

NASA Scatterometer High Resolution Winds for Hurricane Lili

Vincent J. Cardone and Andrew Cox
Oceanweather Inc.
5 River Road, Suite1, Cos Cob, CT 06807 USA

Willard J. Pierson and Winfield B. Sylvester
The City College of CUNY – Remote Sensing Laboratory J-926
Convent Ave. at 138th Street, New York, NY 10031 USA

W. Linwood Jones and Josko Zec
Univ. of Central Florida, UCF Electronical & Comp. Eng. Dept.
P.O. Box 162450 – Orlando, FLA 32816-2450 USA

ABSTRACT

Aircraft flights that measured the normalized radar backscatter coefficient in hurricanes for rain free areas show that the backscatter has properties that differ from those in larger scale extra tropical cyclones. The backscatter values are lower for the higher winds and increase more slowly at upwind and downwind with increasing wind speed, and the values near crosswind increase in such a way that the upwind-crosswind difference decreases with increasing wind speed. A Tropical Cyclone Geophysical Model Function, named TCGMF, has been developed explicitly for tropical cyclones. It differs from NSCAT-1a and NSCAT 1-b for winds above 15 meters per second. The model function is used to obtain a high resolution wind field for Hurricane Lili whose eye has been located for Rev 900 on Julian day 292 in 1996 to be at 23.4 degrees north and 283.1 degrees east. The analysis involves the large gradients in wind speed and pressure and the effects on the measured backscatter resulting from the spiral bands of thick clouds and rain. Conventional data sources such as ship reports, data from a NOAA research aircraft that flew into the storm at the time of the pass and from other spacecraft are used to develop an independent wind field analysis called TC96 for the winds in the boundary layer for comparison to the winds obtained from NSCAT. For winds above 25 m/s, the values of the averages, for TCGMF-TC96 are 0.1 m/s for Rev. 900 and -1.3 m/s for Rev 907. For NSCAT 1-b, corresponding values are -5.32 m/s and -5.95 m/s.