Microplastic Pollution in the Southern Ocean

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Information Paper submitted by Switzerland

Summary

This paper summarizes the recent research activities, namely pollution with microplastics, of scientists at the University of Basel in the Southern Ocean and Antarctica.

Background

Microplastics (MP) pose an emerging threat to the global environment. Wherever one searches, MP is found, albeit in differing concentrations and constitutions. We study the occurrence, distribution and pathway of microplastics, as well as the biofouling of plastics, in the Southern Ocean and Antarctica.

Research Project

The research project addresses the questions of occurrence, distribution, amount and constitution of microplastics found in the Southern Ocean and Antarctica. We ask whether microplastics in these areas originate from tourism, ship traffic or stations on land or from the northern continents.  Can the strong Antarctic Circumpolar Current, which isolates the Southern Ocean from the northern oceans be penetrated by microplastics at the water surface? To answer these questions, the surface water of the Southern Ocean (Weddell Sea, Western Antarctic Peninsula and Scotia Sea), and the snow were examined for the occurrence of microplastics. Microplastics were analyzed and it was looked for signatures to ascertain the importance of local in comparison with more northern sources. As well, emperor penguins, makrozoobenthos and fish of the Southern Ocean were studied to see whether they ingested microplastics aiming at elucidating the importance and pathways of microplastics in these pristine regions. Further, we study whether biofouling –the colonization of particle surfaces by microbes and multicellular organisms– acts as an important pathway for removal of buoyant plastic from sea surfaces through added density.

This project was started in 2017 and this year, it was performed as a collaboration project of EWOS I (Pilot study for an Eastern Weddell Sea Observation System- PI: Felix Mark, AWI).

This is a cooperation project of several research institutes: in the project participated the *Alfred-Wegener Institute (G. Gerdts, S. Primpke, F. Mark), the Royal Netherlands Institute for Sea Research NIOZ (L. Amaral-Zettler), and the Utrecht University (E. van Sebille)*

Conclusion

The research project provides first systematic data on (1) microplastic pollution in the Southern Ocean, in particular the Weddell Sea, and (2) in selected Antarctica and Southern Ocean species, as well as (3) on microbial colonization of microplastics under Southern Ocean conditions.