

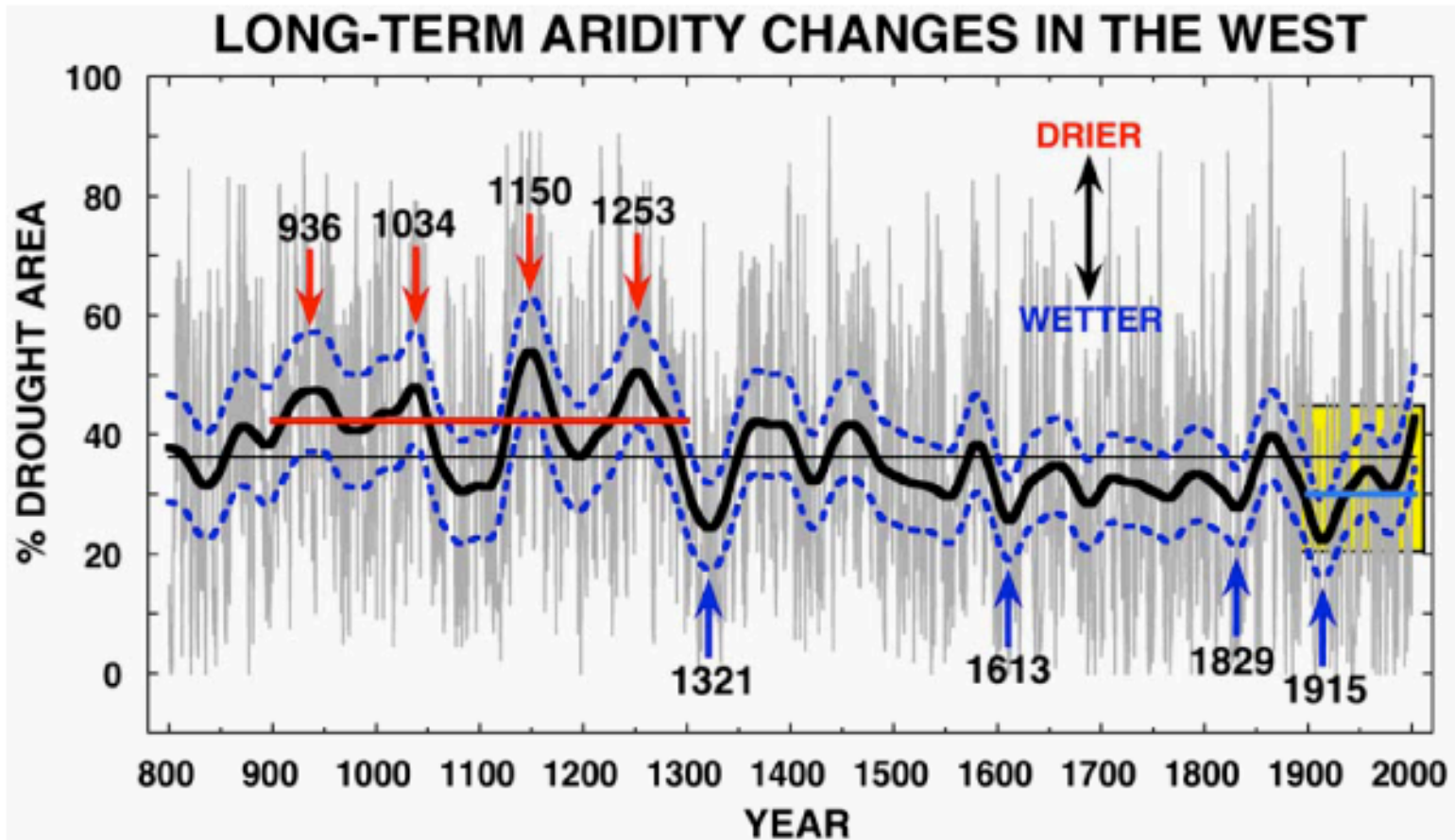
Why Drought Regimes?



*CSI/MAPP Webinar – Drought: Research and Information Supporting Preparedness
November 22 2013*

American West Drought Regimes:

But that was then, things are different now....*Right?*



Drought ($PDSI < -1$) for the Western U.S., reconstructed from tree-ring data (Cook et al., 2004).

Climate-Society Links

American West Drought Regimes

Puebloan Droughts

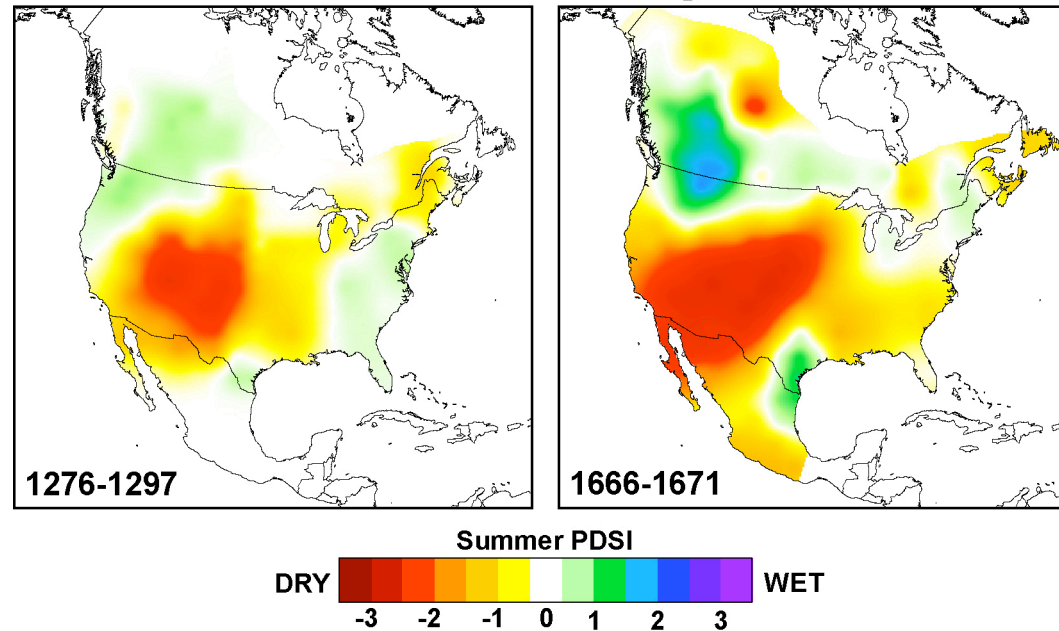


Figure 11. Tree-ring reconstructed summer PDSI during two multi-year droughts centered over the Puebloan cultural area. The “Great Drouth” (Douglass 1929, 1935) lasted for at least 22-years (left). The social and environmental effects of the six-year drought during the mid-17th century (right) were mentioned by Spanish archivists and may provide useful insight into the consequences of multi-year drought on prehistoric farmers in the region.

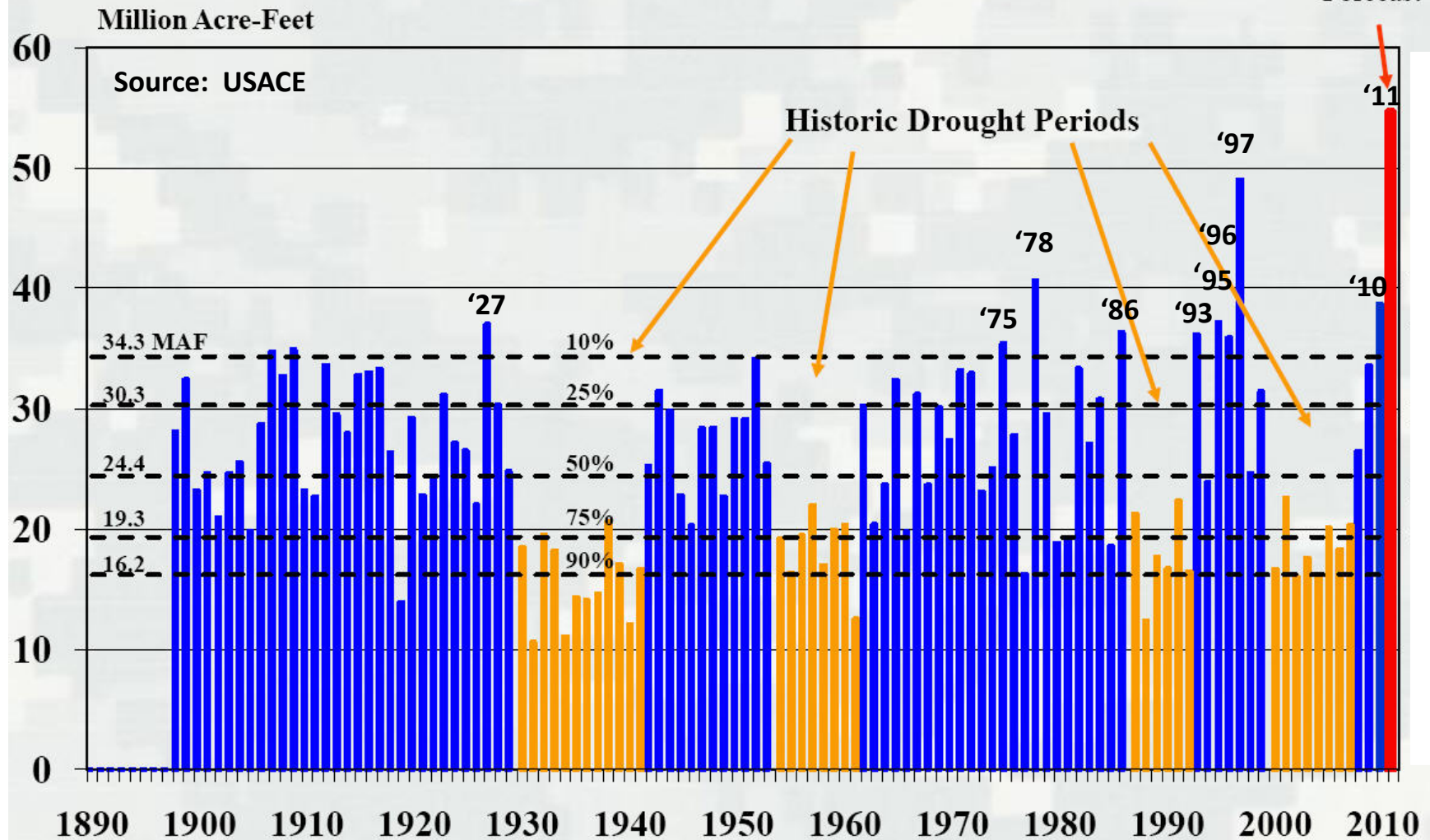
From Cook et al. 2007; *Earth Science Review*

Drought Regimes Common in the Missouri River Basin



What Causes These Regimes, and Are They Predictable?

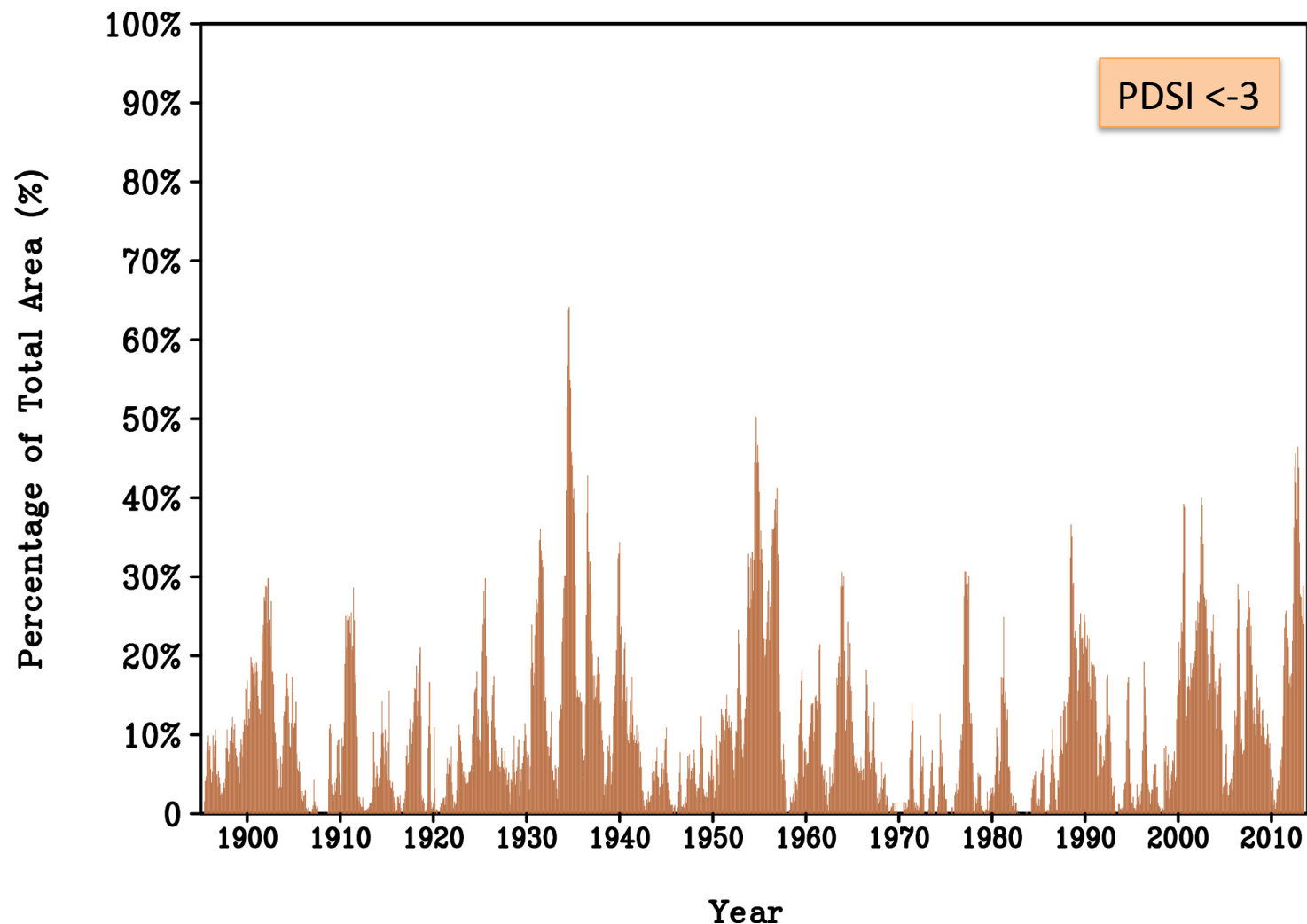
Missouri River Mainstem System Annual Runoff above Sioux City, IA



U.S. National-Scale Drought Regimes

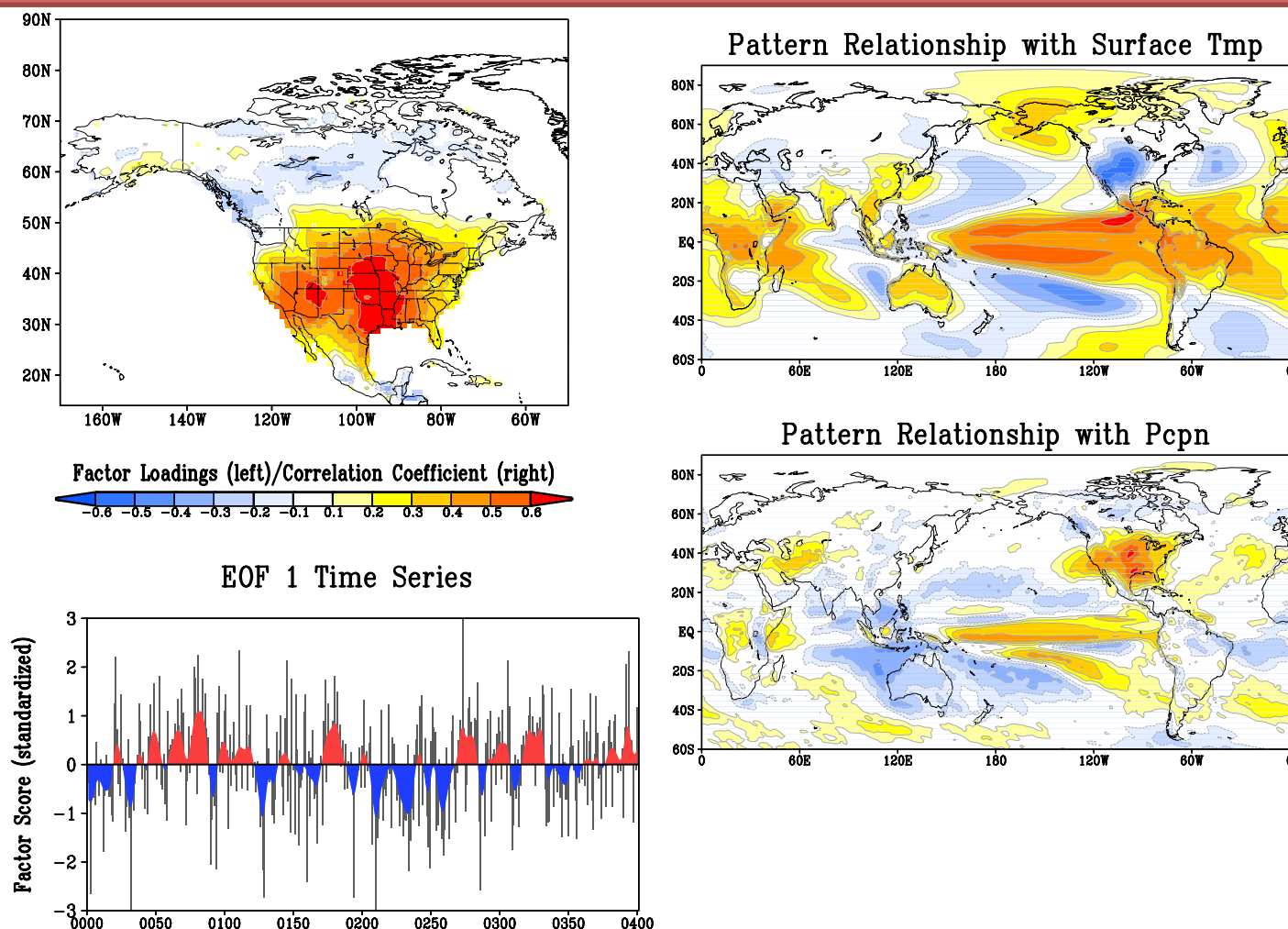
Is the Current Regime Different Than 20th Century Regimes?

Percent Area of the Contiguous U.S.
in Moderate Drought
January 1895–July 2013



Clues from Studying North American Soil Moisture Variability in Climate Models: Part I

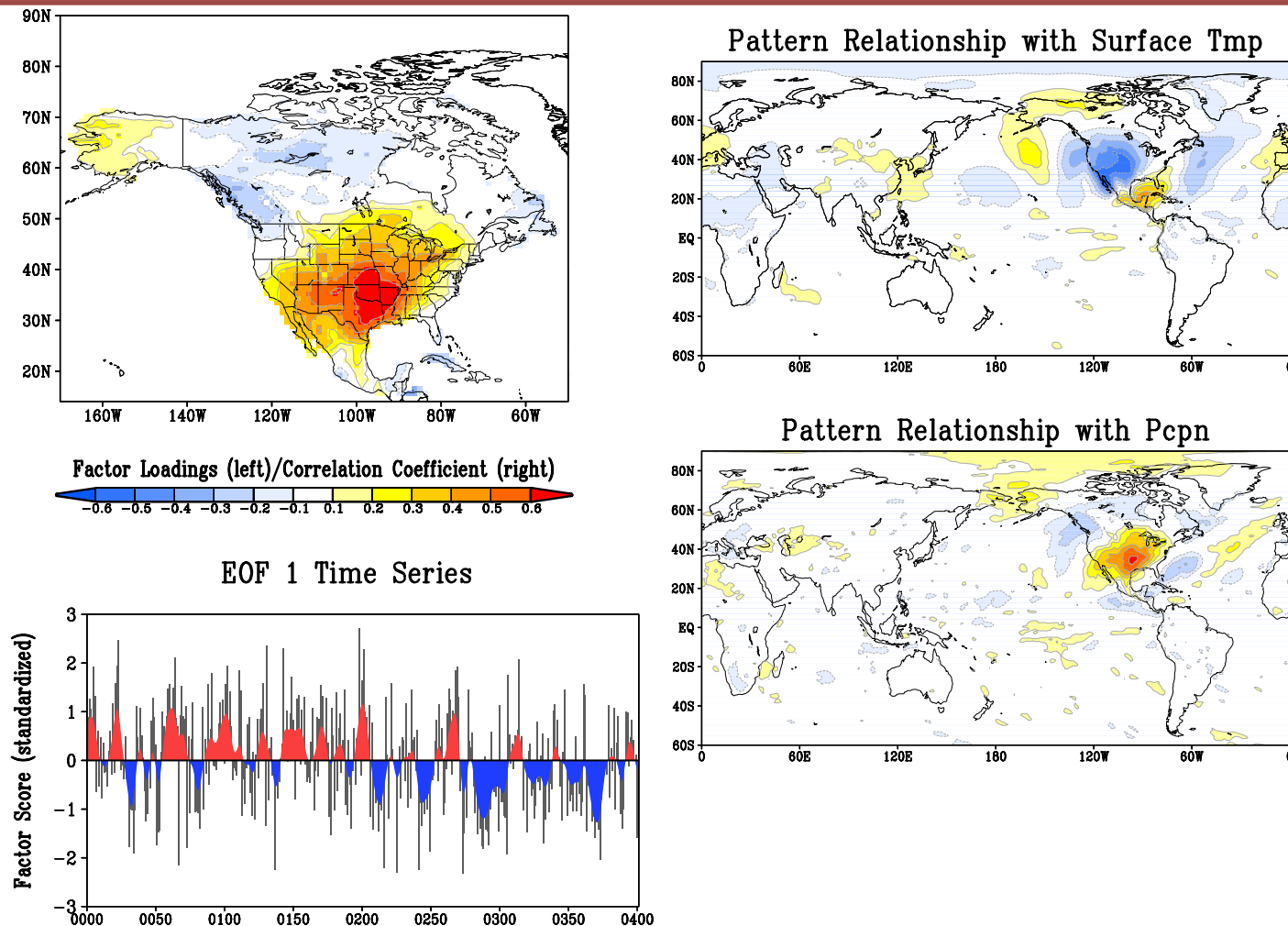
500-yr simulation of NCAR's CCSM4 Coupled Ocean-Atmosphere Model



Confirming Evidence for SST-link to a NA Drought Variability
Potentially Good News for Drought Regime Predictability?

Clues from Studying North American Soil Moisture Variability in Climate Models: Part II

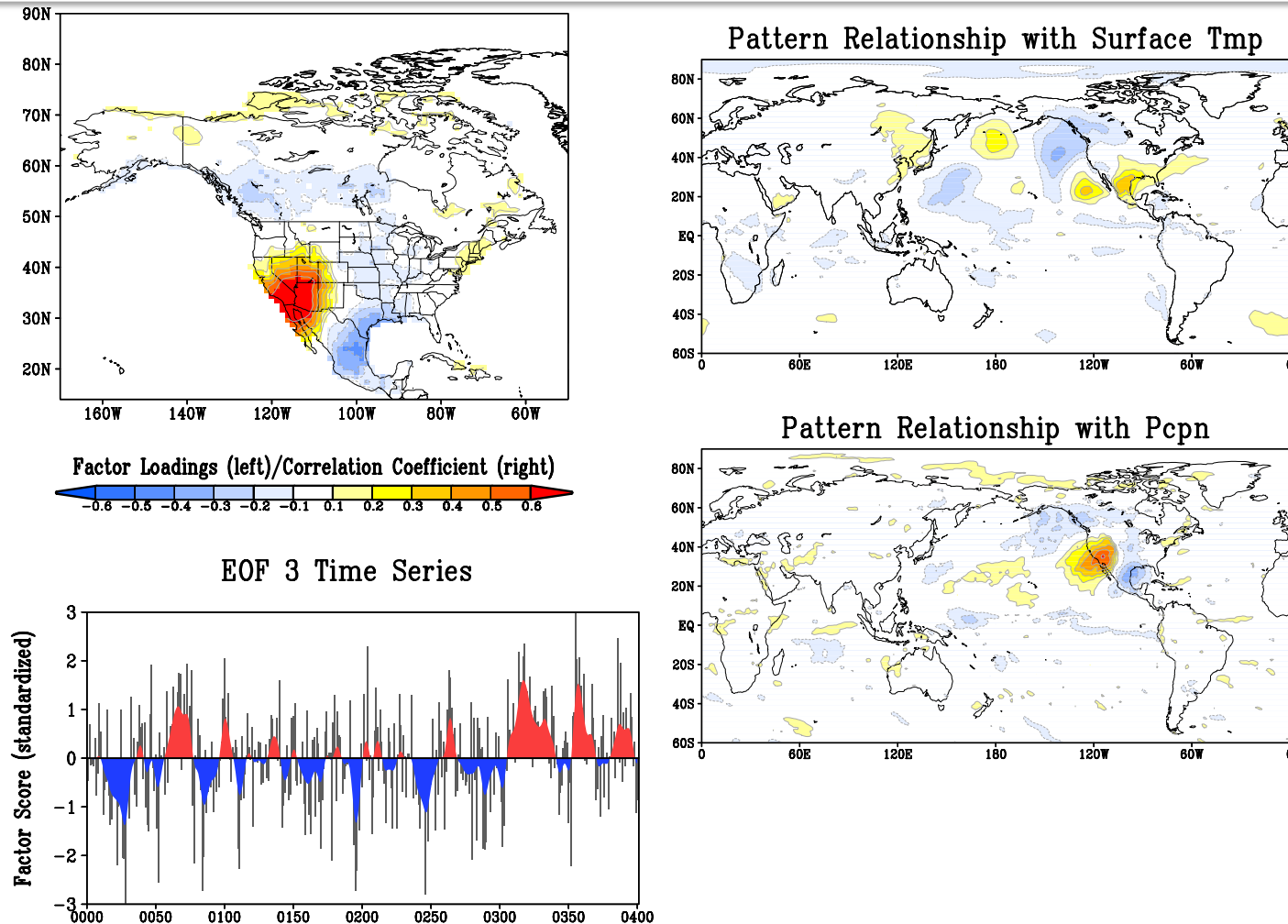
500-yr simulation of NCAR's CAM4 Atmospheric Model



Drought Regimes from Random Atmospheric Variability Alone
Potentially Bad News for Drought Regime-predictability?

Re: American Southwest Drought Regimes: But that was then, things are different now....*Right?*

500-yr simulation of NCAR's CAM4



Southwest US Drought Regimes can arise from atmospheric noise alone
Factors that may explain SW paleo-droughts are likely still in play today

Why Drought Regimes?

Research Challenges

How are North American drought regimes conditioned by forcing?

What is the predictability of climate indicators for drought regimes?

How is global warming affecting the risks of drought regimes?