DEVELOPMENT OF A SATELLITE SCATTEROMETRY APPROACH FOR GREAT LAKES ICE COVER MAPPING

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ABSTRACT

In this paper, we present an approach using scatterometry to map Great Lakes ice cover. Ice cover mapping over the Great Lakes is a regional-scale problem that requires a satellite sensor to provide data with large spatial and high temporal coverage. We first present the scattering physics that are employed in our approach for lake ice identification with dual-polarized Ku-band scatterometer measurements. To test the scatterometry approach for lake ice mapping, we use data collected by the spaceborne NASA scatterometer (NSCAT) over the Great Lakes in conjunction with surface observations obtained during our 1997 field experimental campaign. NSCAT was operated at approximately 14 GHz on the Advanced Earth Observing Satellite (ADEOS) from June 1996 to July 1997 covering the entire ice season over the Great Lakes. The results from NSCAT lake ice mapping are in good agreement with field observations and National Ice Center (NIC) ice analysis charts. With the launch of the SeaWinds Ku-band scatterometer on the QuikSCAT satellite in June 1999, techniques in the scatterometry approach to Great Lakes ice mapping can be developed specifically for SeaWinds data.