

Project acronym: CLAIM

Project title: Clouds Lower the Albedo of Ice Microbiota

Project leader: Karen Cameron, Aberystwyth University, UK

Discipline: Earth Sciences & Environment

Station(s): TRS (Sweden)

Glacial melt is of serious societal concern. Pigmented algae, which flourish on ice surfaces, enhance melt by lowering surface ice albedo and increasing solar absorption. To date, little is known of the environmental conditions that drive the form and function of these communities. CLAIM will pioneer research into the effects of climatic changes on ice algae, by investigating the statistical relationship between reduced short wave radiation (SWR), as a proxy for increased cloud cover, and community changes, measured by algal abundance, metabolomics and pigment composition. These relationships will be studied using a two-method approach. Firstly, rapid biotic responses to daily fluctuations in SWR will be detected by correlating spectral measurements to community changes. Secondly, community adaptations to prolonged increases in cloud cover will be investigated through the use of radiation manipulation experiments.

These investigations will be conducted on Storglaciären, Sweden, using the Tarfala Research Station as a field base for the research between July and early-September 2017. Samples and spectral measurements will be taken in parallel, and samples will be processed ready for analysis at the home laboratory. Algal abundance, metabolomics and pigment composition will be investigated using flow cytometry, liquid chromatography mass spectrometry and high performance liquid chromatography respectively. Results will be published within a peer-reviewed journal such as ISME Journal or Global Change Biology, and outreach activities will increase awareness of this research and climate change issues. A comparative study on Mittivakkat Glacier, Greenland, which tends to receive higher levels of SWR, will be proposed for 2018.