Evaluation of a Coupled WRF-CLM Model over the Western United States

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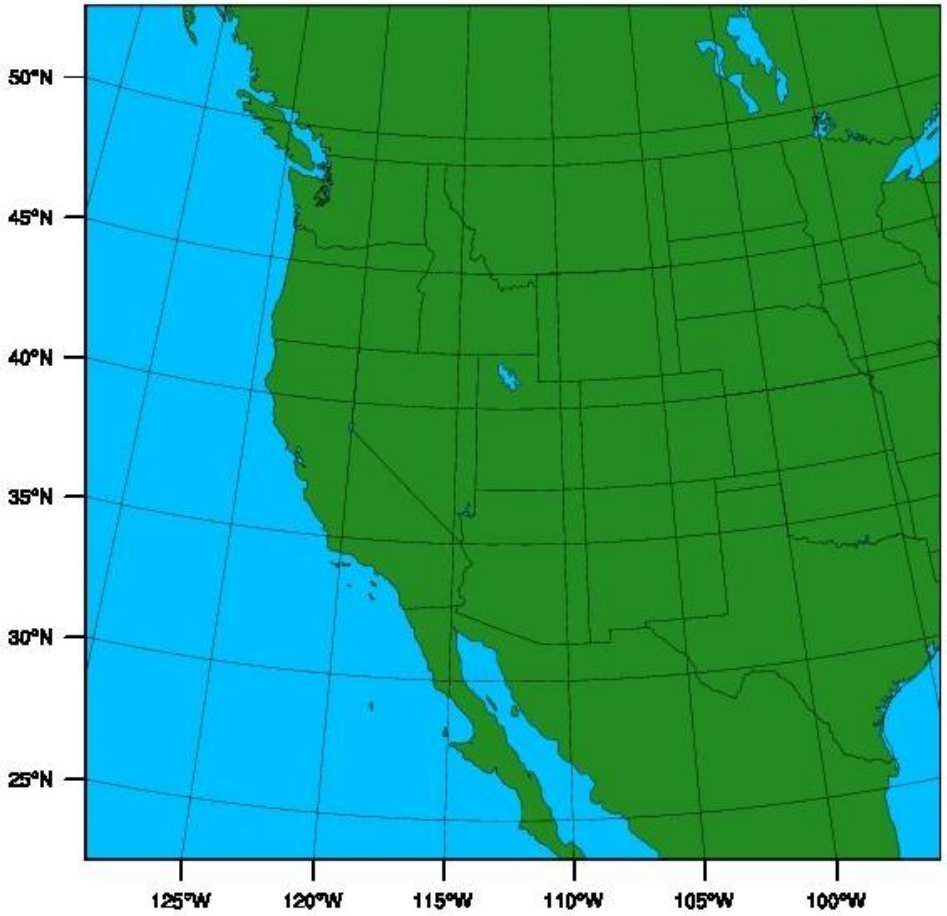
Model Setup

- WRF model version 3.0 coupled with the Community Land Model (CLM) version 3.5 (coupling work by Jiming Jin and Zack Subin).

- Sensitivity testing of microphysics and cumulus schemes for two week periods in January and August 2008 based on persistent precipitation in higher elevations.

Domain

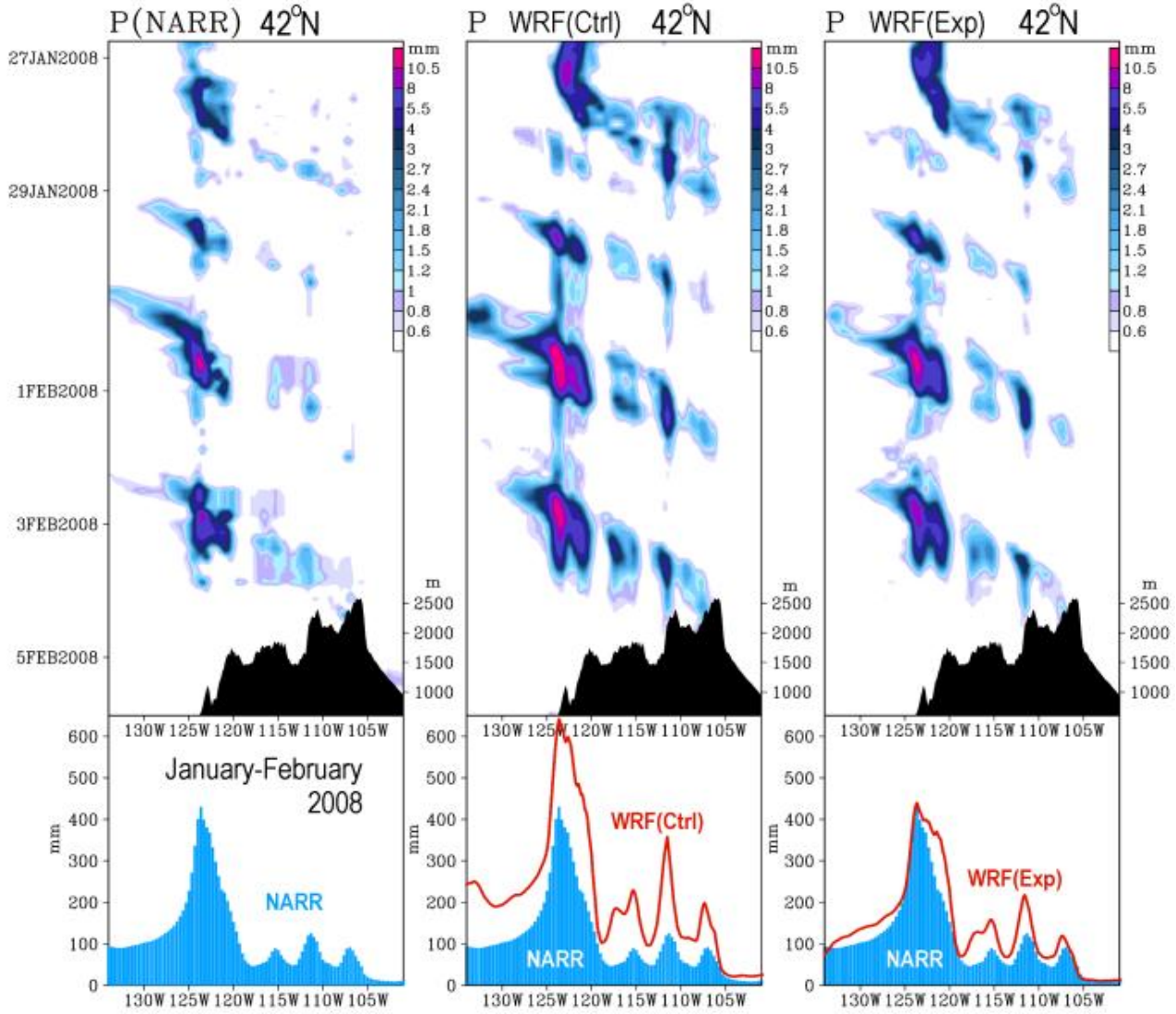


- 110 X 110
- 32 km spacing

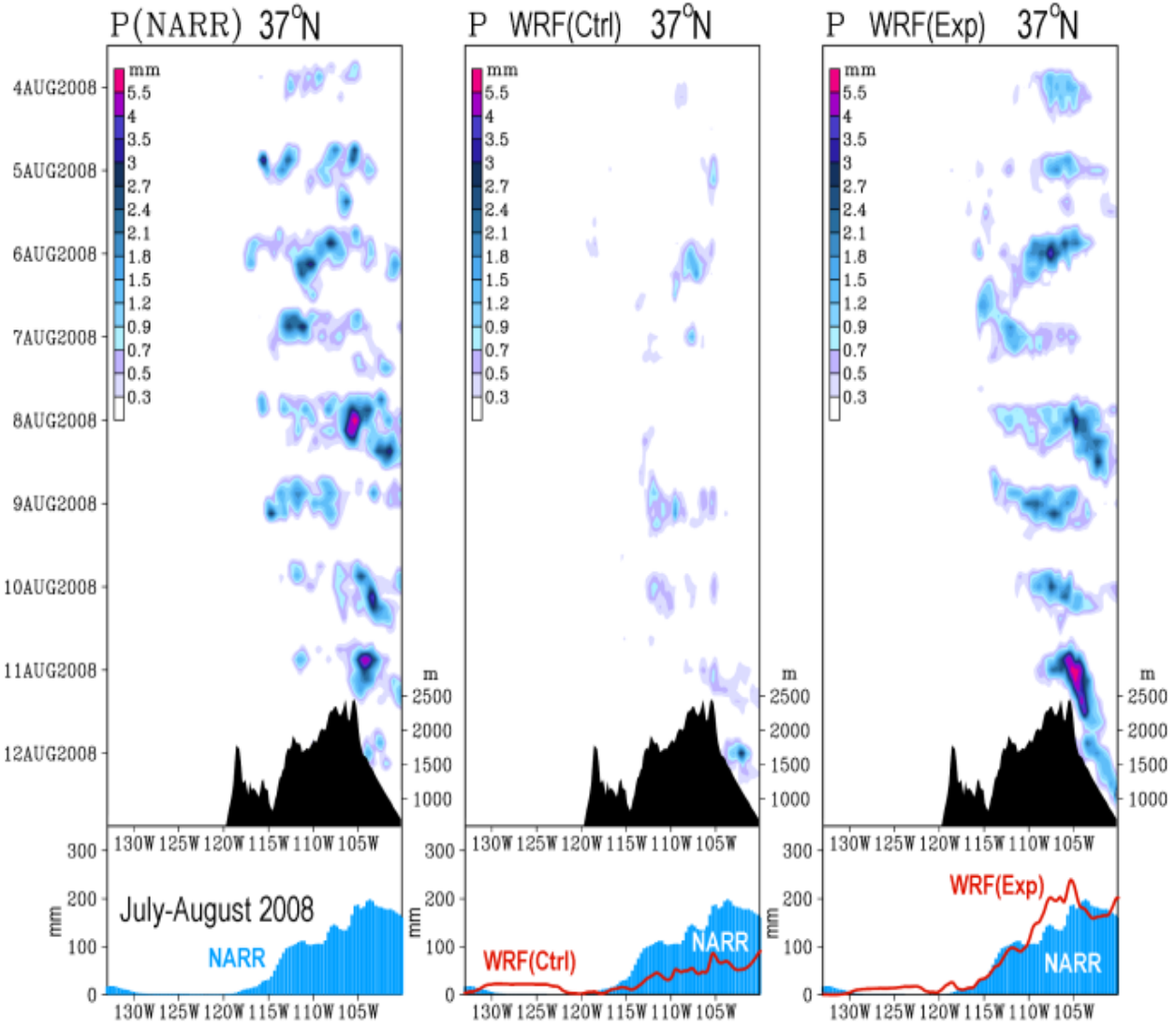
Model Setup

OPTION	SCHEME USED
Microphysics	WSM 5-class
Longwave Radiation	CAM
Shortwave Radiation	CAM
PBL	YSU
Cumulus	Kain-Fritsch
Surface	CLM 3.5
Sfclay	Monin-Obukov
W_damping	On

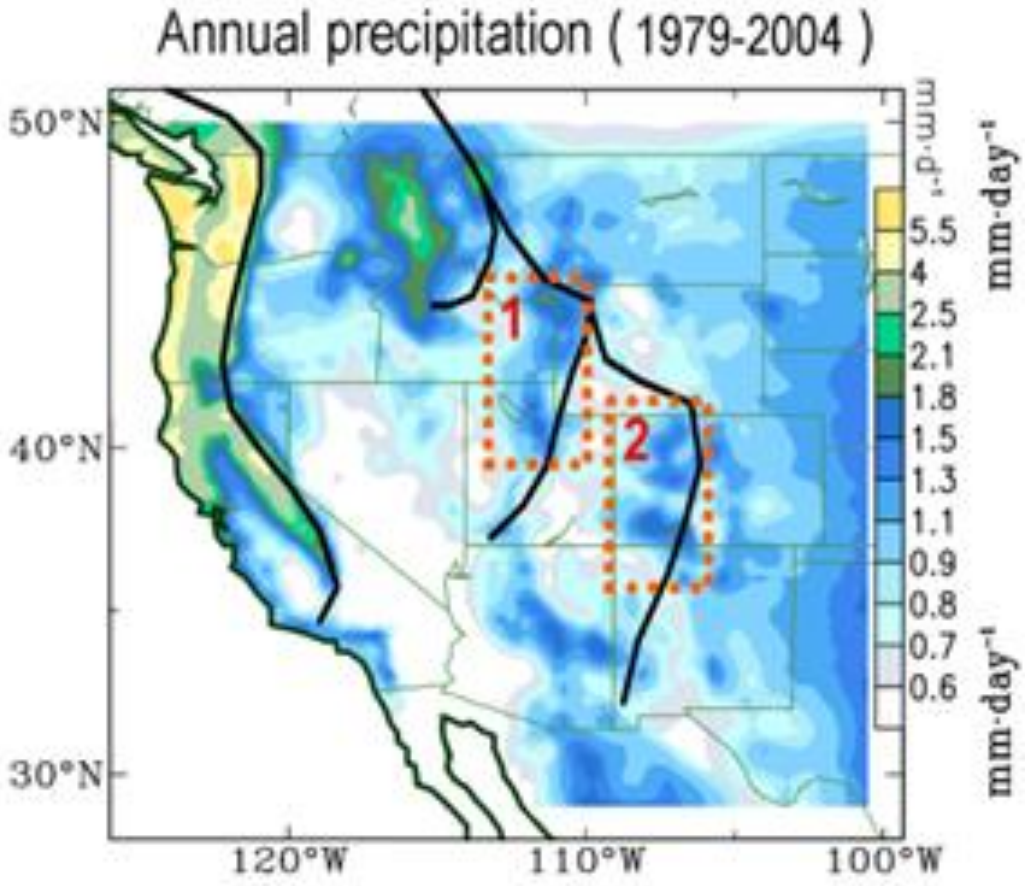
Latitudinal Cross Section - Precipitation

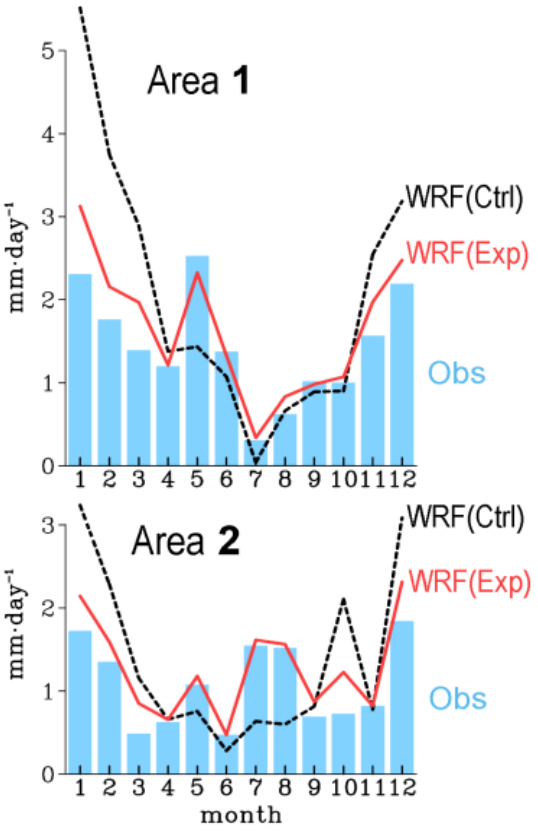


Latitudinal Cross Section - Precipitation



Daily Average Precipitation

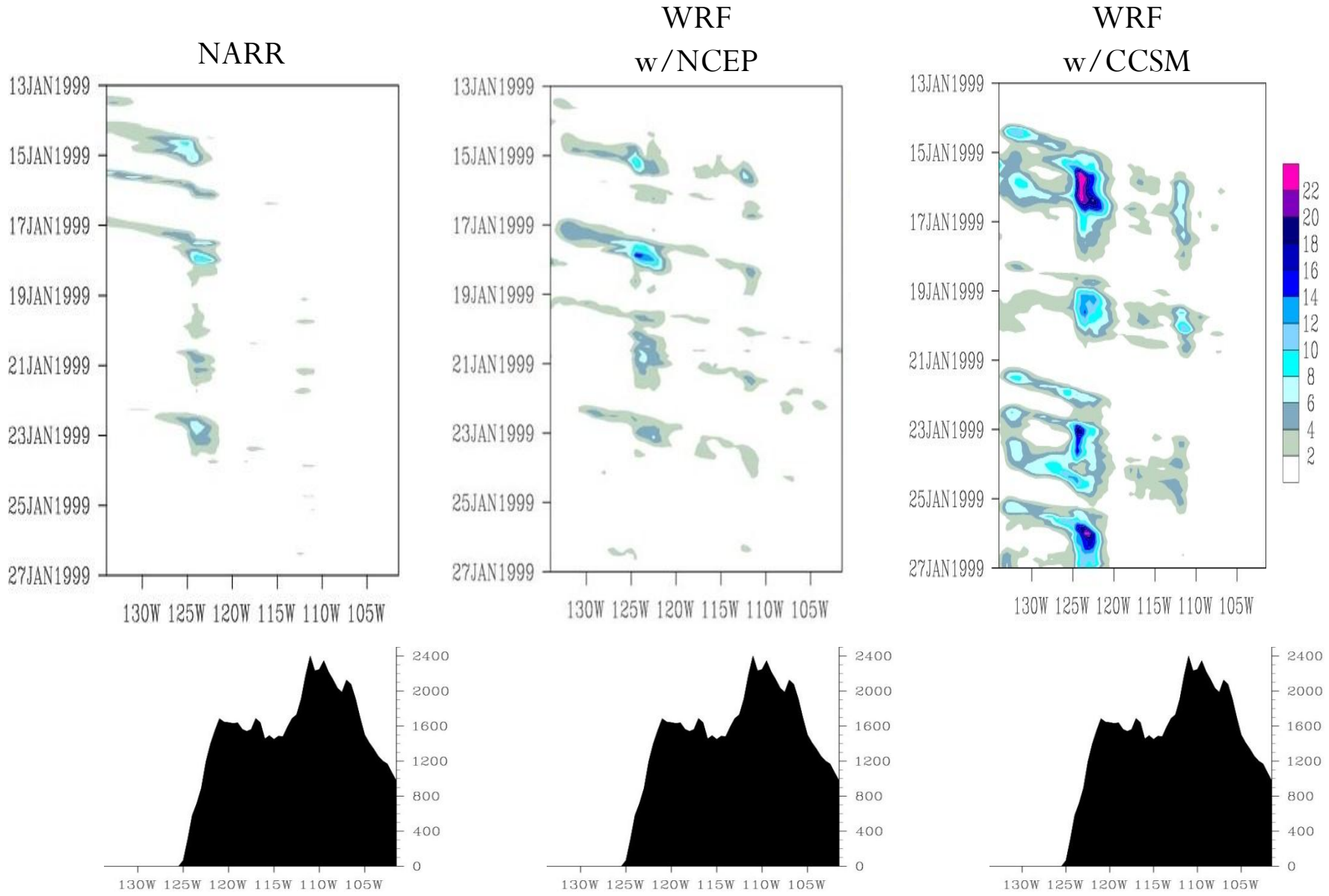




Impact of Large Scale Forcing Data

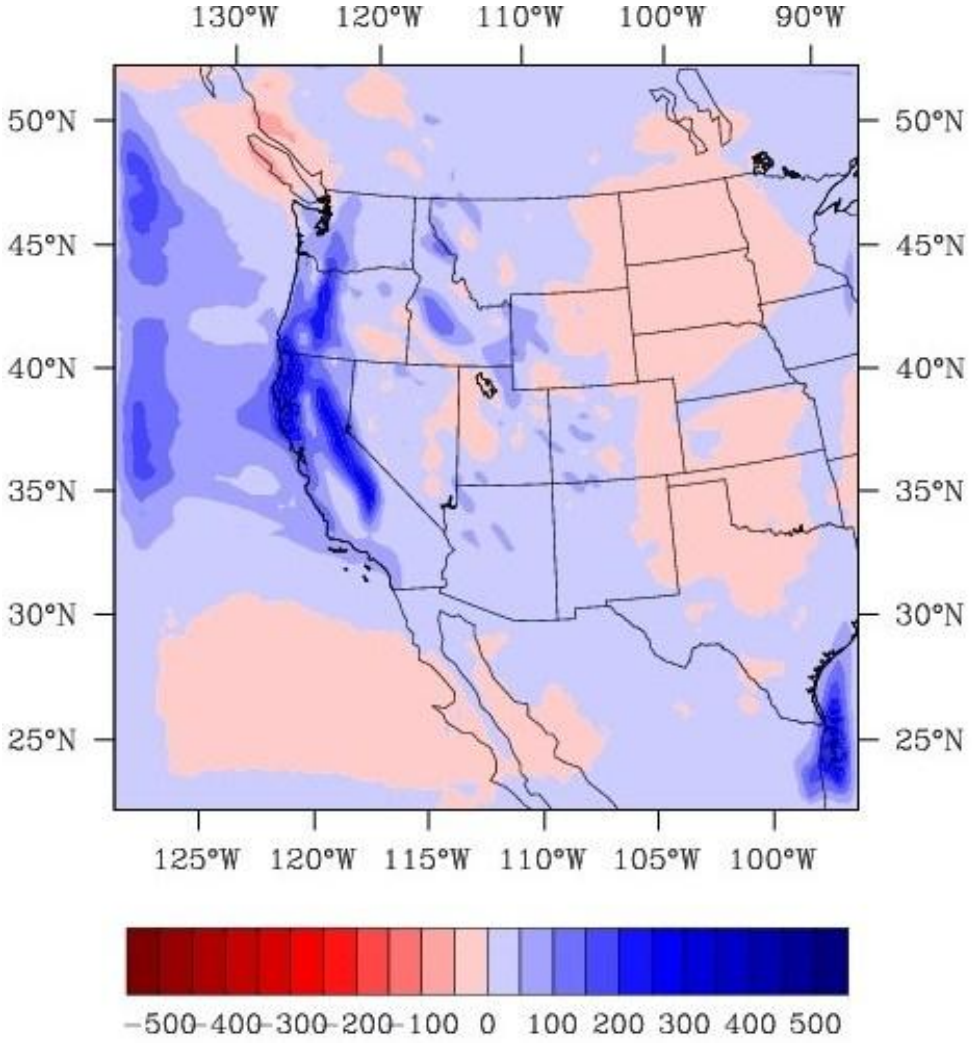
- Run a sensitivity test changing only forcing data (NCEP v. CCSM)
- Run with WSM 5-class microphysics scheme, Kain-Fritsch cumulus scheme
- Run for January 13 – 27, 1999

Latitudinal Cross Section - Precipitation



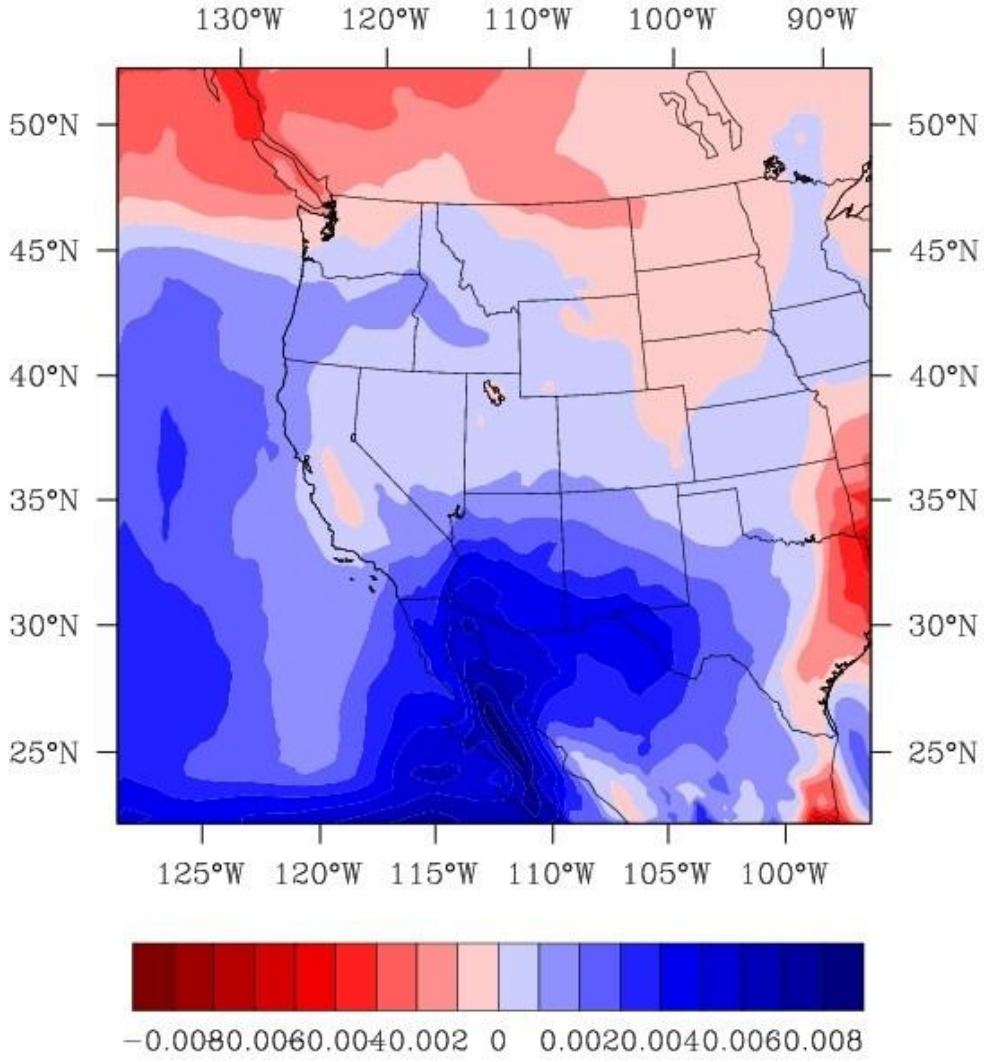
WRF w/CCSM minus WRF w/NCEP

Total Precipitation (mm)



WRF w/CCSM minus WRF w/NCEP

Water Vapor Mixing Ratio (kg kg^{-1}) – Lowest 5 Model Levels



January 13 through January 27

Conclusions

- Coupled WRF-CLM shows improved precipitation simulations, but still exhibits some biases over higher terrain

- CCSM forcing data increases low level moisture in WRF

Thank You!