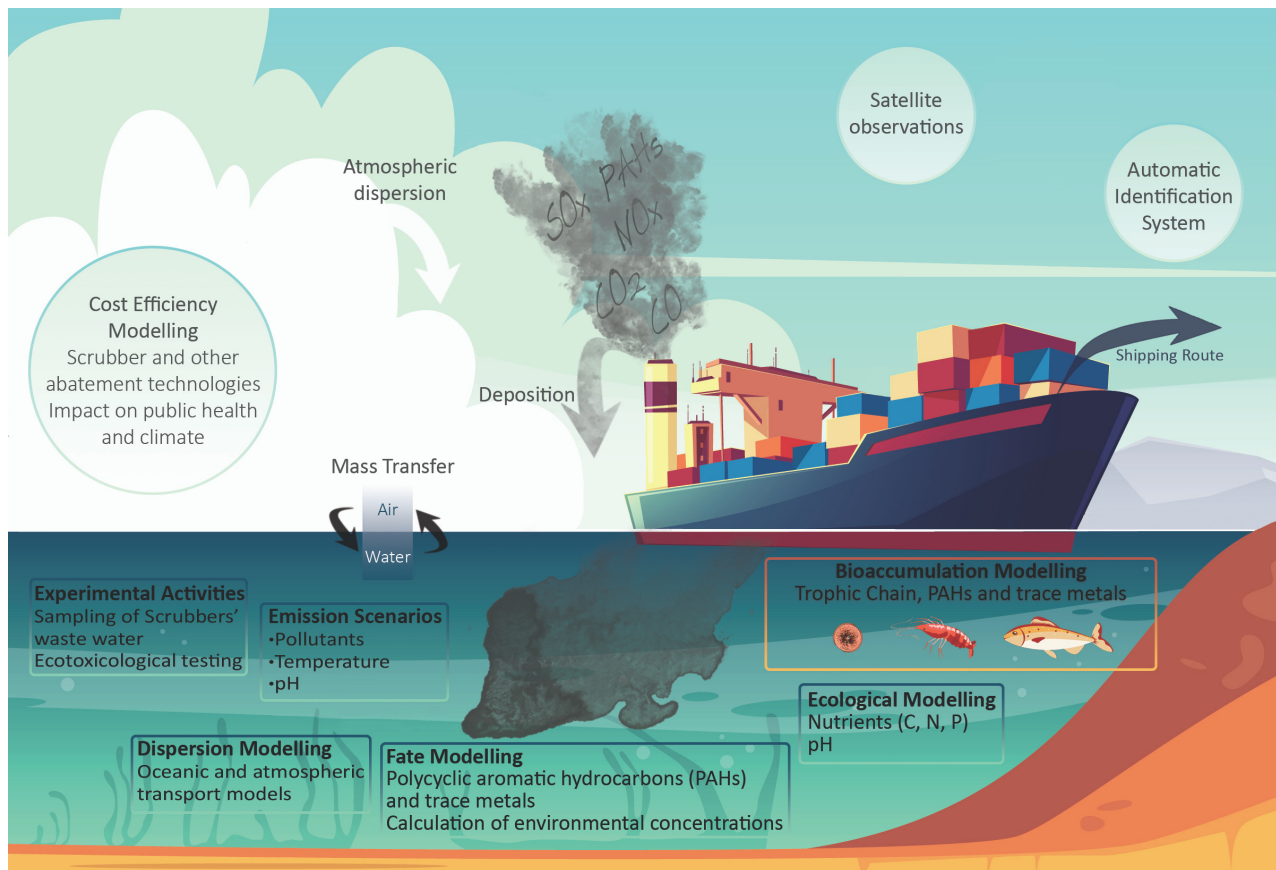




## Evaluation, control and Mitigation of the EnviRonmental impacts of shipping Emissions



## IMPLEMENTATION

The project will include measurements and modelling on actual vessels. Those will focus on abatement techniques and will include emissions to, and concentrations in water, air and marine biota.

A wide spectrum of models will be used, including those for ocean circulation, biogeochemical processes, atmospheric dispersion and the bioaccumulation of pollutants.

### SELECTED OUTCOMES

## MODELLING AND EXPERIMENTS

We have evaluated the available abatement methods for shipping emissions.

A deliverable has been written, which reviews and analyzes control measures for reducing emissions of SO<sub>x</sub>, NO<sub>x</sub> and PM from marine vessels. These results will be used in the modelling of shipping emissions and in the evaluation of their cost-effectiveness.

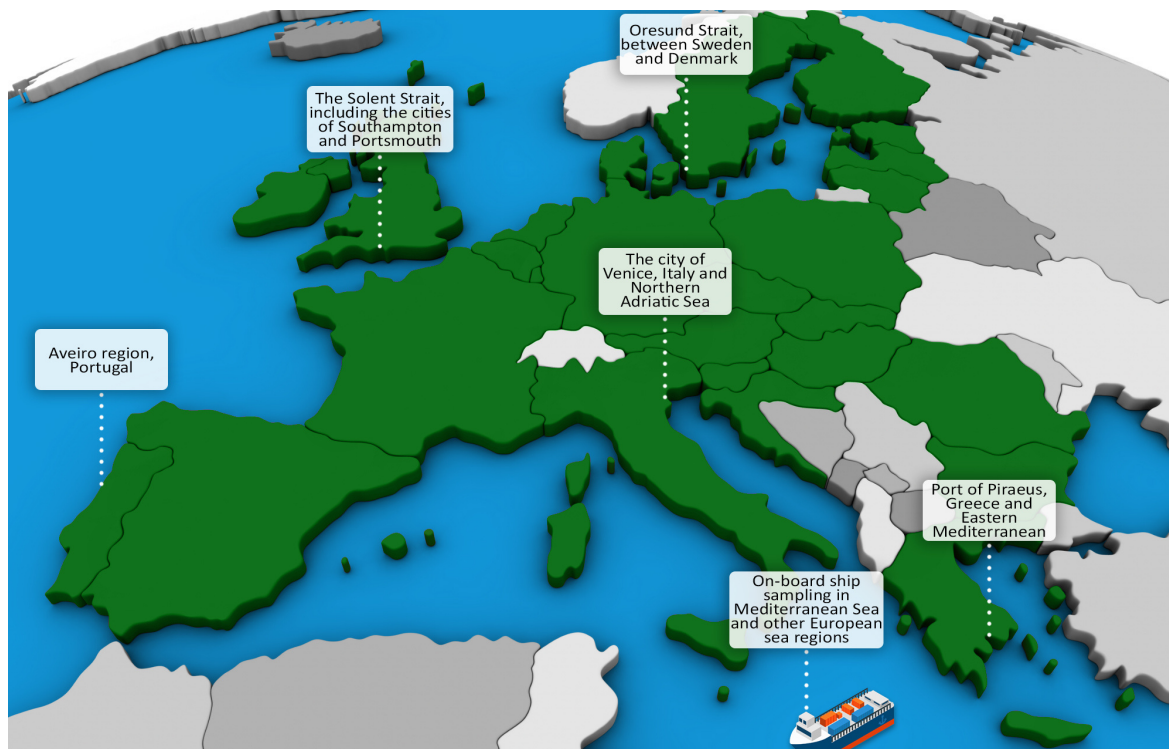
The Ship Traffic Emission Assessment Model (STEAM) will be used in the project for the modeling of both pollutant discharges to water and emissions to the air, originated from ships.

This model has been extended to address nutrients from black and grey water discharges as well as from food waste. The model also treats the modeling of contaminants in ballast, black, grey and scrubber water, bilge discharges and stern tube oil leaks, as well as the releases of contaminants from antifouling paints.

[There is a new publication on modelling of discharges to water using STEAM model](#)  
The paper is a technical approach on how modelling of discharges to water is done in STEAM, what kind of assumptions and considerations need to be taken into account. The paper also describes a dataset for the Baltic Sea for the year 2012.

We still need to combine the GAINS model with water modeling and dispersion modelling, and health assessments. As GAINS uses EMEP S-R matrices, there are discussions to assess if these are applicable for EMERGE models.

# CASE STUDY MAP



The COVID-19 pandemic outbreak and its related confinement measures have introduced new challenges for the EMERGE project as some of the planned case study measurements need to be postponed. There has recently been good progress in the preparation of the case studies and the sampling protocols are almost finalized. It is expected that the campaigns could be realized since the spring of 2021.

## SELECTED OUTCOMES

### ▪ Port of Piraeus, Greece and the Eastern Mediterranean

The responsible team presented all the details regarding the atmospheric and water modelling, the water and particle sampling and the ecotoxicological analysis for the Piraeus Case Study.

### ▪ Aveiro region, Portugal

Developing the case study in terms of modelling.

### ▪ The city of Venice, Italy and Northern Adriatic Sea

The team collecting data for the set-up of biochemical modelling including inputs of nutrients to the Northern Adriatic Sea.

### ▪ Oresund Strait, between Sweden and Denmark

Due to the current situation it is difficult to access ships for water sampling; the ecotoxicological experiments has been postponed until next spring due to the unavailability of the laboratories. Currently working on the modelling.

## READINGS FOR YOUR LOCKDOWN

### [IMO Environment Committee approves amendments to cut ship emissions](#)

Draft new mandatory regulations to cut the carbon intensity of existing ships have been approved by the International Maritime Organization (IMO) Marine Environment Protection Committee (MEPC).

### [Compilation and Assessment of Lab Samples from EGCS Washwater Discharge on Carnival ships](#)

A comprehensive study on Open Loop Exhaust Gas Cleaning System (EGCS) washwater samples from 23 ships, by Carnival Corporation & PLC. and DNV GL.

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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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