

Subproject: Polarimetric scatterometer and SAR measurements of snow covered first-year sea ice for snow thickness discrimination

Actual field dates: April 19 - 22, 2014

Field site: Cambridge Bay, NU, 5-40 km from ice camp

Number of man-days in the field: 12

Summary:

The distributed sampling component of our project is described here. The surface-based scatterometer component is reported elsewhere. Physical sampling of snow and ice took place at a total of 19 locations on land-fast first-year sea ice near Cambridge Bay, NU, ranging from 5 km to 40 km away from the sea ice camp (Figure 1). Sixteen sites were chosen for ASCAT, and 3 for RADARSAT, data validation. Four hundred snow depth measurements were recorded for each of the 19 sites, consisting of 200 m transects parallel to the snow drift pattern and 200m orthogonal to the drift pattern. Transects started at the centre location of each site, with snow depth measured at 1 m intervals using a hand ruler. The mean snow depth varied from 12cm to 18 cm for the 19 sites, which was a surprisingly low variation in snow depth. Additionally, repeated measurements of salinity and electrical conductivity were obtained for the bottom 2 cm of the snow pack at each site. Mean salinity values varied from 3 psu to 17 psu, and electrical conductivity varied from 6 s/cm to 27 s/cm. The snow/ice interface roughness was also recorded at each site. Our efforts in this project, along with SAR and space-borne scatterometer data acquisitions, will help to better understand the role of snow thickness on microwave backscatter as a function of changing snow dielectric properties due to diurnal and seasonal temperature changes.

Photos:

Fig.1: Distributed snow sample locations near Cambridge Bay. Background is a RADARSAT-2 ScanSAR HH image for 2014-02-23. Credit: Mallik Mahmud

Fig. 2: Snow-covered first-year sea ice. Credit: Mallik Mahmud

Fig. 3: First-year ice surface roughness next to the ice camp location. Credit: Mallik Mahmud

Participants:

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Acknowledgements:

ASP, Polar Continental Shelf Project (PCSP), Canada High Arctic Research Station (CHARS), ArcticNet, Arctic Research Foundation, NSERC. The Canadian Ice Service is also acknowledged for providing RADARSAT-2 imagery. RADARSAT-2 Data and Products (c) MacDonald, Dettwiler and Associates Ltd., 2014, all rights reserved.

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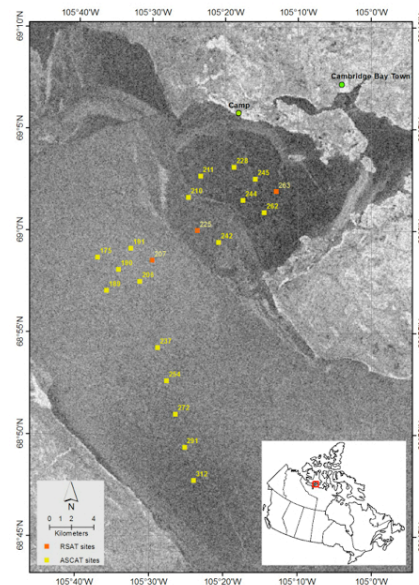


Figure 1



Figure 2



Figure 3