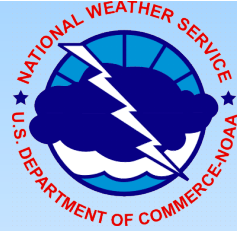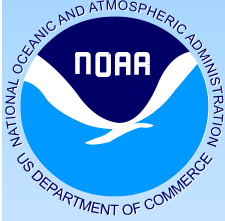# Texas/Oklahoma Climate Extremes Workshop

Ft. Worth, TX
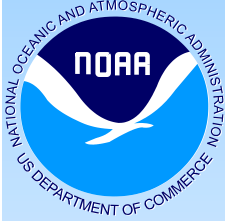
October 13, 2015

*The Challenges of Seasonal Forecasting*

The Challenges of Seasonal Forecasting

- "Weather people cannot even get tomorrow's forecast right. How can they get it right 3 to 6 months from now"?

- Another issue is public understanding of probabilistic forecasts vs. deterministic forecasts.

- However, atmospheric and coupled forecast system models continue to evolve.
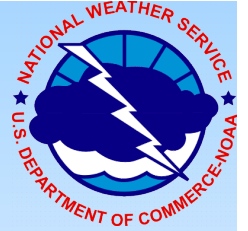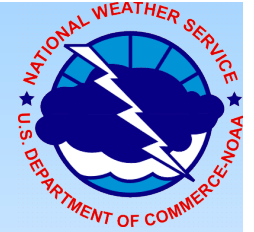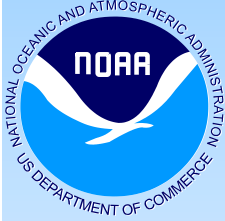
How do you Solve this Problem?
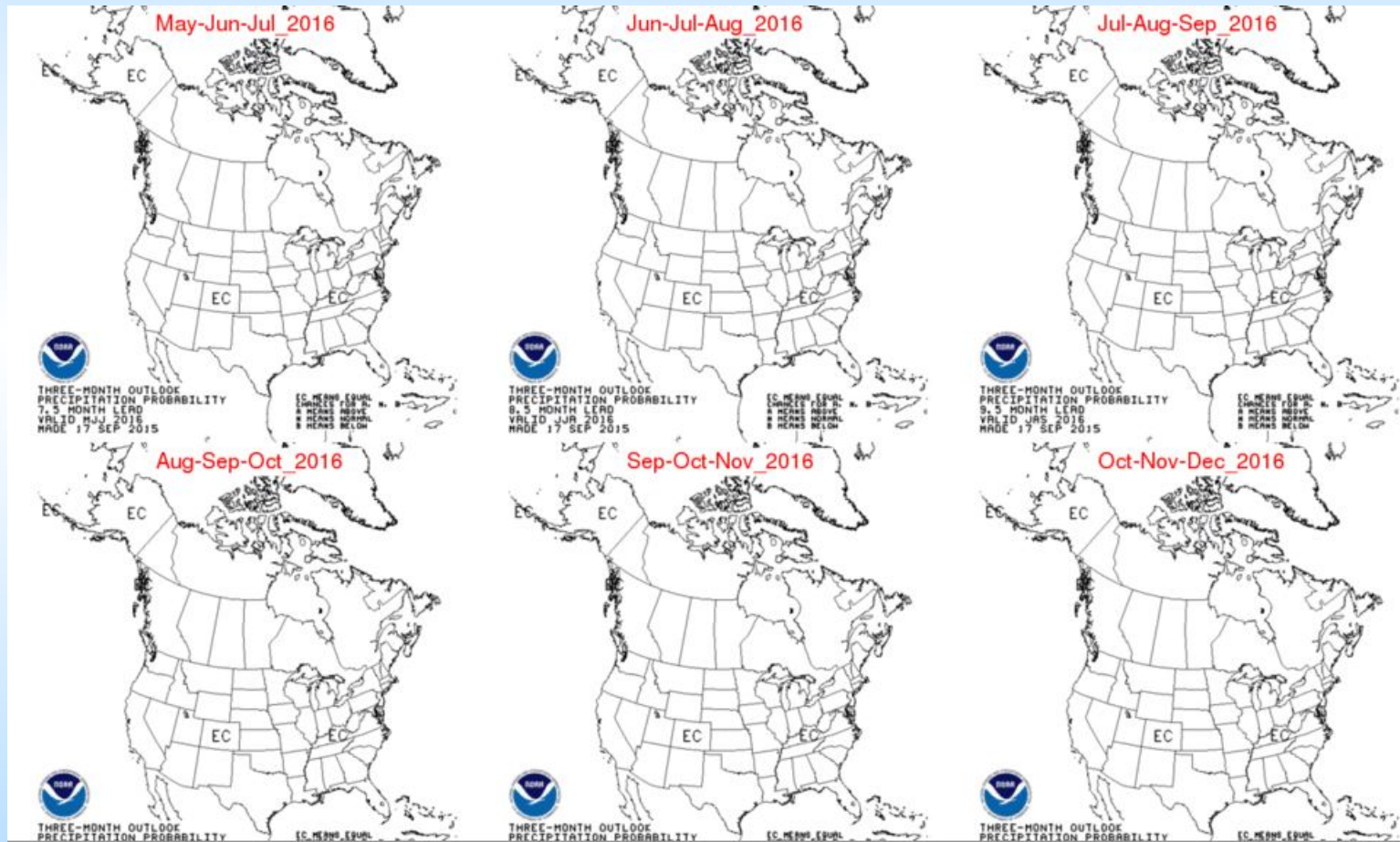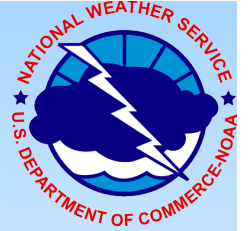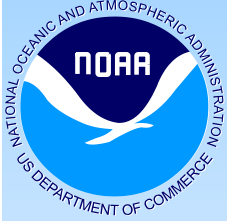
There are tools that are available.

- Trends and Statistical Models.

- Soil moisture data.

- Composites from previous analog years.

- Atmospheric models and new coupled models which factor in both atmospheric and oceanic predictors.

- Ensemble Forecasts.

- Seasonal to semi-annual to yearly signals.
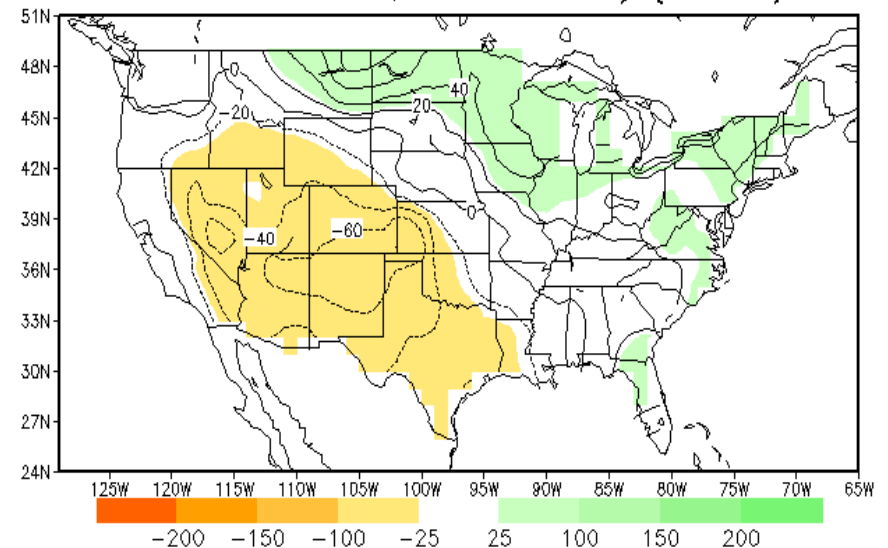
- Decadal signals.
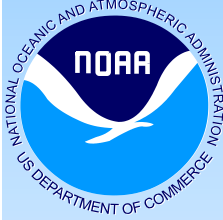
Statistical Tools.
Optical Climate Normals (OCN)

hmgz temperature OCN (15 year) forecast for AMJ
base 1981–2010; units: anomaly (sdX100)

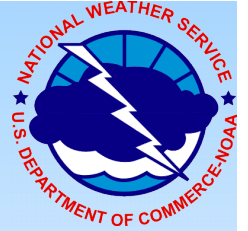Huug van den Dool, CPC/NCEP/NWS/NOAA; untampered OCN; data thru Feb 2015
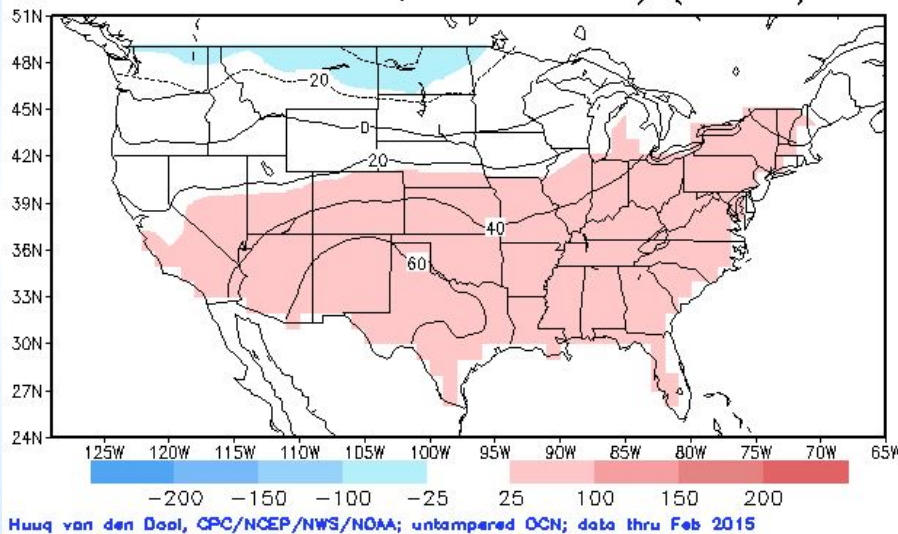
hmgz precipitation OCN (15 year) forecast for AMJ
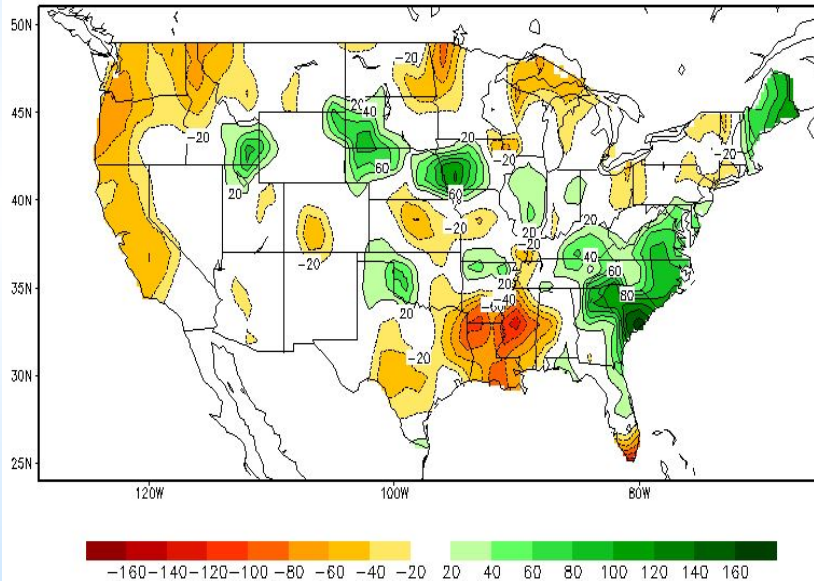base 1981–2010; units: anomaly (sdX100)

**Compares the most recent
15 year trend to the
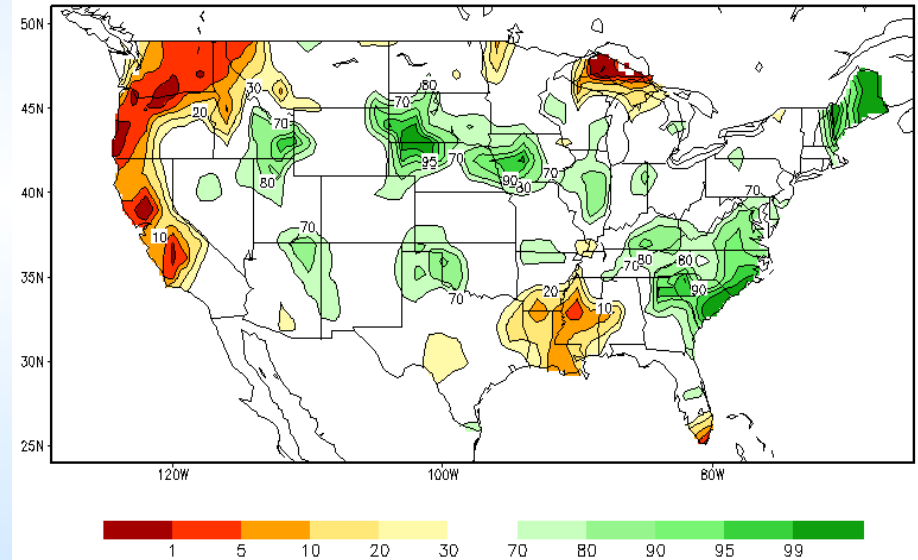1981-2010 30 year normal.**
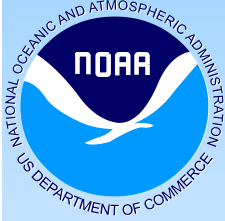
Soil Moisture Anomalies and Percentiles

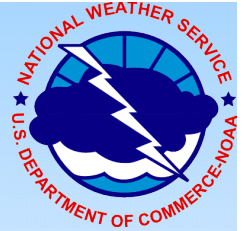Calculated Soil Moisture Anomaly (mm)
OCT 04, 2015
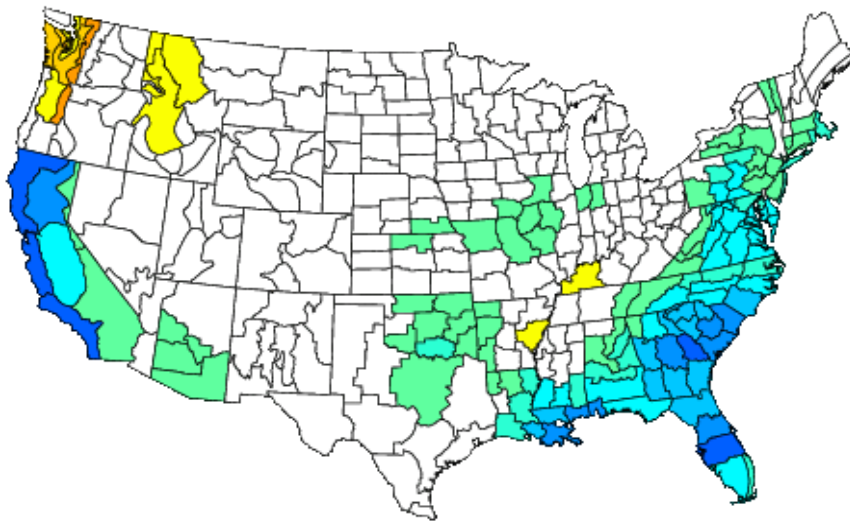
Calculated Soil Moisture Ranking Percentile
OCT 04, 2015

Can help one make weekly to seasonal temperature or precip forecasts based on ensuing atmospheric impacts
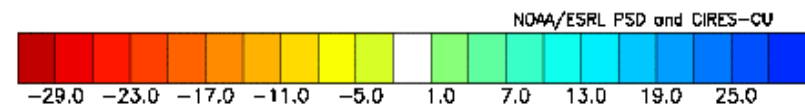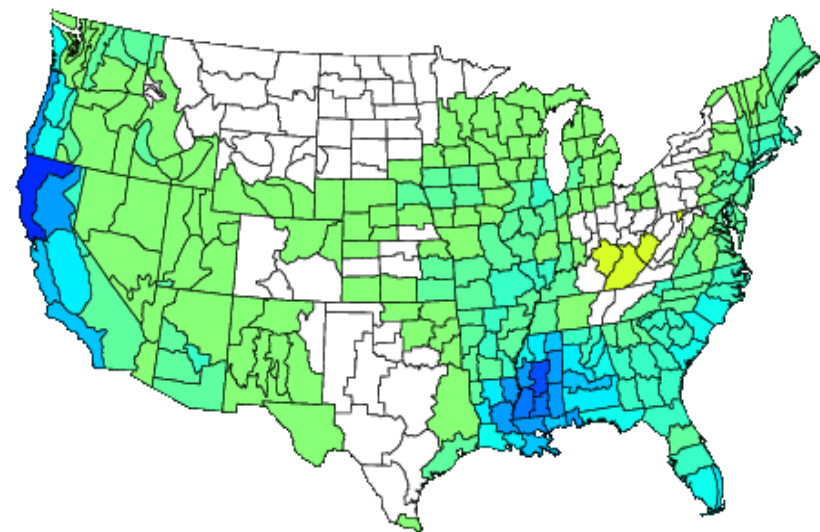
Composite Forecasts from Prior Analog Years

NOAA/NCDC Climate Division Precipitation Anomalies (in)
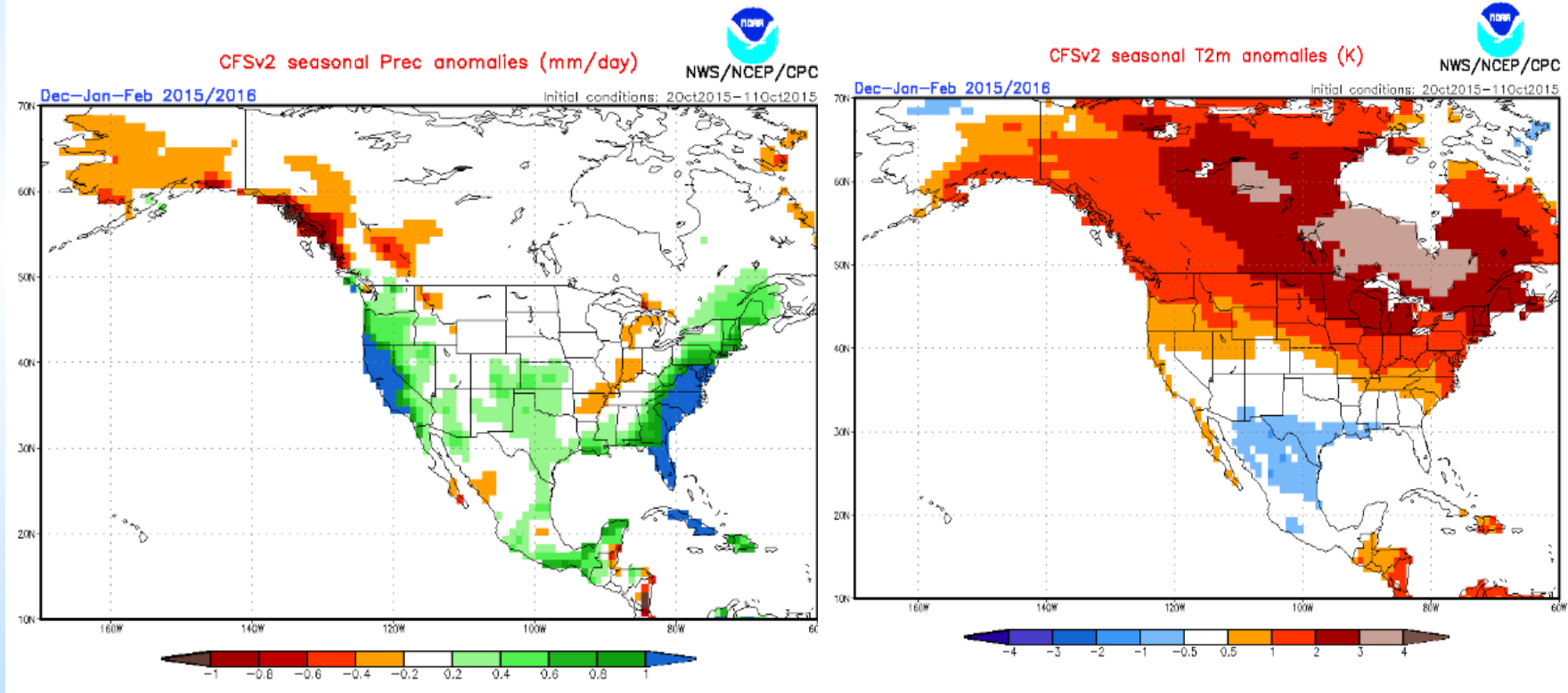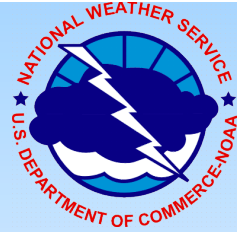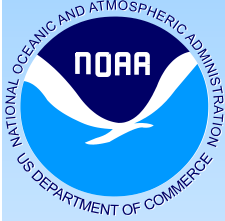Nov to Apr 1997-98
Versus 1981-2010 Longterm Average

NOAA/NCDC Climate Division Precipitation Anomalies (in)
Nov to Apr 1982-83
Versus 1981-2010 Longterm Average

NOAA/ESRL PSD and CIRES-CU
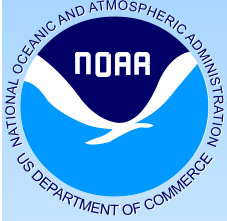
NOAA/ESRL PSD and CIRES-CU
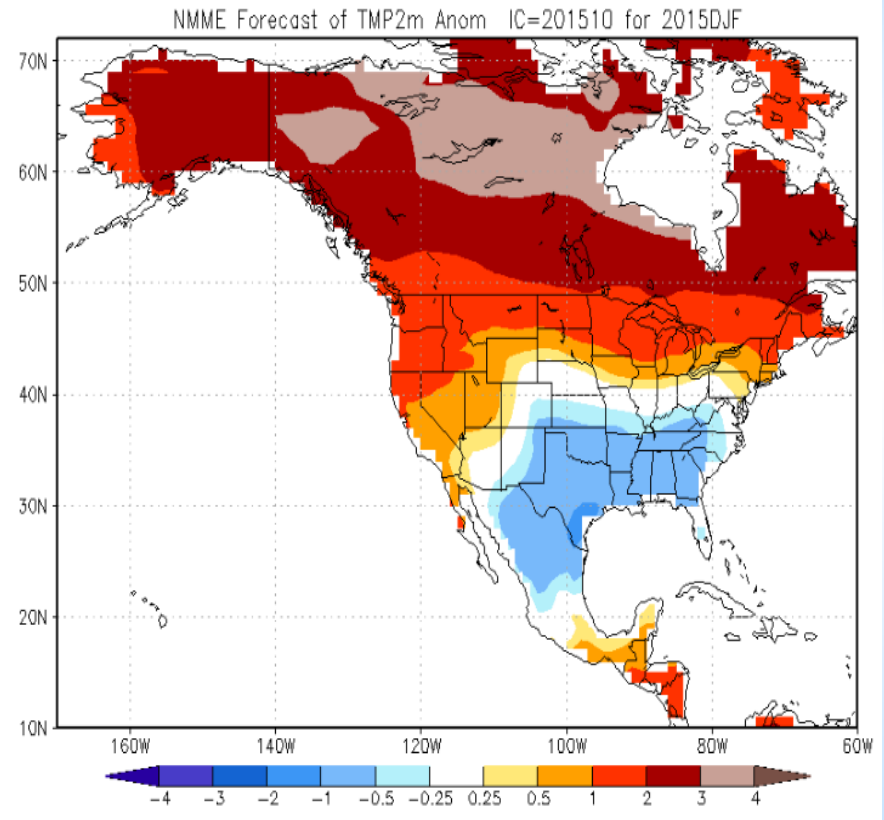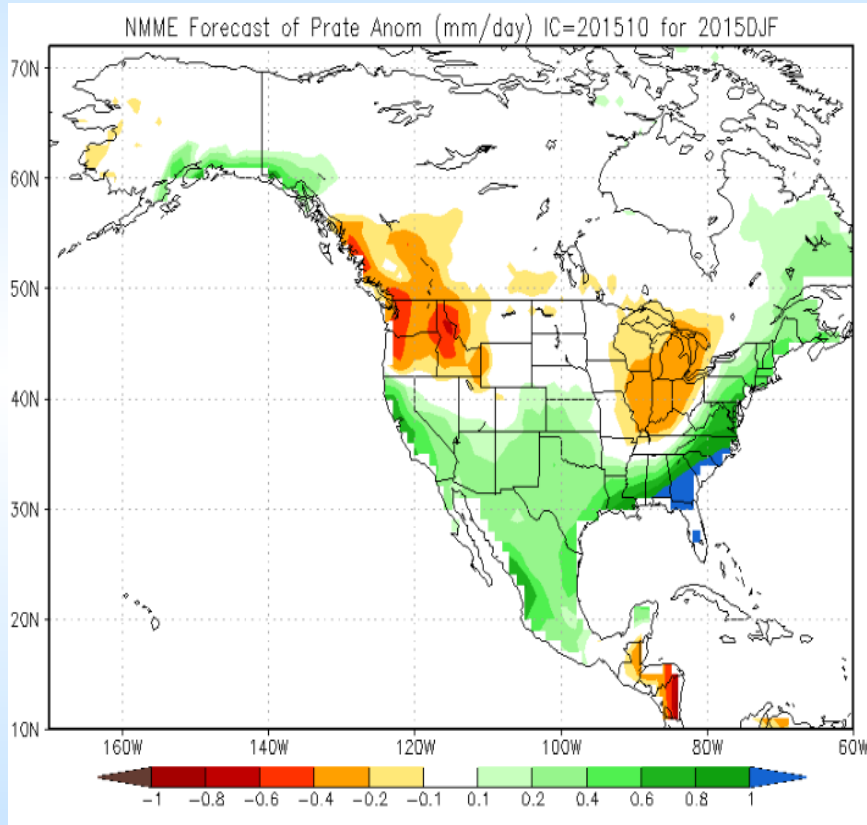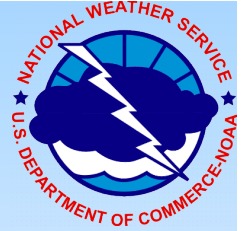
1997-1998

1982-1983

Coupled Forecast Models which Account for both Sea Surface and Atmospheric Conditions.
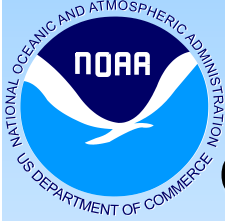

Dec/Jan/Feb 2015/16 precipitation (left) and Temperature anomalies from the NOAA Coupled Forecast System Version 2 (CFSv2).
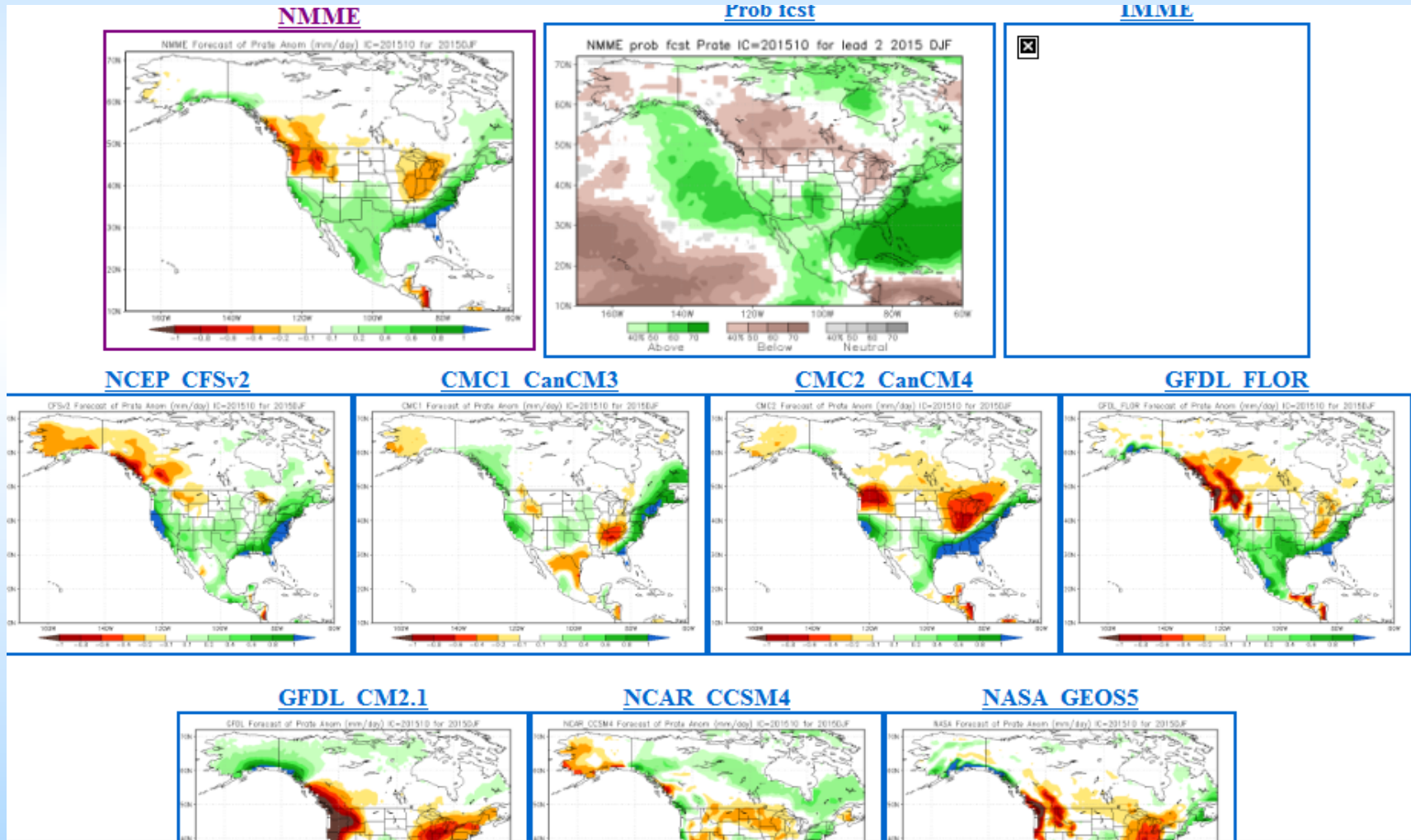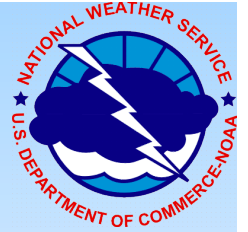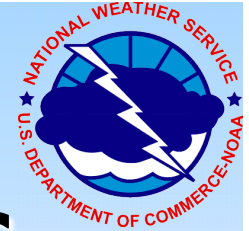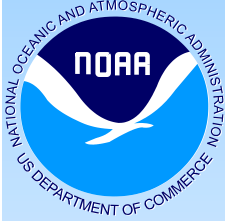
National Multi-Model Ensemble (NMME).

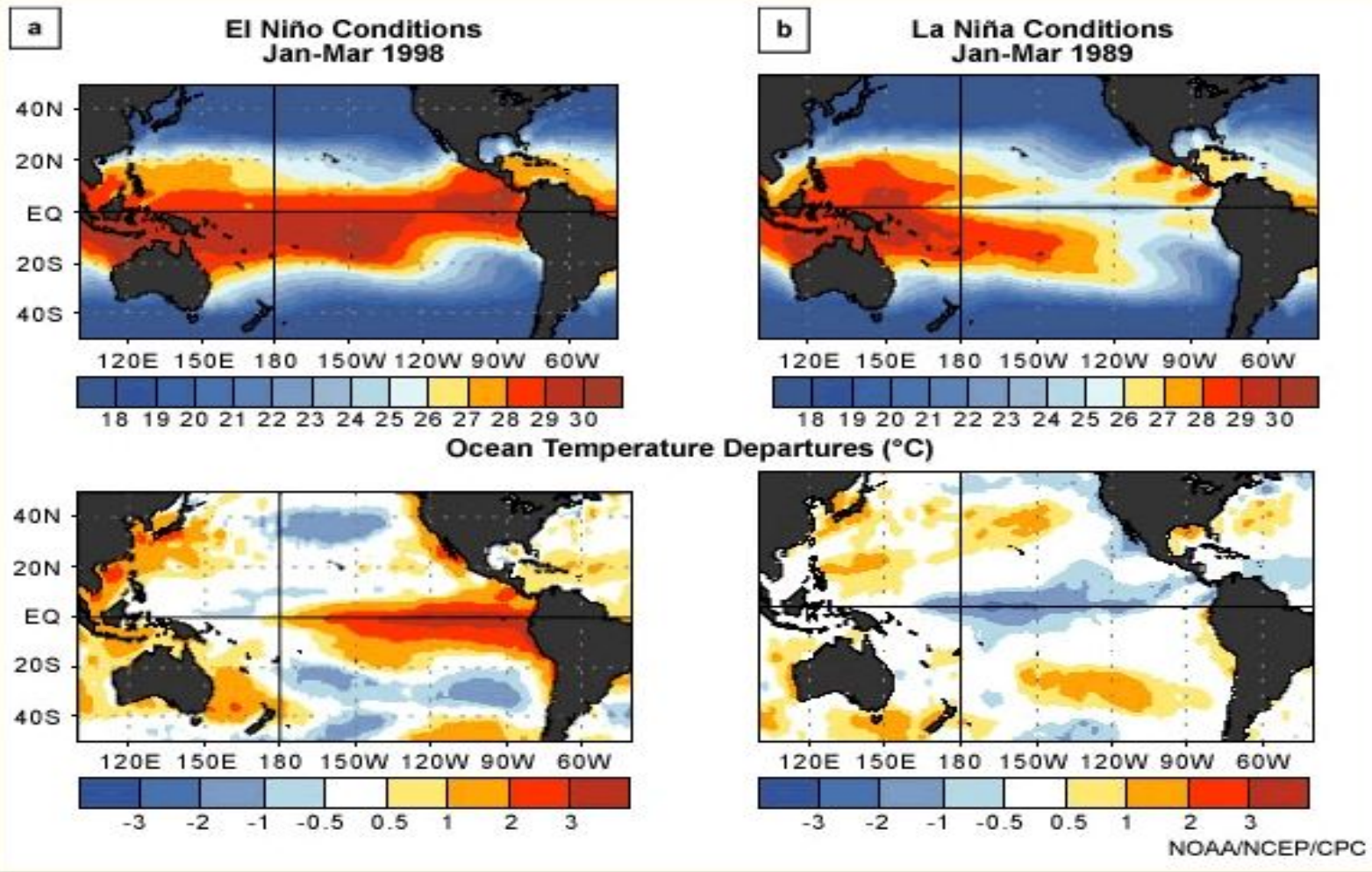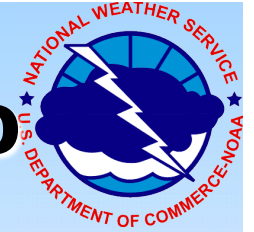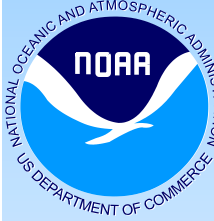**Dec/Jan/Feb 2015/2016 precipitation (left) and temperature forecast from the NOAA NMME.**

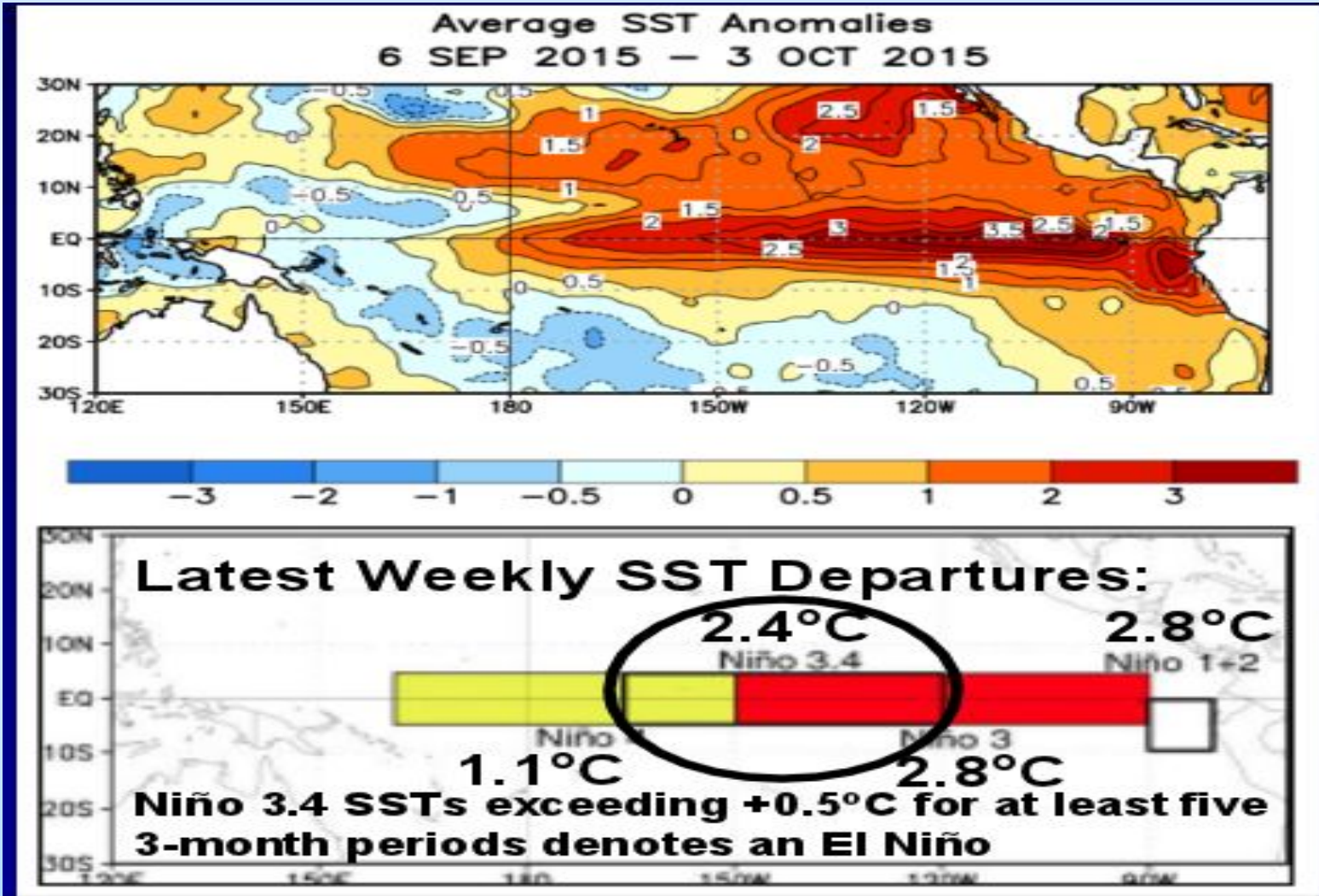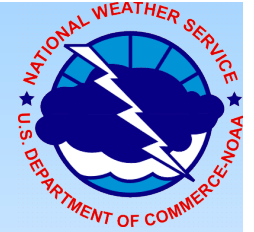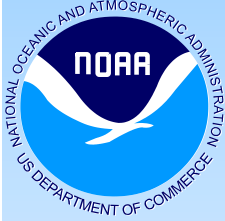# NMME is a compilation of various climate scale models from Canada and the USA.

Seasonal Signals like El Nino and La Nina also provide clues

a. El Niño Conditions Jan-Mar 1998

b. La Niña Conditions Jan-Mar 1989

Ocean Temperature Departures (°C)

NOAA/NCEP/CPC

One of the Three Strongest El Nino Events on Record Underway.

Average SST Anomalies
6 SEP 2015 — 3 OCT 2015

Latest Weekly SST Departures:

2.4°C Niño 3.4

2.8°C Niño 1+2

Niño 1.1°C

Niño 3 2.8°C

Niño 3.4 SSTs exceeding +0.5°C for at least five 3-month periods denotes an El Niño
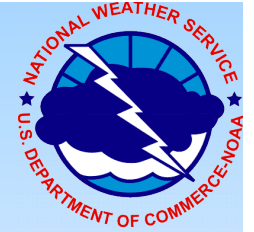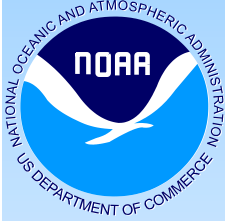
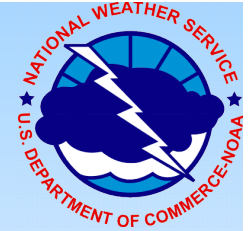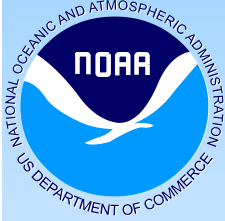# La Nina of 2010-2012 and Drought Replaced by El Nino.
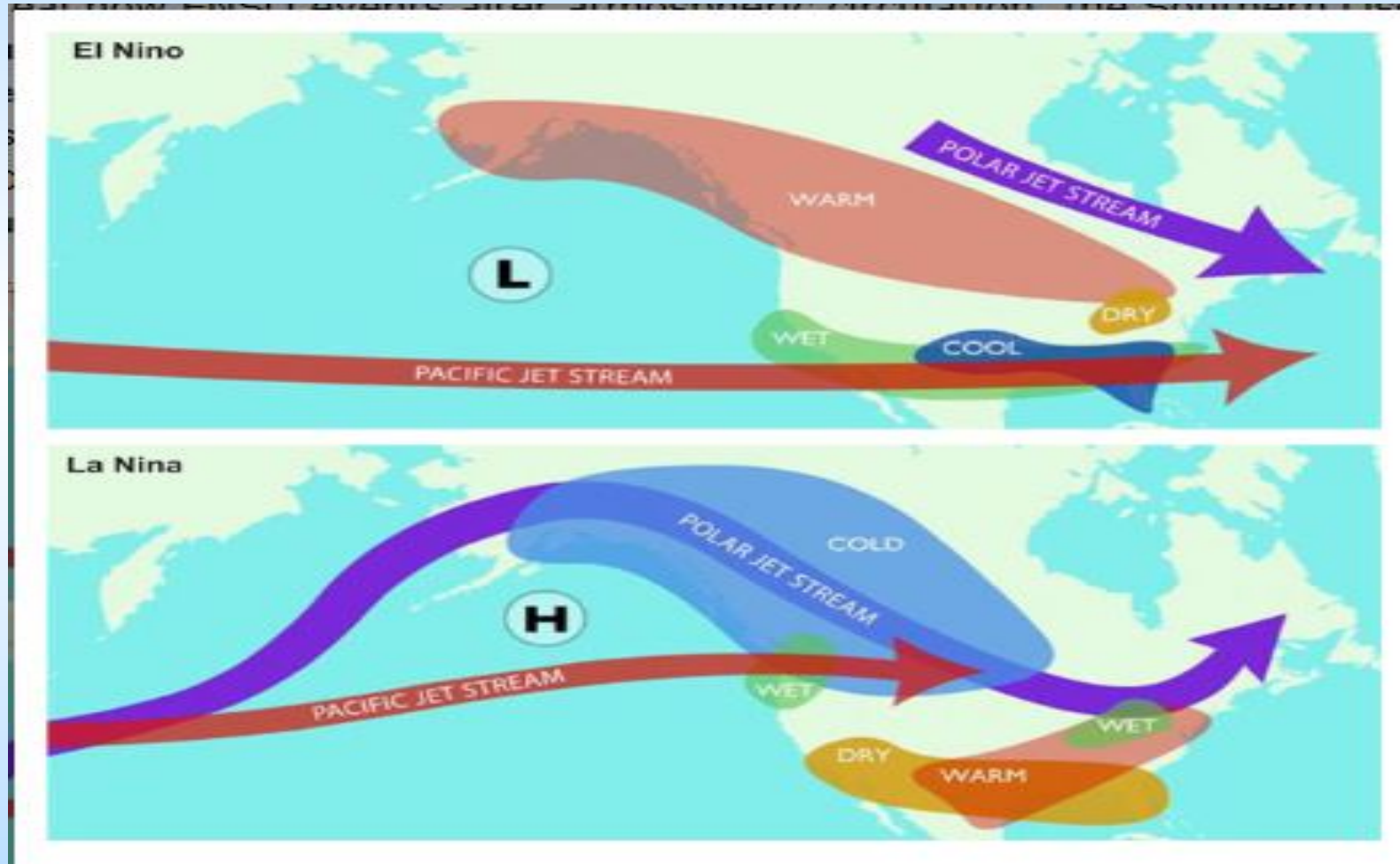
Typically last at least 6 months to as long as 2 years.

....and leads to this...

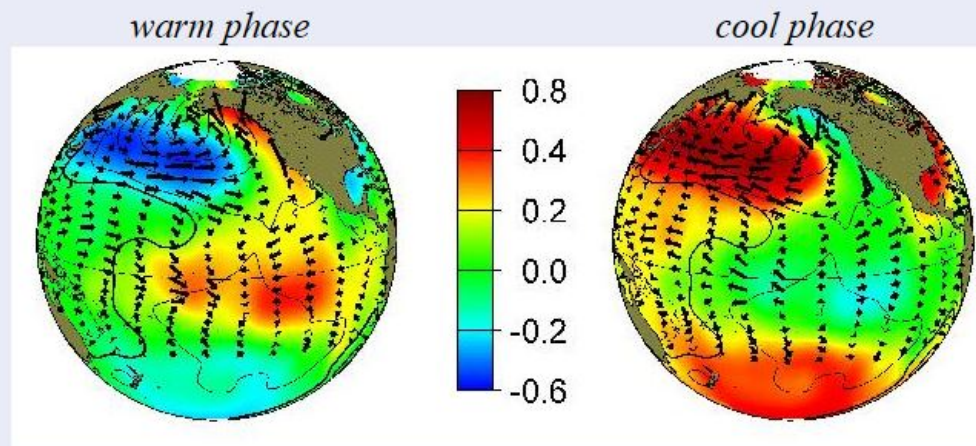# Decadal Oscillations
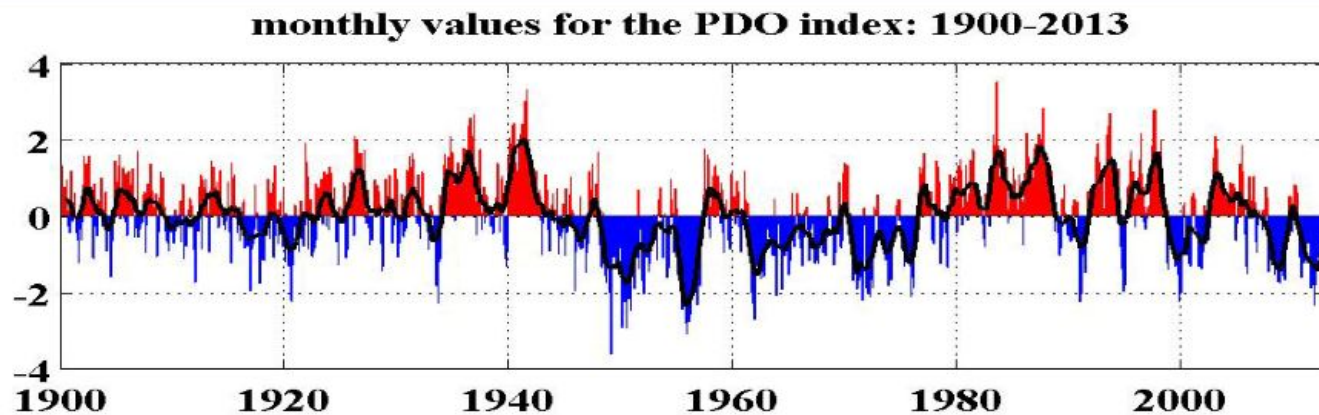
Pacific Decadal Oscillation

Interaction of Pacific Decadal Oscillation and the Atlantic Multidecadal Oscillation

When the PDO is – and the AMO is +, drought conditions are favorable for the US.

Relationship between Decadal Oscillations and US Precipitation.

+PDO -AMO   +PDO +AMO

-PDO -AMO   -PDO +AMO

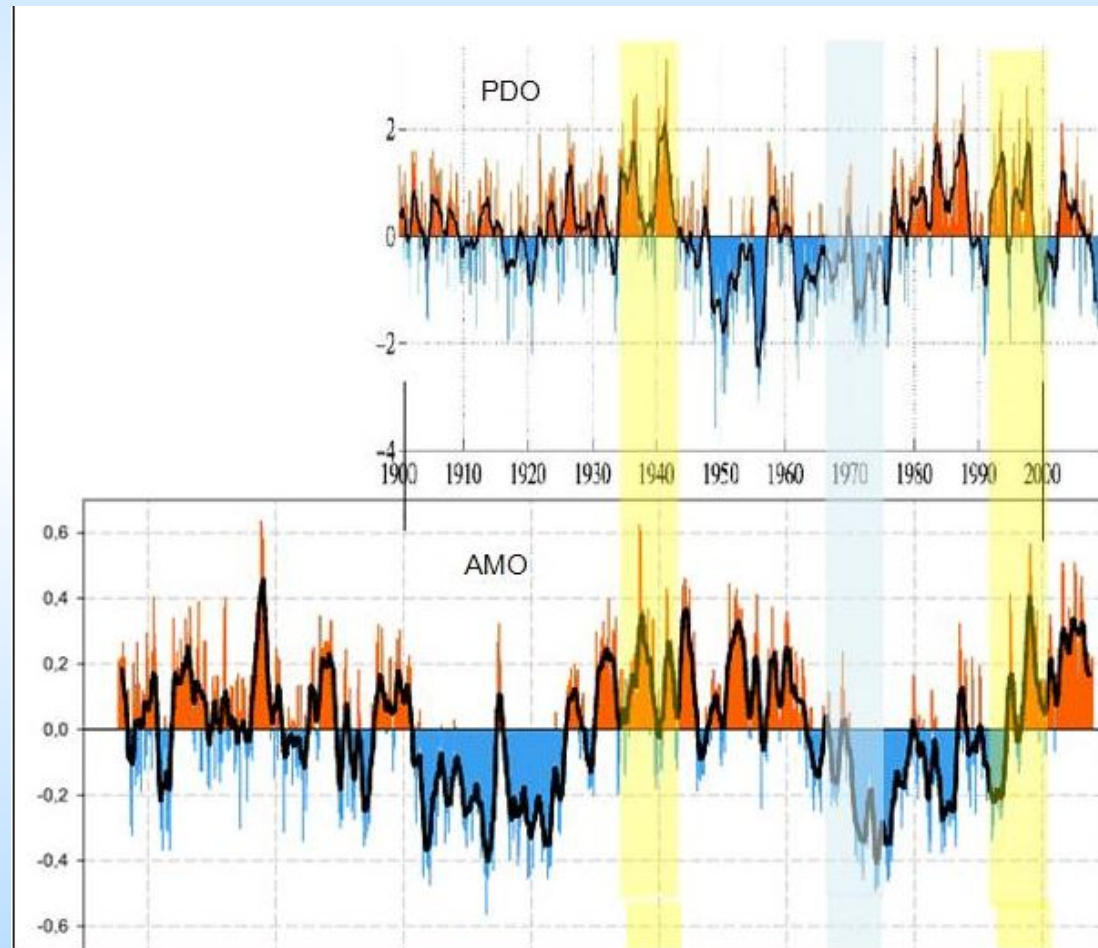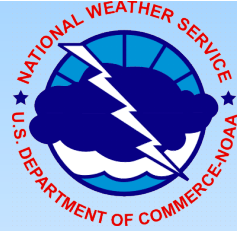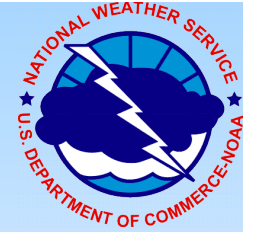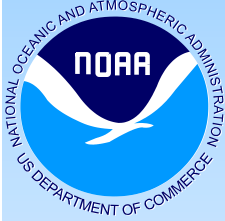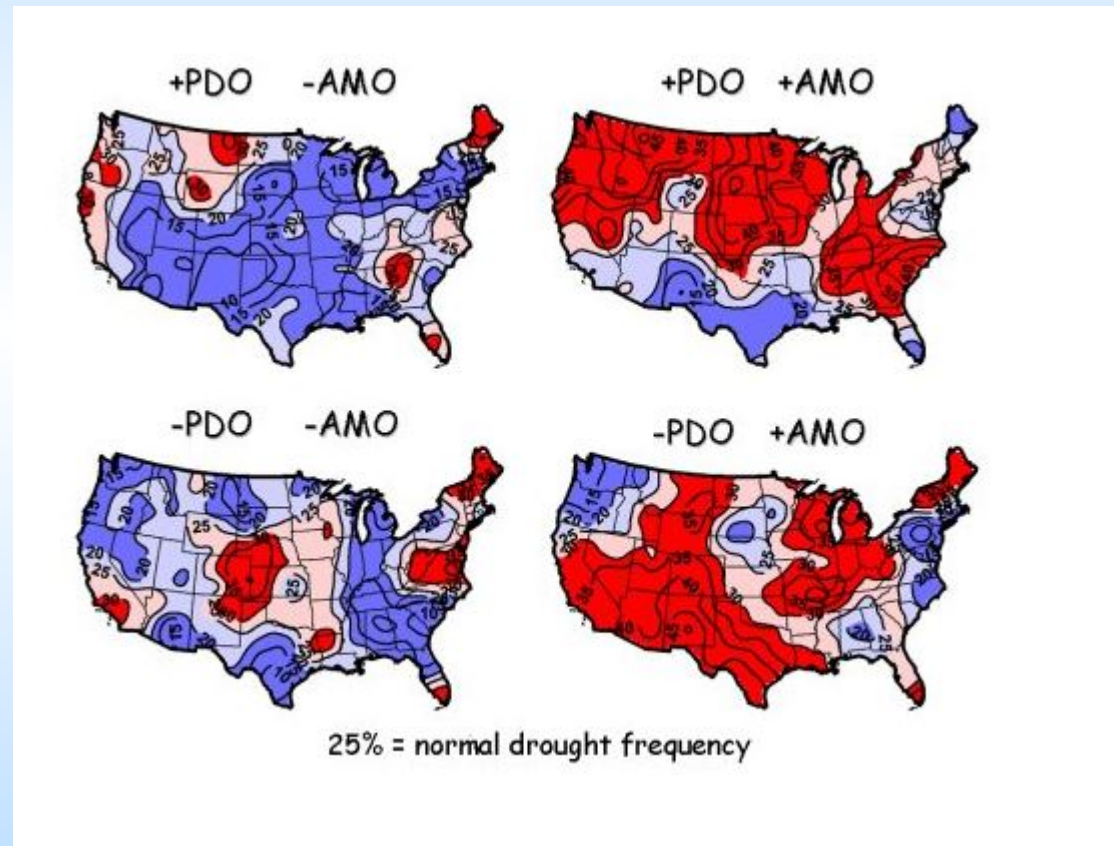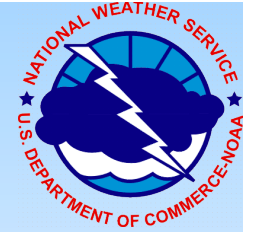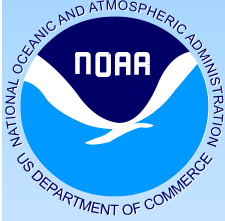25% = normal drought frequency

Putting it All Together

NOAA/NCDC Climate Division Composite Precipitation Anomalies (in)
Dec to Feb 1957−58,1965−66,1972−73,1982−83,1991−92,1997−98
Versus 1981−2010 Longterm Average

NOAA/ESRL PSD and CIRES−CU

NMME Forecast of Prate Anom (mm/day) IC=201510 for 2015DJF

CFSv2 seasonal Prec anomalies (mm/day)
Dec−Jan−Feb 2015/2016
NWS/NCEP/CPC
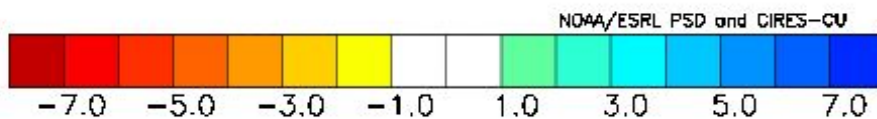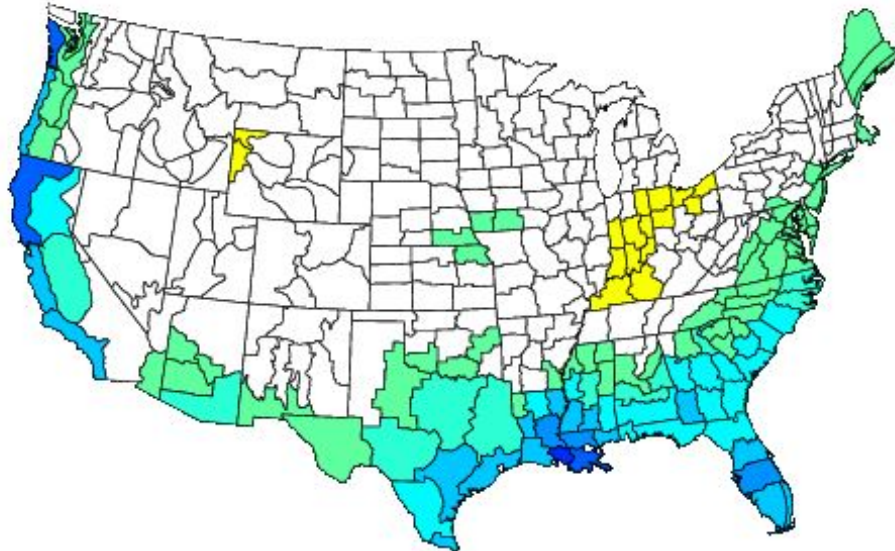
**Dec/Jan/Feb Composite of 6
previous strong El Nino events since 1950.**
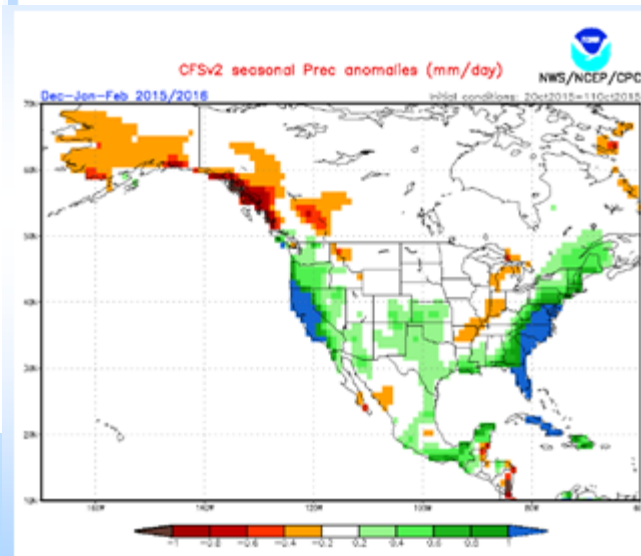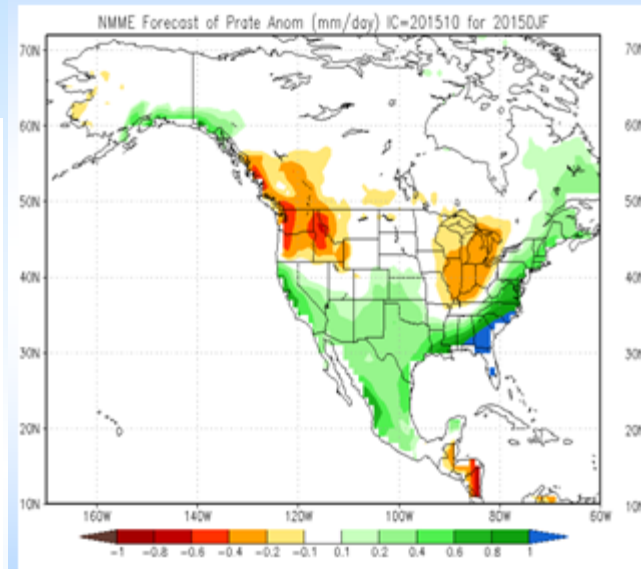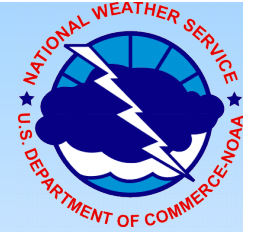
Latest NWS Climate Prediction Center Forecast for Winter 15/16.

THREE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
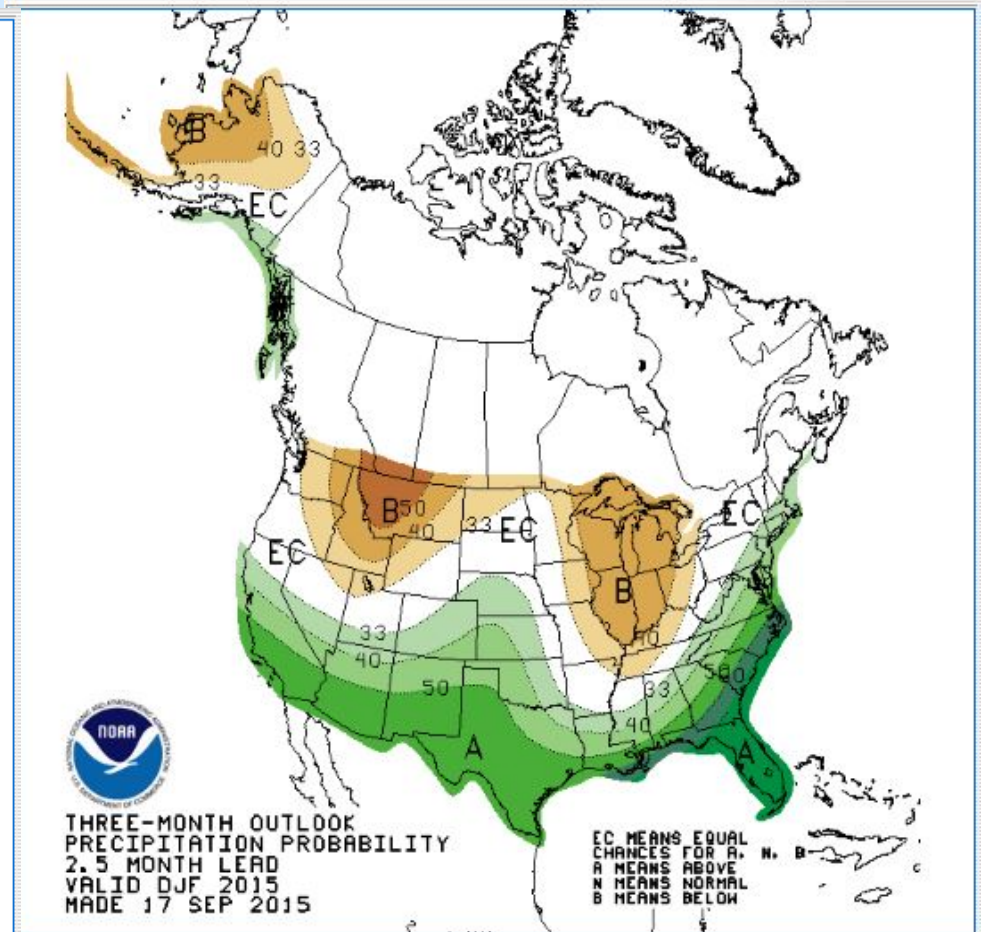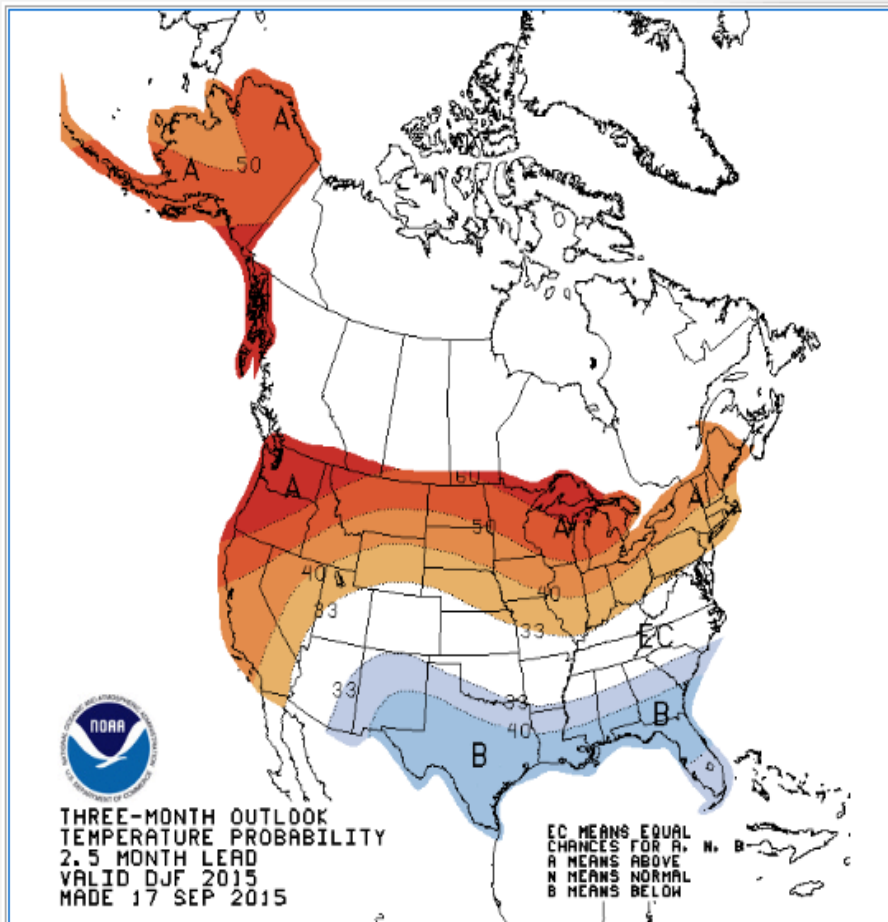2.5 MONTH LEAD
VALID DJF 2015
MADE 17 SEP 2015

EC MEANS EQUAL
CHANCES FOR A, N, B.
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
2.5 MONTH LEAD
VALID DJF 2015
MADE 17 SEP 2015

EC MEANS EQUAL
CHANCES FOR A, N, B.
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

All indications show an increased chance for cooler than normal temps across TX and most of OK and increased chances for above normal precipitation.
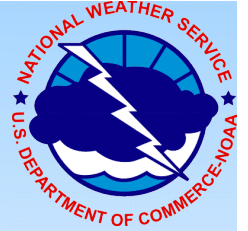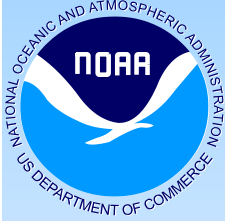
Summary

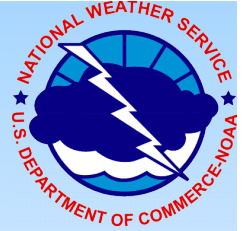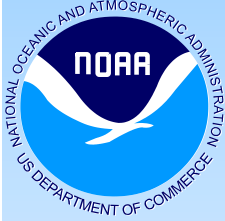- Short term "flash drought" currently impacting much of TX and OK.

- Seasonal signals (El Nino) and composites plus coupled model forecasts show this should break by November (perhaps next week?).

- Longer term decadal trends show signals for reduced chances for drought going forward (PDO+/AMO-).

Questions??

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NWS Southern Region

Climate Service Program Manager

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817-978-1100 x 130