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A „ship of opportunities“ tracking carbon dioxide in the ocean

ATLANTIC SAIL and GEOMAR support European long-term observation network

29.09.2023/Kiel. With the “Class 1 Label”, the European long-term observation network Integrated Carbon Observation System (ICOS) recognises high-quality measurements of carbon dioxide on land, in the ocean and in the atmosphere. One such station is the commercial vessel MS ATLANTIC SAIL, which continuously records temperature, salinity, dissolved oxygen and the carbon parameters alkalinity and pH on its passages across the North Atlantic using GEOMAR equipment. With this contribution, it supports research on societally relevant questions for example regarding the future ocean in a changing climate.

Continuous measurements of carbon dioxide are needed to track the effects of climate change on the ocean and to better assess potential future changes. So-called “Ships of Opportunity” carry instruments voluntarily and free of charge to complement scientific observation networks and measurements conducted from research vessels and autonomous instruments. In this way, they contribute to data collections that help research address societally relevant questions for example regarding the future ocean in a changing climate.

The merchant vessel MS ATLANTIC SAIL has now been awarded the “Class 1 Label” of the European long-term observation network “Integrated Carbon Observation System” (ICOS) for high-quality measurements. A plaque made of Finnish larch handed over in the port of Hamburg will be presented on the ship’s bridge. ICOS is a decentralised European research infrastructure for greenhouse gas observations in the atmosphere, in the ocean and on land. The data collected by ICOS stations in continuous operation are quality-controlled thoroughly and published in the annual “Surface Ocean CO₂ Atlas (SOCAT)”. This massive dataset, with more than 35 million measurements to date, is one of the pillars of the annual “Global Carbon Budget” – the profoundest knowledge base on human-induced carbon dioxide and the influence of humans on the climate.

The research group of Professor Dr. Arne Körtzinger at GEOMAR Helmholtz Centre for Ocean Research Kiel has been conducting observations on commercial ships operating in the North Atlantic between Europe and North America since 2002. The ATLANTIC SAIL is the fourth ship used for these measurements. Its predecessors were no longer available due to decommissioning or relocation to other regions on short notice.

“In order to react to changing circumstances and continue our important measurements, we had to negotiate quickly with shipping companies and fleet managers,” recalls Professor Körtzinger. This required an intensive exchange with those responsible on board to find a place – usually in the ship’s engine room – where the autonomous measuring instruments, several hundred thousand euros worth, could be set up and supplied with continuously pumped seawater and atmospheric air.

“During the work on board, you realise that every ship is designed differently and the conditions for measurements on board vary,” Dr. Tobias Steinhoff recalls. The marine chemist at GEOMAR has been in charge of the installations and measurements since 2005. In addition to the greenhouse gas carbon dioxide, GEOMAR records a whole range of other variables on the ATLANTIC SAIL, including temperature, salinity, dissolved oxygen and the carbon parameters alkalinity and pH. “The diversity

of reliable measurements has earned us the Class 1 label. It is unique in comparison with similar commercial ship measurements operated by other international working groups,” says Dr Steinhoff.

Professor Körtzinger is certain that in the future Global Greenhouse Gas Watch (GGGW), which is currently being intensively discussed at the World Meteorological Organisation (WMO), such observations from commercial ships will play a central role. “We hope that shipping companies such as Atlantic Container Lines ACL running the ATLANTIC SAIL, will be willing to enter into such voluntary and unpaid cooperation with climate research in the future,” says Professor Körtzinger. “The Class 1 label marks our joint efforts. We are particularly grateful to Chief Operations Officer Anders Ivarsson, Technical Superintendent Luciano Crapanzano and Captain Dimitrov Dimitar for their longstanding and active support.”

Links:

<https://www.icos-cp.eu> Integrated Carbon Observation System (ICOS)

<https://socat.info> Surface Ocean CO₂ Atlas (SOCAT)

<https://www.globalcarbonproject.org/carbonbudget> Global Carbon Budget

<https://www.aclcargo.com> Atlantic Container Lines ACL

<https://www.geomar.de/en/research/fb2/fb2-ch/working-groups/team-ob-ch-oc-1> GEOMAR

Research Division 2 “Marine Biogeochemistry”, Marine Carbon Cycle

<https://www.geomar.de/en/discover/ocean-and-climate/ocean-observation> GEOMAR Discover:
Ocean Observation

Images:

Images are available for download at <http://www.geomar.de/n9132-e>

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