



Project acronym: CAPTCHA

Project title: Carbon Accumulation in Permafrost peatlands and ponds in Transition: Chronology of the western Hudsonian Area

Project leader: Laure Gandois, CNRS, France

Discipline: Earth Sciences & Environment: Global change & Climate observation

Station(s): Churchill Northern Studies Centre (Canada)

The CAPTCHA project aims at investigating the effects of permafrost degradation on peatland and lake carbon cycle. The project has been conducted at the Churchill Northern Studies Center. This research station is located in the Hudson Bay lowlands, an area representing the second largest peatland complex in the world, and storing an enormous stock of organic carbon. Recent observations in the area have reported increase of air temperature and direct impacts on ecosystems with the formation of new water bodies.

The objectives of the project are to assess recent and long-term carbon accumulation rates in landscapes affected by permafrost degradation. Permafrost peatland degradation create identifiable features in the landscapes and allow defining chronosequences. Along this chronosequence, peat, lake sediment and water will be collected in order to 1- assess recent carbon accumulation and compare then to pre-industrial carbon accumulation rates, 2- determine the origin (old permafrost or recently fixed from the atmosphere) of carbon released as CO₂, CH₄ and DOM, 3- track the ecological evolution of microbial community, along with the ecosystem changes.

The Churchill Northern Studies center Churchill station is located in an area of continuous permafrost. The Wapusk National Park, also accessible from the station (by helicopter) covers a transition of ecosystem from coastal fens in the North to the Boreal Spruce forest in the south, in a discontinuous permafrost area.

The location offers a unique opportunity to investigate early stages of permafrost degradation on terrestrial ecosystems in different configurations.