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Assessment of trace element contamination within the Antarctic Treaty area

Assessment of trace element contamination within the Antarctic Treaty area

Information Paper submitted by Portugal, Chile, Germany, Russian Federation and the United Kingdom

Summary

The paper outlines the assessment of trace elements (As, Cd, Cu, Zn, Pb and Hg) in soil and moss samples collected from Fildes Peninsula and within ASPA 150 Ardley Island, Maxwell Bay, King George Island (South Shetland Islands). Samples from some areas of Fildes Peninsula that have been subject to long-term and on-going human activity showed enrichment of trace elements, compared to background levels. We encourage Parties to share their monitoring data from across the Antarctic Treaty area to help inform future monitoring research and policy development.

Introduction

The Protocol on Environmental Protection to the Antarctic Treaty, which came into force in 1998, states that there is a need to enhance the protection of the Antarctic environment and that activities in the Antarctic Treaty area shall be planned and conducted so as to limit adverse impacts on the Antarctic environment (i.e. avoid degradation of, or substantial risk to, areas of biological, scientific, historic, aesthetic or wilderness significance).

The South Shetland Islands have been subject to human activity since the earliest arrival of humans in Antarctica. Human activity increased with the establishment of research stations by several nations as scientific activity in the region expanded. Fildes Peninsula, in particular, has a long history of human presence and contains a high density of scientific research stations and shelters compared to other areas of Antarctica (e.g. with infrastructure operated by Chile, China, the Russian Federation and Uruguay). In accordance with the provisions of Annex I to the Protocol, the area has been subject to earlier scientific investigations and monitoring of environmental impact (ATCM XXII/IP44; ATCM XXXI/IP30).

Assessment of trace elements

Building on earlier monitoring work in the region, an international consortium of scientists from Portugal, Chile, the Russian Federation, Germany and the United Kingdom, evaluated the natural and anthropogenic sources of trace elements (As, Cd, Cu, Zn, Pb and Hg) in soil and moss samples collected from different sites in Fildes Peninsula and within ASPA 150 Ardley Island, Maxwell Bay, in January 2013.

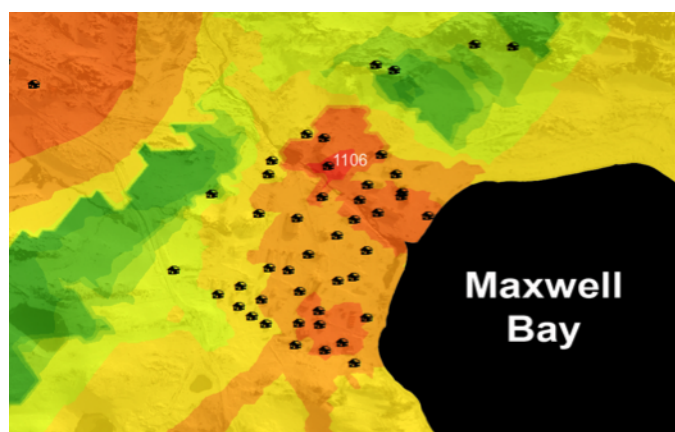


Figure 1. The range of values of the trace element Lead (Pb) in soils found near research stations (in black) close to Maxwell Bay (Fildes Peninsula) in January 2013.

In general, background levels of each element were detected in the majority of samples, including those collected within ASPA 150 Ardley Island. However, samples from areas of Fildes Peninsula subject to human impact, such as in the vicinity of the stations around Maxwell Bay, showed enrichment of all tested elements compared to background levels. Furthermore, a trend of increasing enrichment was seen in the plants collected from Bellingshausen Dome (reference site) towards the area of the stations around Maxwell Bay. These data suggest that parts of Fildes Peninsula are subjected to significant environmental impact due to historic and potentially on-going local human activity around the scientific stations.

Corresponding with the requirements of Annex I of the Protocol and mindful of recent work on the revision of the Guidelines for Environment Impact Assessment in Antarctica (ATCMXXXVIII/WP13), we encourage further monitoring of contaminant levels in areas of substantial human activity throughout the Antarctic Treaty area with a view to assessing if contamination is still taking place and identifying possible sources. Furthermore, we would like to promote greater information exchange between Parties on contamination, in accordance with the principles set out in the Environmental Protocol, to help inform future monitoring research and policy development. With these aims in mind, we encourage all Treaty Parties interested in monitoring within the areas of activity of their national programmes to coordinate methodologies, including environmental sampling and analysis of trace elements, with a view to enhancing inter-comparison and inter-calibration.

Reference

Amaro, E., Padeiro, A., de Ferro, A. M., Mota, A. M., Leppe, M., Verkulich, S., Hughes, K. A., Peter, H.-U., Canário, J. (2015) Assessing trace element contamination in Fildes Peninsula (King George Island) and Ardley Island, Antarctic. *Marine Pollution Bulletin* 97: 523-527.
<http://www.sciencedirect.com/science/article/pii/S0025326X15002751>