A step towards a structured sample and data collection of environmental contamination in the Antarctic

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**Submitted by Germany and Italy**

Summary

This paper builds on earlier reports on the occurrence of persistent organic pollutants (POPs) and trace elements in Antarctica. Germany is starting to share and coordinate monitoring data, from across the Antarctic Treaty area, to help inform future monitoring, research and policy development. A number of Antarctic Treaty Parties operate national Environmental Specimen Banks (ESBs) and a closer cooperation with and between these institutions is considered a very valuable way towards a more structured sample and data collection of environmental contamination in the Antarctic.

***Introduction***

Antarctica is considered as one of the last pristine regions of the planet with limited anthropogenic activity and emissions. Concerning chemical contamination, the discovery of DDT-related compounds in Antarctic penguins was a clear indication of the global impact of human activities (Sladen et al. 1966). Since then, contaminant levels in Antarctica are gaining progressively more attention from the scientific community. This holds especially true for pollutants that persist in the environment and can reach polar regions via long-range transport. These POPs are listed under the Stockholm Convention, to which most Antarctic Treaty Parties are signatory Parties. However, data on contaminants in Antarctica and the Southern Hemisphere are still scarce in comparison to data from the Northern Hemisphere.

Results of earlier reports on the occurrence of POPs and trace elements in Antarctica (ATCM XXXI/IP097, ATCM XXXII/IP069, ATCM XXXVII/IP008, ATCMXL/IP022) indicated that chemical contamination originated from both long-range transport and specific anthropogenic sources, such as tourism and research activities at Antarctic stations may have an effect on the Antarctic ecosystem’s health. In addition, a coordinated and structured data collection strategy is missing that addresses e.g. temporal trends of contaminants in abiotic and biotic matrices. More recently, the Second Global Monitoring Report for persistent organic pollutants under the Stockholm Convention reported that research studies have demonstrated the long-range atmospheric and oceanic transport of persistent perfluorooctane sulfonic acid (PFOS) and its precursors to the Antarctic (UNEP, 2017). In addition, the melting of snow and ice in polar regions due to climate change has been discussed to induce the release of long-trapped chemicals such as regulated POPs (IPCC 2019). In recent years, halogenated flame retardants have also been detected in Antarctic biota such as fish (Dreyer et al. 2019). But contaminant data in biota and the Antarctic food web are still sparse.

***Monitoring in the Antarctic Environment***

The protection of the Antarctic environment is the primary responsibility of the Antarctic Treaty Parties, and the release of contaminants such as POPs into the environment of Antarctica is inconsistent with the comprehensive approach of the Protocol on Environmental Protection to the Antarctic Treaty (the Protocol). The monitoring of soil, water and atmosphere is generally considered to fall within the scope of activities in the Treaty area under Article III of the Antarctic Treaty and early detection of impacts from outside are included in Article 3 paragraph 2 lit. e of the Protocol. Nevertheless, such early detection is not feasible without cooperation with other Parties, organizations and agreements that have developed goals, rules, strategies and practices to cope with similar environmental challenges. In this context, it is important to recall the concept of “information exchange” enshrined in the Stockholm Declaration and the even more encompassing nature of Article III of the Antarctic Treaty.

***The Environmental Specimen Banks***

Environmental specimen banks (ESBs) are facilities that archive samples from the environment for future research and monitoring purposes. In addition, the long-term preservation of representative specimens is an important complement to environmental research and monitoring. The first banking activities were set up in the 1960s, e.g. in Sweden and Japan and then in 1979 in the USA and in Germany. Today, around 30 national ESBs are established around the globe, including the Arctic. Each of these ESBs has its own sophisticated and well-defined protocol to ensure specimen integrity. Today, environmental specimen banking is experiencing a renaissance due to an increase in regulatory interest in ESB biota standards and trend data due to climate change. The International Environmental Specimen Bank Group (IESB, see http://www.inter-esb.org/) promotes the worldwide development of techniques and strategies of environmental specimen banking and the international cooperation and collaboration among national ESBs (Küster et al. 2014). In its most recent update on POPs in the Antarctic (ATCM XXXII/IP069), SCAR asked for a cooperation with all Antarctic ESBs. In this context, Germany with its ESB has started to investigate environmental contamination in the Antarctic and to coordinate with diverse stakeholders such as the IESB.

Conclusions

The cooperation with and between the ESBs of Antarctic Treaty Parties is considered a very valuable way towards a more structured sample and data collection of environmental contamination in the Antarctic. Corresponding with the requirements of the Protocol, and mindful of recent work on the revision of the Guidelines for Environment Impact Assessment in Antarctica (Resolution 1 (2016)), we would be grateful to exchange data with all Treaty Parties that are already monitoring contaminants in Antarctica or are interested in doing so in the future. Germany also offers its cooperation to enable a more structured sample and data collection of environmental contamination in the Antarctic and to coordinate activities.

***References***

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