UNIVERSITY of HAWAI'I MĀNOA

Department of Atmospheric Sciences Seminar Announcement

Department of Atmospheric Sciences, S.O.E.S.T., University of Hawai'i at Mānoa
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SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

Kinetic energy spectra, vertical resolution and dissipation in high-resolution atmospheric simulations

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Date:	**Wednesday, February 5, 2020**
Refreshments:	**3:00pm at MSB courtyard**
	Cookies, Coffee & Tea Provided
Seminar Time:	**3:30pm**
Location:	**Marine Sciences Building, MSB 100**

Abstract:

Using the Model for Prediction Across Scales (MPAS-A), we have found that typical model configurations presently used in research and operations produce solutions that are significantly underresolved vertically. At mesoscale grid spacing representative of current global NWP capability, a vertical grid spacing of 200 meters or less is needed for convergence of the kinetic energy spectrum and to resolve critical flow features in the free troposphere and lower stratosphere at current NWP resolutions (i.e. dx ~ 15 km). We have also determined that we can configure MPAS-A with less horizontal dissipation when higher vertical resolution is employed, thus increasing the effective vertical and horizontal resolution. Importantly, the higher vertical resolution configurations are more efficient than their lower vertical resolution counterparts, and the results argue for moving to higher vertical resolution in our applications even if horizontal resolution must be lowered to fit within existing computing limits. For convection-permitting configurations using horizontal grid spacing of around 3 km, preliminary results suggest that vertical gridspacing of 100-200 meters produces well-resolved solutions for most phenomena. We will present results illustrating these points and we will discuss the implications for atmospheric modeling applications in weather and climate.