

Sea Ice Type Retrieval Algorithms from Fused TerraSAR-X and ALS Data

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Abstract

Sea ice type retrieval from Synthetic Aperture Radar (SAR) promises unimpeded monitoring of the polar ice masses. However, the research generally suffers from the sparsity of in-situ ground truth data, strictly limiting the validity of classifiers. As a result of the MOSAiC expedition, this situation has changed: In-situ measurements in diverse ice conditions have been acquired and are currently being made available. Airborne laser scanner (ALS) data provides high resolution retrieval of ice surface topography at a high spatial coverage, enabling the generation of large ground truth data sets upon fusion with high resolution SAR data. Due to the high temporal frequency of TerraSAR-X acquisitions over the course of the MOSAiC mission, time gaps between fused measurements can be kept minimal. As a result, we can not only develop classifiers for physically well-defined ice classes, but also sound out the limitations of sea ice type retrieval from X-Band SAR using artificial intelligence techniques.