

# Wavelet Analysis of Satellite Images for Sea Ice Motion

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## Abstract

QuikSCAT backscatter and DMSP SSM/I radiance data are used to derive sea ice motion for both the Arctic and Antarctic region using the wavelet analysis method. Sea ice motion of the Arctic for fall/winter/spring time derived from NSCAT, QuikSCAT and SSM/I data agree well with ocean buoy observations. Both comparisons of result from QuikSCAT and SSM/I with buoys are compatible, and their ice tracking results complement each other. Sea-ice drift daily results from QuikSCAT, SSM/I, and buoy data can be merged to generate composite sea ice motion maps for more complete coverage of sea ice motion. In the Antarctic, a case study shows that sea ice motion derived from NSCAT/QuikSCAT data is predominantly forced by and consistent with the surrounding wind field. Based on a series of daily Arctic sea-ice drift maps in December 1999, it is found that the major circulation patterns are changing and shifting significantly within every four to seven days and they are dominated by wind forcing.

**Keywords:** Wavelet transform, QuikSCAT, SSM/I, sea ice motion, feature tracking.

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