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ABSTRACT

Distribution of selected POPs in the Arctic fjords sediments

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The main objective of the studies related to my PhD dissertation is to investigate the cycling of selected Persistent Organic Pollutants (POPs) in the Arctic fjords ecosystems, including abiotic and biotic components. Concentration of selected PCBs and PAHs will be measured in water, suspended matter, sediments and selected organisms. In this presentation preliminary results of POPs concentrations in sediments will be presented.

The extension of knowledge on POPs cycling in the Arctic is important since POPs may be transported over long distances, are persistent in the environment and toxic. They tend to accumulate in fatty tissues of organisms, moreover may biomagnify along the food web. POPs are highly reactive particles and are readily sorbed onto sinking organic and mineral particles. Part of them is accumulated by marine organisms and other part is deposited at the sea bottom. Deposited contaminants may be re-introduced to the water column and be again bioavailable for organisms.

The study presents the results of PCBs and PAHs concentration in sediments collected from Kongsfjorden, Hornsund and Adventfjorden (Svalbard). These fjords are influenced by different water masses (cooler Arctic waters in Hornsund and warmer water of Atlantic origin in Kongsfjord), different rate of glaciers ablation and the intensity of primary and secondary production. In addition, the knowledge on POPs concentrations in the Adventfjord near Longyearbyen may allow to assess the significance of local pollution source. The concentrations of selected polychlorinated biphenyls (CB28, CB52, CB101, dICB118, CB138, CB153, CB180) and selected polycyclic aromatic hydrocarbons (FLN, PHE, ANT, FLT, PYR, BAA, CHR, BKF, BAP, DBA, BP, IND) have been measured in sediment cores from selected depth intervals. GC-FID and GC-ECD techniques were used for qualitative and quantitative analysis of polychlorinated biphenyls and polycyclic aromatic hydrocarbons isolated from collected samples. Sediment layers were dated by ²¹⁰Pb method, therefore the history of POPs accumulation has also been studied.

The concentration of $\Sigma 7$ PCBs and $\Sigma 12$ PAHs in sediments ranged from 0.05 to 1.5

ng/g w.w. from 33.5 to 463.3 ng/g w.w respectively. The compounds present in highest proportion were volatile CB28 congener and phenanthrene. The study results will be discussed in context of environmental conditions that may influence POPs accumulation.