Evaluation of the Potential Impacts of Dual Frequency Scatterometer at the National Hurricane Center

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The results of a user impact study of the proposed Dual Frequency Scatterometer (DFS) on tropical cyclone and marine analysis and forecast applications at the National Hurricane Center will be presented. The planned improvements in DFS over what is currently available operationally from QuikSCAT and ASCAT show promise to improve the utility of satellite ocean surface vector winds in numerous tropical and subtropical analysis and forecasting applications.

For tropical cyclones the most significant improvements seen with DFS will be due to a decreased sensitivity to rain and an increase in the sensitivity of the measurements in the hurricane-force wind speed range. This will allow for increased confidence in the analysis of tropical cyclone intensity in tropical depressions, tropical storms, and category 1 and 2 hurricanes. The identification of TC center formation and dissipation, as well as TC center fixing will also be improved due to decreased sensitivity to rain. Also, the analysis of TC structure through wind radii from tropical storm through hurricane force will be improved. While these improvements would be most beneficial for TCs where aircraft reconnaissance data are not available, they would also supplement the point data from aircraft that are confined to the flight path with a more comprehensive snapshot of the entire TC circulation.

The improved resolution, sensitivity to high wind speeds and decreased sensitivity to rainfall will also improve the utility of satellite ocean vector wind measurements for tropical and subtropical marine analysis and forecasting applications at NHC. More accurate wind retrievals in rain and the higher spatial resolution offered by DFS will improve forecaster identification of high-wind regions and areas of wave and swell generation, resulting in improvements across NHC's marine product suite. Improved wind retrievals will also increase the accuracy of surface analysis and the evaluation of model forecasts of key features and wind events. The enhanced spatial resolution of DFS would also improve the analysis of areas impacted by mesoscale wind events and the intensity of these events across NHC's area of responsibility.