

LESHKEVICH, G.A., NOAA / Great Lakes Environmental Research Laboratory, 2205 Commonwealth Blvd., Ann Arbor, Michigan 48105; and **NGHIEM, S.V.,** Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, California 91109. **Development of a Satellite Synthetic Aperture Radar (SAR) and Scatterometer Approach for Lake Superior Ice Cover Mapping.**

Ice cover mapping over Lake Superior is a regional-scale problem that requires a satellite sensor to provide data with large spatial and high temporal coverage. In this paper, we present the development of an approach using satellite synthetic aperture radar (SAR) and scatterometer to map Lake Superior ice cover. With the launch of ERS-1 and ERS-2 (1991 and 1995) and the subsequent launch of RADARSAT (1995) with its wide swath (~500 km), high resolution (100 m) ScanSAR Wide data, algorithms to classify and map lake ice, based on in situ measurements and observations, have been developed. In addition, 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 have been developed specifically for SeaWinds data and results are to be verified with extensive field observations. Moreover, the results from the Great Lakes Winter Experiment 2002 (GLAWEX02) experiment employing the NASA AIRSAR aircraft and the recent launch of the ENVISAT satellite will facilitate the development of algorithms to map ice thickness and to better utilize the all-weather, day/night imaging capabilities of satellite SAR and scatterometer data for applications in ice forecasting and modeling, climate and winter ecology research, hazard mitigation, as well as operational use.