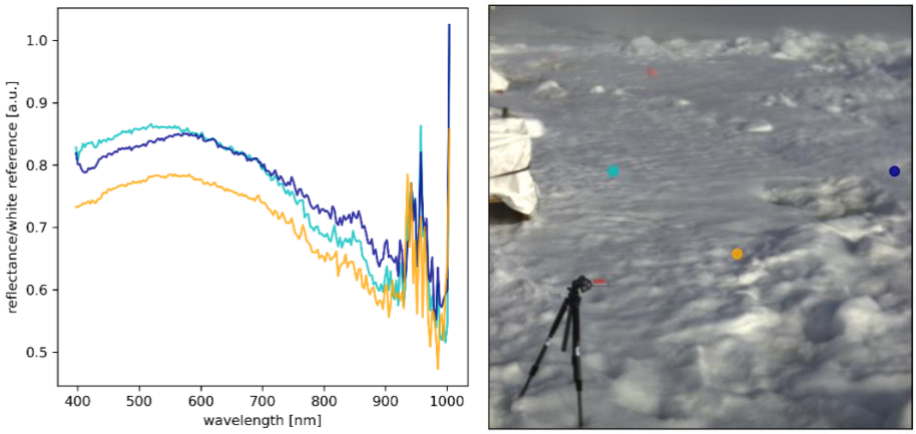
Master Thesis

Temporal evolution of 2-D spectral surface reflectance of sea ice during Arctic summer



Left: Spectral reflectance of three example locations. Right: True color image of the measurement site with the example locations and the white reference marked.

Sea ice observation from space is one of the key research topics at the Institute of Environmental Physics (IUP). Within the research group for Remote Sensing of Polar Regions (www.seaice.uni-bremen.de) new methods for satellite remote sensing of the Arctic ice cover are developed and interpreted in a climate system context.

In the Arctic summer the surface properties and constitution are subject to strong and rapid changes. Precipitation, solar illumination and winds facilitate the evolution of snow and bare ice grains as well as melt pond formation. These events can be observed in situ as well as via remote sensing and are detected as a change of surface albedo or reflectance.

In this project we use optical imagery of high spectral resolution from Polarstern expeditions MOSAiC 2019–2020 (www.mosaic-expedition.org) and ATWAICE 2022 to analyze the spectral snow and ice reflectance measured on the ground to later improve satellite retrievals. The goal is to examine the mechanisms driving the temporal behavior of snow, ice and pond spectral properties and further determine a connection to the surface air temperature history of the floe.

What you need and what you will learn

Knowledge in physics and some computer programming experience, best Python, is required. Interest in digital image processing and spectral analysis will be helpful.

You will work with optical data from unique expeditions as MOSAiC and learn how to use meteorological reanalysis data. Additionally, you will gain insights into remote sensing retrievals and their development for existing and future satellite missions.

Our working group offers an open discussion atmosphere and worldwide contacts to the leading institutions in the field.

Contact

Dr. Gunnar Spreen, room N3330, tel. 62158, email gunnar.spreen@uni-bremen.de

Earliest start date is August 2022.