

Project: Modeling the energy balance of the snowpack in the non-melt zone of the Greenland Ice sheet.

Objective: The objective of this research project is to close the energy budget for the snow pack and be able to simulate the snow temperatures of the Greenland Ice Sheet. This is important for our ability to predict when melting occur on the ice sheet and hence our ability to accurately simulate the mass balance of the Greenland Ice Sheet.

Task:

The task of this project is two fold. The first task is to organise the different observational dataset collected at the Deep Ice Core drilling site in Greenland as part of the EastGRIP project. The dataset consists of incoming and outgoing long and short wave radiation measurements, surface temperature and wind conditions, latent and sensible heat flux, snow pack temperatures, snow accumulation measurements and snow density measurements.

The second task is to setup the Firn Community model such that the snowpack temperatures can be simulated. Once this is achieved the modelled snow pack temperatures will be compared to the observed snowpack temperatures. Using inverse modelling techniques the thermal conductivity of the snowpack will be estimated such that the energy budget is balanced.

Deliverable: A thermal conductivity profile of the snow pack in the interior of the Greenland Ice Sheet.

Prerequisites:

Ability to run and program in python.

International collaboration Dr. Max Stevens (University of Washington)

Relevant references:

<https://github.com/UWGlaciology/CommunityFirnModel>

<https://meetingorganizer.copernicus.org/EGU2017/EGU2017-10893.pdf>

<https://meetingorganizer.copernicus.org/EGU2017/EGU2017-5845-1.pdf>

<http://adsabs.harvard.edu/abs/2012AGUFM.C51B0775S>

<https://journals.ametsoc.org/doi/pdf/10.1175/JCLI-D-13-00635.1>

<https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1002/2017MS000988>