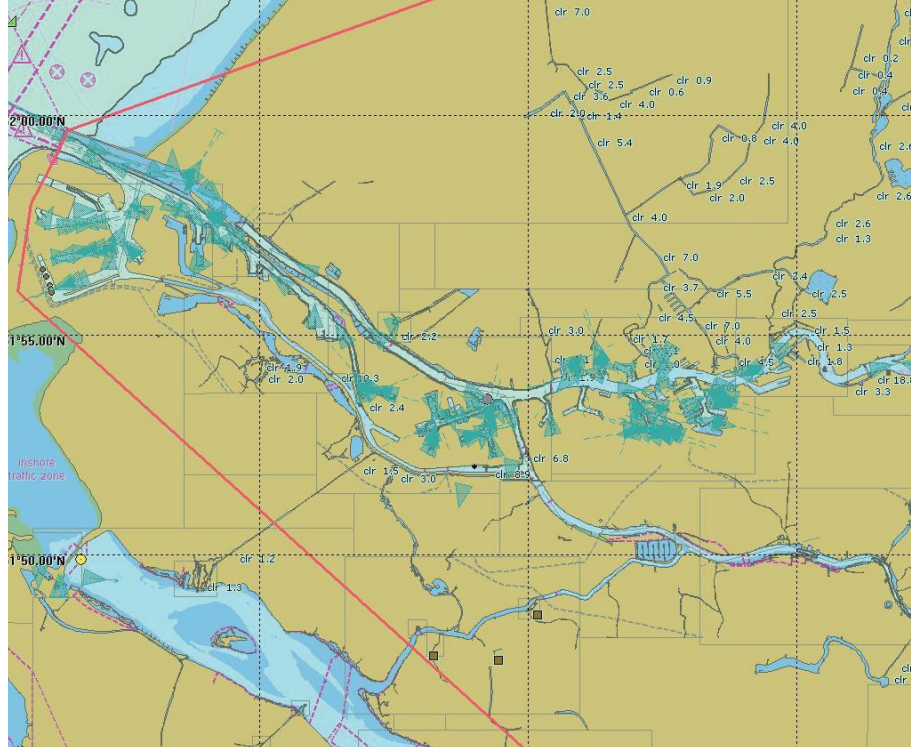


The Dutch government wants to reduce pollution from ships in the North Sea and to this end it is keen to get a better understanding of ships' emissions. In the Port of Rotterdam region, air quality is also a very important issue and emissions contribute substantially to air pollution in the port, which is one of the largest in the world.



The figure shows the AIS targets (green triangles) of all ships in the study area (red). All ship and voyage related data as speed and draught are used for the determination of the emission of that ship in the next time step.

Ship emissions in the port of Rotterdam revealed by AIS data

In a bid to further their understanding of emissions, the Ministry of Transport, Rijnmond Environmental Protection Agency (DCMR), which is responsible for the port area, and the Netherlands Environmental Assessment Agency (PBL), have commissioned MARIN to perform a study aimed at quantifying ships' emissions in the port of Rotterdam area. Started recently, the project will be performed in cooperation with research institute TNO.

Emissions based on AIS data

Since 2005 all ships above 300 gt carry a mandatory Automatic Identification System (AIS). The AIS transponder transmits the vessel's position, course, speed and other relevant data a number of times per minute. This AIS data is received by base stations along the coast and collected within the port area. This data is then used to determine ship emissions in the region.

The AIS message contains the IMO number and call sign. By connecting this with the database of ships, the necessary characteristics can be determined, such as type, size, engine, year of build, maximum

speed, fuel consumption and other characteristics. For each vessel, the different emission factors are determined based on these characteristics.

By linking the AIS movements with the operational parameters, such as speed, navigational status (manoeuvring, moored) and draught, the static ship characteristics and the ship dependent emission factors, detailed ship emissions can be determined. The amount and location of the emissions is then identified.

Future planning

As the emission can be quantified per ship for different parts of the analysed area it is possible to calculate the impact of measures on ship emissions within the area or at certain locations.

Detailed information about shipping emissions also enables improved calculations for local air quality in current and future situations. This can be used to improve spatial planning in relation to legal approbation. Ship emissions in the North Sea will be determined by the same methodology as a follow-up to the MARIN/TNO study. **MARIN**

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