Geophysical Fluid Dynamics Laboratory Review

June 30 - July 2, 2009

Atmospheric Dynamics – Synthesis and Future Directions

Presented by

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High resolution atmospheric models for AR5

The plan for CMIP5 (for the IPCC's AR5) includes an atmosphere/land **"time-slice"** component
for high resolution simulations of regional climate change, weather extremes, air quality, cloud feedbacks

The lab has decided to contribute ambitiously to this component, in collaboration with DOE,
which is offering substantial computer resources

A horizontal resolution of **25km** is reasonable given the size of these resources

**We hope to generate a total of ~500 yrs of simulations
(several SST anomalies and several (3?) choices of model physics)**

200 km

25 km
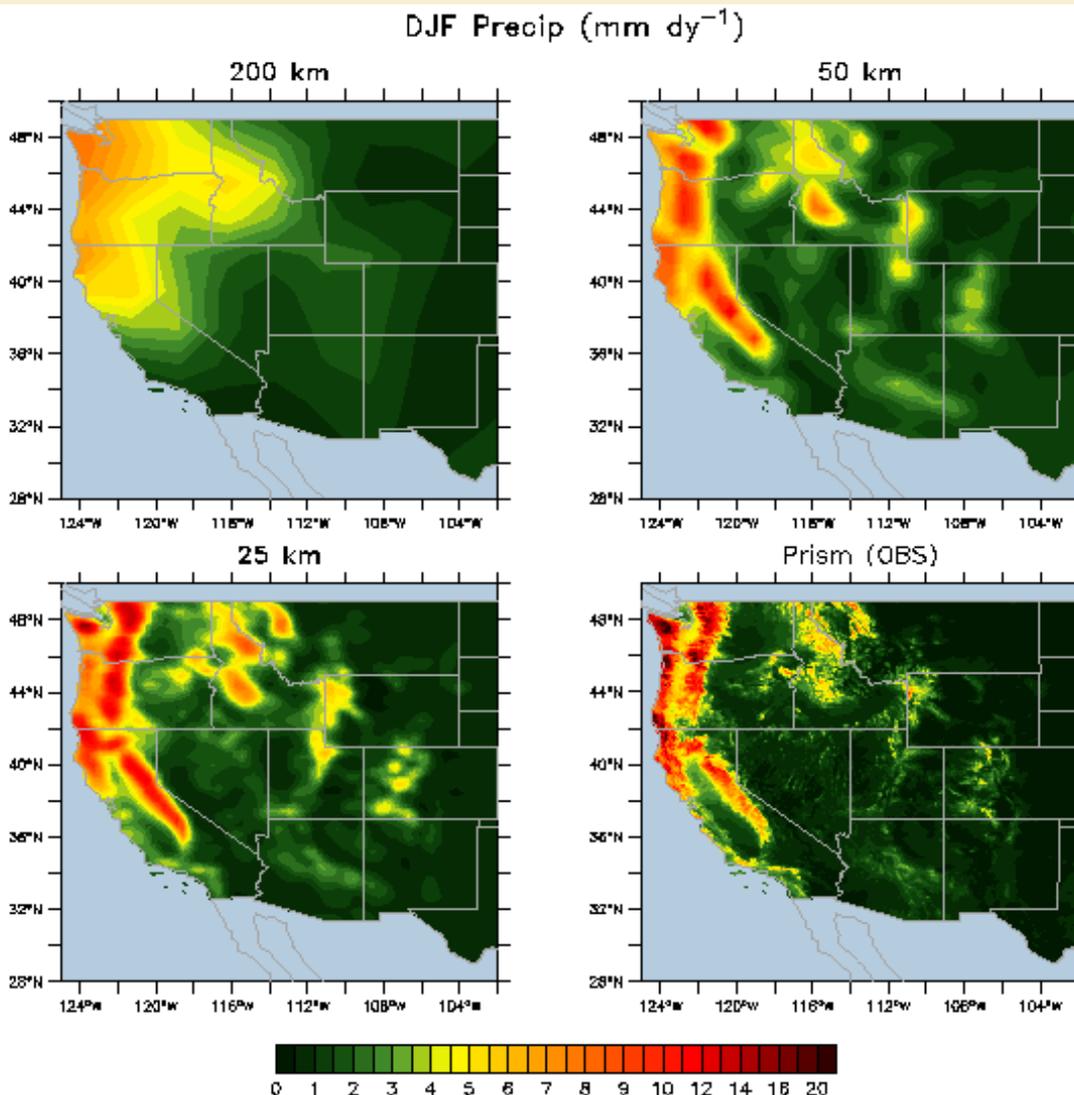
50 km

PRISM observations

25 year global AMIP simulations

DJF Precip (mm dy⁻¹)

High Resolution Atmospheric Modeling Plans

- High resolution development branch will merge with AM3 trunk model, facilitating air quality/aerosol research (time-slices with 50km version possible for AR5)

- Unified non-hydrostatic finite volume code with static/adaptive mesh refinement will be developed (in part with HFIP funding) to enable a new generation of research on extreme weather and regional climate change

- Development of global "cloud resolving" model, initially at 5km resolution, will be actively pursued in collaboration with DOE

- Will work with collaborators (and National Climate Service as it evolves) to add value to high resolution regional climate projections, through statistical refinement and impacts modeling

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