Application of Joint Polar Satellite System (JPSS) Imagers and Sounders to Tropical Cyclone Track and Intensity Forecasting

NOAA Satellite Science Week
Kansas City, MO
April 30 – May 4, 2012

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Research is being performed to develop two new applications of JPSS data for improved tropical cyclone center location and intensity forecasting. Feedback will be obtained from the National Hurricane Center and Joint Typhoon Warning Center through the satellite Proving Ground.

Objective methods are being developed to objectively estimate the center of tropical cyclones from VIIRS imagery and temperature/moisture retrievals from ATMS/CrIS retrievals. This algorithm will also include GOES imagery and is a cooperative effort with UW/CIMSS. Machine learning techniques are being applied to the remote sensing data.

The ATMS/CrIS retrievals are also being used to determine their potential for improving intensity forecasts. For this purpose, the temperature and moisture profiles are being used to estimate the maximum potential intensity (MPI) within the theoretical framework developed by Kerry Emanuel. The retrievals are also being used to estimate tropical CAPE modified by entrainment. Both of these parameters (MPI and CAPE) are important inputs to the operational Logistic Growth Equation Model (LGEM) for prediction of intensity changes.

Preliminary results will be presented on each of these forecast algorithms. AMSU data from Hurricane Irene (2011) is being used for the initial development. A large number of soundings in the environment of Irene from the NOAA Gulfstream Jet are available for use as ground truth in the evaluation of the AMSU soundings. Early ATMS retrievals from an Indian Ocean tropical cyclone from February of 2012 are also being examined and are being compared to similar data from AMSU to provide an initial estimate of the improvements possible from ATMS.