Project acronym: PERMAMERC2

Project title: Mercury dynamics in continuous permafrost areas - Zackenberg, Greenland

Project leader: João Canário, University of Lisbon, Portugal

Discipline: Earth Sciences & Environment: Other - Environment

Station(s): Zackenberg Research Station (Greenland/Denmark)

Contaminant studies in the Arctic have been focused on other environmental compartments rather than permafrost. It has been recently estimated that the Northern permafrost regions contain 1656 Gg of mercury (Hg), which indicates the urgent need for studies to better understand the consequences and impacts of this huge Hg pool in the likely scenario of thawing. PI has been working on Hg biogeochemistry for decades and in the last five years have been particularly focused on Hg dynamics in thermokarst lakes in sporadic and discontinuous permafrost areas in Nunavik, Canada. PERMAMERC2 intends to expand the previous Hg studies in Nunavik to continuous permafrost areas in Greenland near the Zackenberg station and will be focuses on five Hg themes: pools, release, methylation/demethylation, fluxes, and the overall fate and impact. Several sites around the station will be chosen, based on forthcoming meetings with the Greenland Ecosystem Monitoring. This area in a stable continuous permafrost zone begins to experience some permafrost degradation with the appearance of some thermokarst lakes and increase of GHG release. Methodologies include sample incubations with Hg-stable isotopes to access Hg methylation and methylmercury demethylation rates or flux chambers to evaluate Hg/MeHg transport across interfaces. This work will contribute not also to better understand Hg dynamics in permafrost soils but also to increase Hg studies in Greenland that are still scarce. It is also expected to produce scientific based knowledge for decision makers from the Governments of Greenland/Denmark that allows establishing mitigation measurements in a future “natural contamination scenario”.