

Subproject: Irradiance in the snowpack and related physical and optical properties

Actual field dates: May 21- May 29, 2014

Field site: Cambridge Bay, Nunavut, Canada

Number of man-days in the field: 16

Summary:

A total of 10 points have been characterized during the 8 days prior to melt season. Operations at each point involved the full characterization of the snowpack, including physical properties (density, specific surface area and grain shape profile) and optical measurements of snow albedo and transmission profile in the snowpack. In addition, we were able to measure transmission through the sea ice using the same instrument that provides a coherent and comprehensive dataset to study the radiative transfer in the snow+ice system. Snow was removed from the surface the last two days of the experiment, in order to measure the "ice" surface albedo and ice-only transmission. The 10 points show not only variations of the snow depth from 8 to 30 cm, but also changes of the internal properties that could explain approximately 50% of the transmission variations according to our first analysis.

Despite changing weather, the snow conditions during the campaign remained relatively constant. Only moderate melt was observed in the beginning of the campaign, while colder and drier conditions prevailed during the second half. Nevertheless, our observations span too short a period to assess the role of snow metamorphism and melting on optical properties. Analysis of the albedo data using radiative transfer model is in progress.

Photos:

Fig.1: Measurement of the transmission profile in the snow.

Credit: G.Picard/F.Domine

Fig. 2: Snow removal experiment and "ice" albedo measurements.

Credit: G.Picard/F.Domine

Fig. 3: Density profile in a 15 cm deep snowpack. Credit: G.Picard/F.Domine

Fig. 4: Spectral snow albedo measurements near the tent. Credit: G.Picard

Participants:

Ghislain Picard (LGGE Grenoble, France); Florent Domine (ULaval)

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For more information contact ghislain.picard@ujf-grenoble.fr or florent.domine@takuvik.ulaval.ca

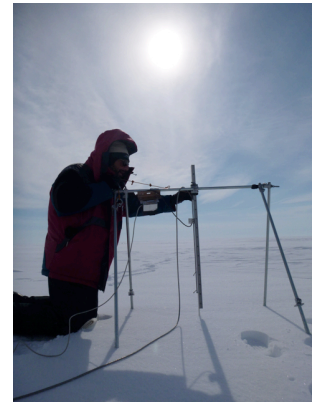


Figure 1



Figure 2

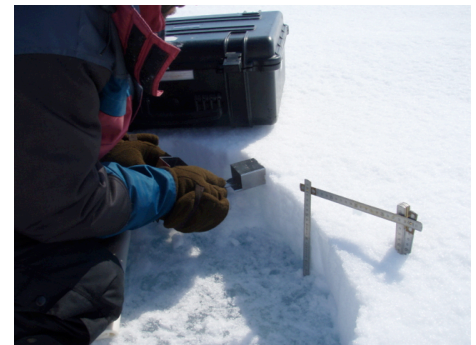


Figure 3



Figure 4