

Ag Summit

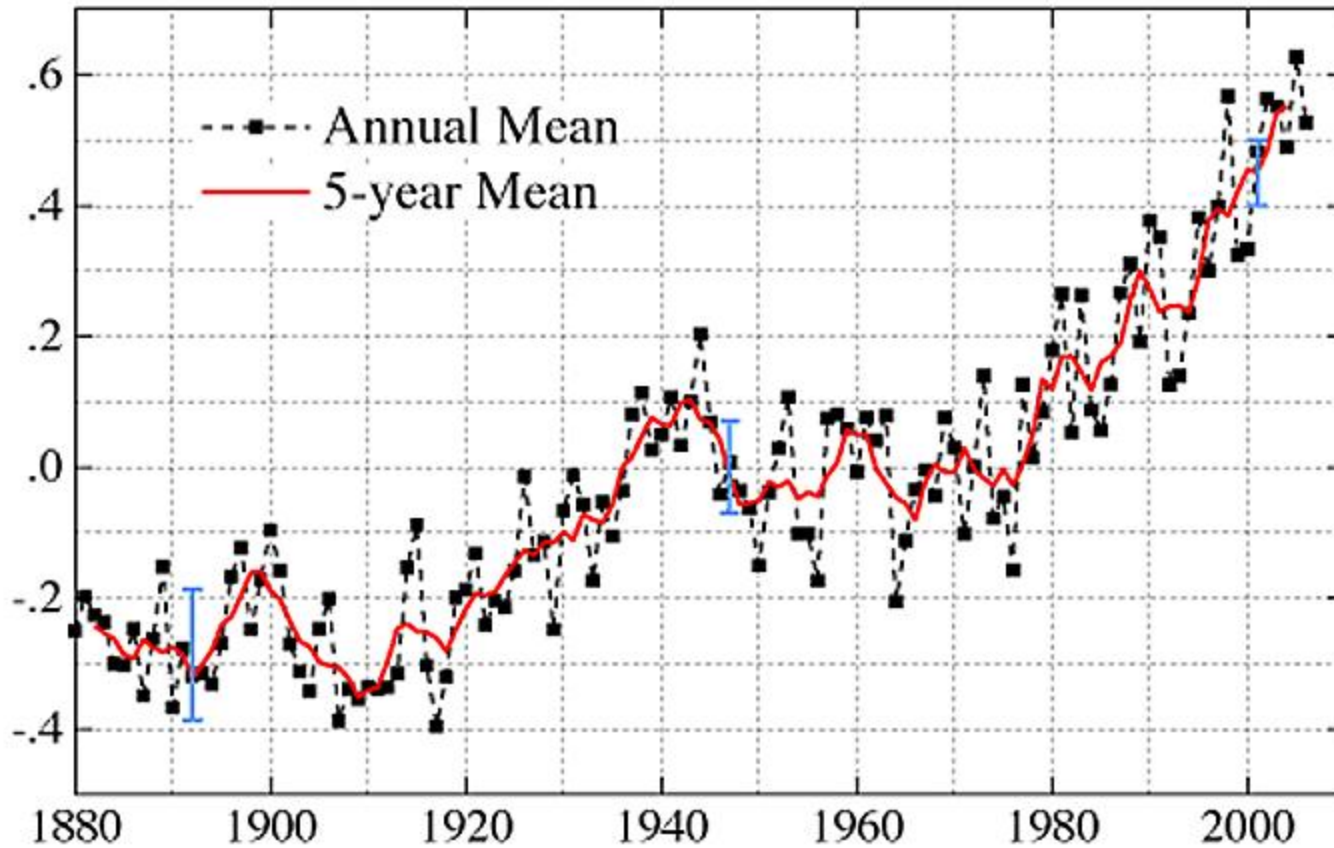
Making Sense Of Chaos



Bryce Anderson
DTN Sr Ag Meteorologist

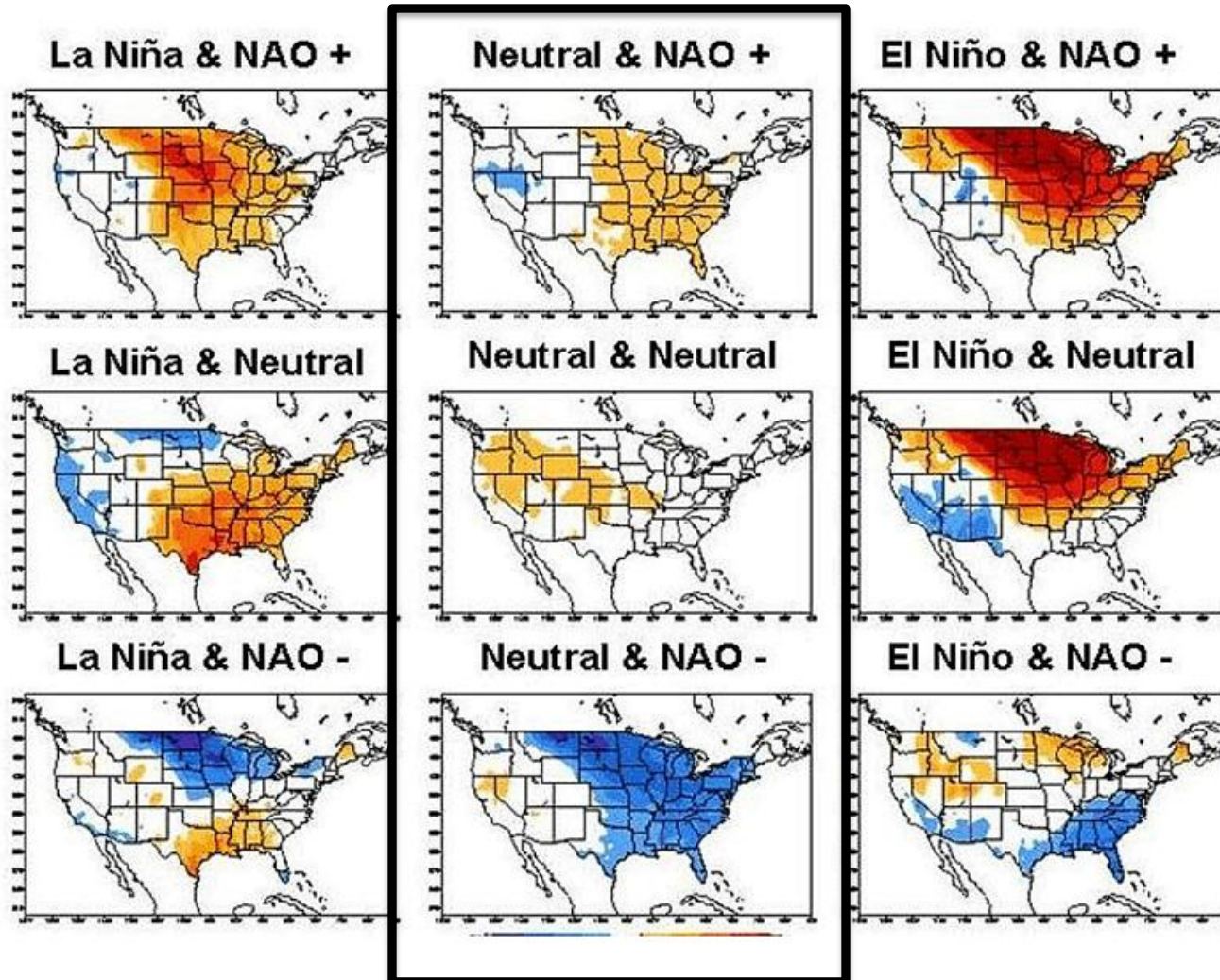
Temps Keep Rising

(a) Global-Mean Surface Temperature Anomaly ($^{\circ}\text{C}$)

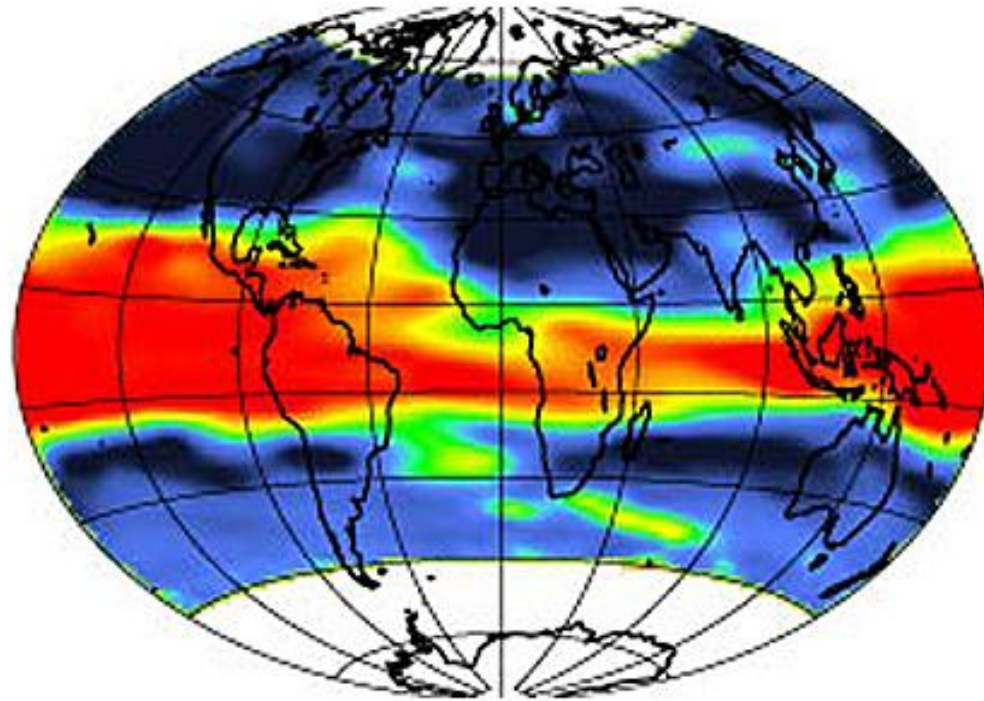


ENSO & NAO

NAO-ENSO-T composites

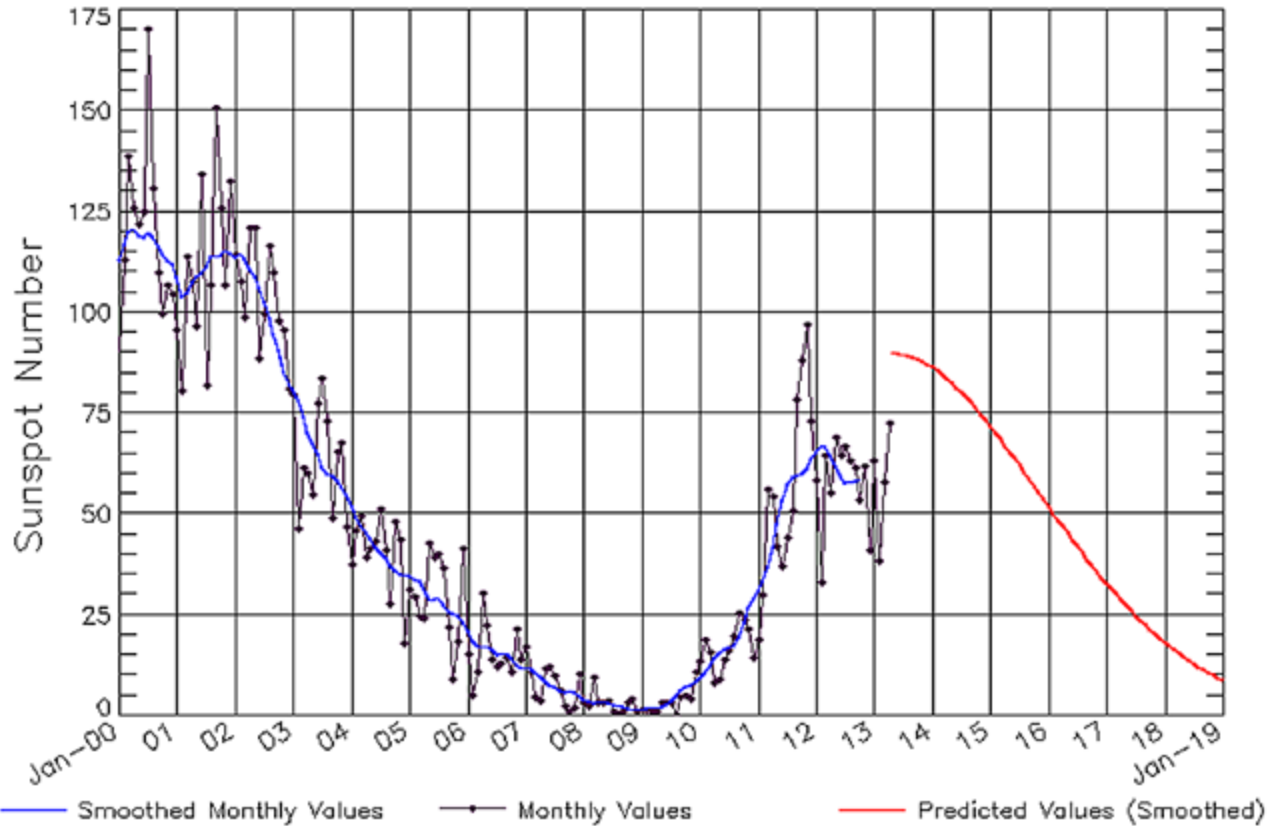


Post-Pinatubo 1991



Sunspot Activity

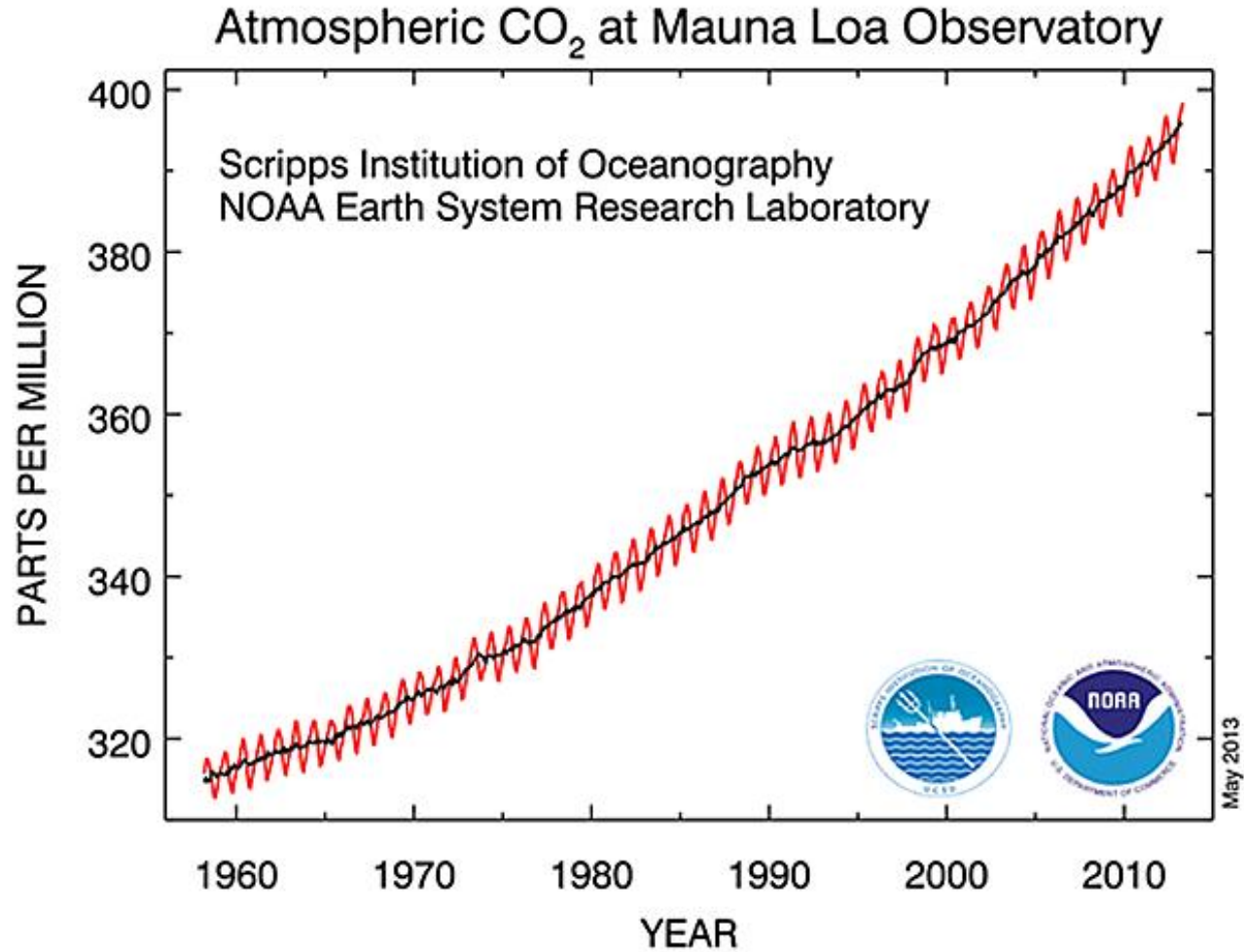
ISES Solar Cycle Sunspot Number Progression
Observed data through Apr 2013



Updated 2013 May 6

NOAA/SWPC Boulder, CO USA

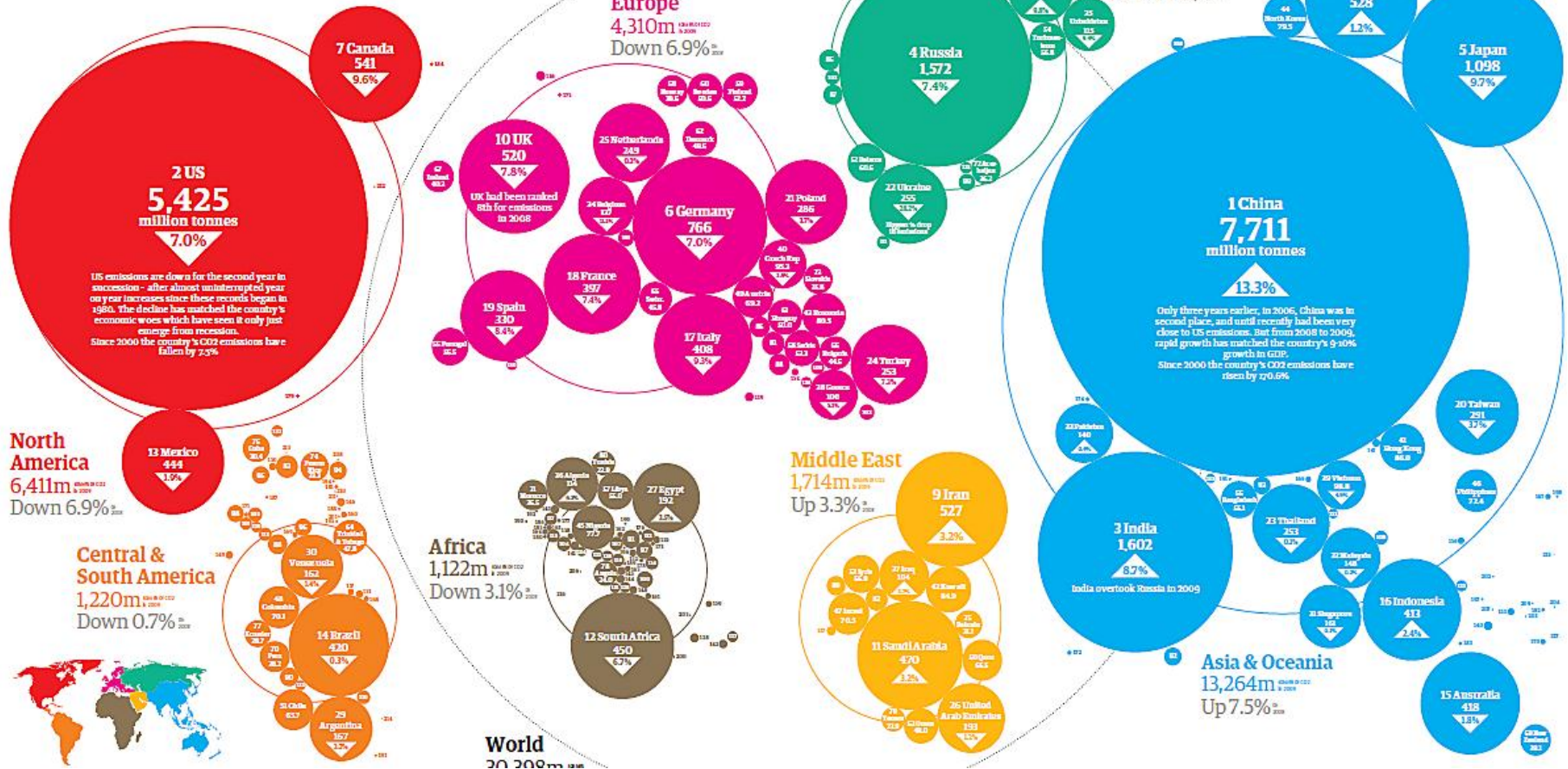
Carbon Dioxide Levels



Global CO2 Activity

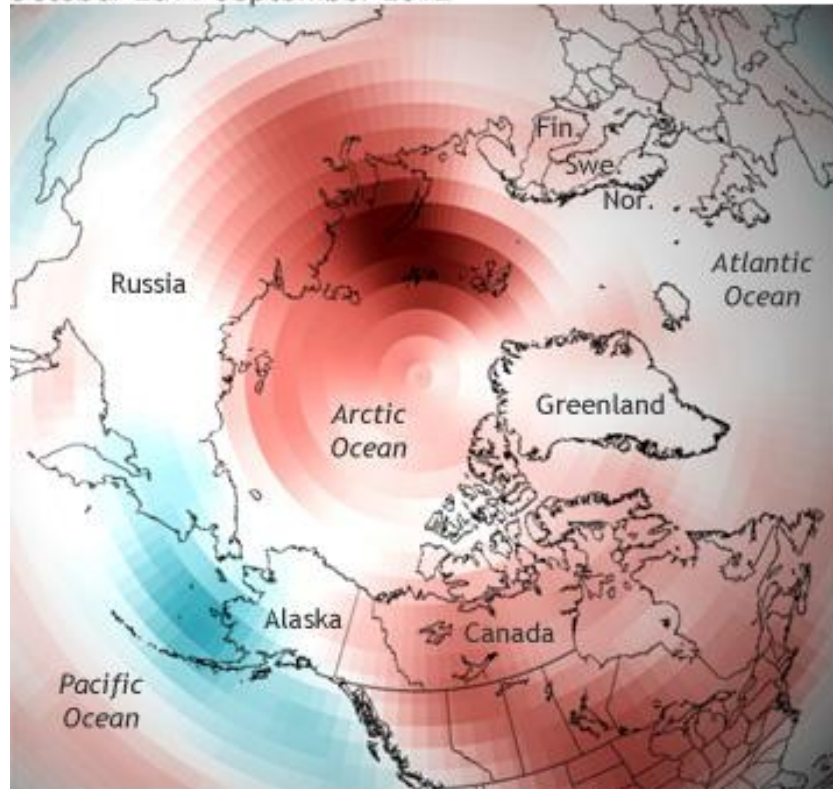
An atlas of pollution: the world in carbon dioxide emissions

Latest data published by the US Energy Information Administration provides a unique picture of economic growth - and decline. China has sped ahead of the US, as shown by this map, which resizes each country according to CO2 emissions. And, for the first time, world emissions have gone down.

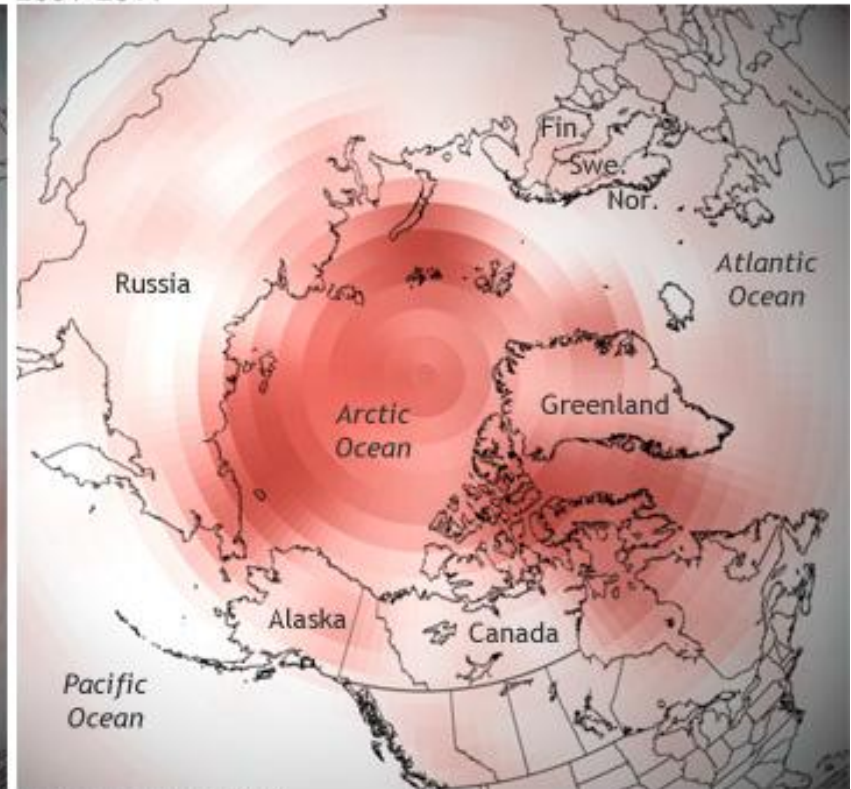


Arctic Warming

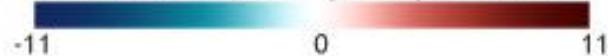
October 2011-September 2012



2001-2011



Difference from average temperature (°F)

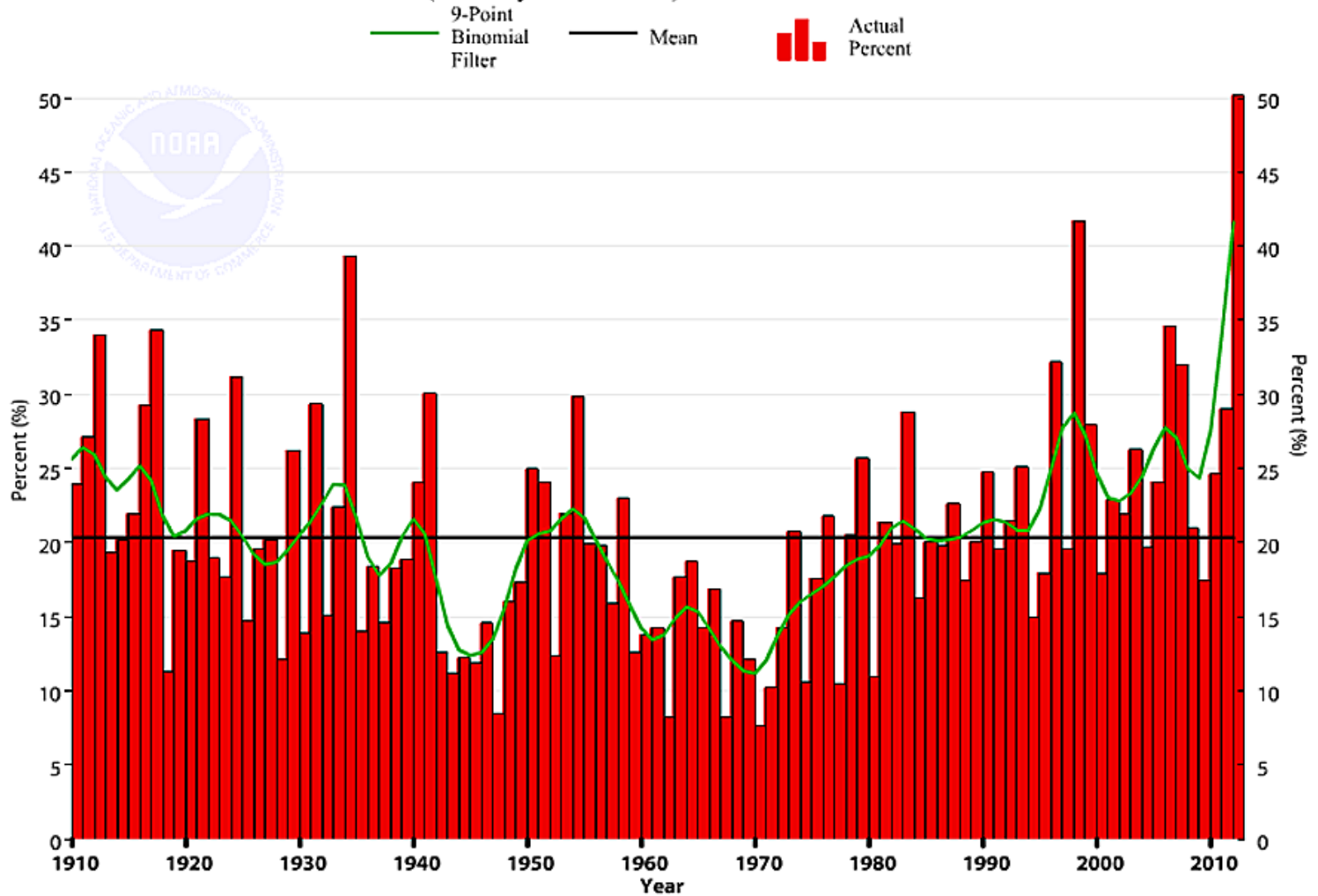


Volatility (or Chaos)

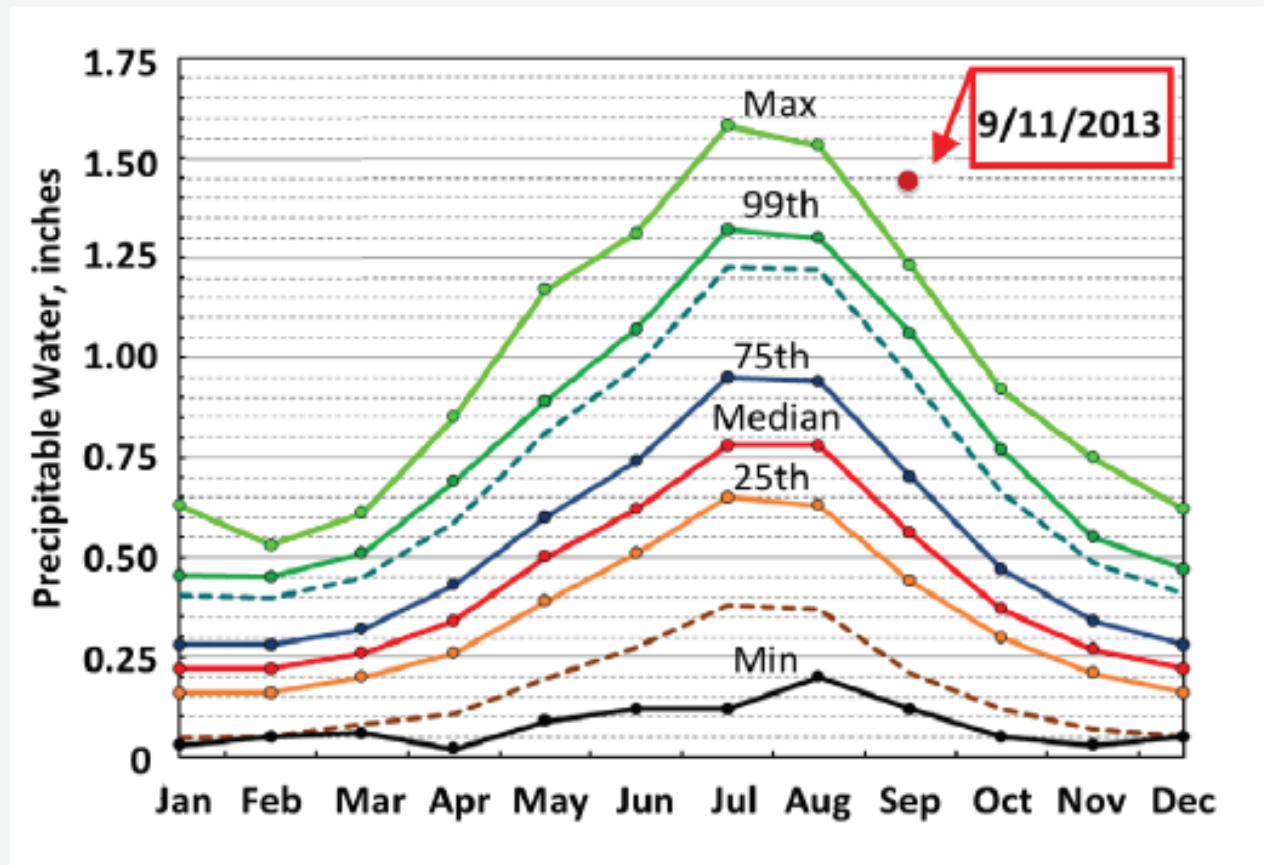
- Warmer seasons are extended
- Increased incidence of extreme dryness or wetness
- More extended periods of either warm or cold weather
- Rainfall totals are higher in heaviest rain events
- More concentrated periods of severe weather
- Extreme warmth is more common, but extreme cold can still occur

More Extreme Events

Contiguous U.S. Without Tropical Cyclone Indicator
Annual (January-December) 1910-2012



Colorado Flood Water Vapor



The range of total atmospheric precipitable water (PW) over Denver from 1948-2012, as measured by balloon soundings at Denver. The measurement on September 11, 2013 (red dot) was higher than any previous September reading. The prominent seasonal curve reflects that warmer air is able to contain more water vapor. (Plot adapted from NOAA NWS.)

“Cards” Are Stacked



As if Nature is dealing from a double shoe.

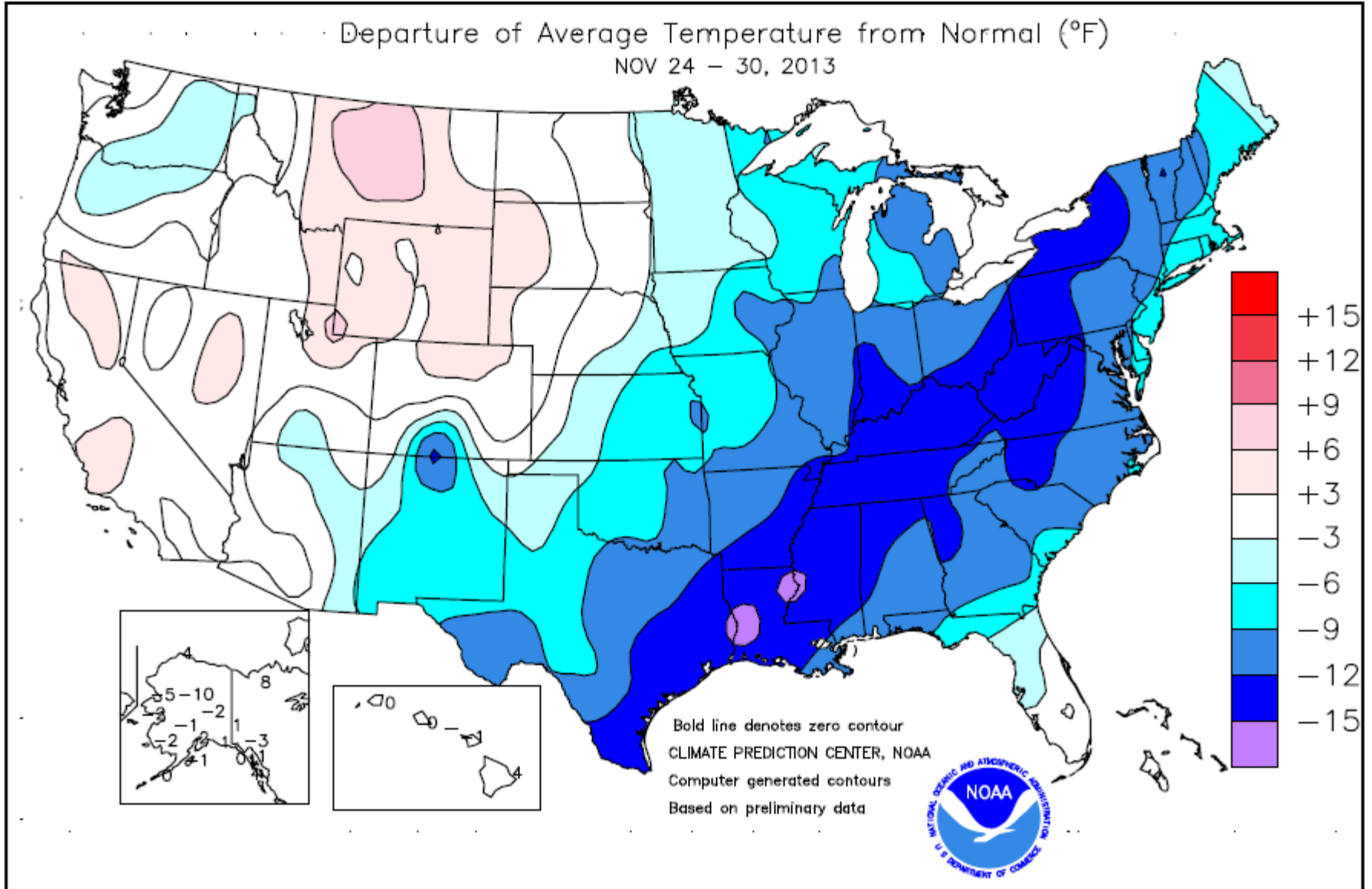


How much drain tile installed? A LOT.



Pivots “all over.”

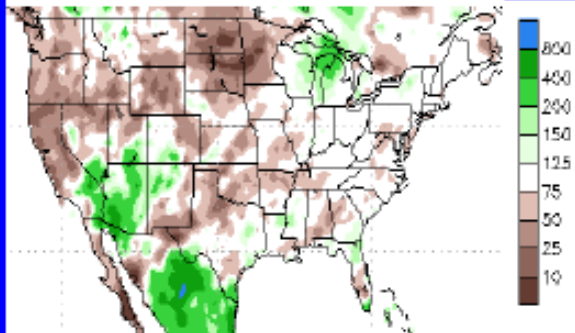
Cold Start To Winter



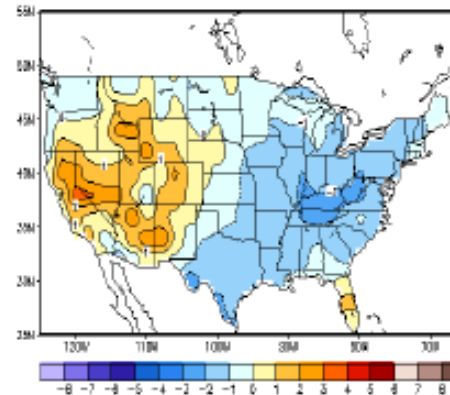
Fall Conditions

Last 30 Days

30-day (ending 30 Nov 2013) % of average precipitation

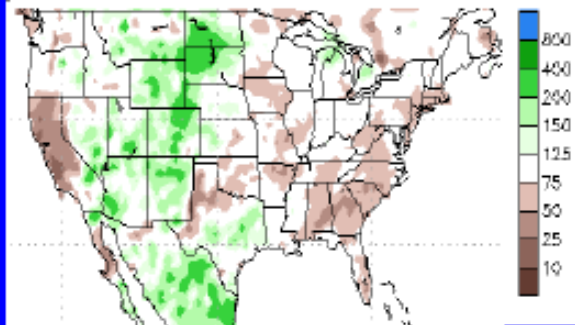


30-day (ending 30 Nov 2013) temperature departures (degree C)

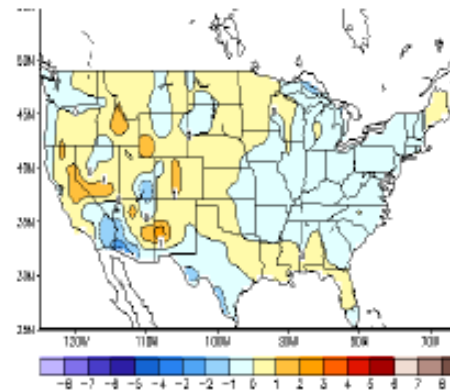


Last 90 Days

90-day (ending 30 Nov 2013) % of average precipitation



90-day (ending 30 Nov 2013) temperature departures (degree C)



October Temps

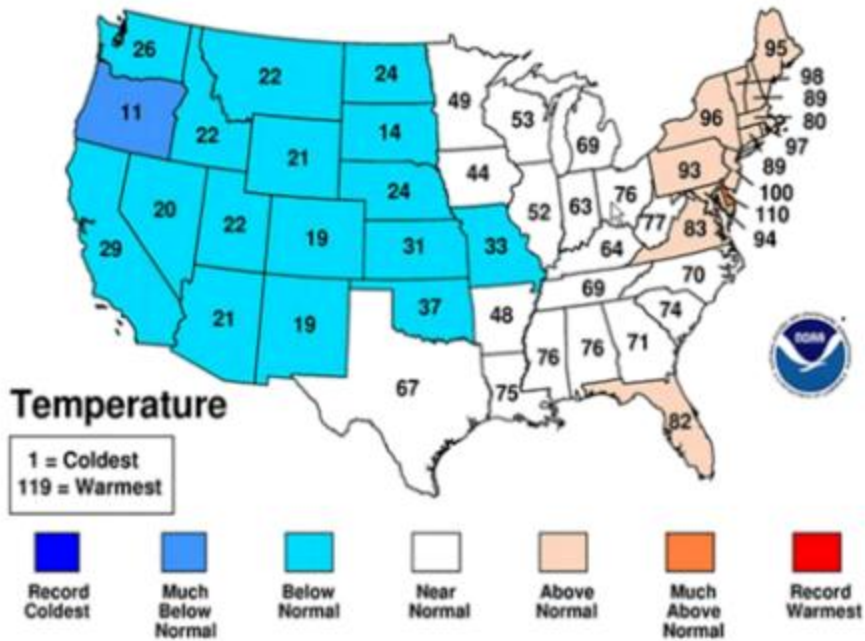
October Temperature Recap

The pattern shows a clear ridge – trough pattern across the country.

Persistent cold across the west

October 2013 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



October Precip

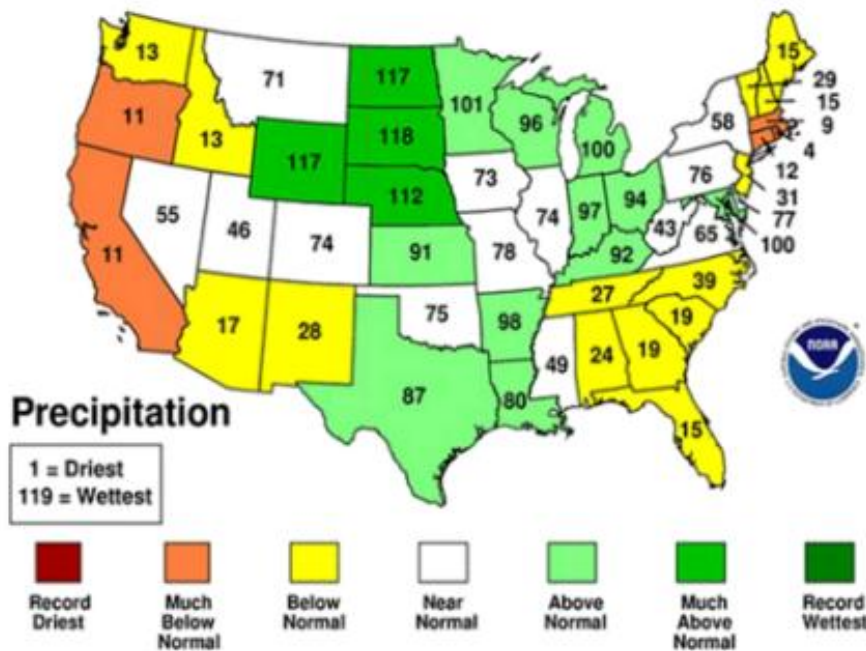
October Precipitation Recap

Wet middle part of the country

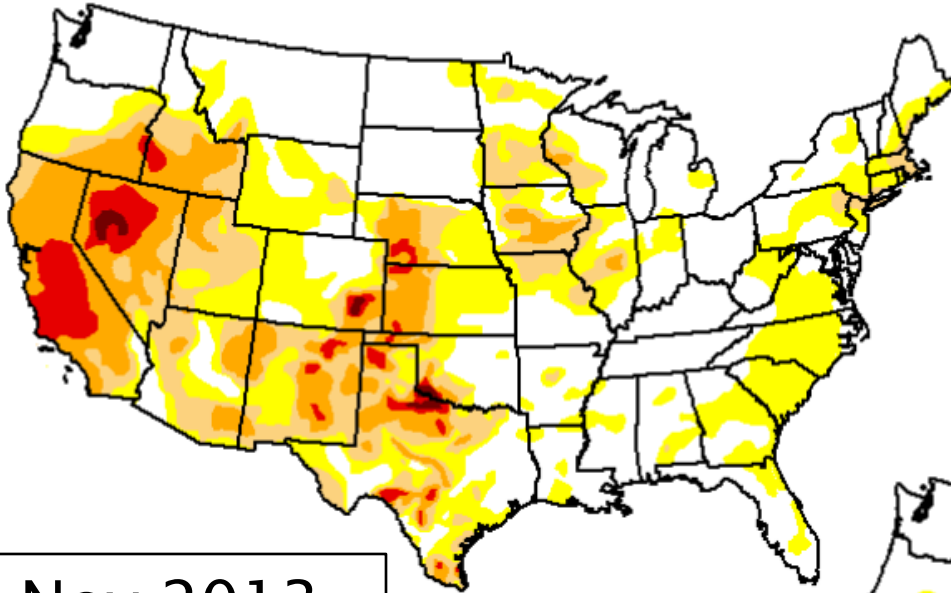
Blizzard and additional precipitation evident in plains.

October 2013 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA

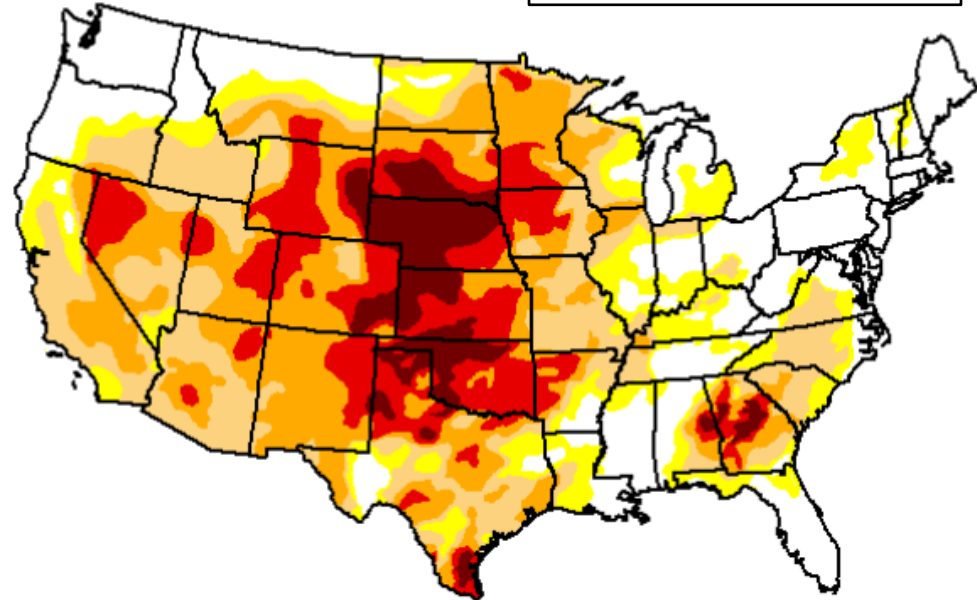


Drought Monitor

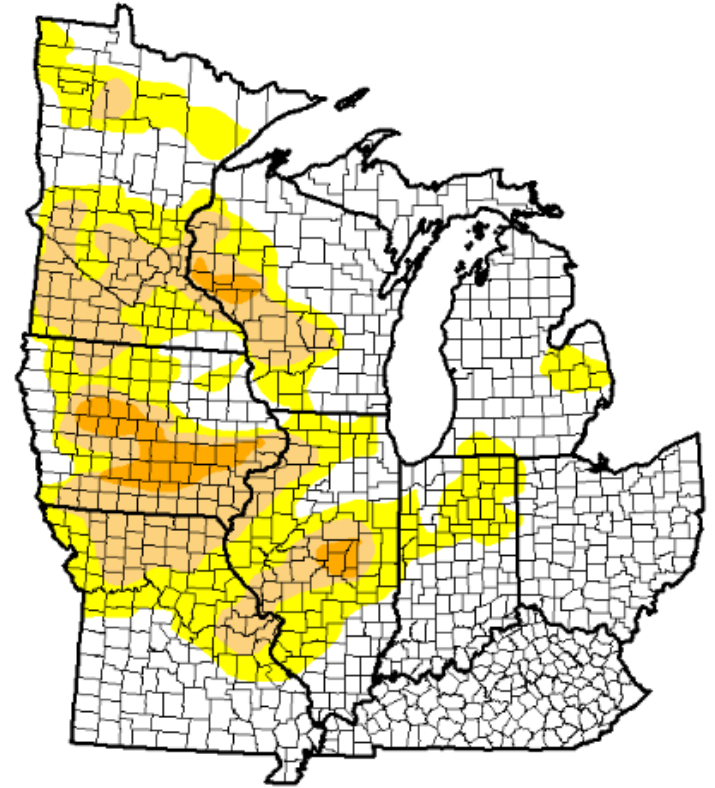
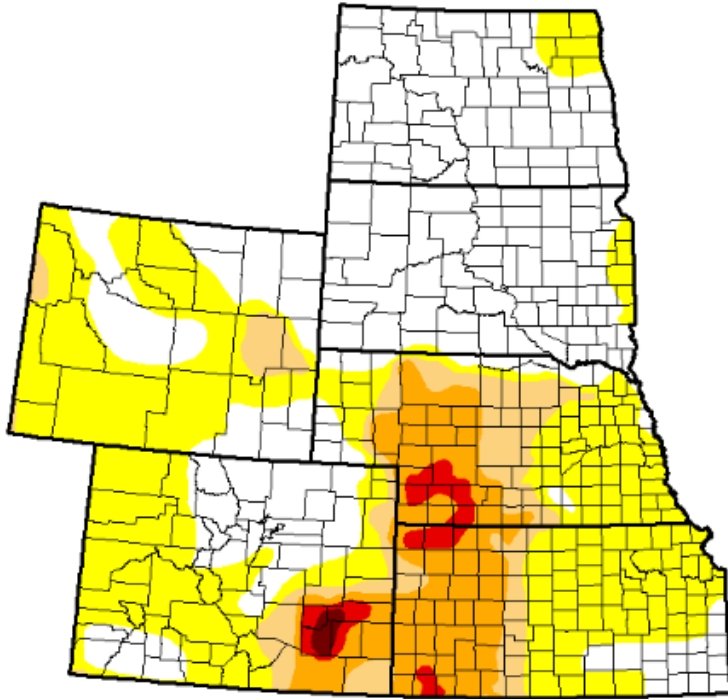


Nov 2012
76% D3-D4
20%

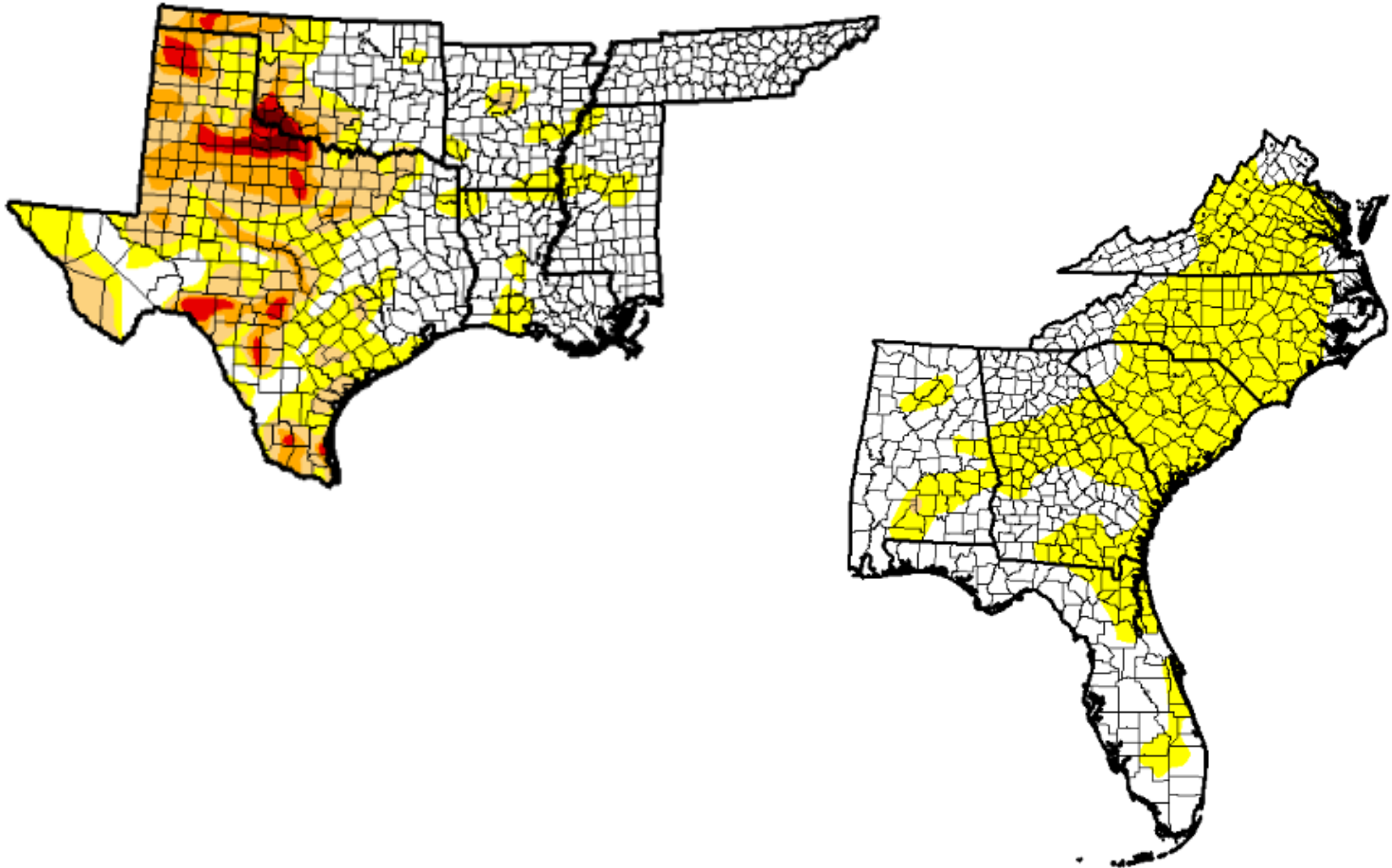
Nov 2013
56% D3-D4
4%



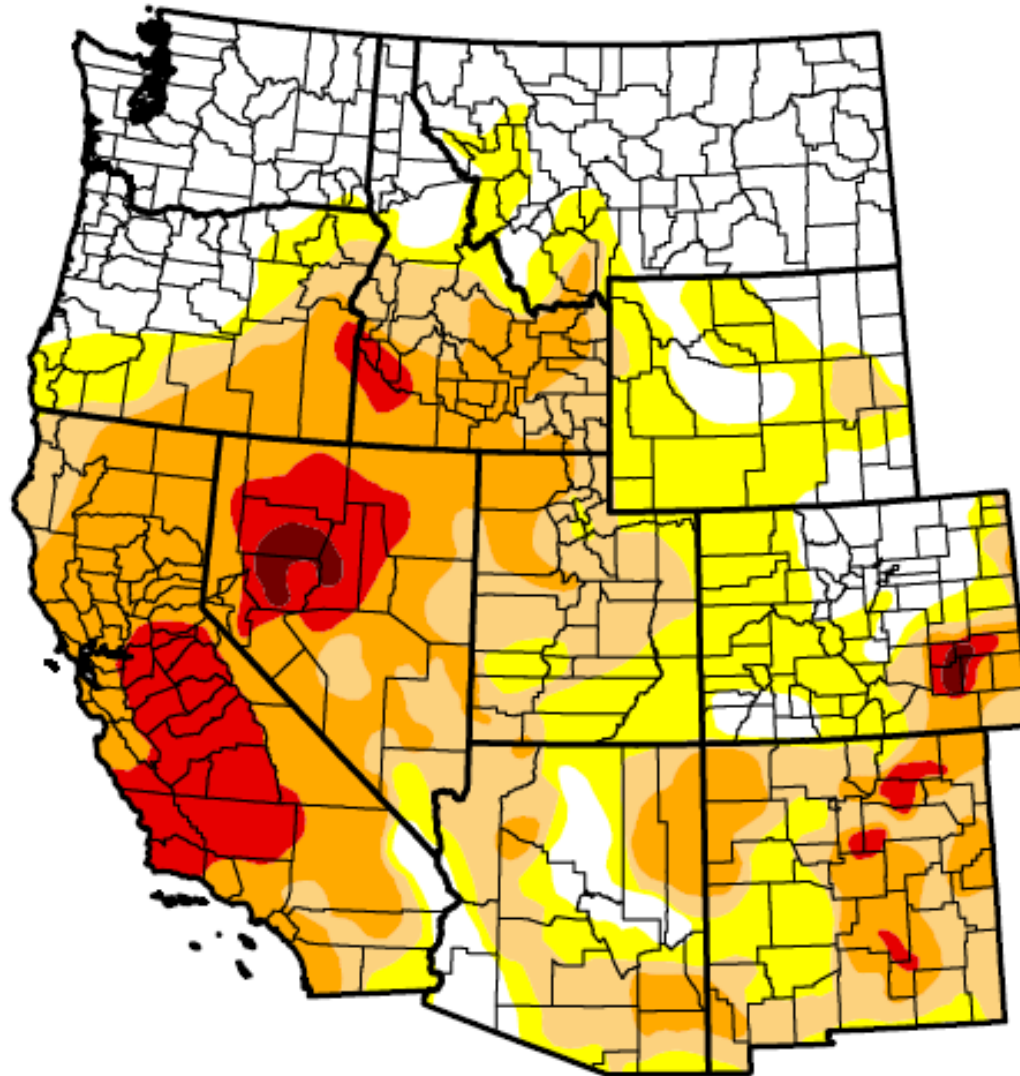
Late Nov Drought Monitor



Late Nov Drought Monitor



Late Nov Drought Monitor

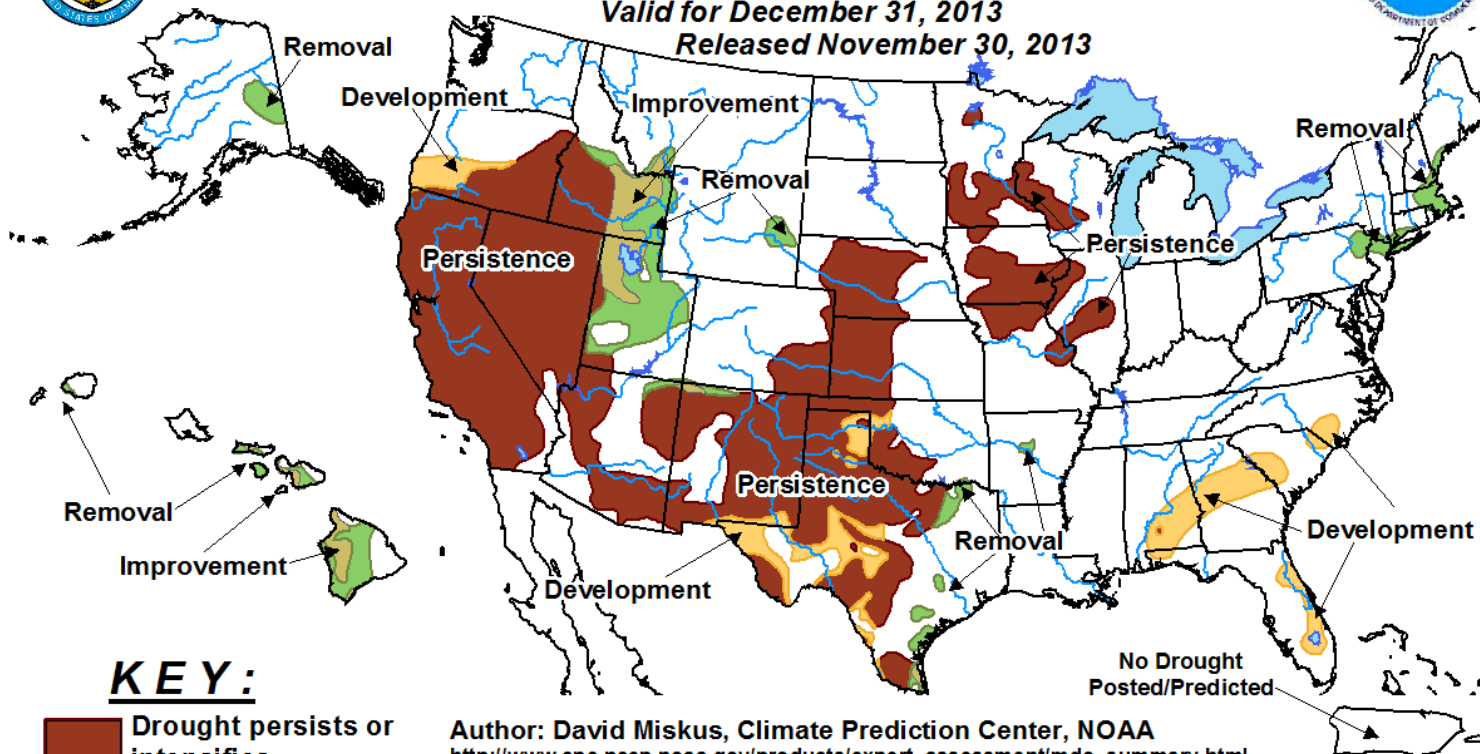


Drought Outlook





U.S. Monthly Drought Outlook Drought Tendency During the Valid Period

Valid for December 31, 2013

Released November 30, 2013



KEY:

-  Drought persists or intensifies
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely

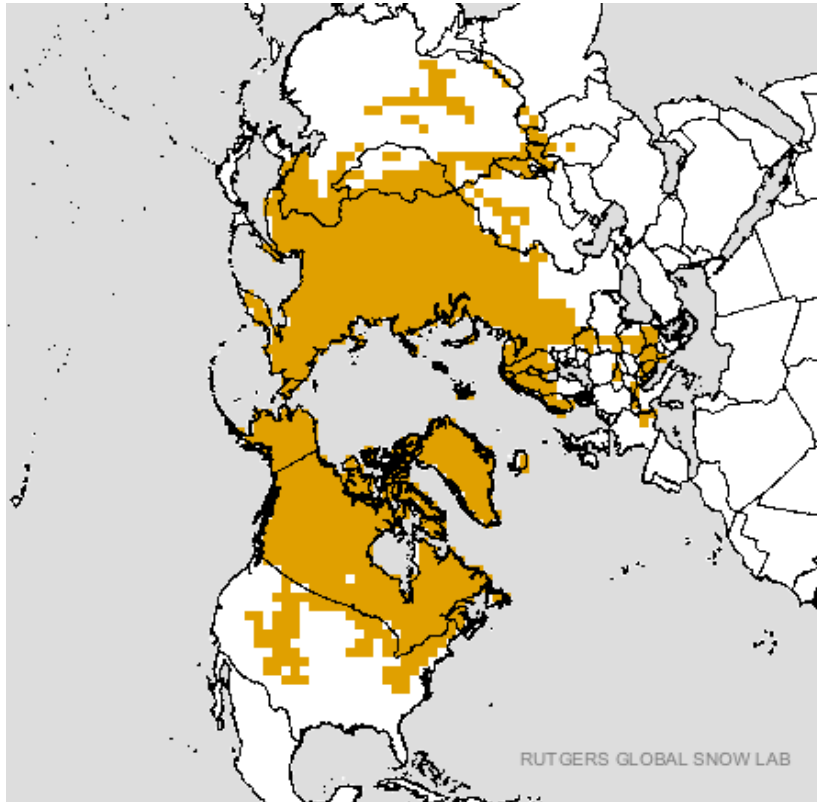
Author: David Miskus, Climate Prediction Center, NOAA
http://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.html

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor.

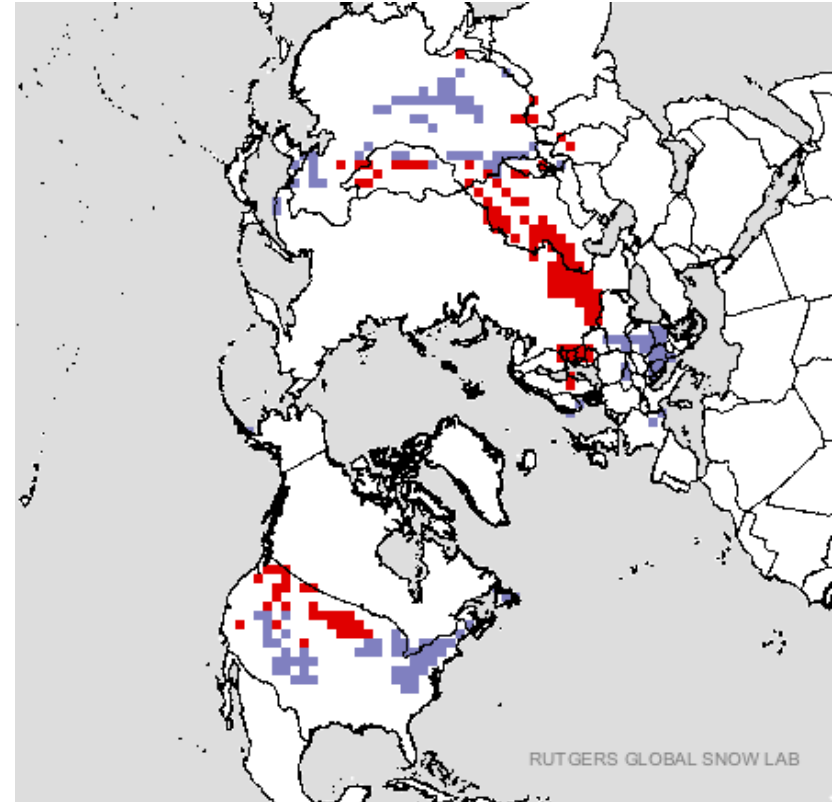
NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period although drought will remain. The green areas imply drought removal by the end of the period (D0 or none)

Snow Cover Late November

Coverage

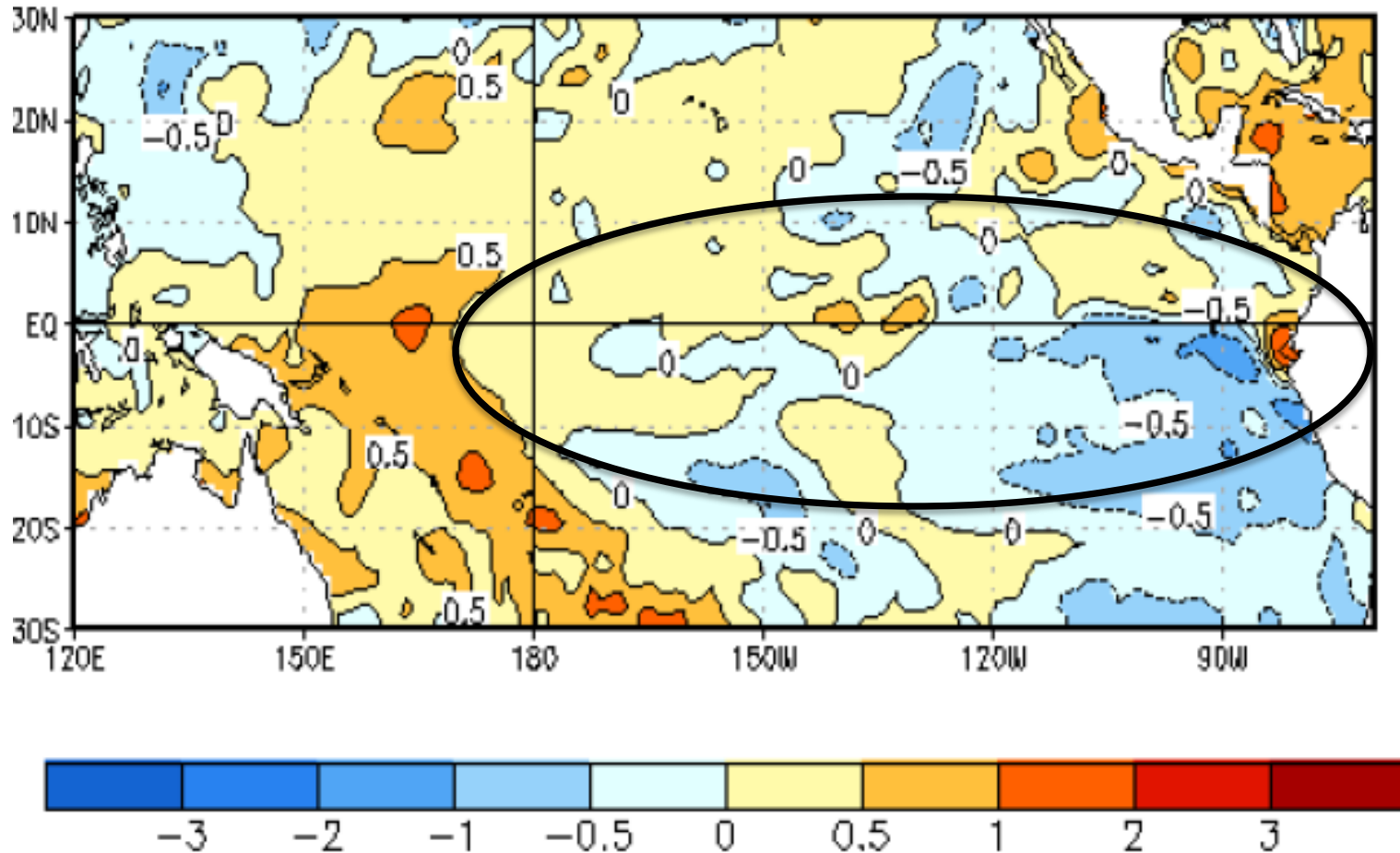


Versus Normal



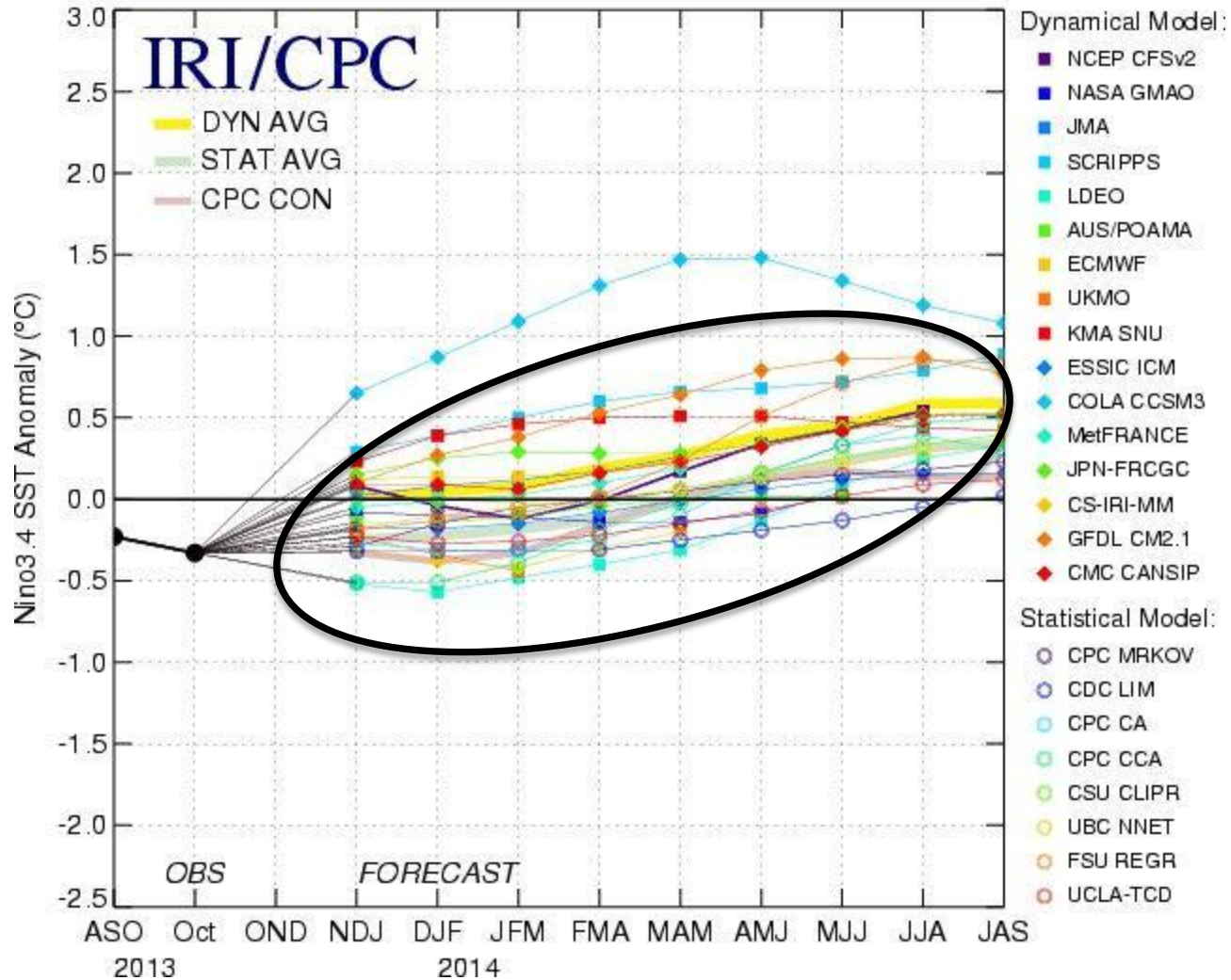
Pacific Temps--Neutral

Average SST Anomalies
3 NOV 2013 - 30 NOV 2013



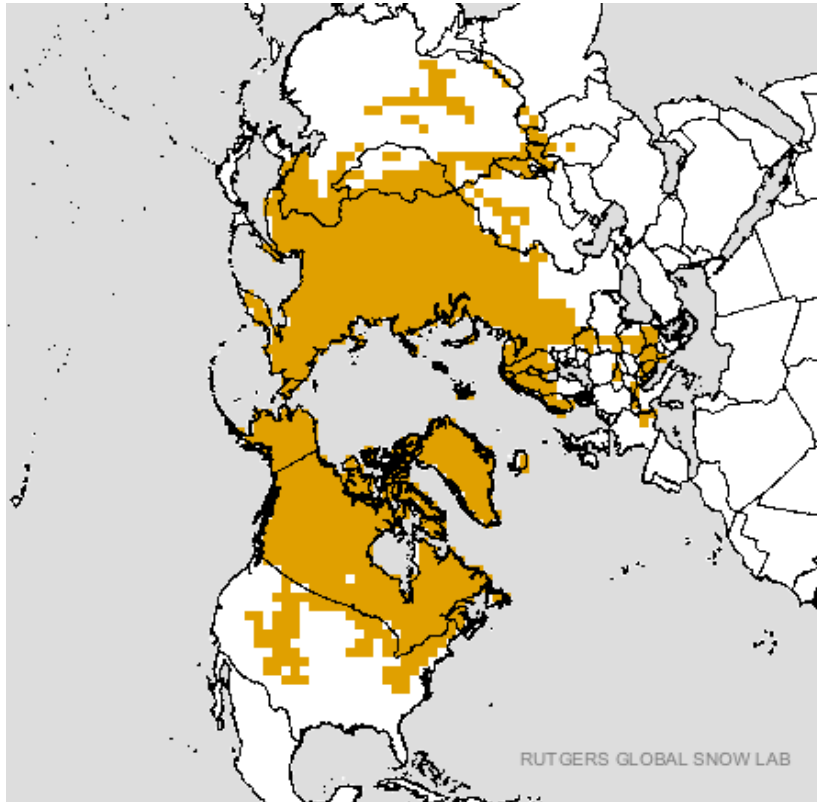
IRI—Weak El Nino Trend

Mid-Nov 2013 Plume of Model ENSO Predictions

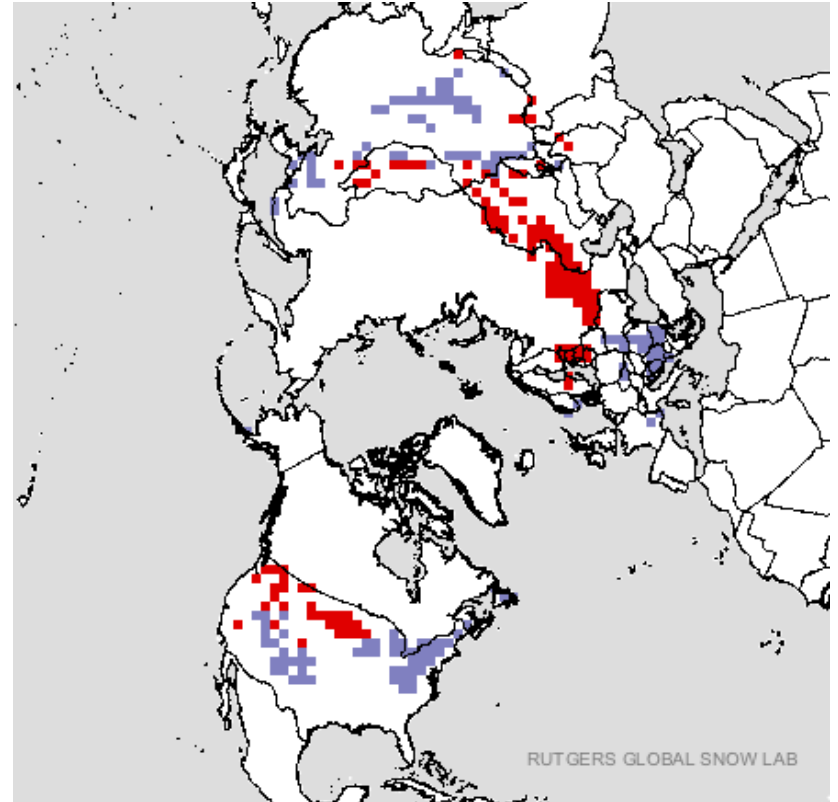


Snow Cover Late November

Coverage

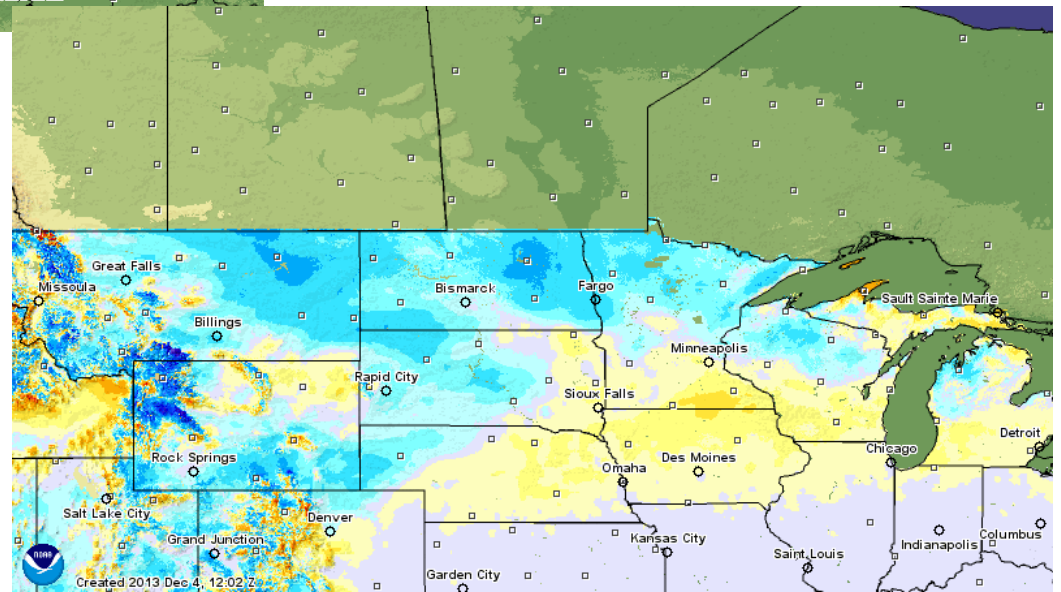
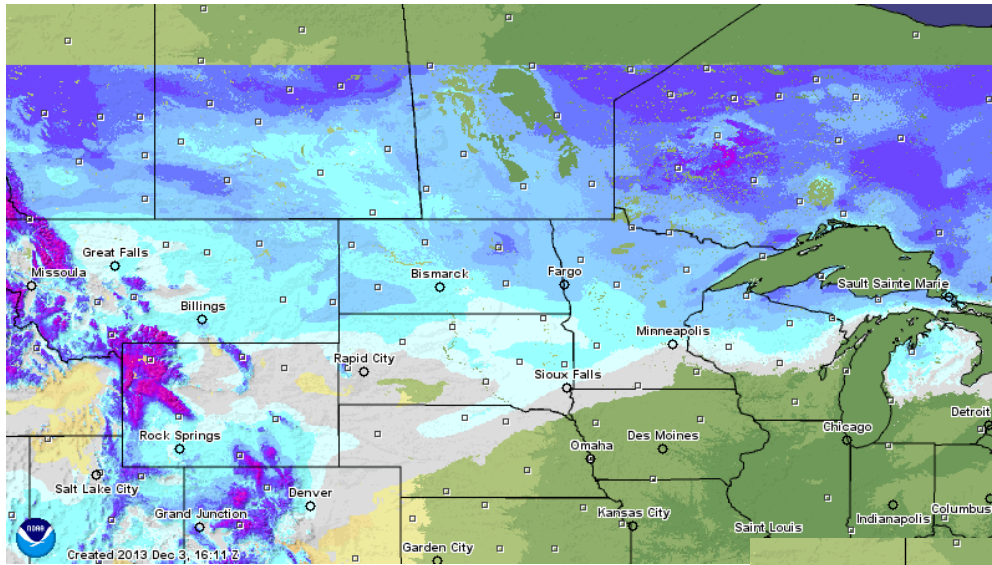


Versus Normal



Snow Cover

12/4/13 4-8" mostly



3-6" above normal NW
but 7-9" below normal
S Minnesota

Australia SOI



SOI values for 03 Dec 2013

Average for last 30 days	8.8
Average for last 90 days	4.6
Daily contribution to SOI calculation	-10.7

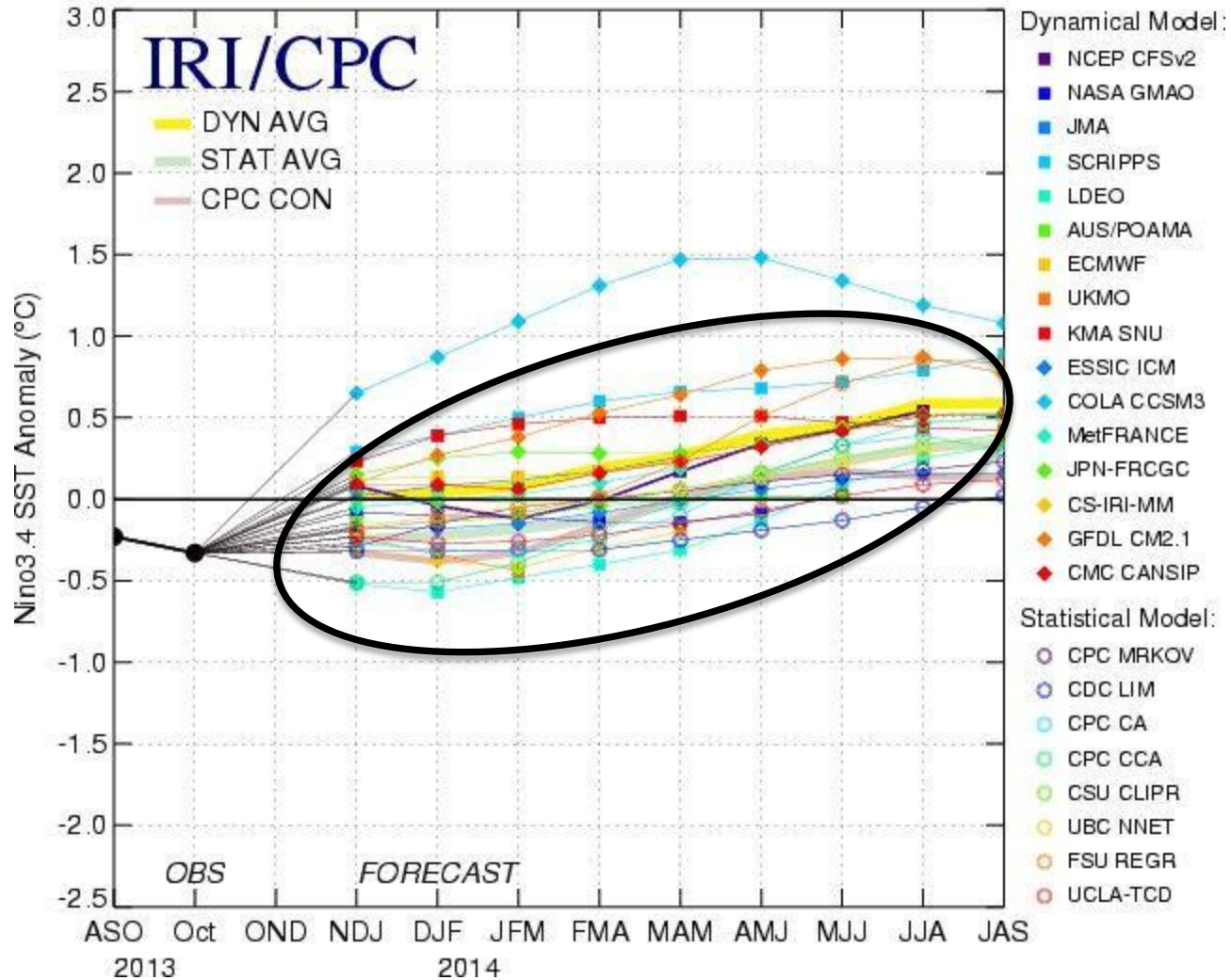
Monthly average SOI values

September	4.3
October	-2.1
November	10.1

Back and forth—officially Neutral.

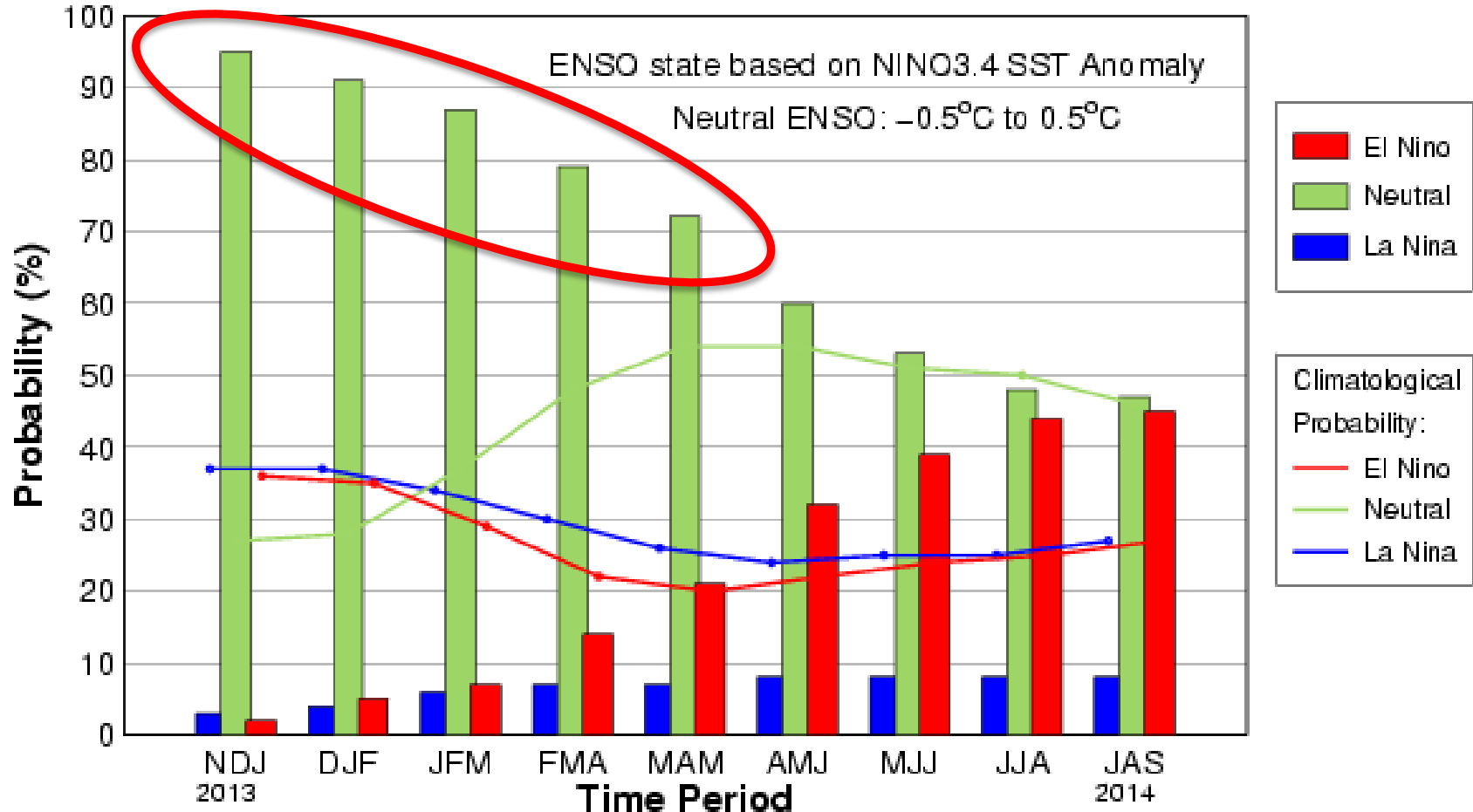
IRI—Weak El Nino Trend

Mid-Nov 2013 Plume of Model ENSO Predictions



IRI—Weak El Nino Trend

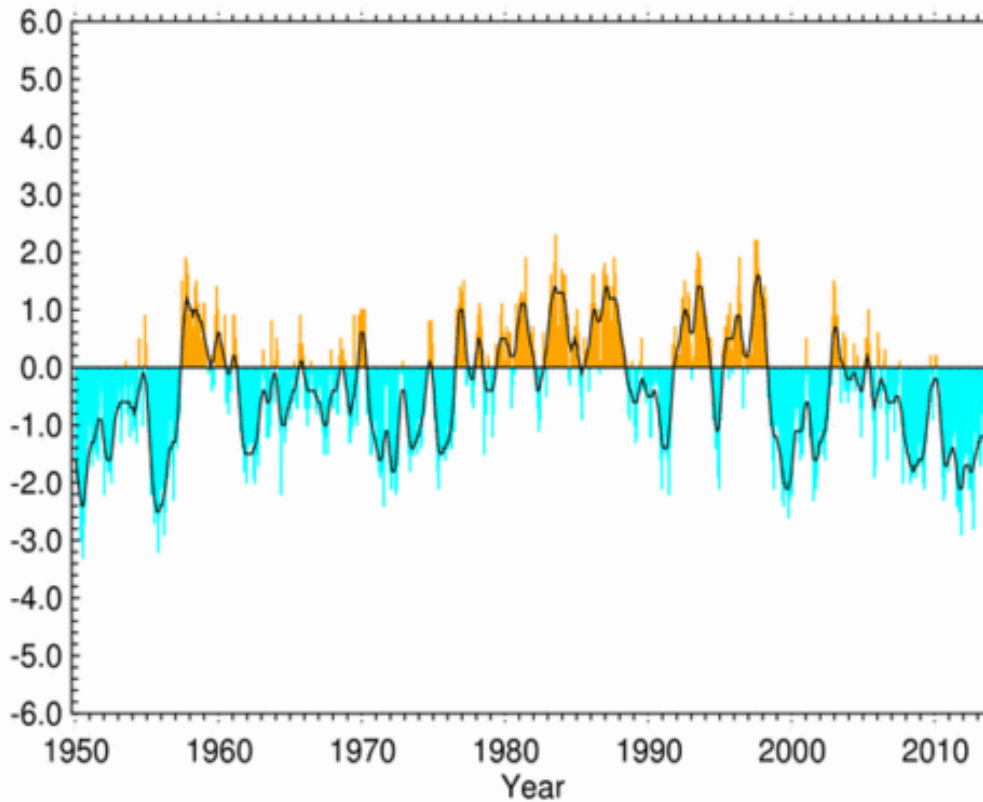
Early-Dec CPC/IRI Consensus Probabilistic ENSO Forecast



At least 70% Neutral call through Spring.

Pacific Decadal Oscillation

Pacific Decadal Oscillation (PDO)

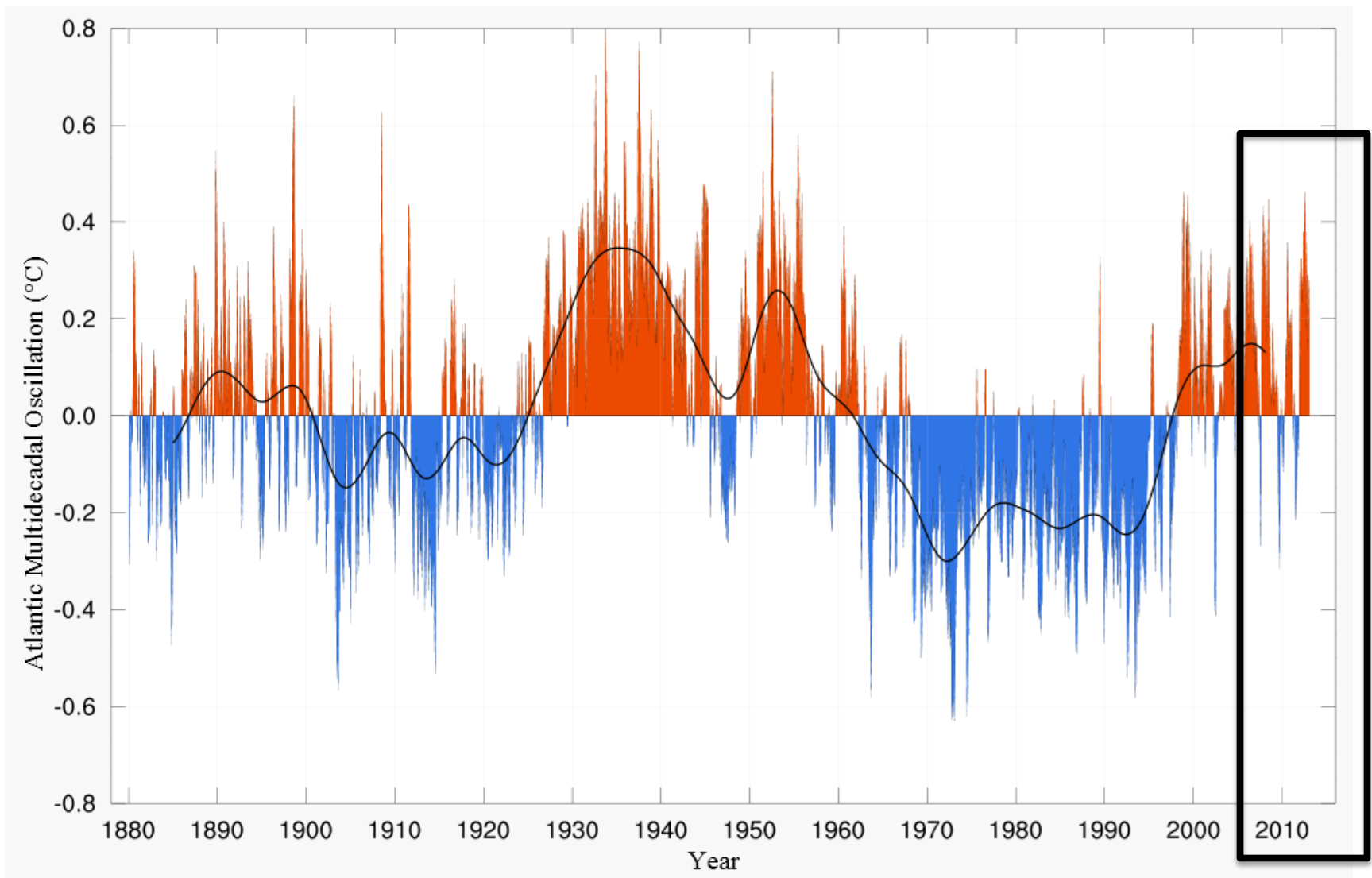


Negative

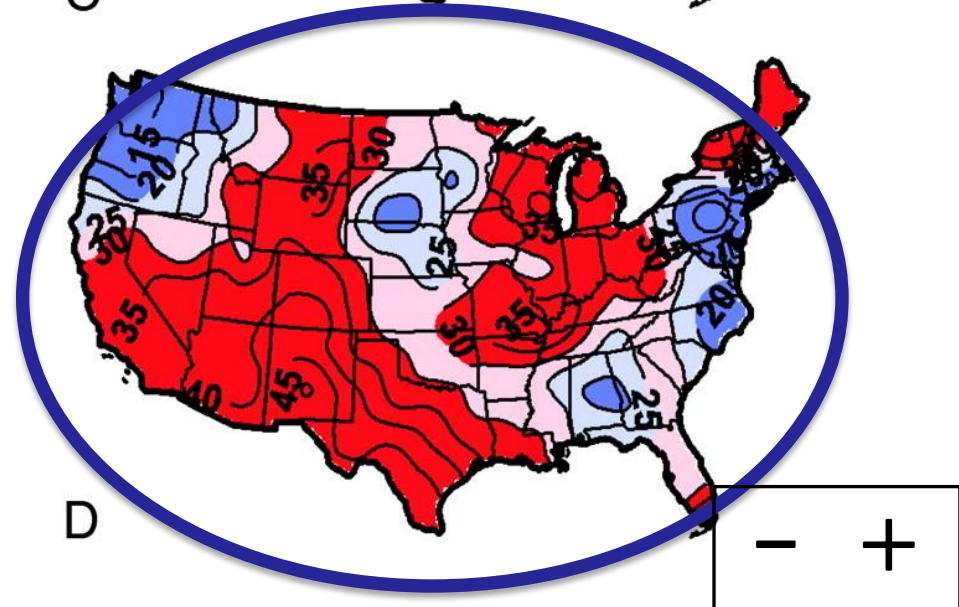
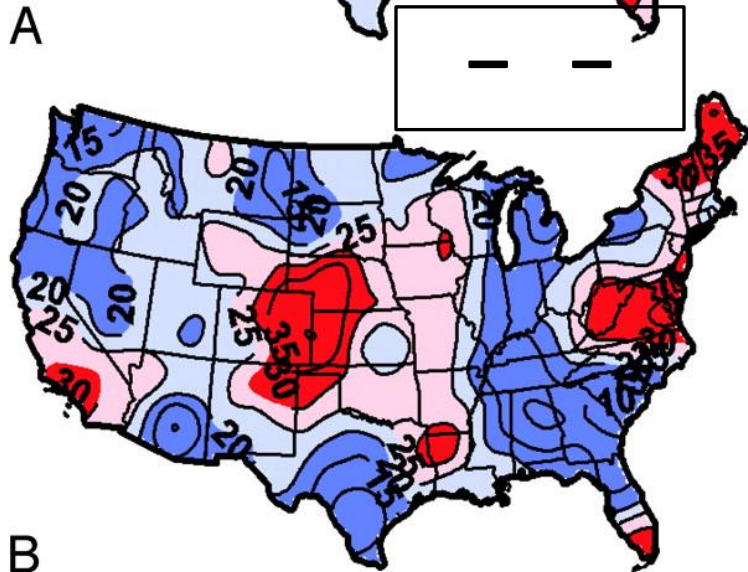
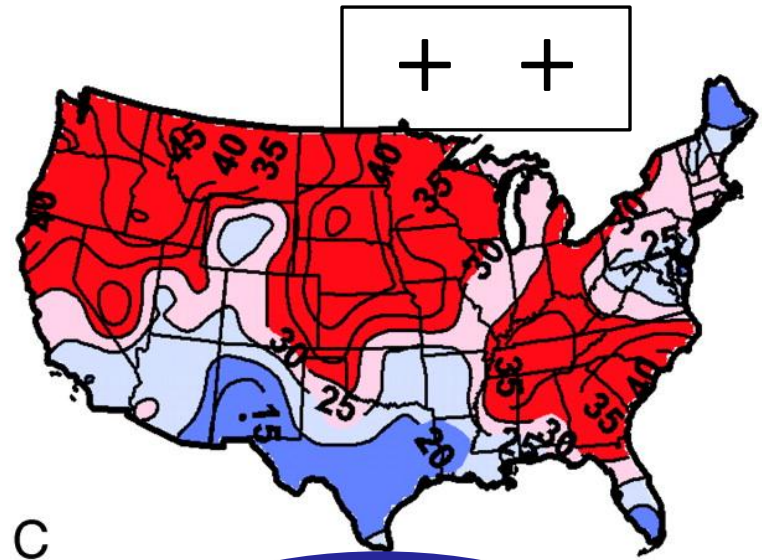
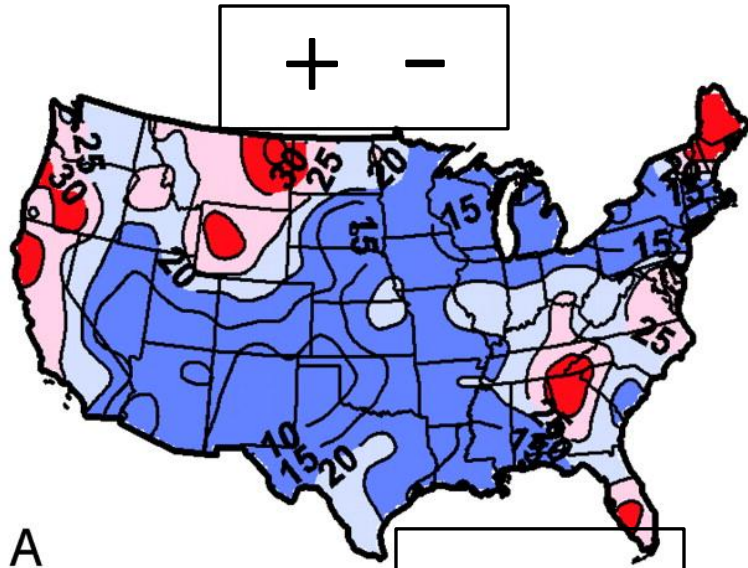
—
25pt binomial filter

National Climatic Data Center / NESDIS / NOAA

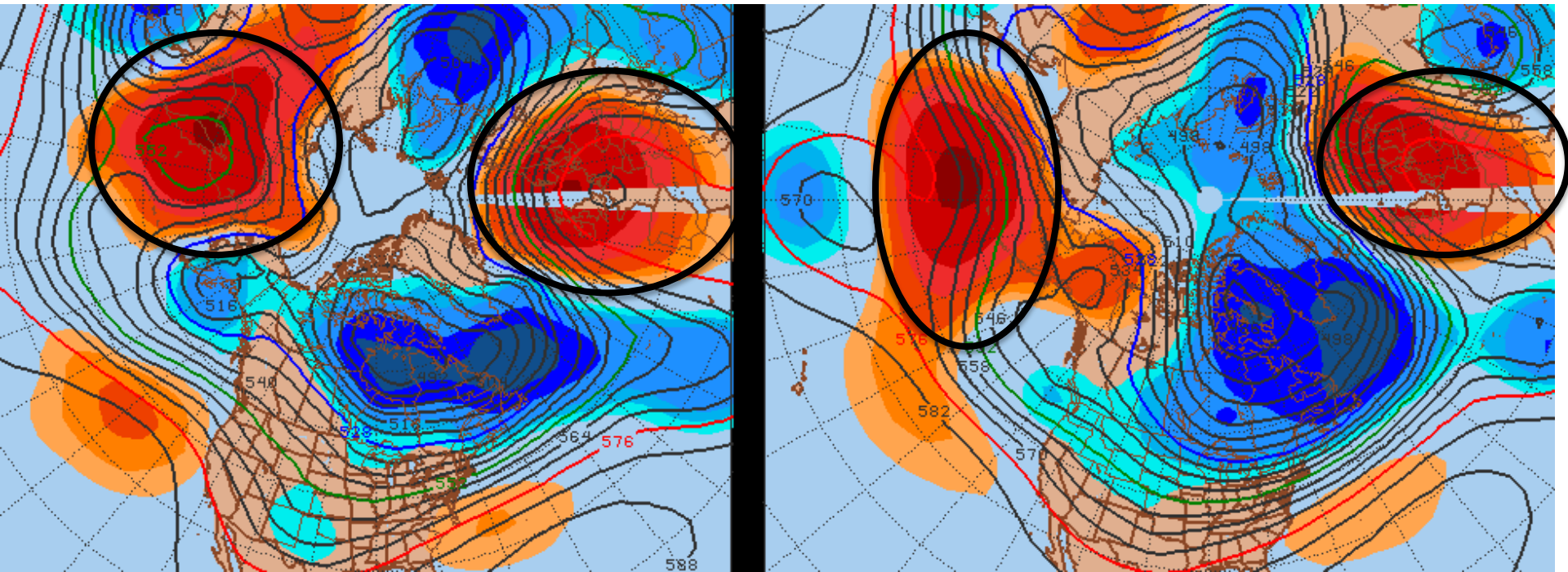
Atlantic Multi-Decadal Oscillation



PDO-AMO Precip Impact



High-Latitude Blocking High

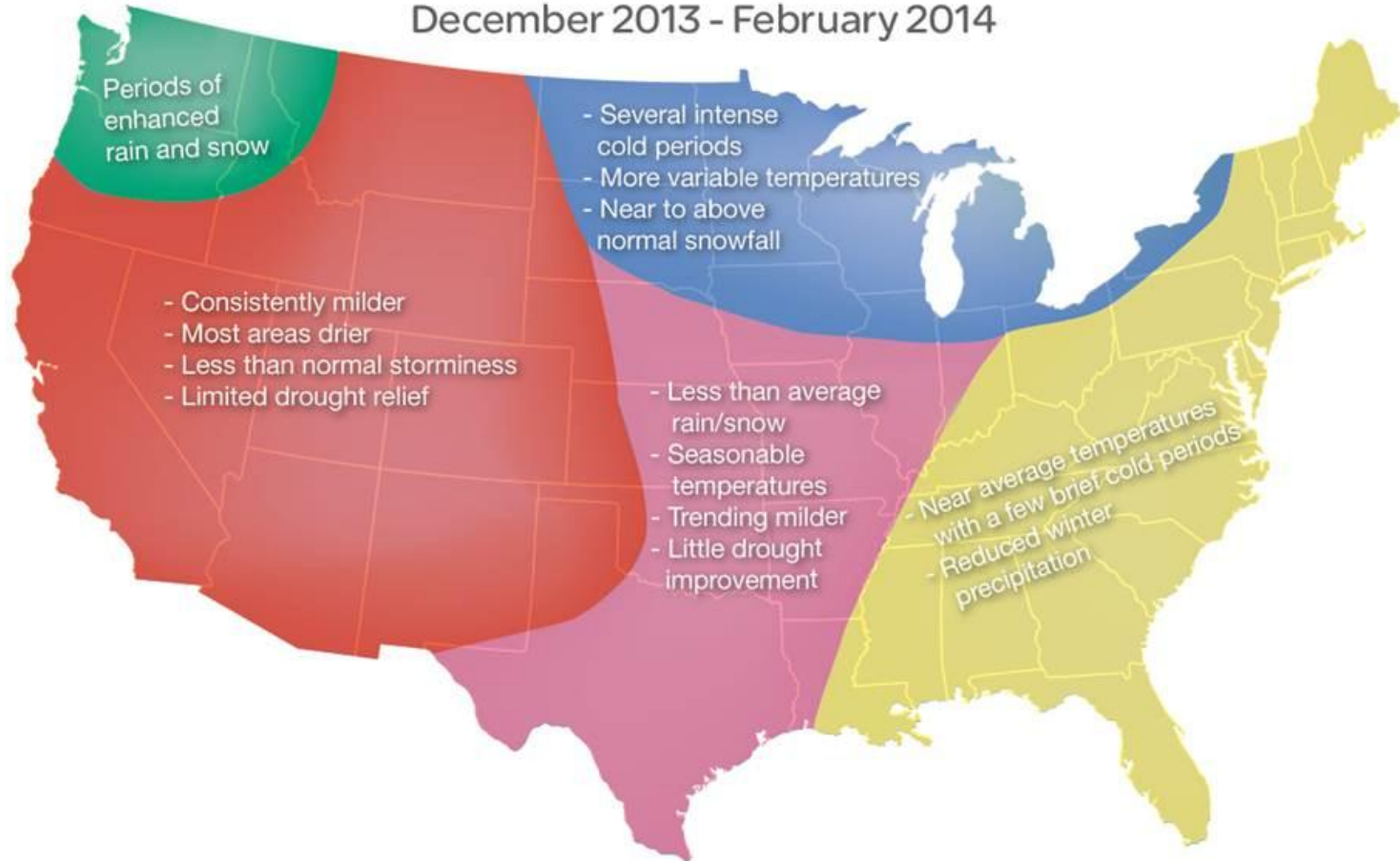


Blocking highs far north re-route jet stream farther south. Influence greater when Pacific is neutral.

DTN Winter Forecast

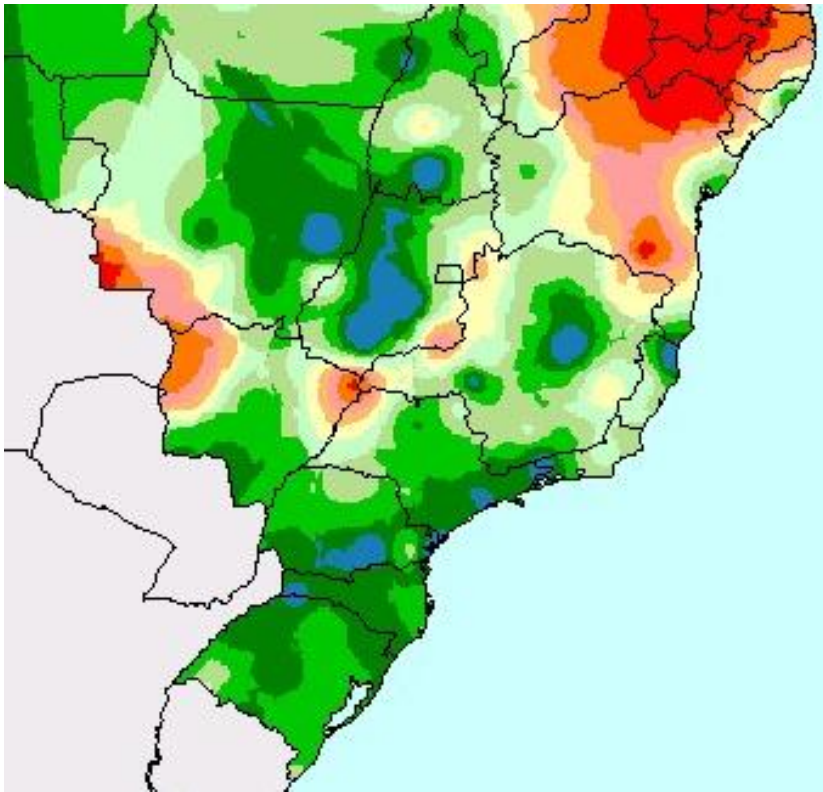
Winter Outlook

December 2013 - February 2014

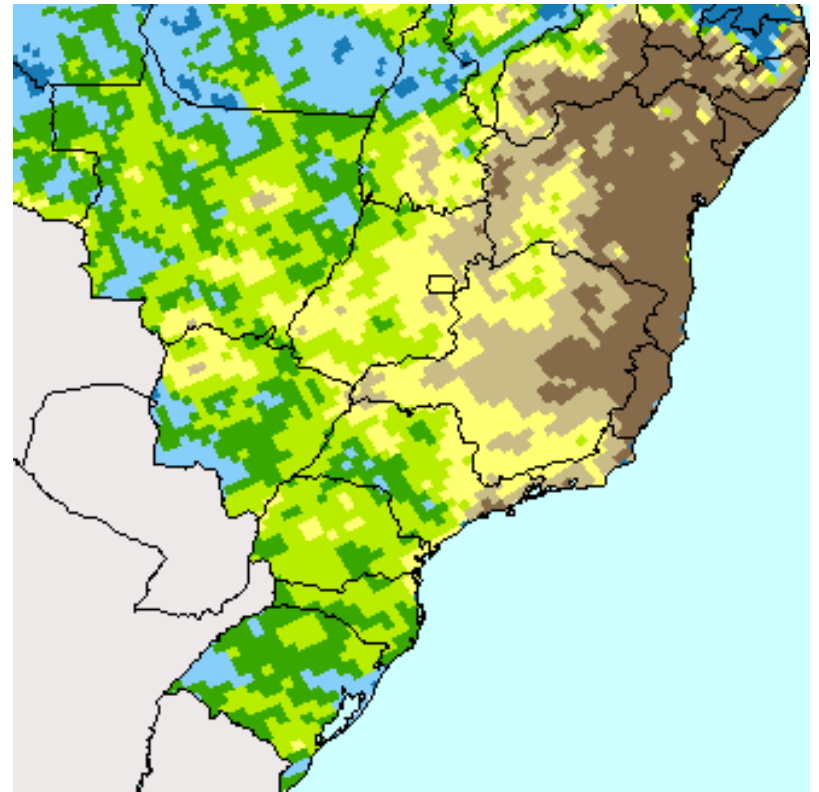


Brazil

Soil Moisture

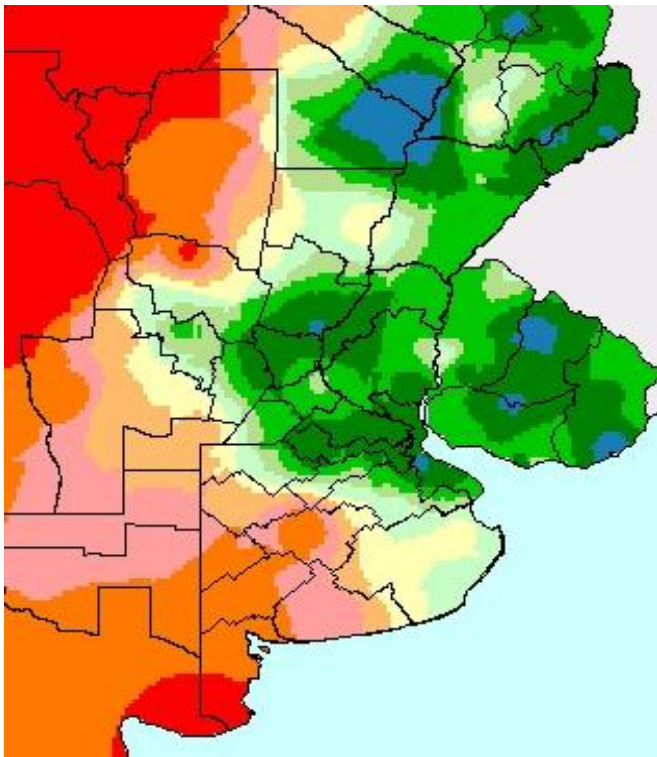


Precip % Normal

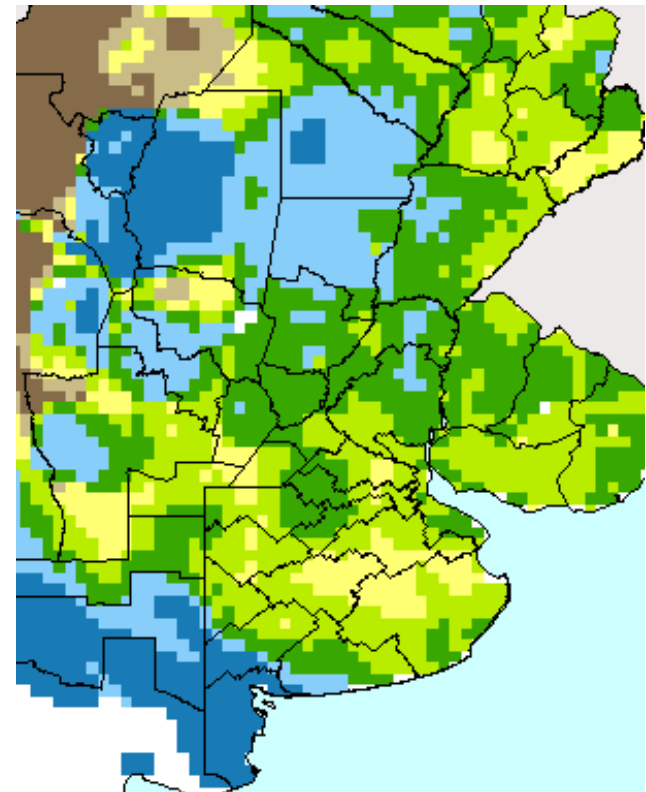


Argentina

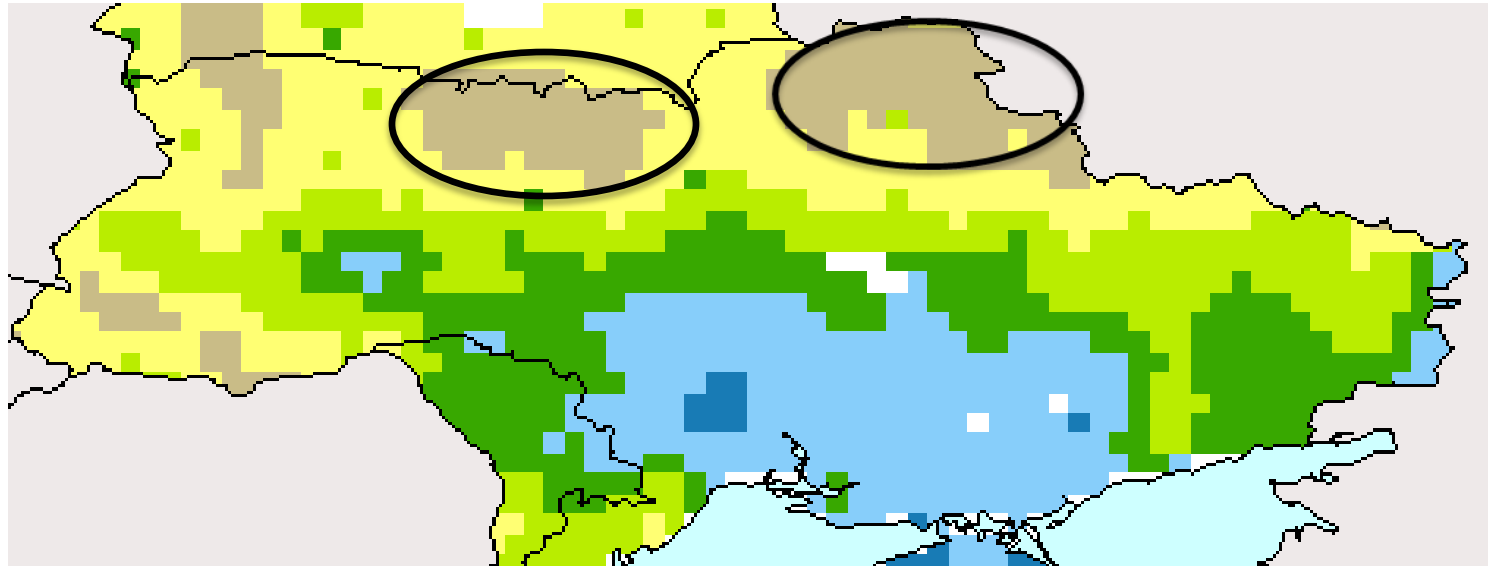
Soil Moisture



Precip % Normal

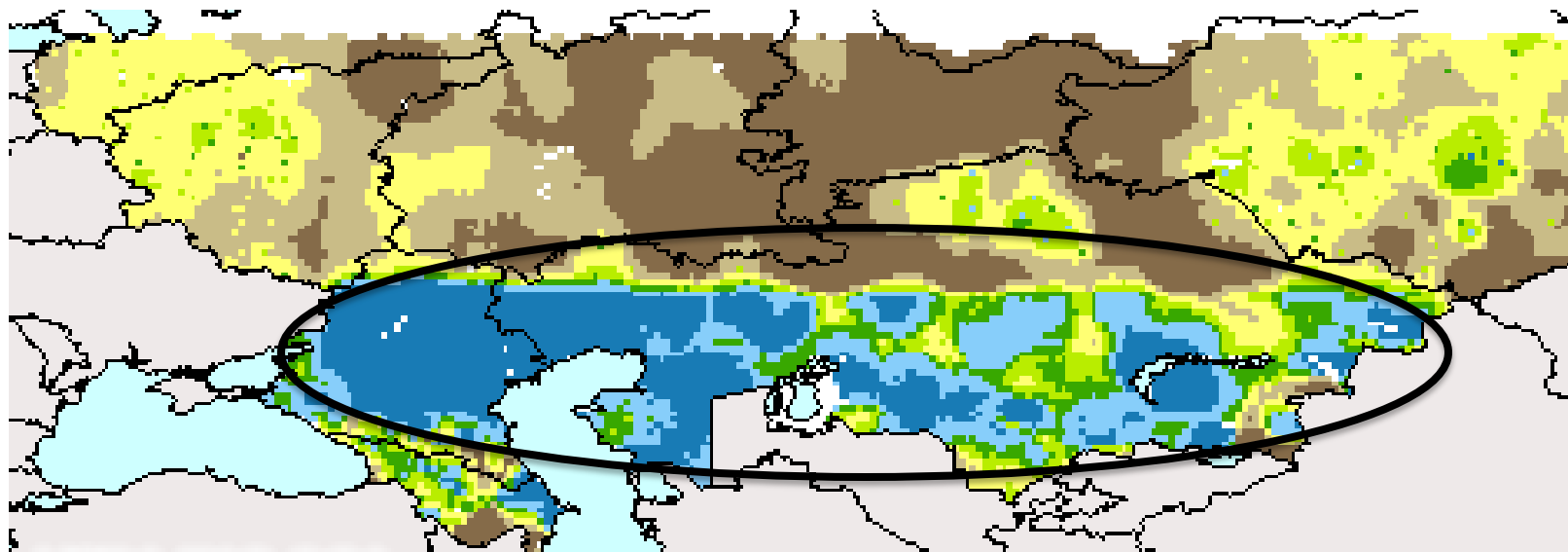


Ukraine 2013 Precipitation



Very few dry areas. Over 30 pct higher production.

Russia 2013 Precipitation



Much improved in south half over 2012.

Ag Summit

Thank You!

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