

Investigations of thin Ice Backscattering Statistics in the Bohai Sea and the Kara Sea using Different SAR Sensors

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In the coastal areas of China sea ice occurs mainly in the Bohai Sea and in the northern part of the Yellow Sea. The ice season lasts from December to March. Here, we report on the continuation of our research on the use of remote sensing technology for sea ice detection and classification in this area. The sea ice conditions in the Bohai Sea during 2010 to 2011 were investigated using ENVISAT ASAR acquired from ESA, Chinese Huan-jing satellite optical imagery and other remote sensing data. In order to carry out research work in ice thickness detection with SAR data, an experimental platform for microwave scattering measurement was build, based on a vector network analyzer. Scattering data of five radar bands (C, X, S, L and Ku) were acquired from the platform. In January of 2011, the platform was tested outdoor. Following the test, a sea ice observation experiment was carried out, and sea ice scattering data were acquired, which can be used to study a scattering model of sea ice. We also investigated the effect of sea ice thickness on the backscattering coefficients as observed in SAR imagery, and the surface features of different sea ice types and their ice thickness distribution. A sea ice thickness retrieval method was developed based on the multi-polarization and multi-band SAR data. The sea ice cover in the Bohai Sea consists mainly of very thin ice fields, less than 30 cm. To compare the results obtained in the Bohai Sea to those in the Arctic we have collected ENVISAT ASAR and TerraSAR-X based backscattering statistics from different thin ice types over the area of the Kara Sea. The comparison serve as a guideline if the methods developed for the Bohai Sea are applicable under Arctic conditions and, vice versa, if the results achieved in the Arctic remain useful in the ice conditions typical for the Bohai Sea.