

An Evaluation of Alternative Species-Advecting Microphysics Schemes in Hurricane WRF

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The Developmental Testbed Center (DTC) will contribute to the pre-implementation testing of the 2016 operational version of the Hurricane Weather Research and Forecasting (HWRF) System by evaluating selected experimental retrospective forecasts conducted by the DTC and by the NOAA/NCEP Environmental Modeling Center (EMC) Hurricane Team. EMC intends to use this evaluation as input for determining the final configuration of the 2016 operational HWRF.

For this evaluation, retrospective forecasts will be produced using variations on the 2015 operational configuration of HWRF, which uses the Ferrier-Aligo microphysics scheme, a single-moment scheme that predicts the mixing ratio of cloud, rain, and snow, and combines individual hydrometeor fields into total condensate for advection. Water vapor is advected separately.

The experimental configurations for this evaluation include an enhanced Ferrier-Aligo scheme with advection of all microphysics species and rime factor, and the Thompson microphysics scheme, which is a partial double-moment scheme that predicts both mixing ratio and number concentration of several liquid and ice species, and advects them individually. The results will be compared against a baseline consisting of retrospective forecasts conducted with a developmental pre-release version of the 2016 HWRF in which the configuration is similar to the 2015 operational configuration, with a few upgrades such as a smaller time step, keeping the non-hydrostatic state after nest moves, and a bug fix for partial cloudiness computation.

The two experiments will be carried out for several storms in the Atlantic and Pacific basins in order to provide a statistically significant sample size. This talk will cover the verification of large-scale meteorological fields performed within the DTC for evaluating the performance the microphysics parameterizations alternatives.