

Building a high resolution global atmosphere climate simulation capability

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Recent work to configure the Community Earth System Model to run climate-length simulations using a high spatial resolution spectral dynamical core is underway. The spectral dynamical core option, a well tested framework for climate simulation that avoids issues of converging pole lines, has been configured to run with a 10 resolution using CAM4 physics parameterization package. The 10 resolution produces a climate comparable to the finite volume dynamical core, with similar biases in the cloud physics and precipitation patterns. Using a $\sim 1/4^\circ$ resolution version produces dynamical quantities such as zonal wind and surface temperature of similar quality. Cloud physics quantities, including precipitable water and total cloud levels, require more investigation. For example, the $\sim 1/4^\circ$ resolution model contains generalized scale invariance that is manifest over multiple orders of magnitude. Scaling exponents that measure the persistency and intermittency of model simulated parameters will be presented and the influence of model resolution on these parameters will be discussed. Also, the single column model is used to provide additional analysis capability to investigate changes in physics parameterization for different model resolutions.