Due to the global climate warming, and therefore intensive glacier retreat, more and more areas free from ice appear that begin to be affected by permafrost. Permafrost is a recipient of a number of chemical compounds considered as pollutants, including: heavy metals (e.g. Hq) and compounds from the group of persistent organic pollutants (POPs) such as among others polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs). The report by experts of the Arctic Monitoring Assessment Program (AMAP) draws particular attention to the problem of long-range transport of anthropogenic pollutants from Eurasia and North America to the Arctic, but also, more disturbingly, to the phenomenon of reemission of pollutants earlier deposited in the soil and permafrost to the environment. Moreover, they emphasise the strong need to supplement data on concentrations of among others PAHs in the surface waters of the Arctic. Release to the environment of pollutants accumulated in permafrost for years can result in difficult to predict ecological transformations related to the exposure of the Arctic fauna and people to the effect of harmful chemical substances. The negative effect of xenobiotics can result in among others disturbances in the functioning of the Arctic food chain and maintenance of the ecological balance of Polar regions.

The primary objective of the project is to investigate the variability of the chemism of surface waters (including atmospheric precipitation and the creek waters) and subsurface waters (shallow groundwater flow occurring on the interface of the active layer and permafrost) in a small glacier-free Arctic catchment in terms of occurrence of chemical compounds with toxic, mutagenic, and cancerogenic properties. Moreover, the following will be attempted: 1) determination of the modification of the chemism of surface and subsurface waters by precipitation waters; 2) estimation of the amount of pollutants supplied to the glacier-free catchment with precipitation waters and from thawing of permafrost and snow melt, as well as those discharged from the catchment as a result of their transport in waters of the Reindeer Creek to the Scott River; 3) preliminary description of the circulation of selected pollutants in waters within the Reindeer catchment.

Complex hydrochemical research (measurements of water stages and water flow rate; qualitative and quantitative determinations of a number of chemical compounds in water samples) supplemented by meteorological measurements will permit the determination of the hydrochemical response of waters circulating within the catchment, and an insight into transport of pollutants in surface and subsurface waters and their modification in response to the changing meteorological conditions.

The variability of the type and concentrations of pollutants in waters circulating within the Reindeer catchment will be possible through:

- Collection of samples of precipitation, waters of the creek (stream supplying water and the main stream), and subsurface waters (sampled from piezometers in the spring, middle, and mouth sections over a period of 30-50 days (daily water sampling).

The analysis of transport of pollutants in surface and subsurface waters, as well as preliminary estimation of the pollution load, will be possible owing to:

- Measurements of the volume of rainfall and measurements of surface and subsurface water stages, and calculation of water flow rate at particular sampling sites in the catchment performed by the co-investigators of the project as a specialist on hydrology and hydrogeology.

Moreover, an insight into the effect of meteorological conditions on the modification of the chemism of both surface and subsurface waters will be possible through:

- Conducting meteorological observations: changes in temperature and air humidity, wind speed and direction, and measurements of rain precipitation volume.