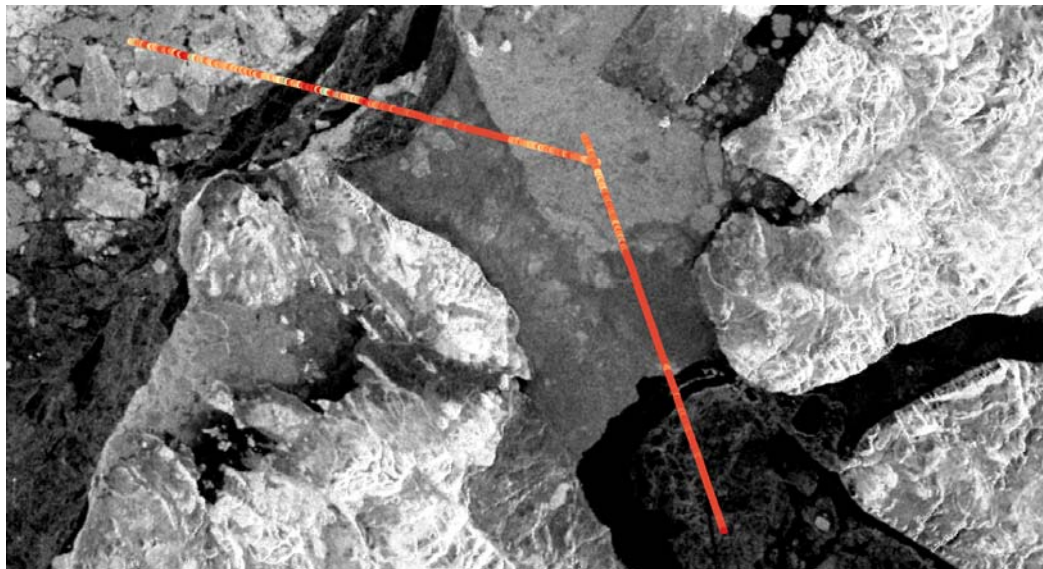


Master Thesis

Roughness and backscatter of the Nansen Sound sea ice plug

Along the northern coast of Canada sea ice plugs can form in the narrow straits and sounds of Ellesmere Island. These plugs persist for several years, undergoing significant morphology and thickness changes throughout the alternating, successive winter and summer seasons. We have been able to carry out airborne surface roughness and ice thickness measurements of the ice plug of Nansen Sound for three consecutive years, and satellite SAR images are available throughout the complete three-year period to document processes leading to the formation of the ice plug as well as its seasonal changes. The aim of this project is to quantitatively describe and interpret the concurrent changes of surface roughness, ice thickness, and radar backscatter observed by these sensors, in order to gain better understanding of radar signatures of multiyear sea ice. In addition, the atmospheric and oceanic boundary conditions of ice plug formation and evolution shall be studied.



Satellite SAR image of the Nansen Sound ice plug, showing ice thickness profile across different ice types

What you need

Excellent marks in the PEP program; Strong numerical and programming skills; Additional knowledge of radar remote sensing and/or sea ice is of advantage.

What you will learn

You will learn much about laser altimetry (both single beam and scanning) and electromagnetic ice thickness sounding of sea ice, and will recognize surface roughness as a key property in material science and physics. You will learn to quantitatively retrieve roughness information from time series data. In addition, you will learn to process and interpret large amounts of satellite SAR data. Finally, you will interpret data from atmospheric reanalysis products and will apply them to the surface energy balance of sea ice.

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