PROJECT SUMMARY REPORT - 2014 SERF CAMPAIGN

Subproject: Microwave Remote Sensing of Artificial Sea Ice

Actual field dates: January 24-February 20, 2014
Field site: Sea-ice Environmental Research Facility (SERF), University of Manitoba, Winnipeg, Canada
Number of man-days in the field: 70

Figure 1

Figure 2

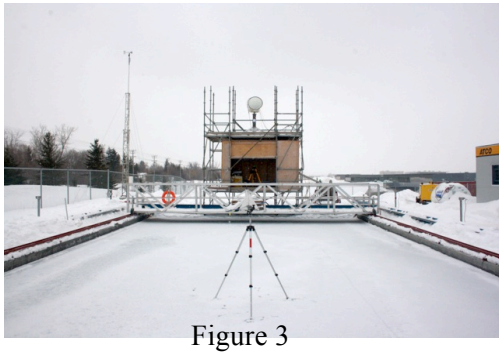

Figure 3

Summary:

For the period of time from January 25 to February 7, 2014 we characterized thermodynamic evolution and microwave scattering mechanisms of growing sea ice coincident to the collection of time series C-band fully-polarimetric radar data across the 20 to 55° incidence angle range. Ice growth from 0 to 35 cm was observed. Time series physical properties of snow (temperature, salinity, density profiles) and ice (temperature, salinity as functions of depth) are being used to understand the electromagnetic properties of the system. A LiDAR system, which uses laser pulses to create a high-resolution elevation map of the snow-ice surface, enabled the inclusion of surface roughness statistics for radar data interpretation. A modelling study will link these variables and the radar response to better understand how the thermodynamic evolution of sea ice is manifest in satellite radar signatures.

Multi-frequency radar measurements (5.25 to 5.75 GHz, i.e. within the C-band) at different incidence angles were collected at various stages during the experiment. An inversion model will be applied to this data set.

Photos:

Fig.1: Newly formed sea ice
Credit: Nariman Firoozy
Fig. 2: Scatterometer and LiDAR measurements of snow-covered surface
Credit: Alexander Komarov
Fig. 3: Calibration of the scatterometer using a corner reflector
Credit: Alexander Komarov

Participants:

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