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Mapping of summer sea ice in the Chukchi Sea from KOMPSAT-5 SAR

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ABSTRACT

Accurate sea ice mapping is important for providing information to guide human activities in polar regions and global climate change research. In this study, a sea ice mapping model based on Random Forest (RF) was developed for the Korea Multi-Purpose Satellite-5 (KOMPSAT-5) Synthetic Aperture Radar (SAR) data obtained from August to September 2015 in the Chukchi Sea. A total of 12 texture features derived from backscattering intensity and the gray-level co-occurrence matrix were used as input variables for sea ice mapping. The RF model produced a sea ice map with a grid size of 125 m, demonstrating excellent performance in the classification of sea ice and open water with an overall accuracy of 99.2% and a kappa coefficient of 98.5%. Sea ice concentration (SIC) retrieved from the RF-derived sea ice maps was compared with that from ice charts. The mean and median values of the differences between the SICs derived from the RF model and the ice charts were −8.85 and −8.38%, respectively. Such difference was attributed to the uncertainty in the ice charts rather than error in the RF model.