

MMM SEMINAR SERIES



Shedding Light on Hidden Aspects of Dynamical Cores

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The dynamical core of a weather or climate model represents the resolved fluid flow component of the atmospheric motion. It selects the fluid dynamics equation set, computational grid, numerical method, the prognostic variables and their staggering options, the vertical grid, and contains a broad portfolio of dissipation mechanisms. The latter are needed to remove numerical ‘noise’ at the grid scale and are ‘engineered’ to keep the model stable. However, the dissipation also interacts with the larger-scale flow, and this can happen in unexpected ways. The talk will shed light on intended and unintended consequences of the dissipation mechanisms via a broad selection of idealized dynamical core test cases. Examples from a portfolio of dynamical cores are shown which include the ‘Spectral Element’, FV3, FV, and MPAS dynamical cores of NCAR’s Community Earth System Model (CESM) as well as examples from the international weather and climate modeling community. These examples cover a variety of scales and phenomena, such as processes at the convection scale, horizontal Lamb (sound) waves, gravity waves, and the larger circulation. We thereby shed light on the hidden, often poorly documented, characteristics of the modeling choices.

Thursday, 3 August 2023, 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 Auditorium

Seminar will also be live webcast

<https://operations.ucar.edu/live-mmm>

Participants may ask questions during the seminar via Slido.