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**Calibration of Scatterometer Wind Speed under Hurricane Conditions**

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***Abstract***

Four scatterometers, namely, *MetOp-A*, *MetOp-B*, *ERS-2*, and *OceanSat-2* were recalibrated against combined National Data Buoy Center (NDBC) data and aircraft Stepped Frequency Microwave Radiometer (SFMR) data from hurricanes. As a result, continuous calibration relations over the wind speed range from 0 to 45 ms<sup>-1</sup> were developed. The calibration process uses matchup criteria of 50 km and 30 min for the buoy data. However, due to the strong spatiotemporal wind speed gradients in hurricanes, a method that considers both scatterometer and SFMR data in a storm-centered translating frame of reference is adopted. The results show that although the scatterometer radar cross section is degraded at high wind speeds, it is still possible to recover wind speed data using the recalibration process. Data validation between the scatterometers shows that the calibration relations produce consistent results across all scatterometers and reduce the bias and root-mean-square error compared to previous calibrations. In addition, the results extend the useful range of scatterometer measurements to as high as 45 m s<sup>-1</sup>.