

MEASURING ARCTIC SEA ICE MOTION USING HIGH-SPATIAL-RESOLUTION OPTICAL SATELLITE IMAGE

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ABSTRACT

Sea ice motion from low-resolution satellite sensors with feature tracking methods, e.g. maximum cross-correlation, has been widely used to monitor changes in sea ice covers. This study presents measuring arctic sea ice motion using high-resolution optical satellite images acquired on August 2014. The high-resolution optical images were obtained from Korea Multi-Purpose Satellite-2 and Korea Multi-Purpose Satellite-3 with the spatial resolutions of 1 m panchromatic (PAN) band and 4 m multi-spectral (MS) bands and 0.7 m PAN band and 4 m MS bands, respectively. The sea ice motion was retrieved using sub-pixel correlation strategy, and the measuring results were represented as N/S and E/W displacements. In addition, individual ice floe was able to be delineated using the combinations of the spectral characteristics and the shape metrics, e.g. area, perimeter and length of the ice floe, from the advantages of the high-resolution images. The sea ice motion was also analyzed using the delineated ice floes and shape based matching method. The measurement results were compared with drifting buoy data. The results are applicable to fill the gaps between sparse buoy data and the motions from low-resolution satellite data.