

Project acronym: BCAM

Project title: Baseline Conditions and Arctic Mining Impacts under Hydro-Climatic Change

Project leader: Jerker Jarsjö, Stockholm University, Sweden

Discipline: Earth Sciences & Environment

Station(s): Khibiny Educational and Scientific Station, Russian Federation

Mining is an economic fundament for many Arctic communities and nations, although the operations involved and the waste produced may have severe environmental impacts. This project aims at acquiring new and comprehensive hydrogeochemical snapshot data from different locations in the vicinity of the Khibiny research station. This will provide an observational basis to test hypotheses regarding pathways, dominant transport processes, and bioavailability of metals near Arctic mining areas.

We will collect water samples for metal analyses from stream networks in the Khibiny region, as well as suspended sediment samples, bedload samples and soil samples for textural and metal concentration analyses. We see the proposed field campaign and subsequent analyses as a unique opportunity to increase the understanding of baseline conditions (under negligible human impacts) regarding hydrogeochemistry and trace element concentrations. We also note that this window of opportunity may be closing soon, due to on-going rapid hydro-climatic changes in the regions.

Additionally, the world-unique extraction of rich deposits of apatite - nepheline ores in the Khibiny Mountains will enable sampling of clearly mining-disturbed areas under ambient conditions that that only very rarely have been considered in baseline and mining impact studies. We therefore expect that there is large potential for novel insights on fundamental processes. In addition to scientific advances, we believe that the data and analyses that would result from the proposed project can fill an input need to strategic impact assessments that are highly useful for investigating effects of multiple and cumulative impacts from non-renewable resource extraction.