



Great Plains warm-season precipitation in a two-way nested high-resolution GCM

Lucas Harris, Shian-Jiann Lin, and Jan-Huey Chen

NOAA/Geophysical Fluid Dynamics Laboratory, Princeton University, Princeton, NJ, United States (lucas.harris@noaa.gov)

Many atmosphere GCMs have a persistent dry and warm bias over the US Great Plains in the summertime, which is related to an incorrect diurnal cycle of precipitation and the inability to simulate eastward-propagating convective systems in the lee of the Rockies. It is believed that these biases are at least in part due to coarse GCMs being unable to properly resolve convection over the Plains.

A nested-grid simulation, using a quarter-degree global grid and a factor-of-three 8-km nest over North America, is performed using the GFDL High Resolution Atmosphere Model (HiRAM), a hydrostatic global model using a less-intrusive convective scheme and a six-category microphysics. This simulation is compared to more coarsely-resolved uniform-resolution and nested simulations of grid-cell-widths between 110 and 25 km. We find that the summertime dry bias is alleviated in our 8-km nested-grid simulation. Further, biases in the diurnal cycle have been reduced and there is evidence of propagating features in the lee of the Rockies.