MMM SEMINAR

NCAR

Global Nonhydrostatic Atmospheric Simulation with MPAS

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The Model for Prediction Across Scales (MPAS) is comprised of global nonhydrostatic atmosphere (MPAS-A) and hydrostatic ocean (MPAS-O) solvers and is being developed for weather, climate, and regional climate applications. The horizontal meshes used in its component models are based on unstructured spherical centroidal Voronoi tesselations (nominally hexagonal meshes) with C-grid staggering that permit both quasi-uniform and variable-resolution configurations. Recent test results from the atmospheric component MPAS-A, using global uniform-mesh configurations and for NWP-timescales and horizontal mesh spacings from 60 km to 3 km, confirm that it reproduces weather phenomena with fidelity similar to state-of-the-art operational and research NWP models. Global kinetic energy (KE) spectra reveal that MPAS produces an effective model resolution (filter scale) of approximately 6 times the mesh spacing. The mesoscale regions in the MPAS KE spectra are produced without use of kinetic energy backscatter, in contrast to other results reported in the literature. Variable-resolution mesh results, with mesh spacings in the hydrostatic scales (60 - 15 km) or spanning hydrostatic and nonhydrostatic scales (50 - 3 km), show no evidence of unphysical structures in the Voronoi mesh transition regions and do not suffer from the problems inherent in traditional grid-nesting approaches. These variable-resolution results illustrate the need for scale-aware physics. We will present these and other results and discuss ongoing and future development and applications for MPAS-A.

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

Recorded seminar link can be viewed here: https://www.mmm.ucar.edu/events/seminars

Thursday, 6 November 2014, 3:30 PM Refreshments 3:15 PM NCAR-Foothills Laboratory 3450 Mitchell Lane Bldg 2 Main Auditorium, Room 1022

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