A NUMERICAL SIMULATION OF HURRICANE ANDREW

J.L. Eastman, M.E. Nicholls, and R.A. Pielke
Colorado State University
Department of Atmospheric Science
Fort Collins, CO 80523

Results of a simulation of Hurricane Andrew are presented. The numerical model used in this study is the Colorado State University Regional Atmospheric Modeling System (RAMS). The model contains a full set of non-hydrostatic compressible dynamic equations, a thermodynamic equation and a set of microphysics equations for water- and ice-phase clouds and precipitation. There are parameterizations for longwave and shortwave radiation, surface fluxes and subgrid-scale fluxes. The model has a two-way interactive multiple nested grid capability which makes it possible to resolve cumulus convection in the convectively active region of the tropical cyclone. The fine grid used to resolve convection in the simulation has a horizontal grid increment of 3 km and a width of 300 km. The nested grids move with the low pressure minimum in order to keep the convection within the center of the fine grid. Convectively explicit simulations using an Atlantic hurricane season sounding (Jordan, 1958) and of Hurricane Andrew have show that the model is able to produce a realistic hurricane structure and life cycle (Nicholls and Pielke, 1995; Eastman, 1995).

Hurricane Andrew was a devastating storm which made landfall on the southeast Florida coast on 24 August 1992. Wind gusts were as high as 200 mph and billions of dollars of damage was caused. Andrew weakened over south Florida but re-intensified slightly before making secondary landfall in Louisiana. The results of the numerical simulation are compared with observations with particular emphasis on the surface winds and the mesoscale processes occurring in the eyewall as the hurricane moved inland.

References

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