"SeaWinds on QuikSCAT Postlaunch Calibration Plan and Expected Performance"

James N. Huddleston
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Abstract

SeaWinds on QuikSCAT is a scanning pencil-beam scatterometer scheduled to launch on May 16, 1999. Once in orbit, it will make accurate, high-resolution (7 x 25 km) measurements of the normalized radar cross section, σ^0. Its wide (1800 km) swath provides for 90% coverage in 24 hours – an improvement over previously flown fan-beam scatterometers. The σ^0 measurements made by QuikSCAT, along with a geophysical model function, will be used to determine the speed and direction of wind over the ice-free ocean at a resolution of 25 x 25 km. Additionally, the σ^0 measurements will be useful for many land and ice applications.

In order to detect and track subtle climatological phenomena, very high radiometric accuracy, on the order of 0.1 dB, is required. Therefore, it is extremely important that the QuikSCAT instrument be well calibrated and that the science data processing system be thoroughly verified. QuikSCAT will undergo an extensive postlaunch calibration campaign led by the QuikSCAT Sensor Verification Team (SVT) at the Jet Propulsion Laboratory (JPL) with support from science team members and ground data processing system engineers. Testing of geophysically oriented postlaunch calibration algorithms was made possible through the development of a highly accurate instrument simulation and data processor. The simulation has been used to predict the magnitudes of residual calibration errors and to estimate the expected wind retrieval accuracy of QuikSCAT. This paper briefly outlines the basic design and operation of SeaWinds on QuikSCAT, describes the postlaunch calibration plan, indicates the expected nature and magnitude of residual calibration errors, and presents the predicted wind retrieval performance of the QuikSCAT system.