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**Title:** *Contamination of the European Arctic marine sediments on the verge of global change*

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Polar regions are predicted to incur some of the most pronounced effects of global climate change. Scenarios of future climatic development predict changes in the air and sea water temperature, as well as the extent of the ice cover and ice thickness. Global climate change in the Arctic may also change fate of contaminants transported mainly from Siberia and Western Europe. Permafrost melting, higher water flux from Siberian rivers, increased Atlantic Current flow may supply high concentrations of persistent organic contaminants, heavy metals and anthropogenic radionuclides.

Our aim is to study recent and historical contamination at the Barents Sea and fiords of western Svalbard. Numerous inorganic contaminants: radionuclides ( $^{239,240}\text{Pu}$  and  $^{137}\text{Cs}$ ) and heavy metals (eg. Pb, Cd, Zn) and organic contaminants (PCB, PAHs) are studied. Sediment dating and every sediment layer analysis allows to study precisely changes in contaminant concentrations and sources within last 150 years.

Sediment samples were collected at 11 sampling stations in the Barents Sea. Until now, sampling at 6 stations in Svalbard fiords was conducted. Sediment cores were collected using a gravity corer, sliced every 1 cm, frozen onboard and transported to the Institute of Oceanology PAN laboratory. Sediment porosity, grain size, organic carbon concentration (CHN analyzer) was obtained. Sediment accumulation rates were determined by  $^{210}\text{Pb}$  method (alpha spectrometry). Concentration of anthropogenic radionuclides:  $^{137}\text{Cs}$  (gamma spectrometry) and  $^{239,240}\text{Pu}$  (alpha spectrometry) was measured. Selected trace metals: Pb, Cd, Zn etc, were measured by AAS. The radionuclide and organic contaminant concentrations in the Barents Sea are already published (Zaborska et al., 2010 and Zaborska et al., 2011). The contamination assessment in Svalbard fiords, is recently continued however.

Anthropogenic radionuclides ( $^{137}\text{Cs}$ ,  $^{239,240}\text{Pu}$ ) concentrations in the Barents Sea reached 10.5 Bq/kg and 2.7 Bq/kg respectively. Predominant radionuclide sources were ice transport, global fallout and reprocessing facilities.  $\Sigma 12\text{PAH}$  concentration ranged from 35 d.w. to 132 ng/g d.w. in the Barents Sea and in Hornsund reached even 500 ng/g.  $\Sigma 7\text{PCB}$  ranged from 0.7 to 3.5 ng/g in the Barents Sea and from 0.1 ng/g to 0.6 ng/g in Hornsund. The observed composition and spatio-temporal pattern of organic contaminants is in accordance with long-range transport supplies.



The Pb concentrations ranged from 7 to 22  $\mu\text{g/g}$ , Cd concentrations ranged from 0.2 to 0.5  $\mu\text{g/g}$  and Zn concentrations ranged from 77 to 100  $\mu\text{g/g}$  in Hornsund. Surface sediment layers were definitely enriched in trace metals what was connected to human activity.