OCEAN BRIGHTNESS TEMPERATURE MEASUREMENTS USING THE QUICKSCAT RADIOMETER

by

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ABSTRACT

The SeaWinds instrument on the QuikSCAT satellite is a special purpose radar remote sensor known as a scatterometer. This scatterometer is designed to measure the scattering characteristics of the earth's surface to infer ocean surface wind vector and other geophysical parameters. This thesis presents the novel use of the radar receiver as a total power radiometer to measure the brightness temperature (blackbody emission) of the Earth.

The derivation of a Radiometric Transfer Function Model is presented for the QuikSCAT Radiometer (QRad) that is used to calculate the apparent brightness temperature collected simultaneously with the radar scattering measurement. Analysis results are presented for on-orbit measurements to derive transfer function parameters, and the model performance in producing brightness temperatures is assessed by comparisons with near-simultaneous brightness temperature measurements from an independent microwave radiometer, the Tropical Rainfall Measuring Mission (TRMM) Microwave Imager (TMI). These results demonstrate the utility of Qrad obtaining good quality brightness temperature measurements especially over the oceans.

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