

North American Regional Climate Change Assessment Program

<http://www.gfdl.noaa.gov/~bw/narccap>

GFDL Contribution:

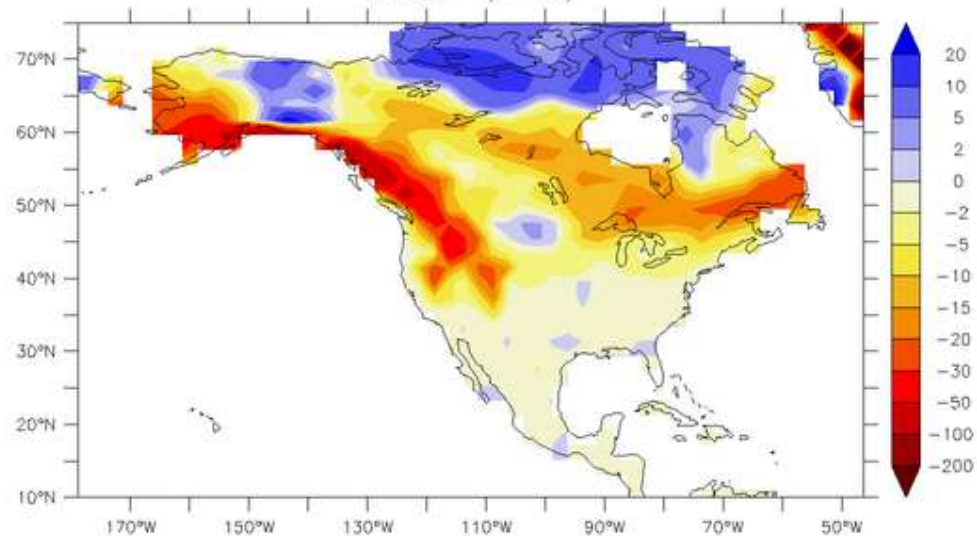
- 1) Special runs (30 yr control and 30 yr A2) of CM.1,
GFDL's IPCC coupled model
with high time resolution (8/day) output for downscaling;
interpolated to pressure levels as requested

- 2) “time-slice” runs of a ~50km global atmospheric model;
control uses observed SST/sea ice;
CM2.1 SST sea ice anomalies
(A2 minus control -- monthly means and 30yr trends)
with high time-resolution (8/day) over N. America
(currently only available on model's native vertical levels;
interpolation routine provided -- see link above)

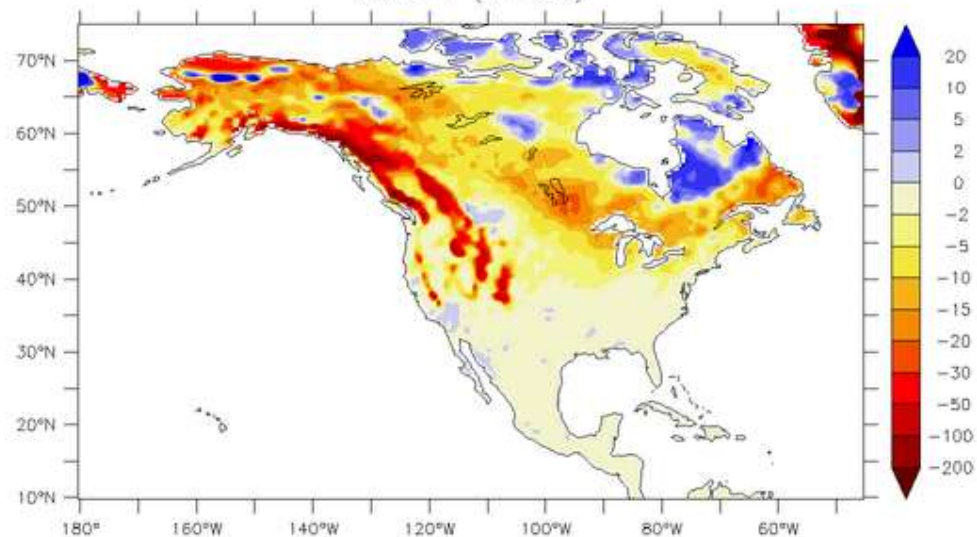
Change in snow mass: A2 minus control DJF

Surface Snow Mass, $\text{kg m}^{-2} \text{ s}^{-1}$, DJF

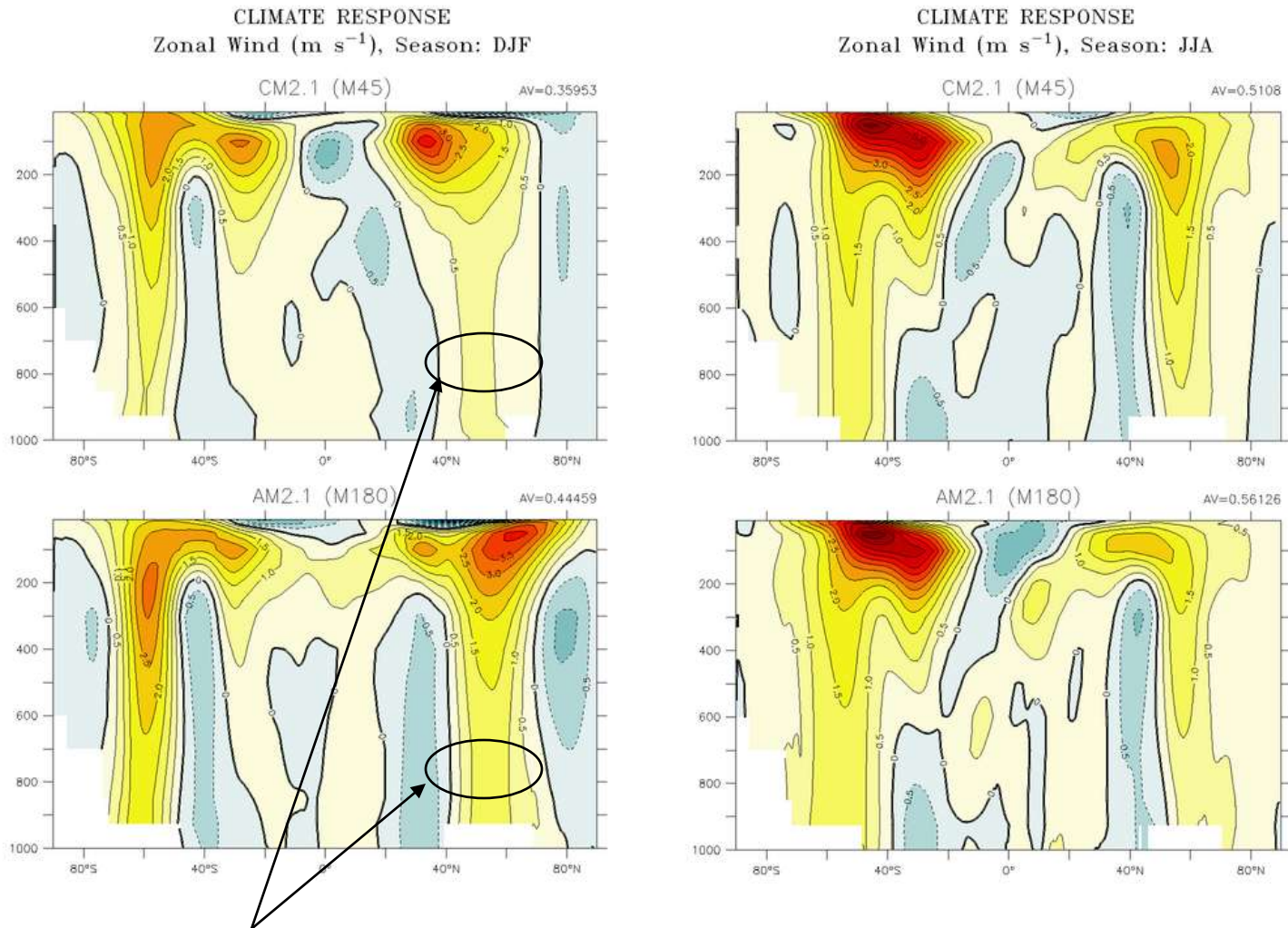
CM2.1 (M45)



AM2.1 (M180)



Zonal mean zonal wind response:
are the differences due to higher resolution or decoupling?



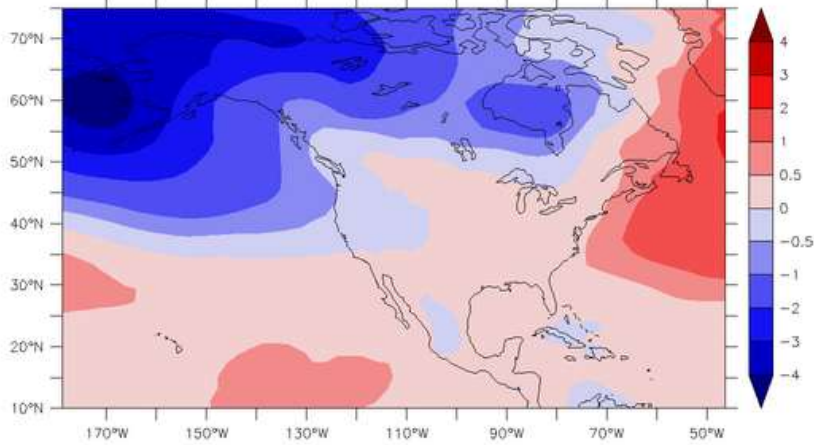
Poleward movement of westerlies in winter much larger in M180

Sea level pressure response (A2 - control) over N.America

DJF

Sea Level Pressure, mb, DJF

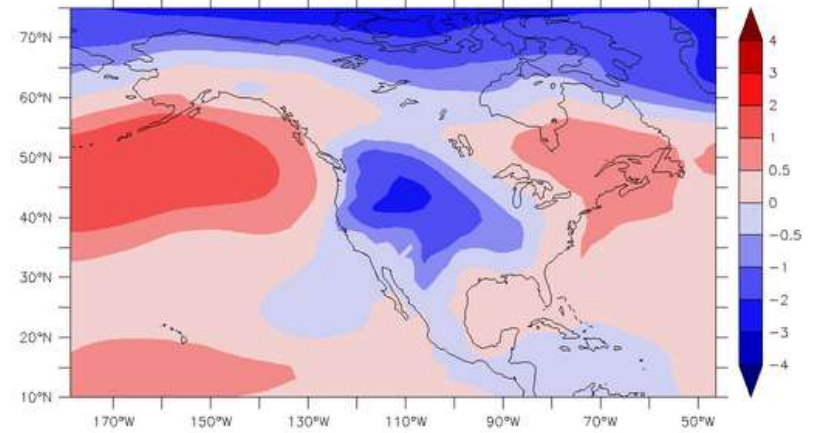
CM2.1 (M45)



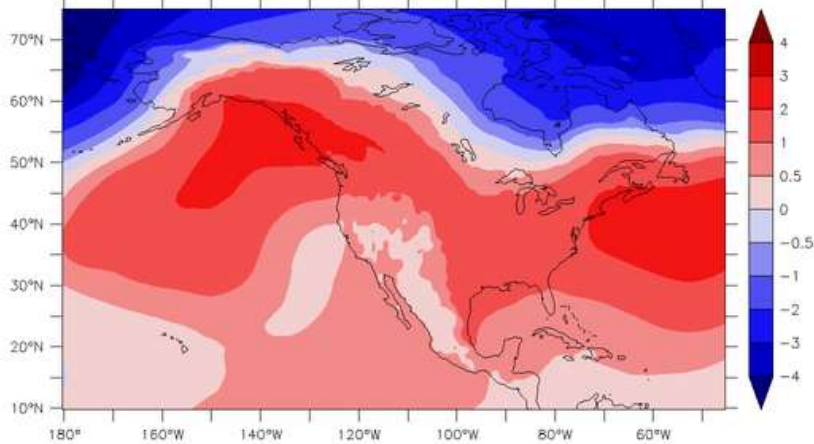
JJA

Sea Level Pressure, mb, JJA

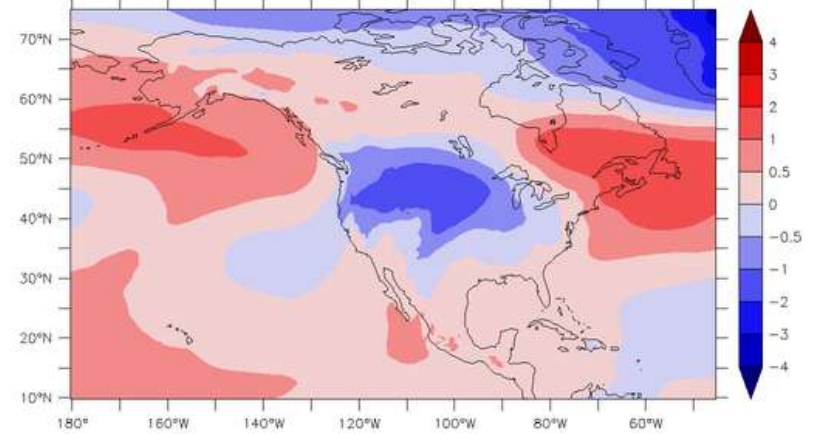
CM2.1 (M45)



AM2.1 (M180)

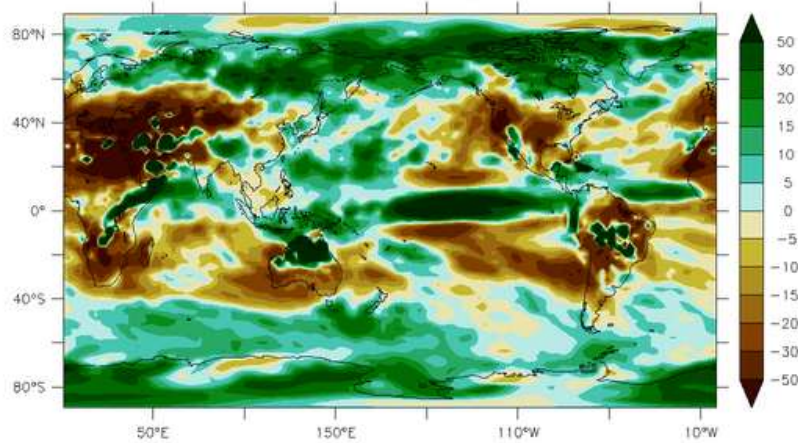


AM2.1 (M180)

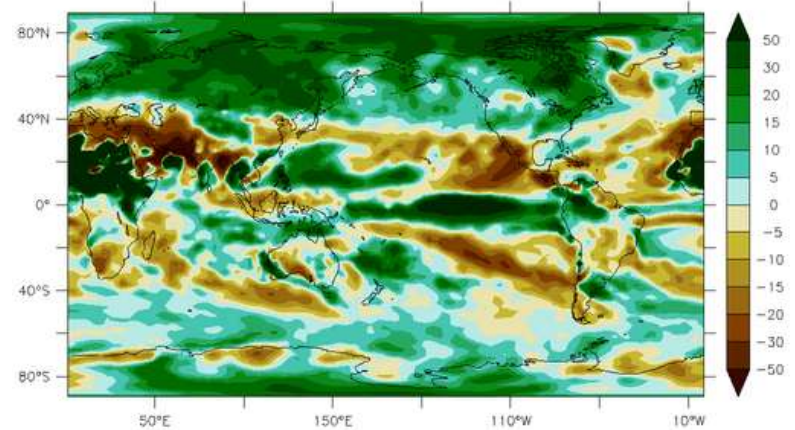


Precip response over globe: are the differences due to resolution or decoupling?

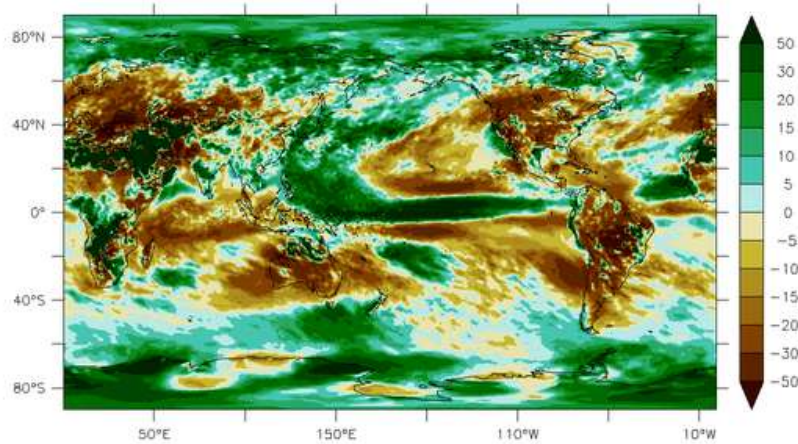
Precipitation Response, percent, JJA
CM2.1 (M45)



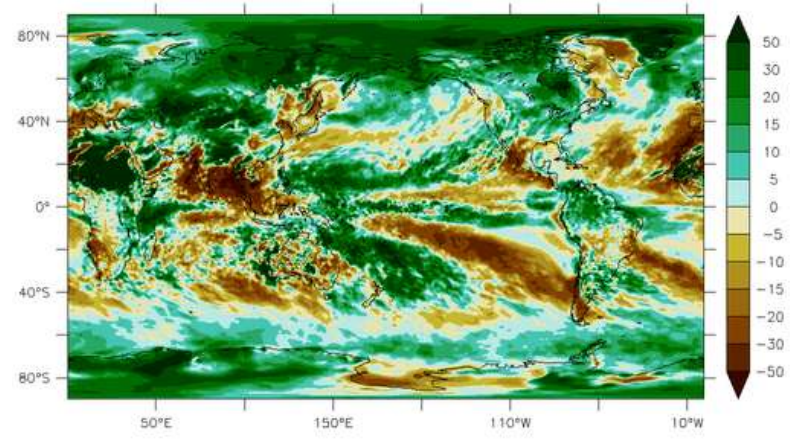
Precipitation Response, percent, DJF
CM2.1 (M45)



AM2.1 (M180)

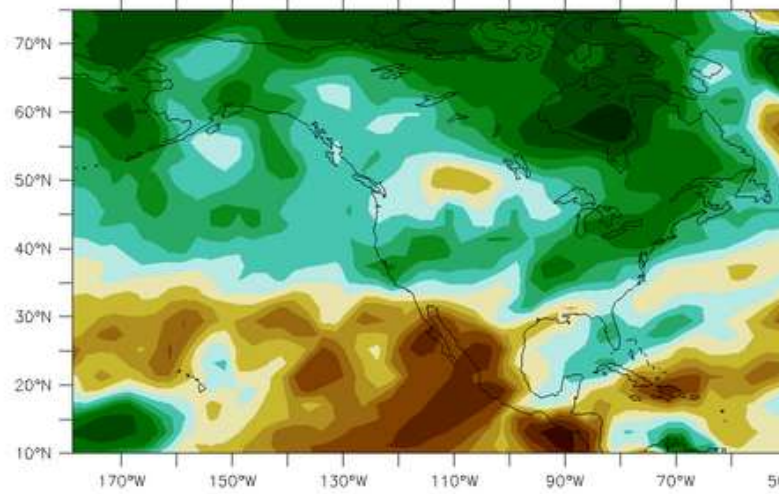


AM2.1 (M180)



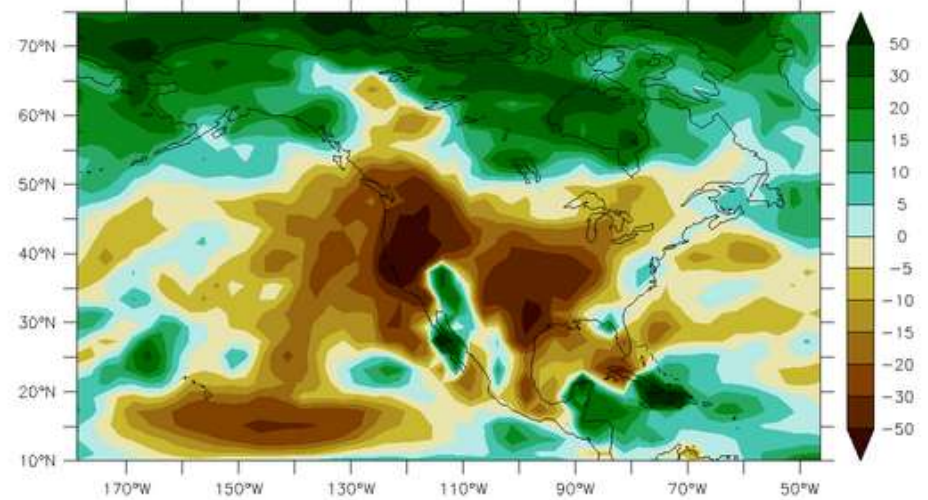
Precipitation Response, percent, DJJ

CM2.1 (M45)

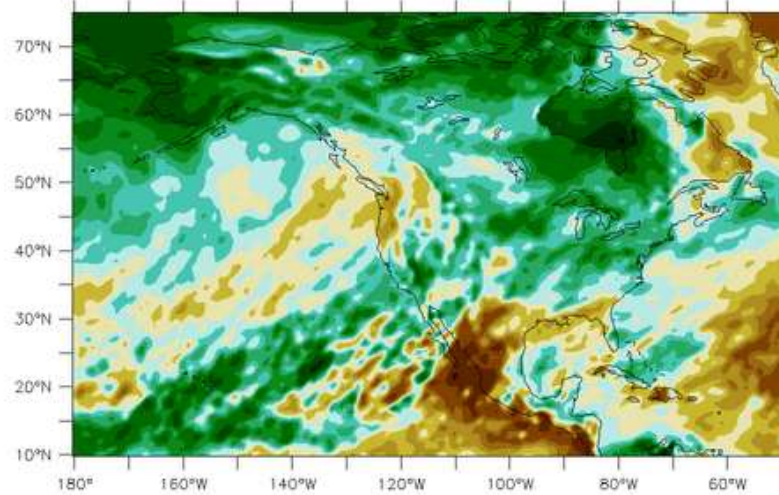


Precipitation Response, percent, JJA

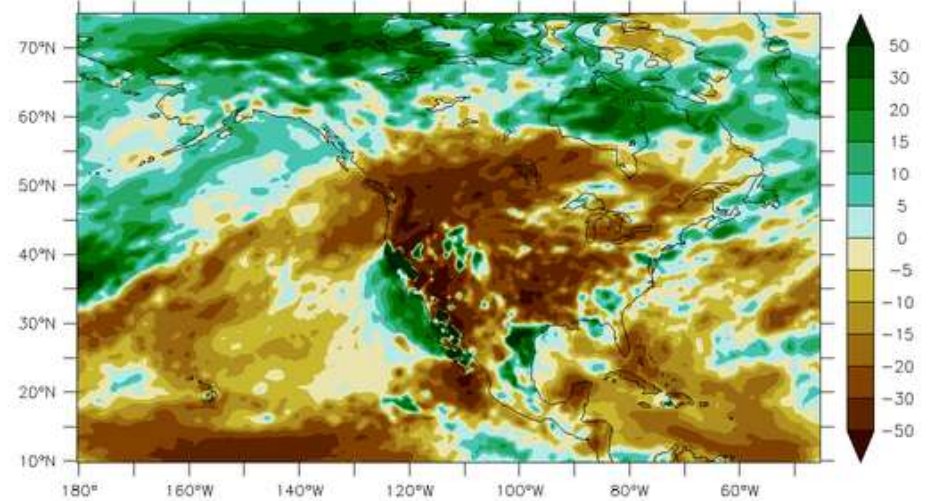
CM2.1 (M45)



AM2.1 (M180)



AM2.1 (M180)

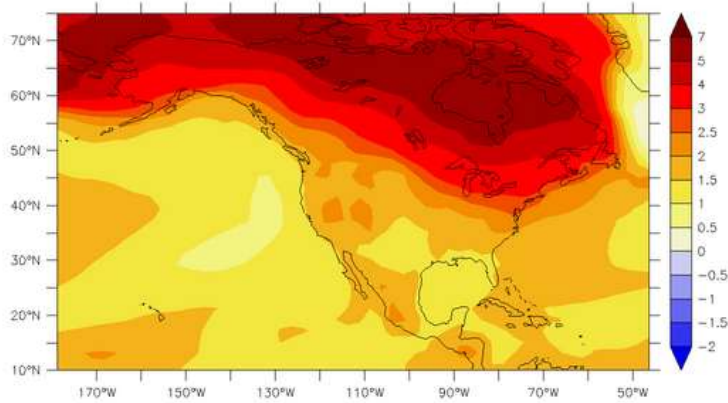


Surface air temperature response

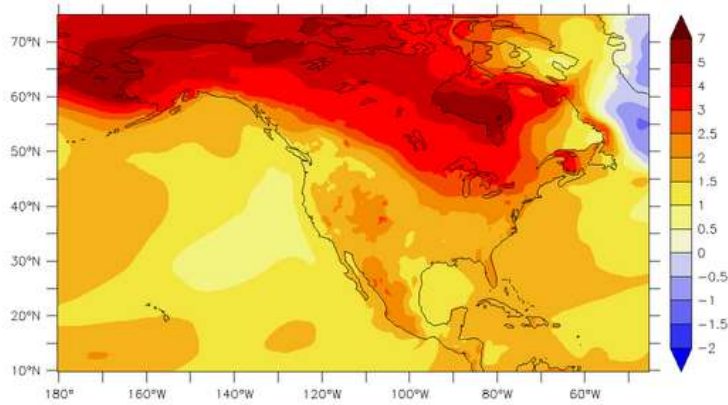
DJF

Near Surface Air Temperature, deg C, DJF

CM2.1 (M45)



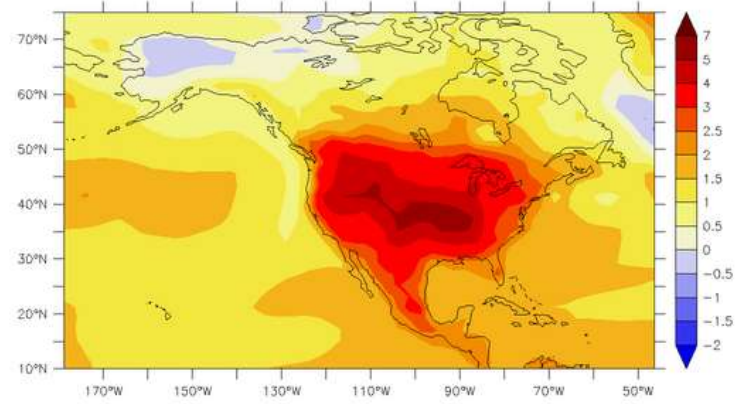
AM2.1 (M180)



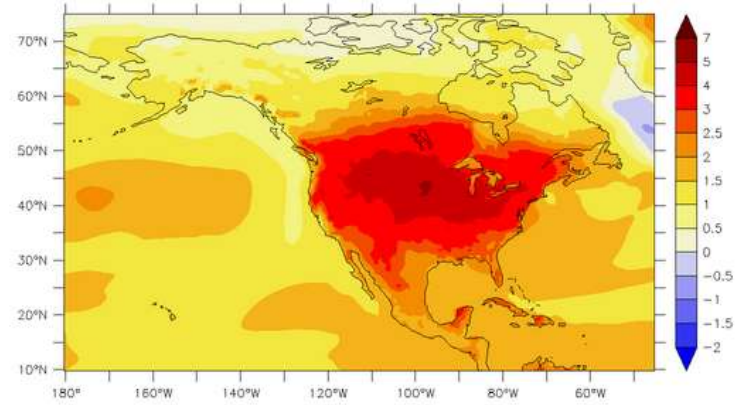
JJA

Near Surface Air Temperature, deg C, JJA

CM2.1 (M45)

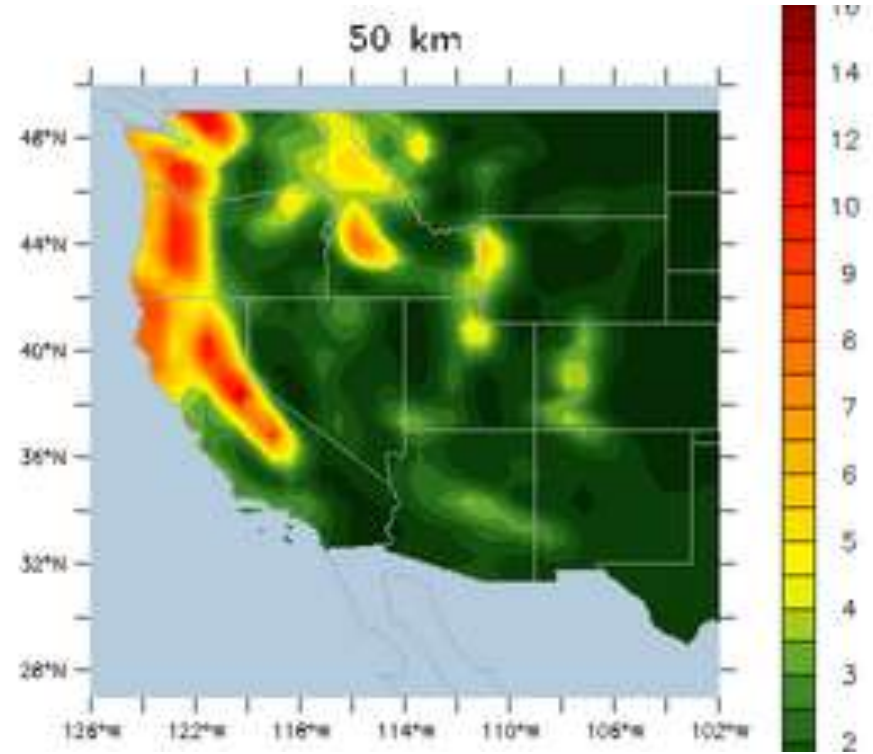
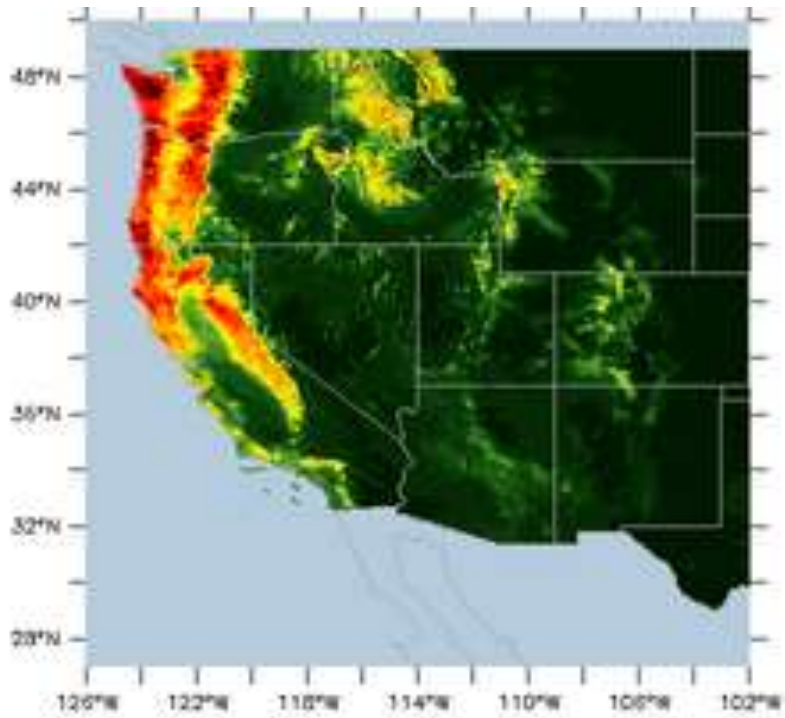


AM2.1 (M180)



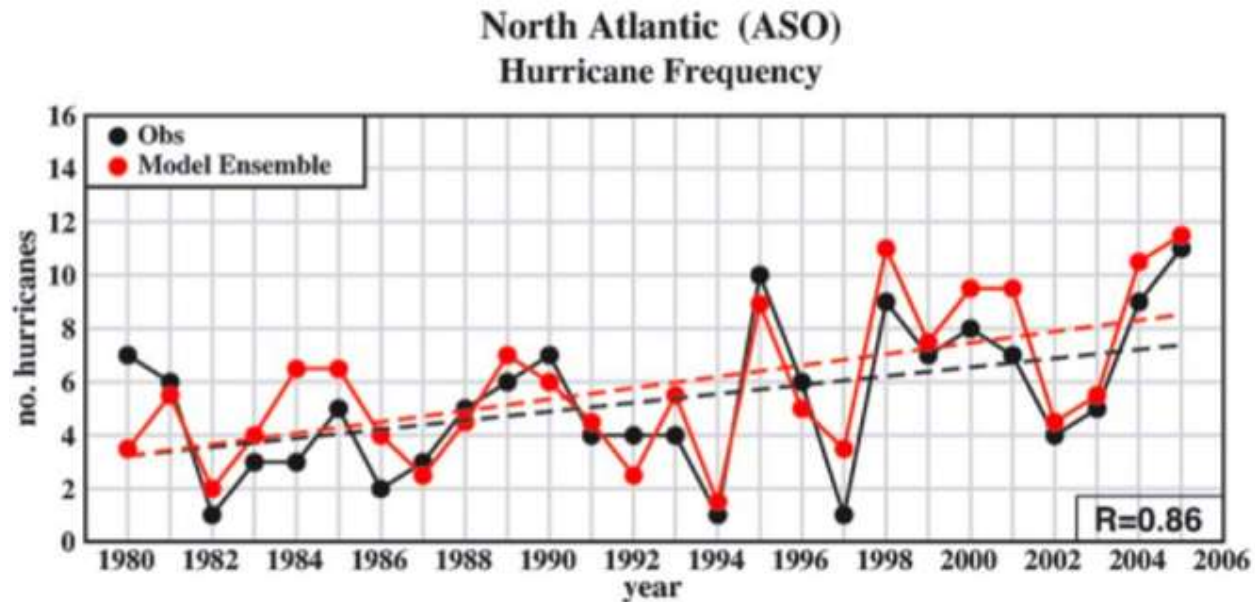
Winter Precipitation in Western US (control)

M180 -- DJF



Regional model of Atlantic basin -- but developing new 50km global model that also looks very promising (current model produces relatively few Atlantic tropical storms)

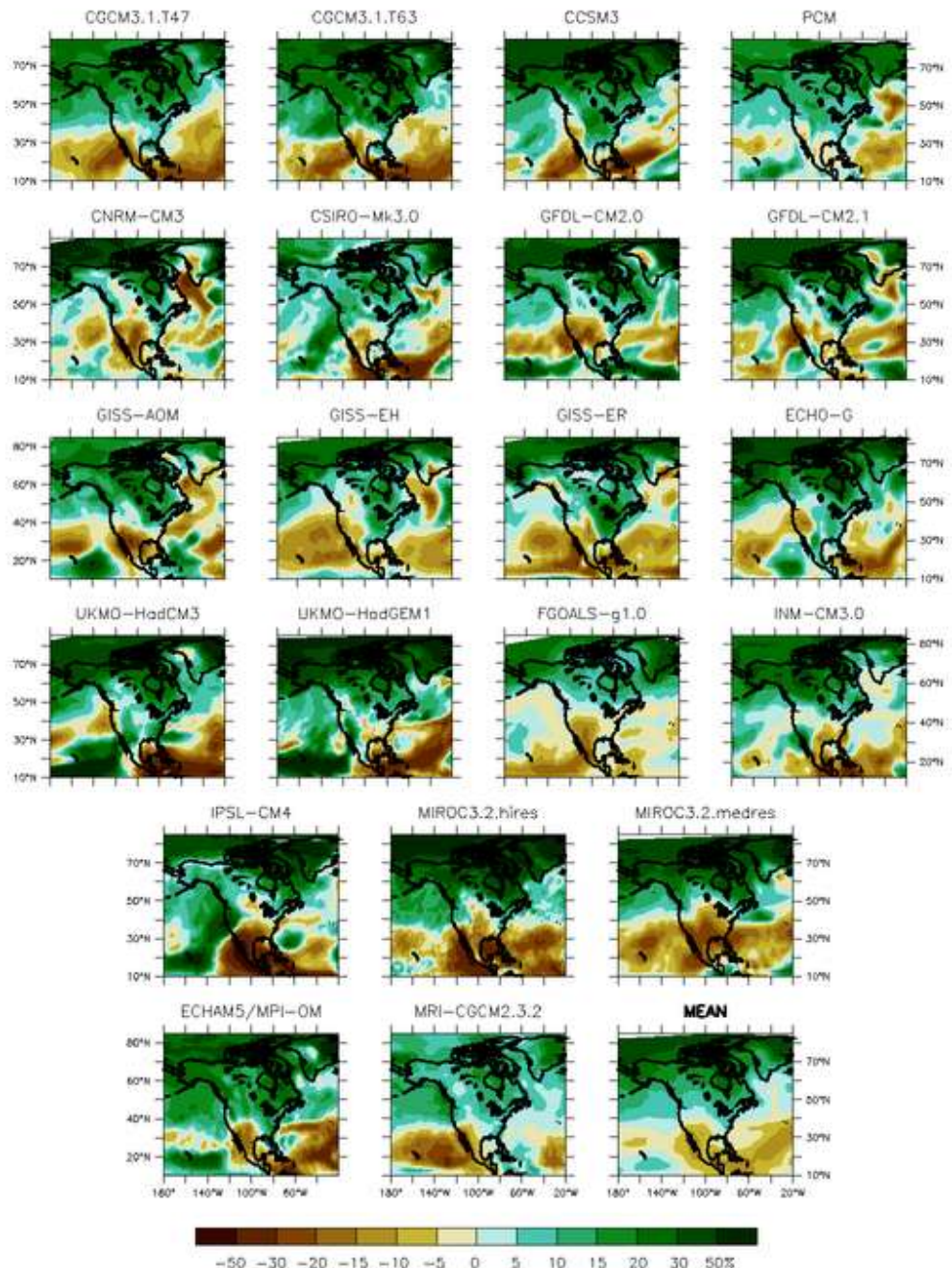
Hope to have new and improved 50km time-slices within 1-2 years



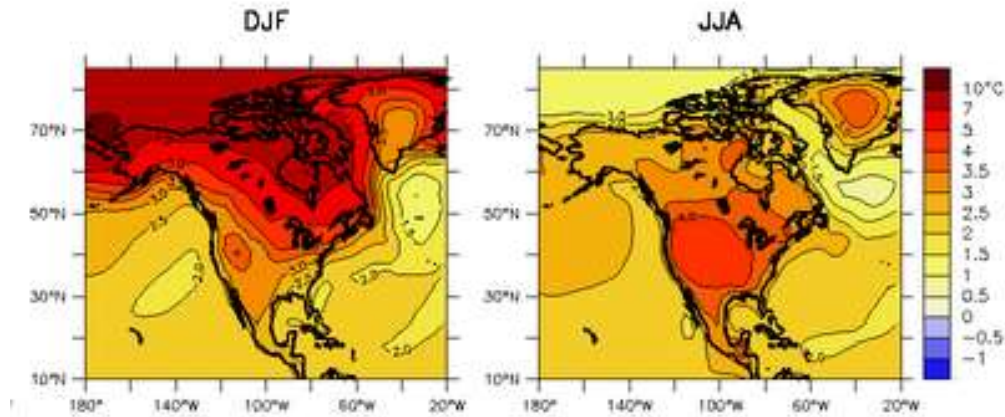
Knutson et al, BAMS 2007

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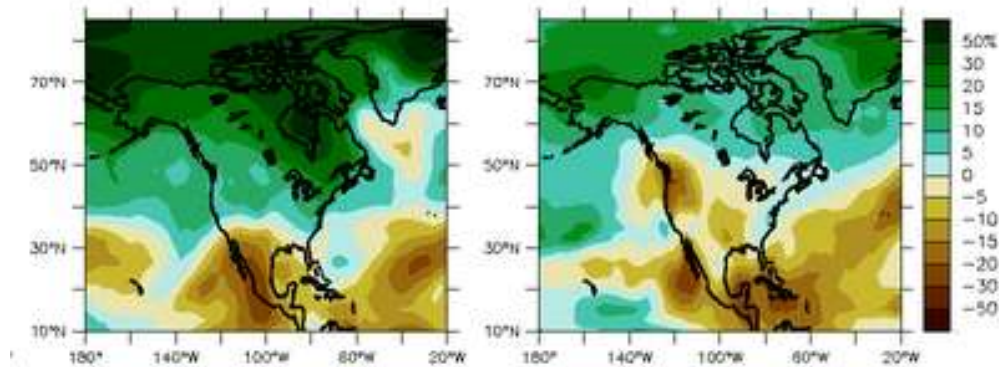
Annual Mean Precip Response (%)



AR4: 2080-2099 (A1B) - 1980-1999 N. America

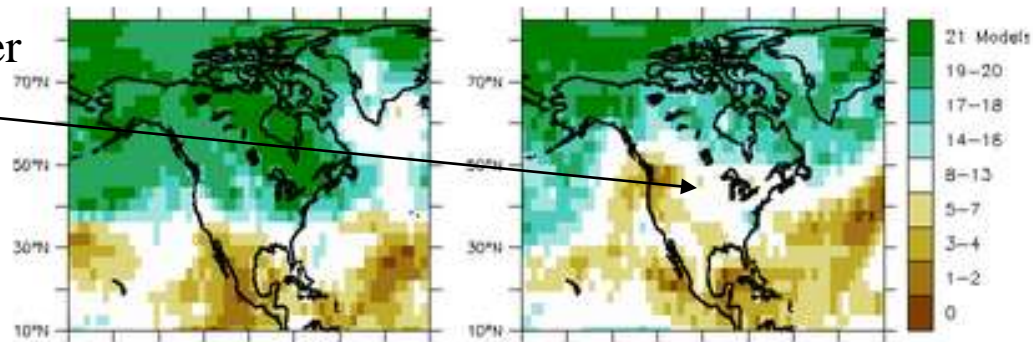


temperature



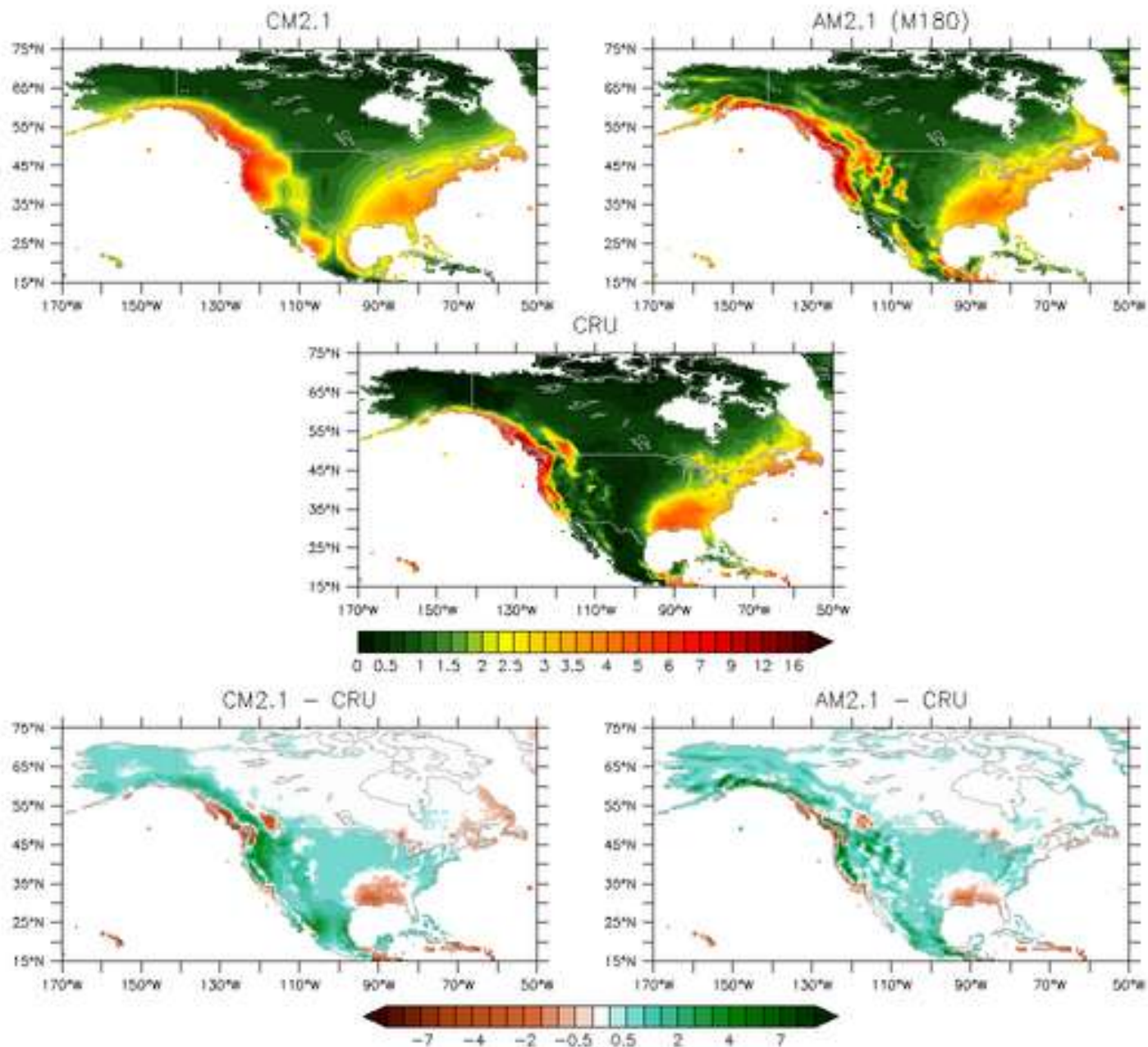
Precipitation %

Need to do better than this



#models with $dP > 0$

Precip (mm/d), DJF



Precip (mm/d), JJA

