



Project acronym: P-PEAT2

Project title: Understanding Phosphorus cycling in Peatlands under Climate Change 2

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Discipline: Earth Sciences & Environment: Other - Environment

Station(s): Toolik Field Station (USA)

Phosphorus (P) is an essential element for life that limits productivity in many terrestrial ecosystems. Histosols accumulate a large amount of P due to its high presence of organic matter and adsorption processes, but little is known on the mechanisms that occlude or potentially remove P from old peat layers. The P-PEAT2 project wants to understand long-term P storage in permafrost peatlands in the long-term stoichiometry. Climate change is increasing decomposition and favoring the thawing of permafrost in arctic and subarctic peatlands, leading to drastic geochemical changes. The unknown consequences of future changes in histosols on P cycle suppose big hurdles that P-PEAT2 will address. In the previous INTERACT call, our project was funded to investigate P cycling in the subarctic region of Abisko. Soil samples were obtained from several palsa mires along a permafrost-thaw gradient in an area of discontinuous permafrost. P-PEAT2 aims to complement previous research and improve the knowledge on P cycling in continuous permafrost peatlands. For this reason, Toolik Field Station is an excellent site for its development. We will sample peat soil and compare the active layer vs. permafrost soil in different mire types and “hydrological windows” as local forms of permafrost thaw in polygon mires. P speciation, stoichiometry and microbial activity will be measured on soil samples. Vegetation will be described and sampled for stoichiometric determination. Water chemistry will be determined. The project intends to develop a theoretical modeling of P cycling for continuous and discontinuous permafrost peatlands comparing Arctic and Subarctic regions.