ABSTRACT:
As part of the early use of the new NCAR-Wyoming supercomputer ‘Yellowstone’, a 60 year state-of-the-art Community Earth System Model (CESM) simulation was performed. The atmospheric component was CAM5-Spectral Element at 1/4deg., and ocean component the Parallel Ocean Program (POP2) at 1/10deg. This “present day” run employed 23,404 cores, costing 250-300K pe-hours per simulated year and made about 2 simulated years per day. The run has since been extended to 100 years. Initial top-of-atmosphere radiation imbalances of just over 1Wm\(^{-2}\) were reduced to 0.3Wm\(^{-2}\) by the end of the run. A major result was that both Arctic and Antarctic sea ice extent and annual cycle compared well with observations and more-tuned low resolution runs. Annual mean SST in the Equatorial Pacific and ENSO variability was also well simulated, as was Tropical and Southern Atlantic SST. In addition, the high resolution of the model enabled small-scale features of the climate system to be represented, such as air-sea interaction over ocean frontal zones, mesoscale systems generated by the Rockies, and the ocean response to strong wind jets and tropical cyclones. However, a feature of this run, and all high resolution CAM runs is that the precipitation in the Inter-tropical Convergence Zone is excessive. Associated single component runs are used to help attribute the strengths and weaknesses of the fully coupled run. This talk is an update of one given at Breckenridge, June 2013.

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* Refreshments are served before seminar. *

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