

Although the Arctic is pristine region of the Earth, some contamination by substances derived from human activity is measurable in this ecosystem. These contaminants include heavy metals (eg. mercury, lead, cadmium and arsenic), radioactive isotopes (eg. cesium, plutonium) and organic substances (eg. DDT, PCB). Contaminants are transported to the Arctic by the atmosphere, ocean currents and ice cover transport. The Arctic is vulnerable to changes of environmental conditions that are caused by global climate change. The increase of air and water temperature and sea ice thawing will impact the delivery of anthropogenic substances to the marine environment. Particularly permafrost melting may discharge large loads of contaminants to the environment. The increase of strength of warm, Atlantic current (West Spitsbergen Current) may also increase transport of contaminants from temperate regions of Earth. That is why the study of processes that impact the distribution of contaminants within the Arctic is very important. Heavy metals eg. Hg, Cd, Pb, Zn, Cu, As are natural elements of Earth crust. Since industrial revolution their excavation and use by humans increased dramatically. Metals may enter the environment from natural sources (eg. rock weathering, volcanic activity) but in larger part they are emitted by human activities (metallurgy, energy, transportation). The aim of this project is to study importance of oceanic circulation (West Spitsbergen Current) for distribution of contaminants within two fjords in Spitsbergen. By achieving the aim it will be possible to verify the hypothesis claiming that: West Spitsbergen Current is very important source of heavy metals to west Spitsbergen fjords and metals distribution within fjords corresponds to variability of this current flow into the fjords.

The Project will be divided into fieldwork part, analytical part and summary part. The main fieldwork will be conducted on board of Oceania, the ship owned by Institute of Oceanology PAN. During the fieldwork we will also be hosted at Polish Polar Station in Hornsund. The long term mechanisms of heavy metals fluxes to the fjord will be studied by a measurements of metals concentrations in dated sediment cores. The month scale changes in heavy metals concentrations will be estimated by measurements of their concentrations in seawater and suspension from the spring to the autumn.