

# North American Water Project (NAWP, formerly TRACE)

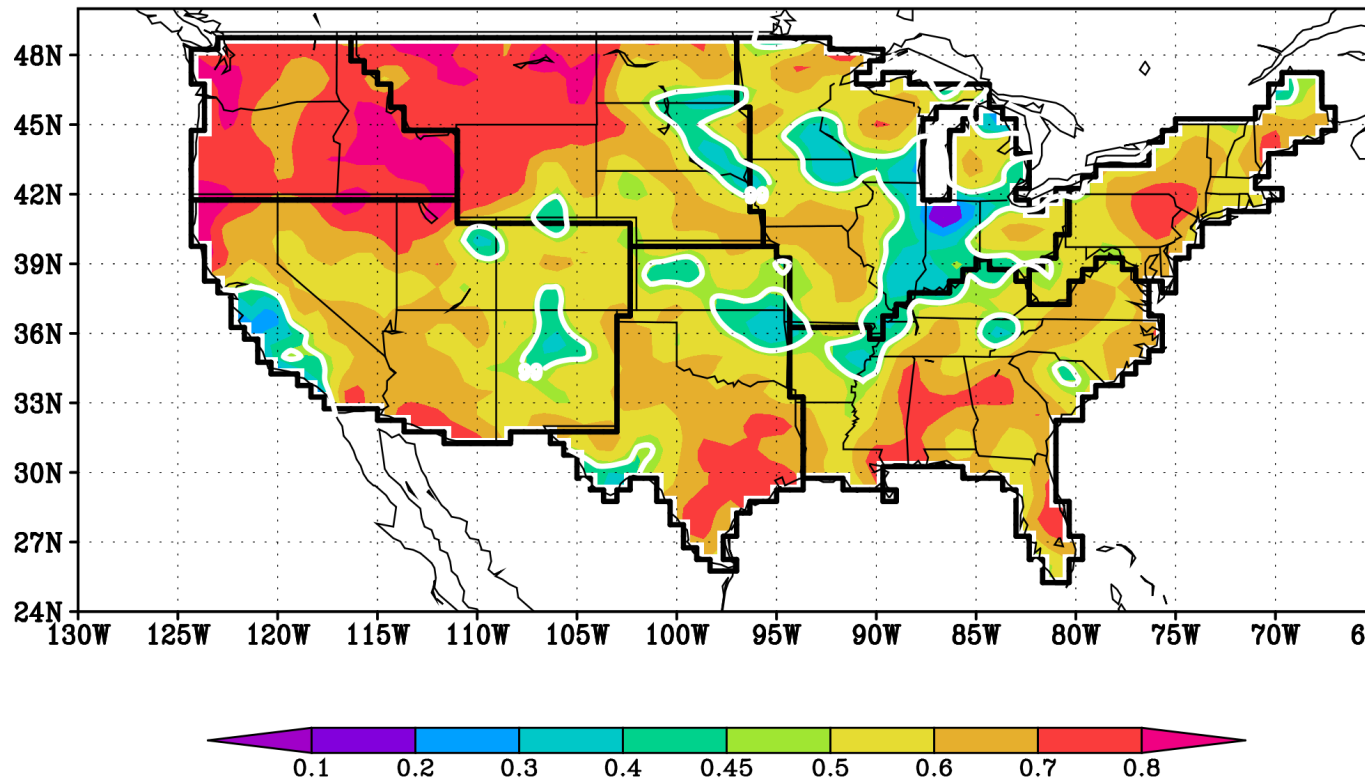
- NAWP will establish the scientific basis, observations and modeling approaches required to manage water security and sustainability through climate and environmental change uncertainties. This will require an interdisciplinary integration of North American hydroclimate observation and prediction resources that transcends scales and enables procedures and analytic tools to adapt to change.

## CHALLENGES:

- **Adaptation:** Developing a scientific basis and tools to adapt to climate and environmental change.
- **Benchmarking:** Understanding the sensitivity of the water cycle to change.
- **Science informing decisions:** Developing the capacity for science-informed decisions related to climate and environmental change.

# Reanalyses in the National Climate Assessment

JJA Pr MERRA Correlation to CPC



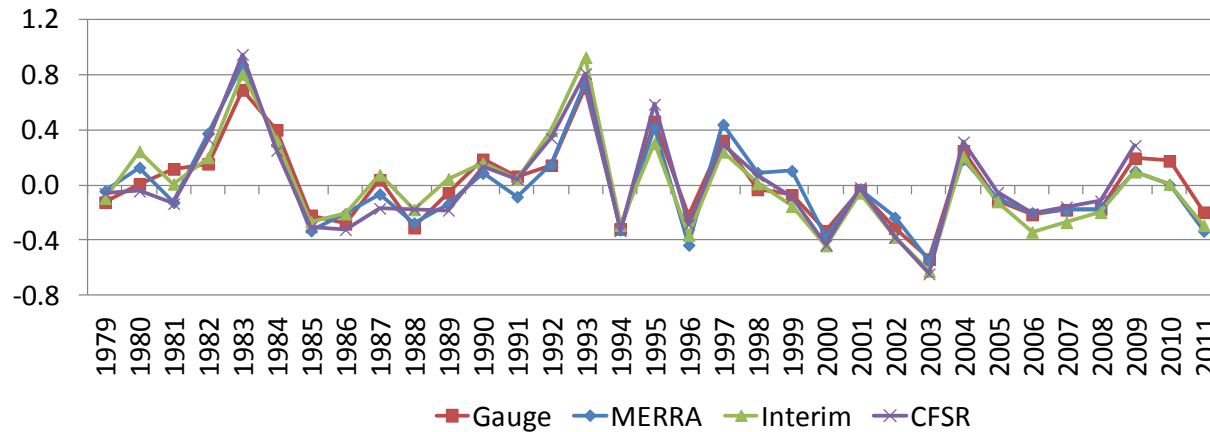
MERRA summertime precipitation compares well with CPC over most of the US, especially NW but rather poor in the MW US.

What controls the quality of the MERRA precipitation?

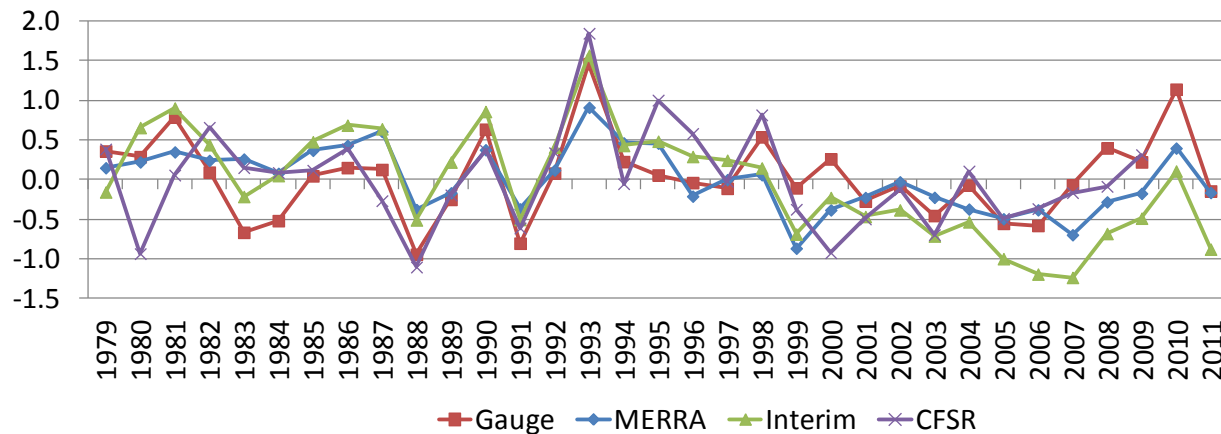
- While Reanalyses assimilate observations, many essential climate variables are derived from the background model forecast, with associated errors and uncertainties

# Regional Precipitation

NW JJA Precip Anomalies (mm day<sup>-1</sup>)



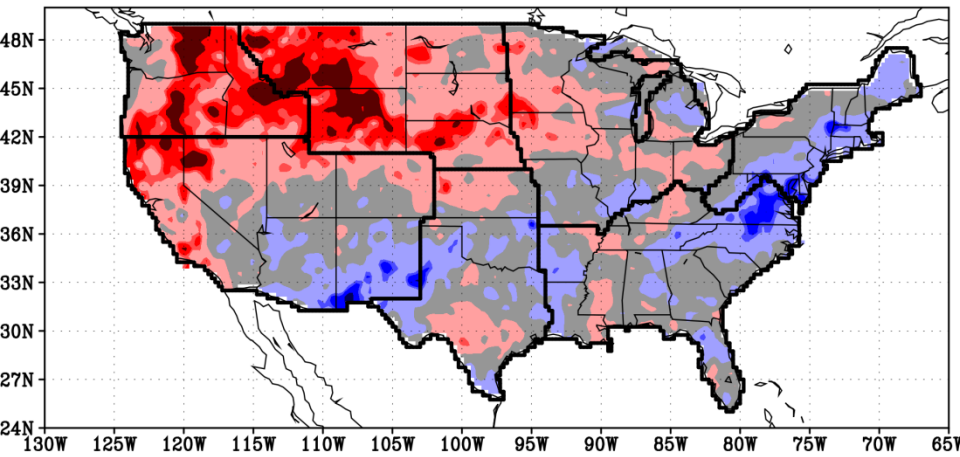
MW JJA Precip Anomalies (mm day<sup>-1</sup>)



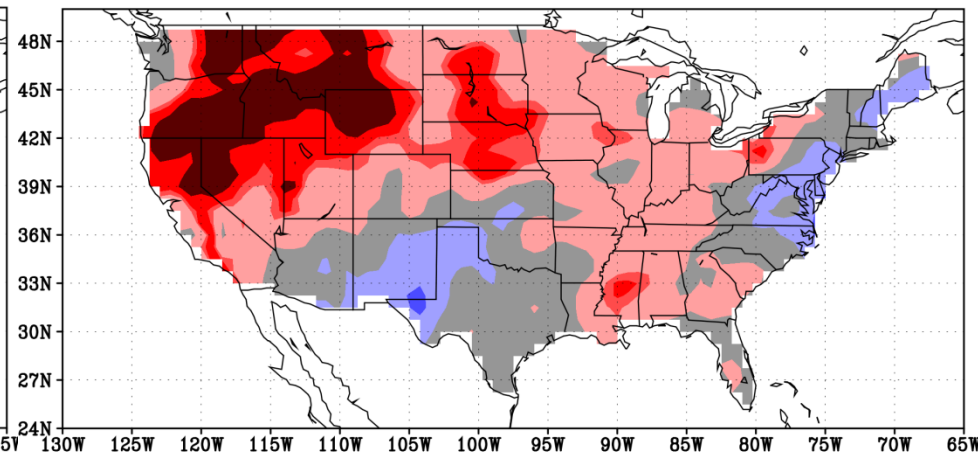
- All reanalyses agree well in **NW**
- In **MW**
  - MERRA underestimates anomaly magnitude
  - CFSR completely misses some anomalies
  - Interim has a persistent trend

# ENSO Connection

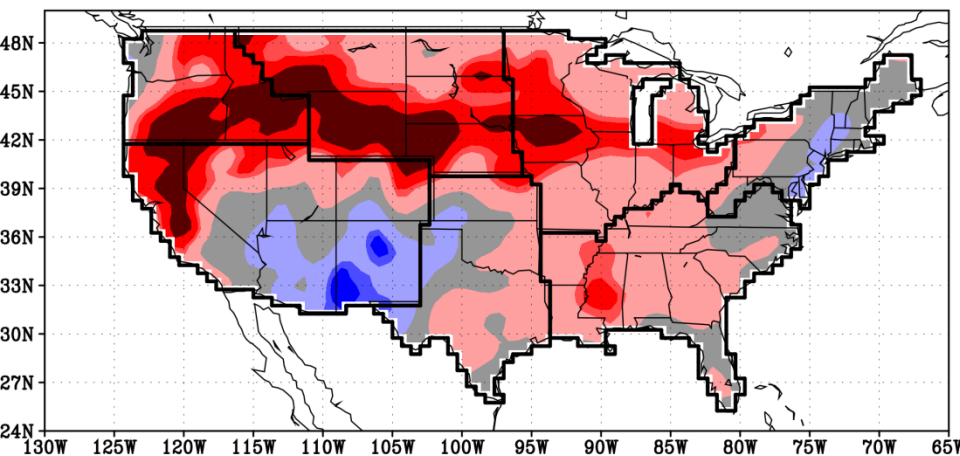
CPC Gauge JJA Pr Correlation to MAM ENS034



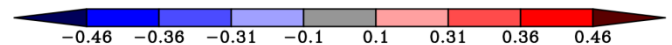
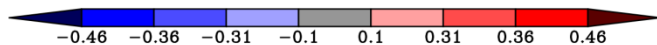
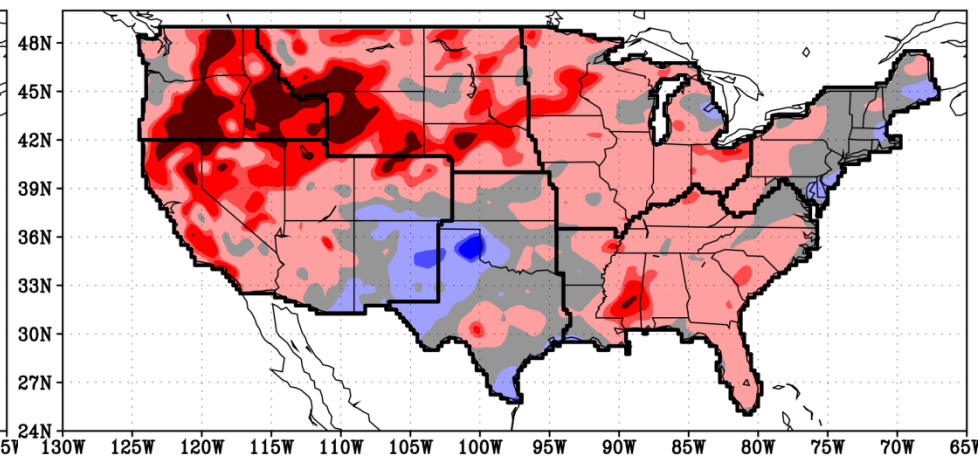
ERA Interim JJA Pr Correlation to MAM ENS034



MERRA JJA Pr Correlation to MAM ENS034



CFSR JJA Pr Correlation to MAM ENS034



Observed JJA precip shows a correlation to MAM ENS034 in the NW, not in MW. Reanalyses agree with the NW correlation, but also have some correlation to ENS034 in MW and SE. This suggests the large-scale circulation influence of ENSO persists for NW, but that the local coupling in the reanalyses is insufficient to represent reality.

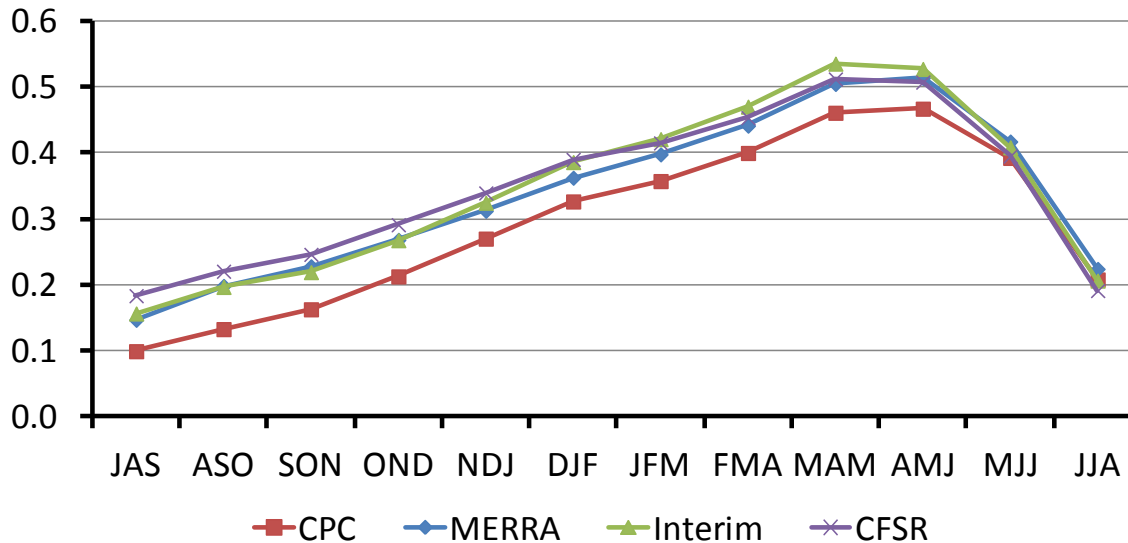
# Summary

- Regarding Reanalyses in NCA: Some regions may be better represented than others in seasonal variability, but depends on variable
- For hydrology development prediction, the local coupling, especially in MW and SE, could be an area where improved precipitation prediction could greatly affect the reanalyses results.
- There are many similarities among the reanalyses; collectively, these could be exploited to quantitatively assess the uncertainty
- Report, including evaluation of air temperature:  
<https://gmao.gsfc.nasa.gov/projects/NCA/>

# Backup slides

# Why MAM NINO34?

NW JJA Pr Correlation To Seasonal ENSO34



- In NW, reanalyses track CPC gauge obs with higher correlation to ENSO in MAM
- In reanalyses (especially MERRA), this correlation seems more wide spread than it should be

JJA PR Correlation to MAM ENSO34

