

Session: OS-5 The role of snow on sea ice for sea-ice parameter retrieval and variability

Polar program: None

Title: PIPERS: SAR backscatter parameters and co-located LiDAR scans in the Ross Sea

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Text: The austral autumn sea ice cruise to the Ross Sea and Terra Nova Bay under the research project PIPERS (Polynyas, Ice Production and Seasonal Evolution in the Ross Sea) presented extraordinary opportunities to acquire co-located SRS imagery and terrestrial laser (LiDAR) scans of the sea ice surface during autumn freeze-up conditions. Numerous sites, representing mixed first-year ice types (nilas, consolidated pancakes, and ridged first year) were laser scanned at sub-centimeter scale using a Riegl VZ-1000 LiDAR scanner in both on-the-ice surveys from multiple scan positions and single-position scans from the high vantage point of the ship's (N.B. Palmer) bridge wing. Scans generally encompassed areas of at least 100m x 100m with sufficient point cloud returns to generate surface topography rasters at better than 5 cm resolution. SAR data from two high-resolution polar orbiting satellites (TerraSAR-X and Sentinel 1) were co-spatial and co-temporally acquired of the LiDAR survey sites. We present comparisons of raw backscatter, entropy, and roughness parameters from the polarimetric SAR data for direct comparison to sea ice topography and elevation-derived surface roughness parameters. Very thin or non-existent snow cover during the cruise period will negate some of the problematic volume scattering seen in other SAR imagery, and allow better interpretation of the backscatter signal from this imagery in terms of ice type.

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