Project acronym: PollAct

Project title: Organic pollution in freshwaters of the Russian Arctic – does it originate from permafrost thaw?

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Discipline: Earth Sciences & Environment: Water sciences/Hydrology

Station(s): North-East Science Station (Russian Federation)

The main objective of the project PollAct is to determine the concentrations of polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) in the zone of continuous permafrost. These pollutants can be stored in permafrost for a long time, released due to climate warming, and impact downstream ecosystems through fluvial transport. Therefore, we intend to test a hypothesis that permafrost may act as a secondary source of PAHs and PCBs.

The proposed research will be conducted in the vicinity of the North-East Science Station (NESS) in the lower Kolyma basin by three scientists (geographers and chemist). Freshwater and ground ice will be sampled and the initial chemical analysis of water will be performed during the field campaign using station equipment (to determine the concentrations of N-NO3-, N-NO2-, P-PO43-, N-NH4+, total carbon, and total nitrogen). Detailed analysis of water will be conducted at Gdańsk University of Technology laboratory in Poland. PAHs and PCBs in water samples will be analyzed using gas chromatography coupled with mass spectrometry (TQ8050 GC/MS-MS System, SHIMADZU).

The expected result is to improve the understanding of the environmental fate of organic pollutants in areas with permafrost occurrence. The obtained results will be compared with previous studies in areas characterized by a rapidly changing periglacial zone (the Arctic – Svalbard, and the Antarctic – King George Island). At least two scientific papers will be prepared and results will be discussed on international conferences. Moreover, another expected outcome of the project is establishing a long-term scientific cooperation with the North-East Science Station.