MMM SEMINAR SERIES

High-Resolution Climate-Scale Simulations using the Model for Prediction Across Scales – Atmosphere (MPAS-A)

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We present two high-resolution multi-seasonal simulations using the Model for Prediction Across Scales-Atmosphere (MPAS-A). Our first dataset from Michaelis et al. (2019) uses a variable-resolution mesh with 15-km grid spacing over the entire Northern Hemisphere expanding out to 60-km elsewhere and spans 10 years in present and future thermodynamic environments. Given the atmosphere-only nature of MPAS, these years are thus defined by analyzed sea surface temperature (SST) patterns. For the future climate simulations, we apply monthly-averaged temperature changes to the initial conditions at all atmospheric pressure and soil levels and to the daily-varying SSTs. Additionally, pseudo-daily sea ice fields were created from the monthly-averaged CMIP5 ensemble mean sea ice for both historical and future time periods. These simulations reasonably represent present-day large-scale mean fields such as tropical precipitation patterns and wintertime storm track activity. The future simulations also replicate key warming signatures such as Arctic amplification and tropical upper-tropospheric warming. Our second dataset uses the 15-km quasi-uniform mesh and spans 30 years corresponding to water years 1990 through 2019 (i.e., 1 October 1989 – 30 September 2019). MPAS-A reasonably captures large-scale atmospheric features and their variability in the Northern Hemisphere, including maritime sea-level pressure systems, such as the subtropical highs, upper-tropospheric flow regimes, and teleconnection patterns. There many aspects of these datasets to be explored; therefore, we intend to make these model output publicly available in hopes that they are useful to the broader research community for studying various other meteorological phenomena as well as participating in model comparison studies.

Thursday, 17 July 2025, 2:00PM

Refreshments 1:45PM

Please also join colleagues for refreshments and informal discussion after the seminar until 3:30PM

NCAR-Foothills Laboratory, 3450 Mitchell Lane

FL2-1022, Large Seminar

Seminar will also be live webcast

https://sundog.ucar.edu/public/page/MMM

Participants may ask questions during the seminar via Slido.