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Reduce ship emissions - but how? Transdisciplinary research project investigates effects of shipping

14 May 2020 / Kiel. Ships are the most important means of transport in international trade. Researchers from the Kiel University and the GEOMAR Helmholtz Centre for Ocean Research Kiel are investigating the effects of global shipping on the ocean and society as part of the transdisciplinary and international research project ShipTRASE. The project is currently starting its work.

The computer on the desk, the jacket on the coat rack and probably even the coffee cup in the kitchen cupboard—most of the objects in our everyday life have travelled halfway around the world by ship before we can use them. Shipping is the most important means of transport in international trade. In 2018, around 90,000 merchant ships moved around 11 billion tons of freight across the oceans and marginal seas. The trend is rising.

Although ships produce fewer emissions per tonne of freight transported than trucks or freight trains, the extensive transport of goods by sea has far-reaching environmental consequences. Already today, individual states, the European Union (EU) and the United Nations (UN) are working on drawing up and implementing regulations for more environmentally friendly, low-emission shipping and thus a more sustainable and fairer use of the world's oceans. So far, however, little is known about the impact of individual measures and the effects of, for example, sulphur emissions and other pollutants on the marine environment.

Against this background, researchers from Sweden, Germany and France now want to analyse the ecological, economic and legal aspects of both short and long-term measures to reduce ship emissions and corresponding control mechanisms as part of the ShipTRASE project. In a two-stage evaluation process, the Belmont Forum, the international sustainability network Future Earth and the EU initiative “Healthy and Productive Seas and Oceans” (JPI Oceans) have selected ShipTRASE as one of 13 inter- and transdisciplinary projects worthy of funding which deal with the sustainable use of oceans in particular (“Transdisciplinary Research for Ocean Sustainability”).

For a total of three years, from June 2020 to May 23rd, 2023, the German project partners will develop options for action for more sustainable shipping, combining biogeochemical and legal perspectives. Dr. Christa Marandino from GEOMAR Helmholtz Centre for Ocean Research Kiel coordinates the German consortium, which also includes Prof. Dr. Nele Matz-Lück from the Walther-Schücking-Institute for International Law at Kiel University (CAU) and Dr. Sonja Endres from the Maritime Cluster Northern Germany.

“In order to cover all aspects of the topic, we need experts from different fields. Fortunately we have this broad access to marine topics in Kiel and, thanks to the Future Ocean Network, we have experience in cooperation across disciplinary boundaries,” emphasises Prof. Dr. Nele Matz-Lück from Kiel University. “For the tasks ahead, we can draw on expertise in the fields of chemical oceanography, international law, environmental economics and engineering. We also want to actively involve the shipping industry,” adds Prof. Christa Marandino.

One aspect that is being investigated in Kiel are so-called Emission Control Areas (ECAs). These ECAs include the North Sea and Baltic Sea. "In these areas, for example, the emission of sulphur oxides from ship smokestacks is strictly limited," explains Prof. Dr. Nele Matz-Lück. "However, there is a lack of regulations in some cases for the exact implementation and also the monitoring of compliance proves difficult", says Matz-Lück.

In addition, in some cases it is unclear what consequences the measures used to help comply with the new emission regulations will have on the ocean. In ShipTRASE, the effects of gas scrubbers and, in the long term, the use of liquefied natural gas (LNG) as an alternative fuel are being investigated.

Using laboratory experiments, researchers at GEOMAR, headed by Christa Marandino, will investigate the effects of these technologies on the uppermost water layers, assessing whether they are effective by comparing to conventional ship propulsion emissions, or possibly even introduce a new risk to the surface ocean. The project idea was developed within the international SOLAS program (Surface Ocean - Lower Atmosphere Study), which deals with the interactions between the ocean surface and atmosphere. "Our goal is to understand whether different types of ship emissions have different effects on the trace gas cycling in the surface water," summarizes Christa Marandino.

The scientific and legal foundations will then be used to involve representatives from industry and politics, both in Germany and internationally, to discuss these issues, share information and results and help shape further scientific research.

"ShipTRASE provides an analysis of the economic and ecological consequences of implementing control areas at sea, various options for alternative fuels and the effects of further legal regulation, as well as a methodology for carrying out such an analysis," says Prof. Matz-Lück, summarising the project's objectives.

Links:

www.geomar.de GEOMAR Helmholtz Centre for Ocean Research Kiel

<https://www.wsi.uni-kiel.de/en> The Walther Schücking Institute for International Law

Images:

At www.geomar.de/n7002-e images are available for download.

Kontakt:

Jan Steffen (GEOMAR, Communication and Media), Tel.: +49 431 600-2811, presse@geomar.de

Friederike Balzereit (Kiel Marine Science, Public Outreach), Tel.: +49 431 880-3032,
fbalzereit@uv.uni-kiel.de