

Title: Towards high resolution climate simulation using a two-way nested model: precipitation and extreme events.

Authors: Lucas Harris and Shian-Jiann Lin

A nested-grid version of the GFDL High Resolution Atmosphere Model (HiRAM) has been developed to locally enhance the resolution of the global cubed-sphere grid. Simulations with 40- and 25-km nests over the Maritime Continent and North America depict an improvement of precipitation biases and better represent extreme precipitation events and extreme winds in tropical cyclones; however, the dry and warm bias over the US Great Plains in the summer, chronic in many atmosphere models, remains undiminished even at 25-km resolution.

A nested-grid simulation with a quarter-degree global grid and a factor-of-three 8-km nest over North America is then performed to determine if better resolution can further improve precipitation biases over the plains. We find that the summertime dry bias is alleviated in this simulation. Further, biases in the diurnal cycle have been reduced and there is evidence of propagating features in the lee of the Rockies.