6.22 CALIBRATION OF THE NCAR AIRBORNE W-BAND RADAR USING OCEAN SURFACE BACKSCATTERING DATA

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The HIAPER Cloud Radar (HCR) is a 94 GHz scanning W-band system which has been deployed in several field campaigns mounted in an underwing pod on the NSF/NCAR HIAPER aircraft. Because of the radars exposure to extreme environmental changes, monitoring of radar system calibration is of great importance. Utilizing the backscattering properties of the ocean surface as a calibration reference for airborne and spaceborne sensors is well established for microwaves and has recently gained popularity in the millimeter wave frequencies. Since first ocean scan data collected by HCR during the Cloud Systems Evolution in the Trades (CSET) experiment (2015) showed great promise as a calibration resource, ocean scan data were collected on a regular basis and coordinated with atmospheric profiling through the release of dropsondes in the recent Southern Ocean Clouds, Radiation, Aerosol Transport Experimental Study (SOCRATES).

We will present a comparison of these two data sets which shows a large but fairly constant bias in HCR reflectivity calibration with somewhat higher values for SOCRATES than for CSET data. However, the radar system is stable within 1 dB over the course of all flights of one field experiment. We further compare the ocean scan calibration results with other calibration methods that make use of known maximum thresholds of reflectivities observed in light rain, within the bright band, and in the ice phase of clouds. A preliminary analysis shows consistency between the different methods, underlining the potential of using the ocean surface as a calibration target.