INTER=ACT

Project acronym: IME4Rad

Project title: Improving model estimations of boreal forest structural influences on radiation regime during snowmelt

Project leader: Clare Webster

Discipline: Earth Sciences & Environment: Water sciences/Hydrology

Station(s): Pallas-Sodankylä Research Station (Finland)

Our research will be conducted at Sodankylä Research Station in the surrounding boreal forest, which is representative of the majority of the northern hemisphere forest snow covered area. At Sodankylä we plan to collect high resolution spatially and temporally distributed forest structure and radiation data during snowmelt. We aim to use the collected data for improvement of model representation of forest structure influences on both snowmelt and spatial variations in forest snow albedo at a range of spatial scales. At local and regional scales, these models are important for predicting snowmelt and water availability. At regional to global scales, these models are important for estimating the influence of the snow albedo feedback on environmental warming or cooling, errors in which currently contribute to large uncertainties in climate change scenario estimates. The data collection and analysis methods outlined in this proposal have been developed and refined by the research team over previous snow seasons in sub-alpine forests. We will use an unmanned aerial system (UAS) for capturing 3D forest structure information using established structure-from-motion methods. Radiation measurements will be carried out using a UAS rotocopter to capture above-canopy forest albedo, and sub-canopy measurements will be carried out using a portable hand-held radiometer set-up and a fixed cable car set-up. This research at Sodankylä will become part of a longer-term effort by the research team, who are working on using 3D forest structure data to develop and validate new parametrisations for calculating the radiation regime in forests at a range of spatial scales.