



Long-range transport and temporal trends of emerging organic contaminants in the Arctic - impacted by human activities and climate change

Zhiyong Xie (1), Wenying Mi (2), and Ralf Ebinghaus (1)

(1) Helmholtz-Zentrum Geesthacht, Geesthacht, Germany (zhiyong.xie@hzg.de), (2) MINJIE Institute of Environmental Science and Health Research

Emerging organic contaminants (EOCs) may reach ecologically sensitive Arctic environment via atmospheric and/or oceanic long range transport. They are subject to a variety of processes in the Arctic environment such as degradation, bioaccumulation and interaction between the atmosphere, snow, water and soil. Additionally, climate change may significantly influence the transport and environment fate of EOCs in the Arctic. As a part of collaborative German-French program at joint French-German Arctic Research Base (AWIPEV) in Ny-Alesund, Svalbard, this project is proposed to investigate the occurrence and long term trends of EOCs in Arctic air, water and snow.

Integrated high-volume air samples were taken on the platform of German Atmospheric Observatory using a high-volume pump operated for 7 days to obtain a volume of ~ 2500 m³. A glass fiber filter is used to trap the airborne particles and the gaseous contaminants are collected with a PUF/XAD-2 resin column. Surface snow samples were collected on the glaciers around Ny-Alesund and seawater samples were obtained in Kongs Fjord from 2011 to 2018. EOCs including poly- and perfluoro alkyl substances (PFASs), brominated flame retardants (BFRs) and organophosphate esters (OPEs) have been determined in all air, seawater and snow samples. Data achieved from this study may improve models to predict the environmental progression and assess the effect of human activities and climate change on remobilization and phase exchange for EOCs in the Arctic ecosystem.