MMM SEMINAR NCAR

Energetics of NWP Models from the Bottom Up: Coupled Atmosphere-Wave-Ocean Impact Predictions of Superstorm Sandy and Beyond

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Air-sea enthalpy and momentum fluxes are essential to the energetics of numerical weather prediction (NWP) models. However, parameterizations of air-sea fluxes are often crude and create "man-made" energy source/sink that does not exist, especially in the absence of an interactive ocean in the model. The erroneous surface heat, moisture, and momentum fluxes can cause compounding errors in the atmospheric model (e.g., precipitation, water vapor, boundary layer properties). To make the matter worse, a common (but unintentional) practice is to over tune other physical parameterizations such as microphysics and surface/boundary layer to compensate errors from surface fluxes. In this study, the University of Miami Coupled Model (UMCM, a fully coupled atmosphere-wave-ocean model) is used to address some of these issues. Observations from tropical cyclones and winter storms are used to evaluate the model results. In general, sea state-dependent air-sea fluxes improve model predictions. However, poor initial conditions of both the atmosphere and ocean in many cases remain to be a challenge for assessing impacts of coupled model physics and model predictions. Another important aspect is that fully coupled models provide explicit, integrated impact forecasts of wind, rain, waves, ocean currents and surges in tropical cyclones, which are missing in most current NWP models. Superstorm Sandy provided a perfect framework for testing this concept and developing integrated impact forecast system. It requires a new strategy for model development, evaluation, and verification. Ensemble forecasts using high-resolution coupled models can provide quantitative probabilistic forecasts and uncertainty estimates, which also allow us to explore new methodologies to verify probabilistic impact forecasts and evaluate model physics using a stochastic approach.

> This seminar will be recorded and available via webcast at: http://www.fin.ucar.edu/it/mms/fl-live.htm

PLEASE NOTE THE SPECIAL DAY AND TIME

Tuesday, 20 May 2014, 10:30 AM Refreshments 10:15 AM NCAR-Foothills Laboratory 3450 Mitchell Lane Bldg 2 Main Auditorium, Room 1022

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