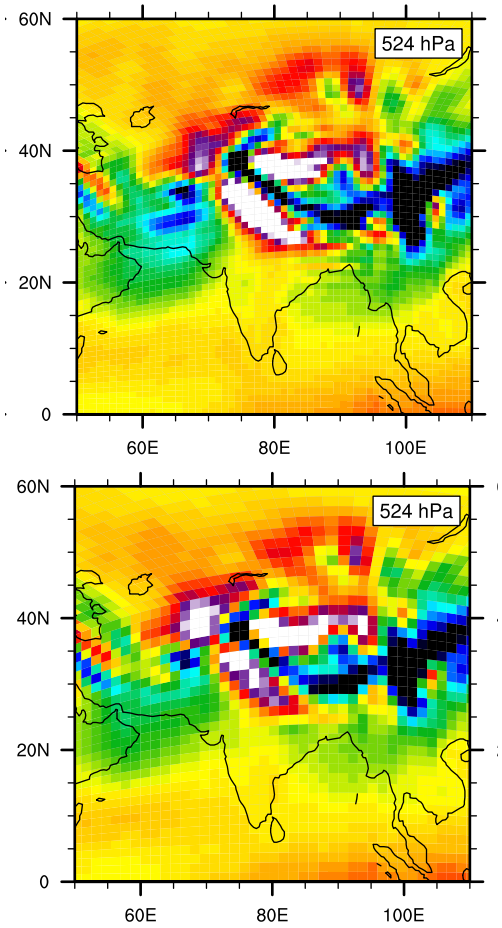
Exploring a Lower-Resolution Physics Grid in CAM-SE-CSLAM



Climatological vertical pressure velocities in the default configuration (top) and the lower-resolution physics grid. (bottom).

Herrington, A. R., Lauritzen, P. H., Reed, K. A., Goldhaber, S. and B. E. Eaton, Evaluating a Lower Resolution Physics Grid in CAM-SE-CSLAM, JAMES, 11 (2019a). [DOI: 10.1029/2019MS001684]

Scientific Achievement

The lower-resolution physics grid is compatible with the atmosphere model of the Energy Exascale Earth System Model, and would provide a more accurate solution of precipitation while providing a significant reduction in computational costs.

Significance and Impact

- Despite the use of a lower-resolution physics grid, the range of scales resolved by the model is indistinguishable from the default method of evaluating the physics at the same resolution as the dynamical core.
- The lower resolution physics grid provides significant cost savings with little to no downside.

Research Details

- The lower-resolution physics grid contains 5/9th fewer grid columns than the dynamical core.
- Algorithms are presented that map fields between the dynamic core and the lower-resolution physics grid while maintaining numerical properties ideal for atmospheric simulations such as mass conservation and mixing ratio shape and linear-correlation preservation.