

Project acronym: FunCaST

Project title: Fungal contributions to the carbon cycle of subarctic thermokarst ponds

Project leader: Christian Wurzbacher, University of Gothenburg, Sweden

Discipline: Earth Sciences & Environment

Station(s): CEN Whapmagoostui-Kuujjuarapik Station (Canada), Toolik Field Station (US)

The project is addressing the role and phylogenetics of fungi residing in permafrost thaw ponds. In these ponds ancient carbon that has been stored to permafrost for thousands of years is recycled back to the active carbon cycle. It is known that fungi are in the front line starting the carbon degradation and our preliminary results show that fungi in the permafrost thaw ponds are to a large extent composed of unknown fungal taxa. The project will study these organisms combining traditional cultivation based approach to state-of-the-art molecular techniques, especially metagenomics shotgun sequencing. The cultivation based experiments are aimed at isolating some of the unknown fungi for phylogenetic and ecological studies while metagenomics enables studying the environmental role of these fungi.

The study locations include two geographically distinct sites: Whapmagoostui-Kuujjuarapik, which is affected by the thawing process, and Toolik Lake Field station, which is a pristine site. The purpose of this set up is to study the endemism of the fungi in the ponds and whether these fungi are endemic to the environment or geographic location. The goal of this study was to determine the role of the fungi in the degradation and transformation processes of carbon originating from thawing permafrost. A second goal was to investigate the endemism of these fungal taxa in thawing subarctic and arctic freshwater ecosystems.