Project Title: Improved retrievals of snow depth on sea ice for numerical sea ice prediction applications

Researcher's Name and Affiliation:
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Project Location:
Eureka, Nunavut

Timeframe:
March to April 2016

Project Description:
Snow depth over sea ice is a crucial variable that has to be properly initialized in numerical weather prediction (NWP) systems. However, snow depth on sea ice is poorly observed conventionally and has proven very challenging to address with satellite imagery. Recently available measurements from the NASA's Operational IceBridge (OIB) can directly estimate snow depth on sea ice at sufficiently high resolution to allow meaningful validation with ground reference measurements. The overreaching objective of this proposal is to utilize state of the art remotely sensed measurements to improve Environment Canada's capability to provide information on snow depth over sea ice for applications related to numerical model based prediction systems such as the Canadian Seasonal to Interannual Prediction System (CanSIPS) and the Regional Ice Prediction System (RIPS) In order to meet these objectives a new suite of snow on sea ice thickness ground measurements needs to be acquired coincident with OIB flight lines.

Methodology:
Data collection will take place on the sea ice approximately 30km from Eureka, Nunavut. Sampling will consist of long transects co-incident with OIB flight lines where we will be measuring snow depth (with MagnaProbe), snow density and water equivalent (with snow tube), snow stratigraphy (with snow pit kit), and sea ice thickness and freeboard (with ice auger). Transportation will be provided by snow machines and no structures that will be erected, restored or abandon during the field campaign.

Data:
The data collected will be used to validate OIB retrieval estimates in order to estimate snow depth and characterize its variability over sea ice in the Canadian Arctic, and provide inputs to CanSIPS/RIPS used for operational sea ice forecasting at Environment Canada.

Reporting:
Results of this project will be communicated with technical reports and peer reviewed journal articles.