



Optimal Hurricanes Part II: Observations of superintense winds in Hurricane Isabel (2003)

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Hurricane Isabel became a powerful category five tropical cyclone on the Saffir-Simpson scale on September 11th, 2003 and maintained a strong intensity during a peak period of four days. The NOAA and U.S. Air Force Hurricane Hunters flew multiple missions into Isabel from September 11th to September 14th, collecting a multi-platform dataset that includes NCAR GPS dropsonde, radiometer, Doppler radar, and in situ data. High-resolution rapid scan satellite imagery was also recorded during this time period. These instruments show several unique features, including the presence of extremely high wind speeds, multiple mesovortices, and a polygonal eyewall. On September 13th, the strongest known wind (107 ms⁻¹) ever recorded in a hurricane was obtained by a dropsonde at 1752 UTC. This observation, along with satellite and radar data, suggests the possibility of strong mesovortices in the eyewall that have been predicted by numerical and laboratory simulations. Isabel's thermodynamic and kinematic structure derived from the in situ, dropsonde and Doppler measurements on the 13th will be presented. These results suggest that Isabel's intensity exceeds that predicted by known theories for the maximum intensity of a hurricane for the given set of environmental conditions, and that the 'superintensity' mechanism described by Persing and Montgomery (2003) likely played a role in the observed extreme wind speeds.