Ocean Surface Wind Speed of Hurricane Helene Observed by SAR

The hurricanes can be detected by many remote sensors, but synthetic aperture radar (SAR) can yield high-resolution (sub-kilometer) and low-level wind information that cannot be seen below the cloud by other sensors. In this paper, an assessment of SAR capability of monitoring high-resolution hurricane was conducted. A case study was carried out to retrieve ocean surface wind field from C-band RADARSAT-1 SAR image which captured the structure of hurricane Helene over the Atlantic Ocean on 20 September, 2006. With wind direction from the outputs of U.S. Navy Operational Global Atmospheric Prediction System (NOGAPS) model, C-band geophysical model functions (GMFs) which describe the normalized radar cross section (NRCS) dependence on the wind speed and the geometry of radar observations (i.e., incidence angle and azimuth angle with respect to wind direction) such as CMOD5 and newly developed CIWRAP models have been tested to extract wind speed from SAR data. The SAR retrieved ocean surface winds were compared to the aircraft wind speed observations from stepped frequency microwave radiometer (SFMR). The results show the capability of hurricane wind monitoring by SAR.

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