RV SONNE SO305-2 E-POLIO & M2ARGO

Singapore- Port Louis, 16.07.-05.08.2024

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1. Weekly report

16. - 21.07.2024

More than half of the world's 8 billion people live in cities, and the trend is rising. At 3%, these urban agglomerations make up only a very small proportion of the global land area. Their changing lifestyles, intensive industrial production and agriculture alter their immediate environment, the inland waters and oceans. The project E-POLIO (short for Emerging POllutants and Microplastic Abundance in Surface Waters of Indian Ocean), as part of which the expedition SO305/2 is being carried out in the Indian Ocean, focuses on emerging pollutants that are characteristic of such urban agglomerations. These pollutants have four main characteristics in common: increasing occurrence in the environment, dispersion over large areas, steady accumulation and long residence time in marine ecosystems. For the study area of SO 305-2 it is the first time that a risk assessment has been undertaken for newly emerging pollutants. It covers almost the entire Indian Ocean - starting from the heavily populated regions of Indonesia, Malaysia and Singapore to remote marine regions of the open ocean. This allows to better understand the far-reaching influence of megacities and thus the land-coast-ocean interaction in a very sensitive marine ecosystem.

In the run-up to the expedition, it became clear that it would not be possible to start the expedition as scheduled as three containers were delayed, two of which with the necessary provisions. Thanks to the efforts of everyone involved, the containers arrived during the day on 17.07, were loaded and unpacked so that we could start SO 305-2 with a delay of 1.5 days on the evening of 17.07. The work permit fornational waters of Malaysia was denied, so we only passed through the Straits of Malacca, and were finally allowed to start taking measurements on the night of 21. July.

Extensive sampling of the surface water and deeper water layers is planned. This measurement program of microplastics, artificial estrogens with extremely harmful hormonal environmental effects as well as organic micropollutants such as carcinogenic polycyclic aromatic hydrocarbons and per- and polyfluorinated alkyl compounds, will be supplemented by air sampling on deck using high-volume air samplers.

Additional biochemical and hydrographic measurements are used to characterize different water masses and to record large-scale flow and exchange processes. In addition, the aim is to improve the understanding of the nitrogen cycle in the central equatorial and southern Indian Ocean, as this is also influenced by human activities and too much nitrogen input can disrupt sensitive ecosystems through over-fertilization. Extensive sampling of this kind, to understand the transport routes of anthropogenic pollutants both horizontally i.e. from land to the open ocean - and vertically - from the water surface into deeper water layers - has never been done before in the Indian Ocean. In addition to assessing the environmental risk posed by the new pollutants studied, we also hope to gain fundamental insights into their dispersal mechanisms and their fate, which can be transferred to other marine regions as models. The atmosphere on board is very good and we are well supported by the ship and feel welcome on board, despite the shipyard period that has just come to an end.



With best wishes from on board to those who stayed at home

At sea, 21.07.2024

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Joanna Waniek