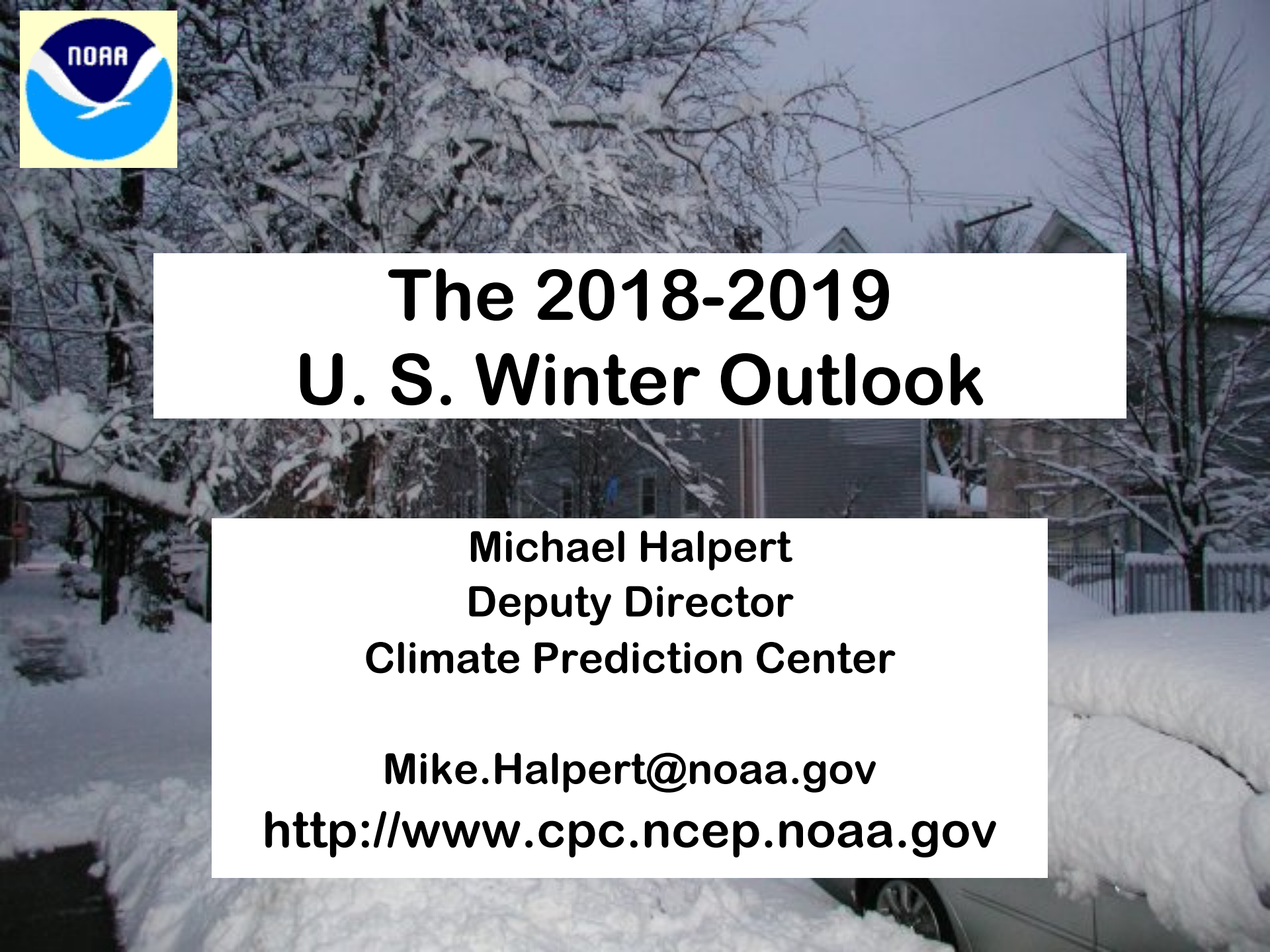

The 2018-2019 U. S. Winter Outlook

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Climate Prediction Center

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http://www.cpc.ncep.noaa.gov

Outline

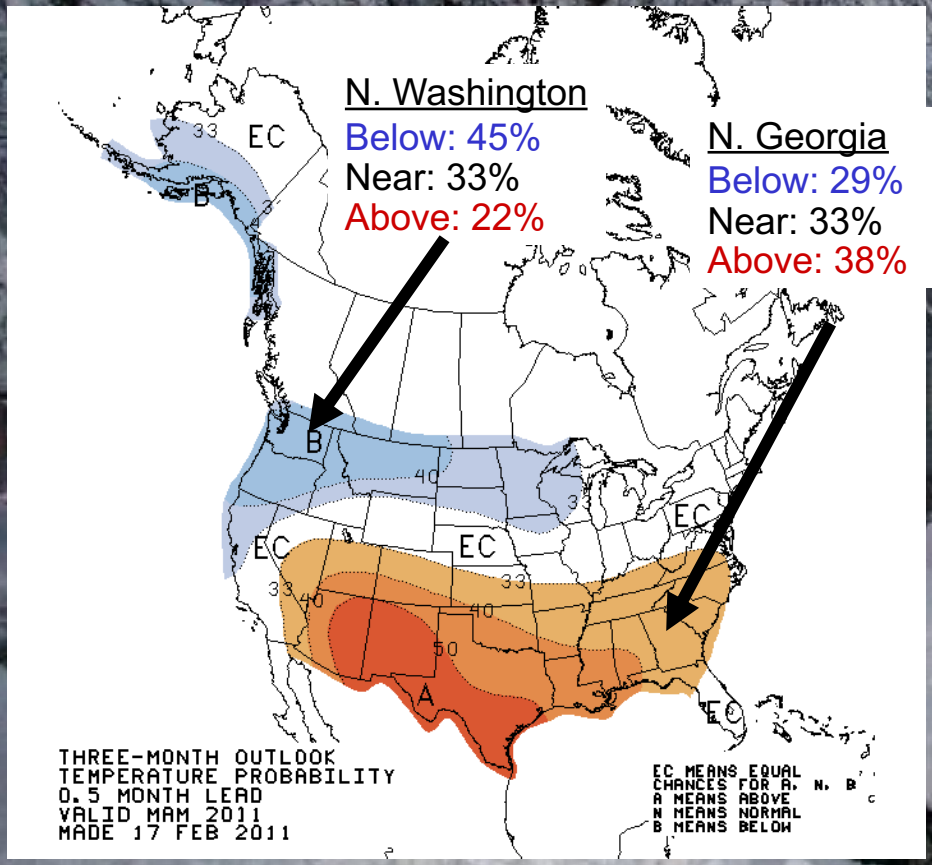
- **About the Seasonal Outlook**
- Review of 2017-18 U. S. Winter (DJF) Outlook
- Potential Climate Features impacting U. S. Winter
- 2018-19 U. S. Winter (DJF) Outlook

Outlook Categories and Probabilities

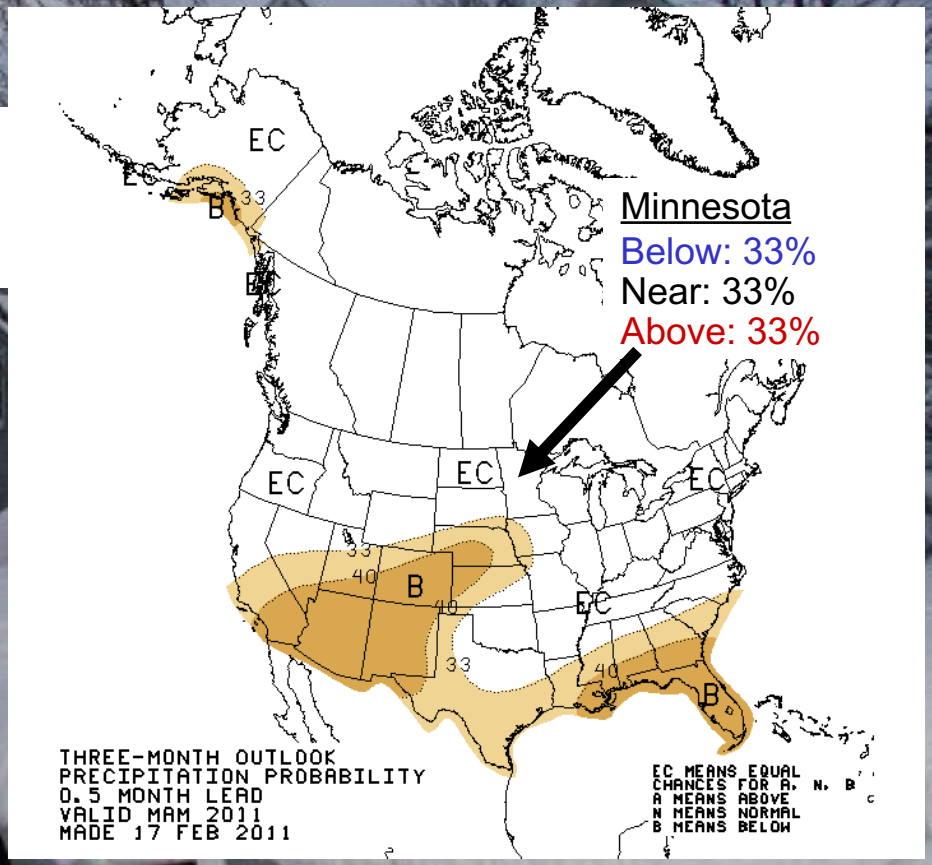
- Seasonal outlooks are prepared for average temperature and total accumulated precipitation category
- Three categories are used (terciles). These are BELOW-,NEAR- and ABOVE-normal (median), for temperature (precipitation).
- Regions where the likelihoods of the three categories are the same (33.33…% each) are designated as “EC”, for equal chances.
- In non-EC regions the labels on the contours give the total probability of the dominant category.

U. S. Seasonal Outlooks Interpretation

Temperature



Precipitation



About the Seasonal Outlook

- Each month, near mid-month CPC prepares a set of 13 outlooks for 3-month "seasons" (any set of 3 adjacent months) for lead times ranging from ½ month, 1 ½ months, 2 ½ months, 3 ½ months, …, 12 ½ months.

  Next Outlook: October 18

  Final Winter Outlook: November 15

- The outlook for each successive/prior lead time overlaps the prior/successive one by 2 months. This overlap makes for a smooth variation from one map to the next.

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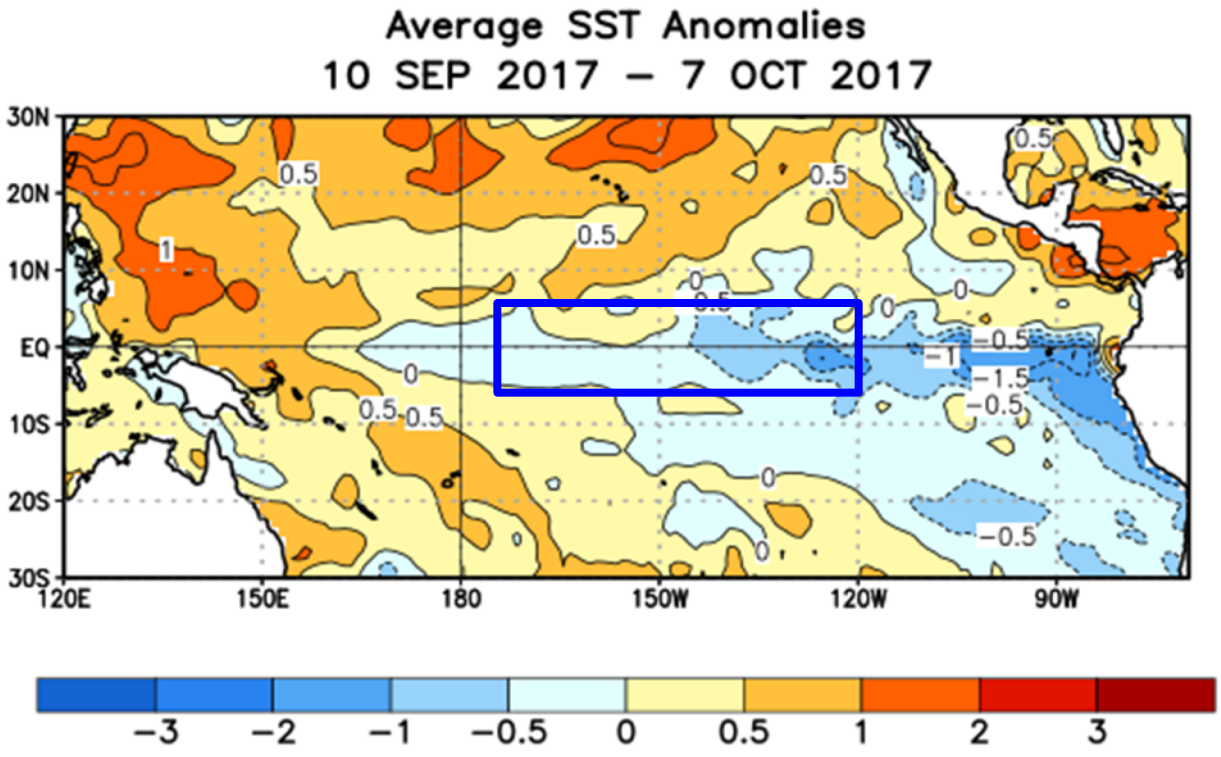
Winter 2017-18 Outlook Rationale (from October 2017)

- ENSO-neutral conditions have prevailed since last winter's weak La Niña faded last winter.
- La Niña is favored to develop during the fall and persist through the winter (~60% chance).
- AO has been and continues to be erratic. Large swings possible in any year (e.g. DJF 2009-10).
- DJF temperature trends relative to 1981-2010 base period are generally small but positive over country; precipitation trends resemble La Niña.
- Forecast consistent with models with nod toward weak La Niña. Adjustments possible as we get closer to winter.

There is an increasing chance (~55-60%) of La Niña during the Northern Hemisphere fall and winter 2017-18.



Pacific Niño 3.4 SST Outlook

Models generally favor that Niño 3.4 will be between -0.5° and -1.0°C during late 2017 and early 2018.

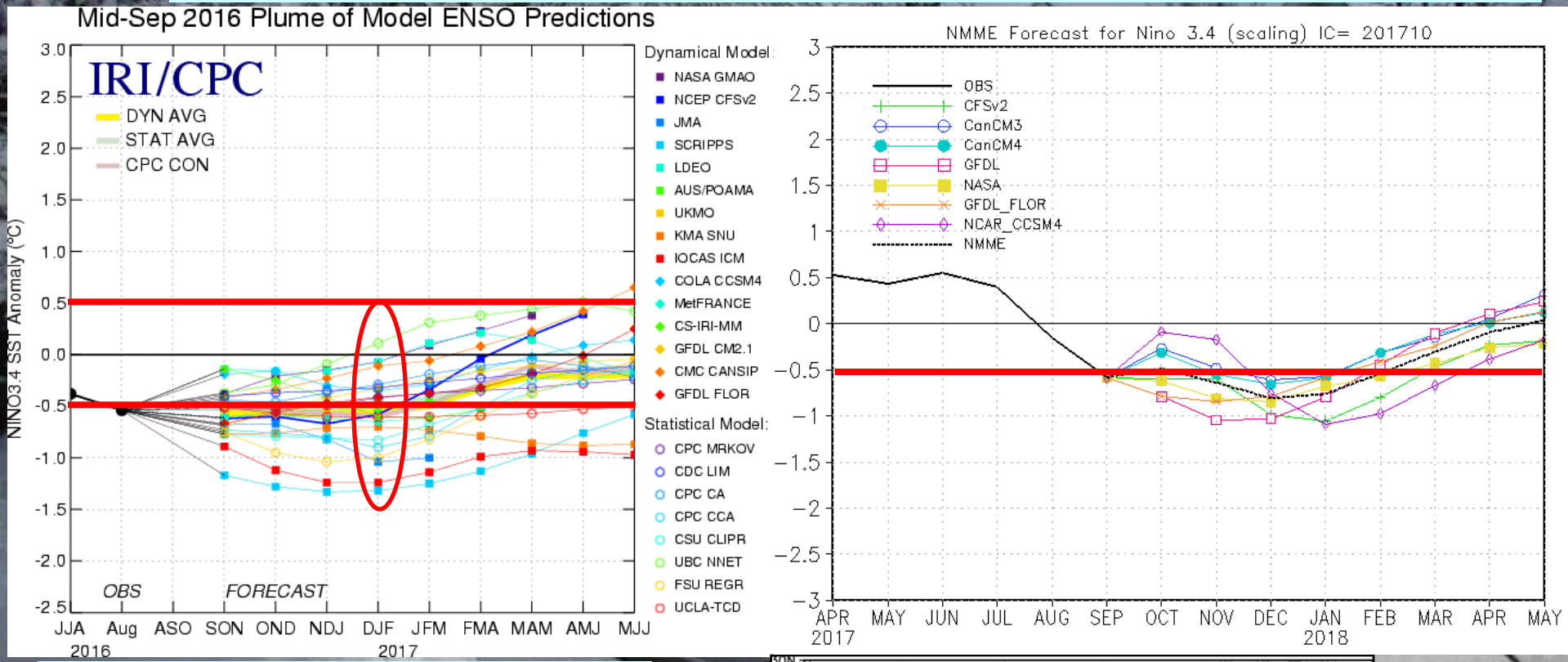
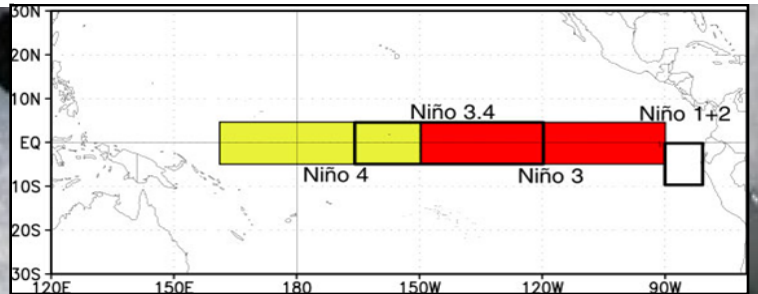
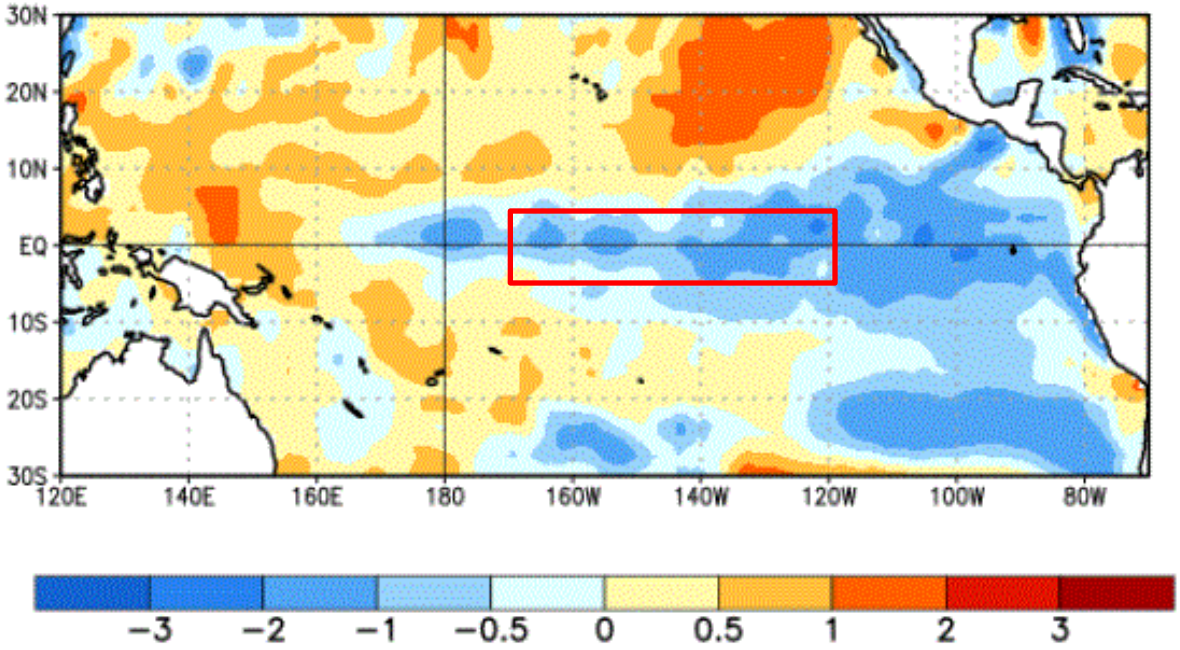


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 September 2017).

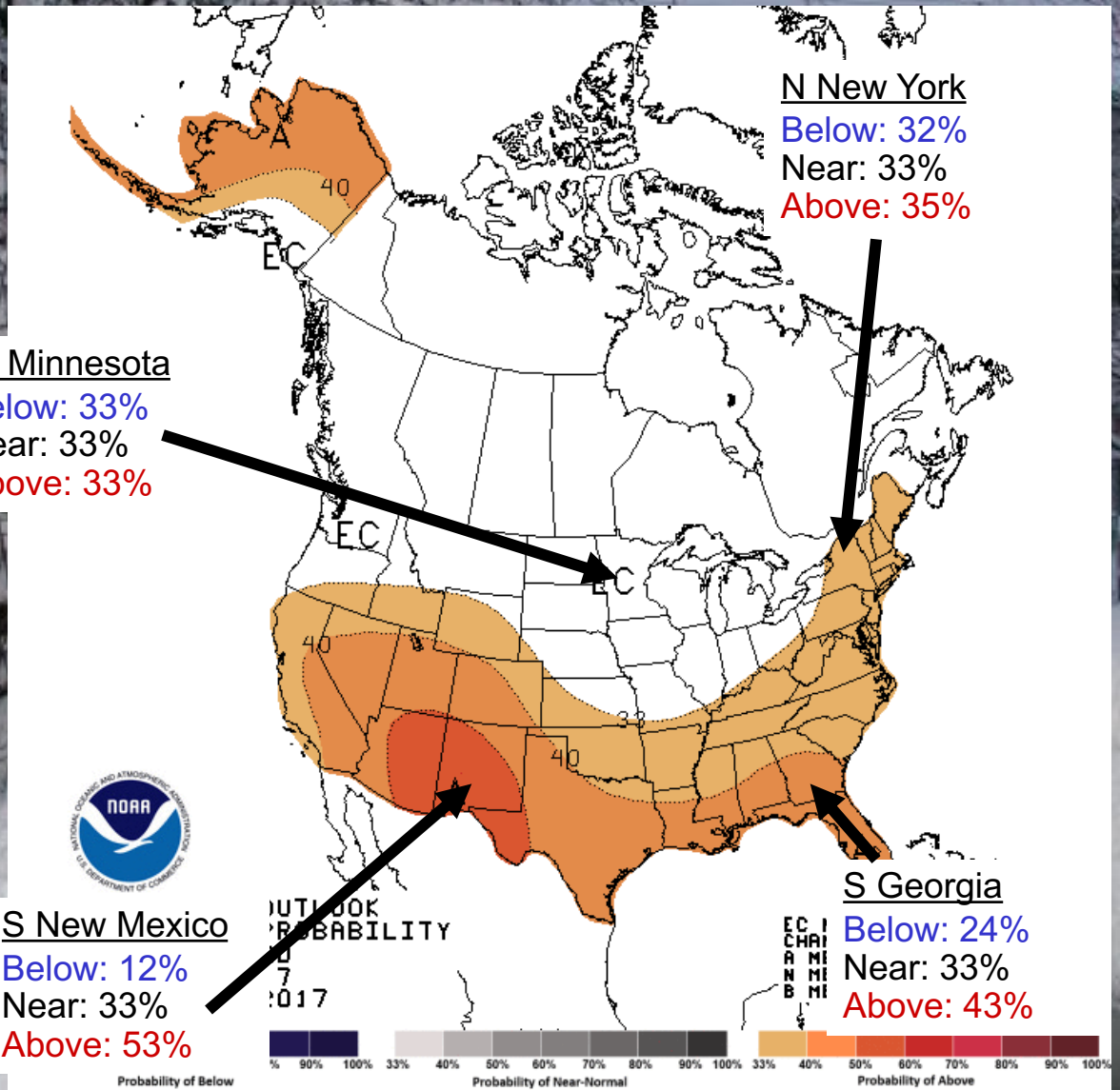


31January 2018 SST Anomalies

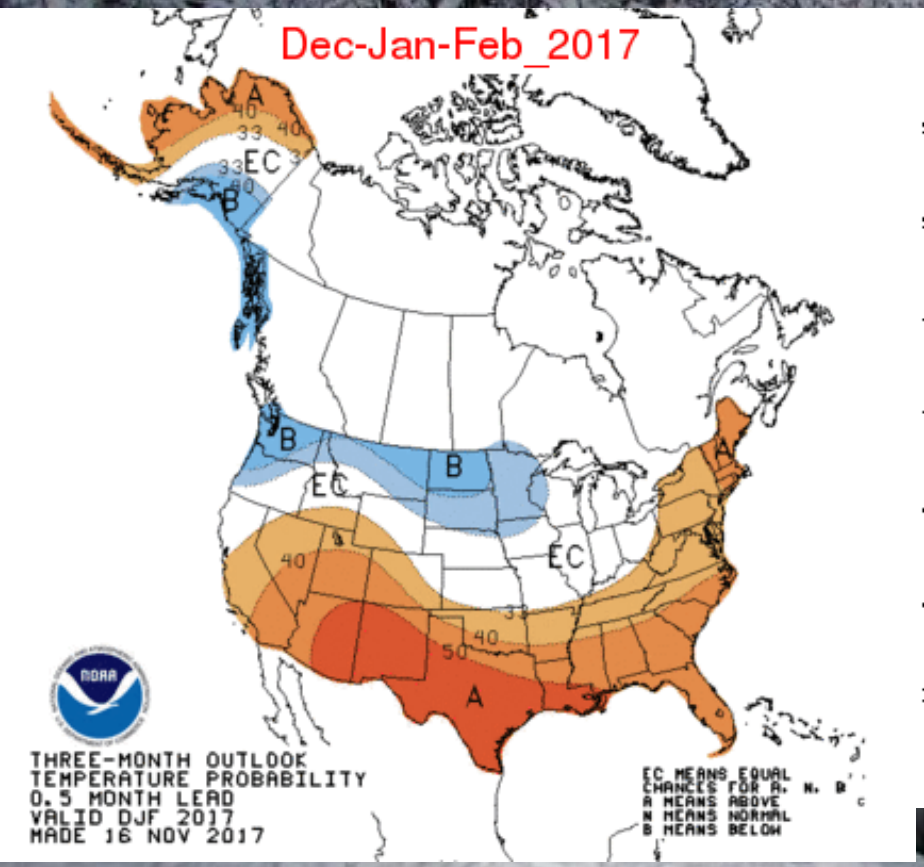


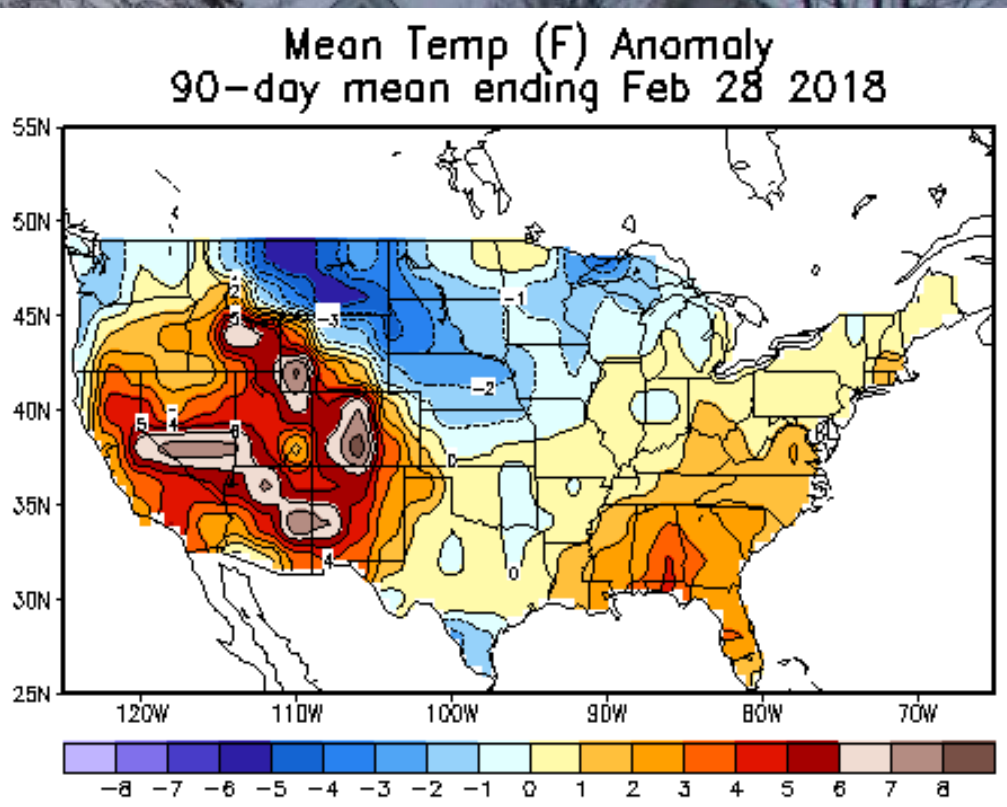
DJF Oceanic Niño Index = -0.9

December 2017 – February 2018 Temperature Outlook (Sep Release)



December 2017 – February 2018 Temperature Outlook (Nov release)

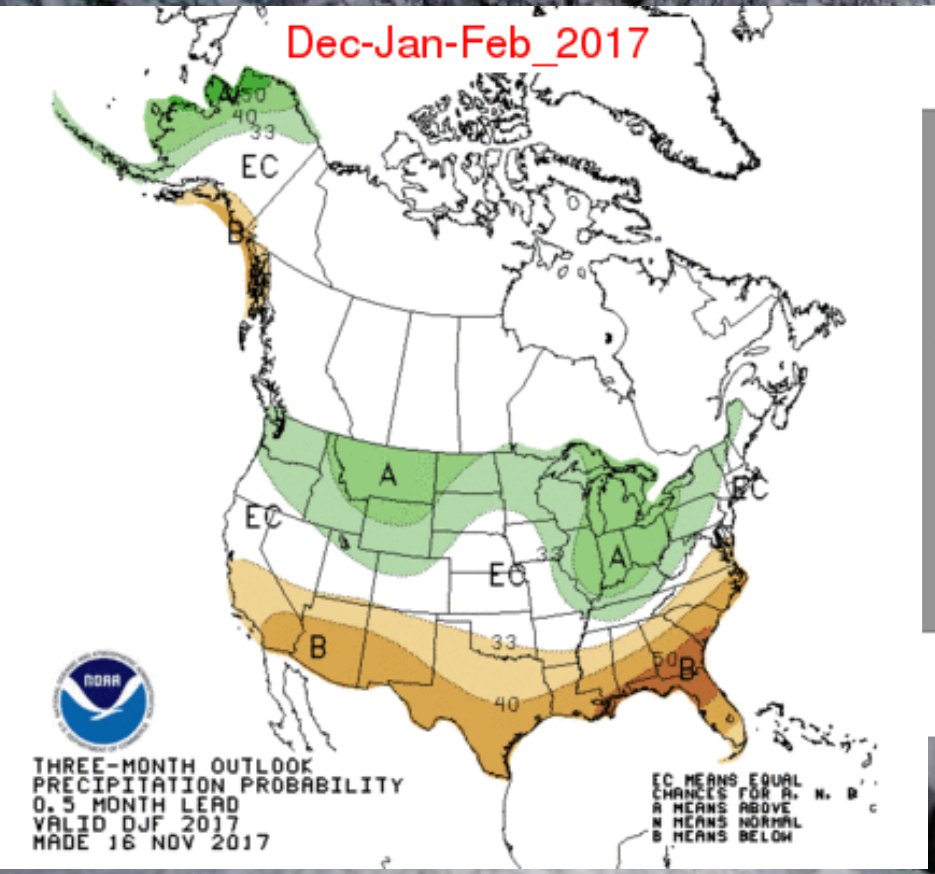


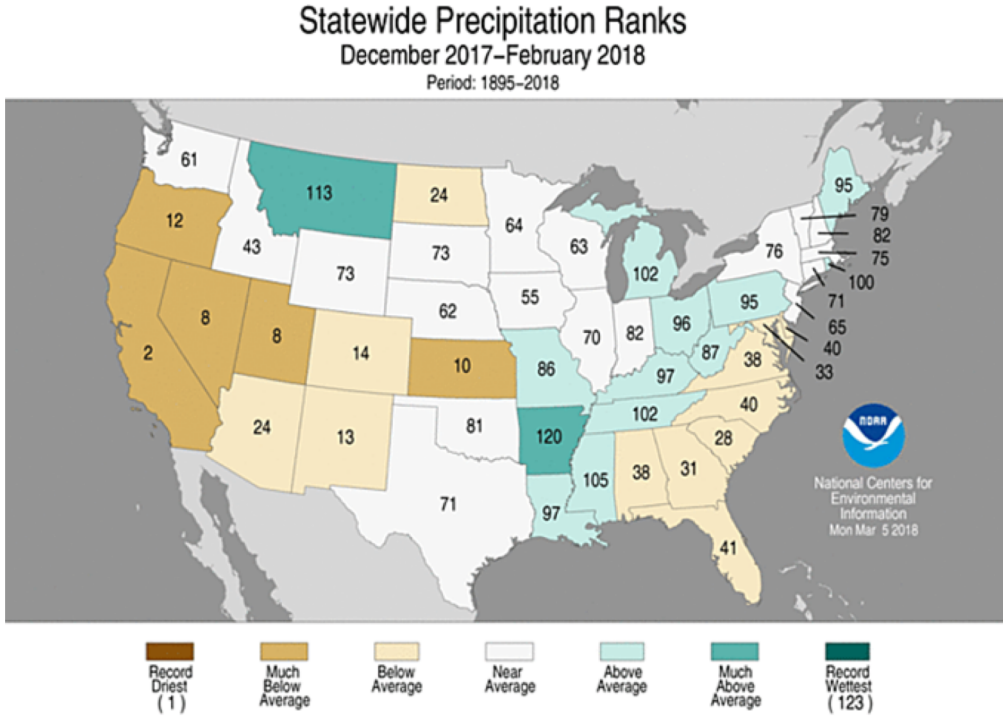


Heidke Skill Score: 34.9

Coverage: 72%

December 2017 – February 2018 Precipitation Outlook





Heidke Skill Score: 32.2
Coverage: 72%

Outline

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Where does seasonal predictability come from?

- *Persistent or recurring atmospheric circulation patterns* associated with anomalies in
  - the initial state of the climate system, or
  - boundary conditions
- *El Niño and La Niña*: anomalous climate states whose development, persistence and evolution are somewhat understood
- Potentially persistent or recurring atmospheric circulation patterns that are less well understood: AO, NAO, PNA
- *Unidentified persistent atmospheric patterns* may arise from the initial state of the climate system or from boundary forcing
- *Decadal variability or trends*:
  1. Climate Change
  2. Anomalies in the large scale ocean circulation can vary over decadal timescales

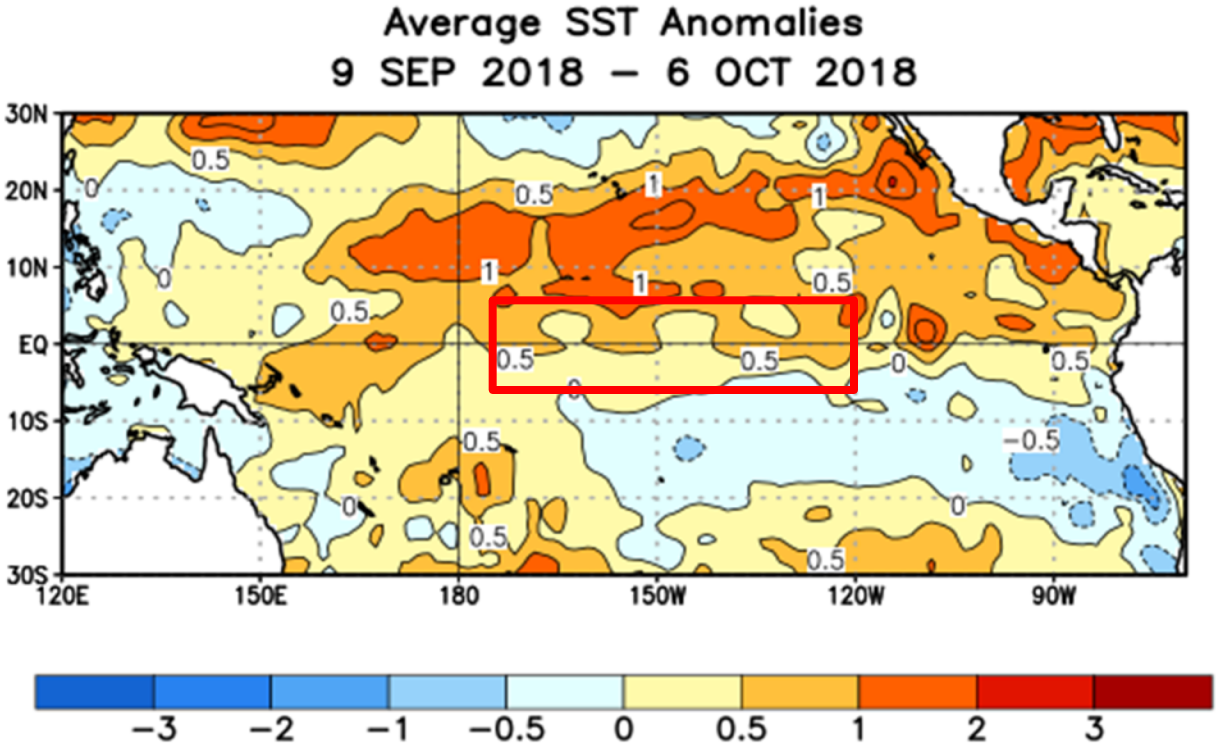
     e.g. Atlantic Meridional Overturning (AMOC)

How Does CPC Make Operational Seasonal Climate Outlooks?

- Seasonal temperature and precipitation forecasts are based on a combination of *statistical* and *dynamical* forecasts
- An objective *consolidation* of forecast information often provides the starting point for the outlook map
- Model forecasts (specifically the NMME) now play a large role
- A <u>forecaster subjectively adjusts the forecast</u>

- A team of seasonal forecasters reviews the forecasts with input from across NOAA and other agencies
  - Internally, forecasters gather Friday before release date to review the current climate state and previous forecasts and draw preliminary maps
  - Call on Tuesday before release date to review the forecaster's preliminary maps is open to entire NWS
- Release date every third Thursday of the month
- *Monthly ENSO forecast is always updated prior to the start of the seasonal forecast process (2nd Thursday)*

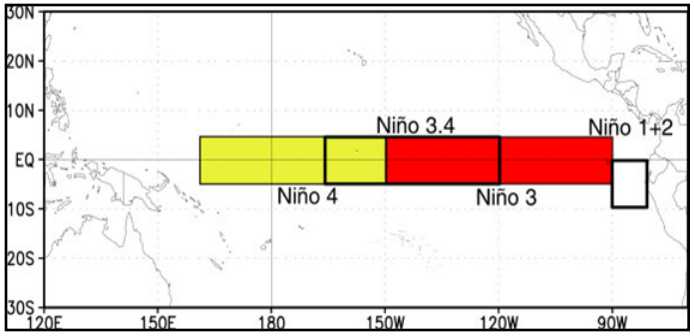
There is a 50-55% chance of El Niño onset during the Northern Hemisphere fall 2018 (September-November), increasing to 65-70% during winter 2018-19.

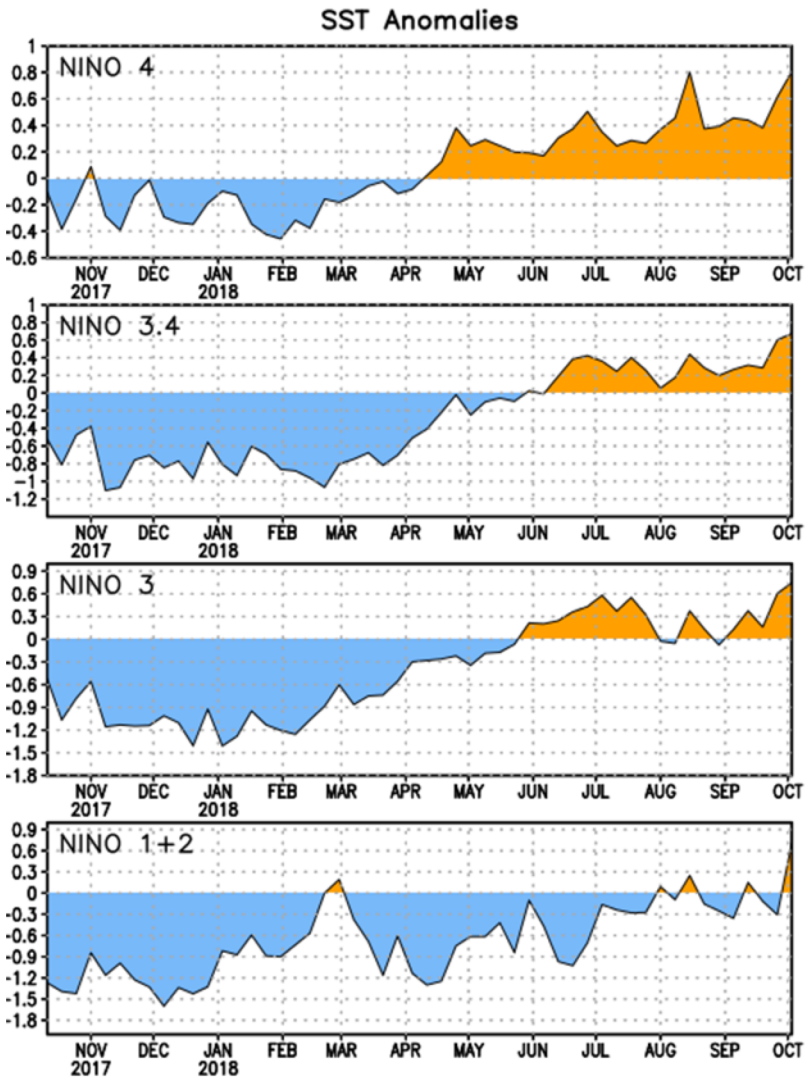


Niño Region SST Departures (ºC) Recent Evolution

The latest weekly SST departures are:

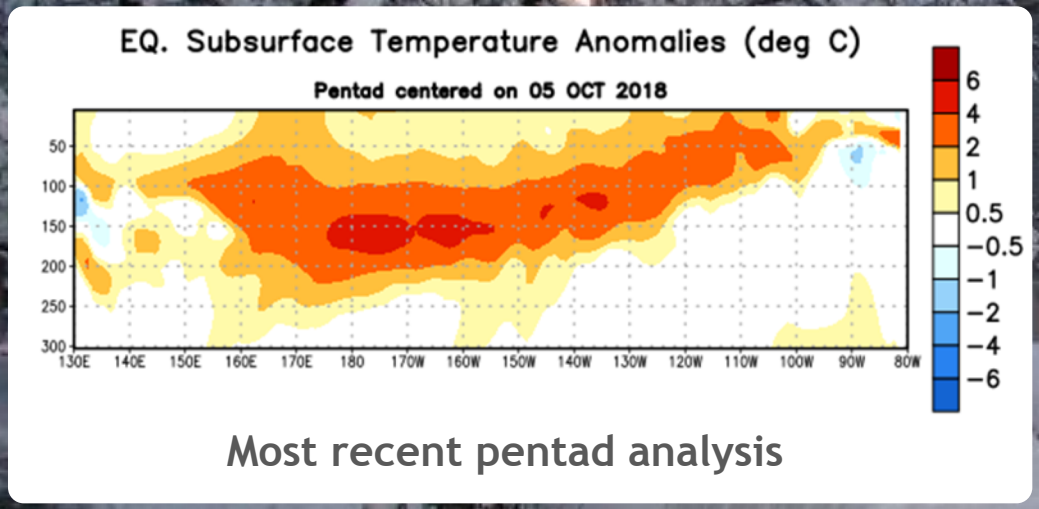
Niño 4	0.8ºC
Niño 3.4	0.7ºC
Niño 3	0.7ºC
Niño 1+2	0.7ºC





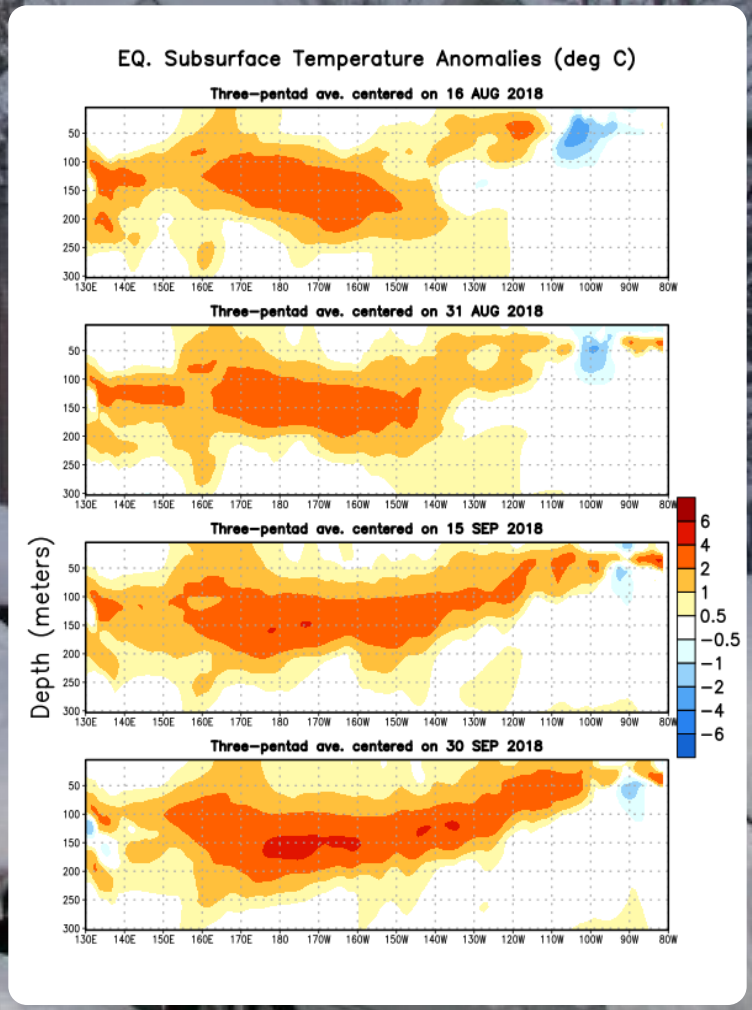
Sub-Surface Temperature Departures in the Equatorial Pacific

In the last two months, positive subsurface temperature anomalies have expanded into the eastern Pacific Ocean.



Most recent pentad analysis

A small area of weak, negative temperature anomalies persists in the eastern Pacific Ocean.



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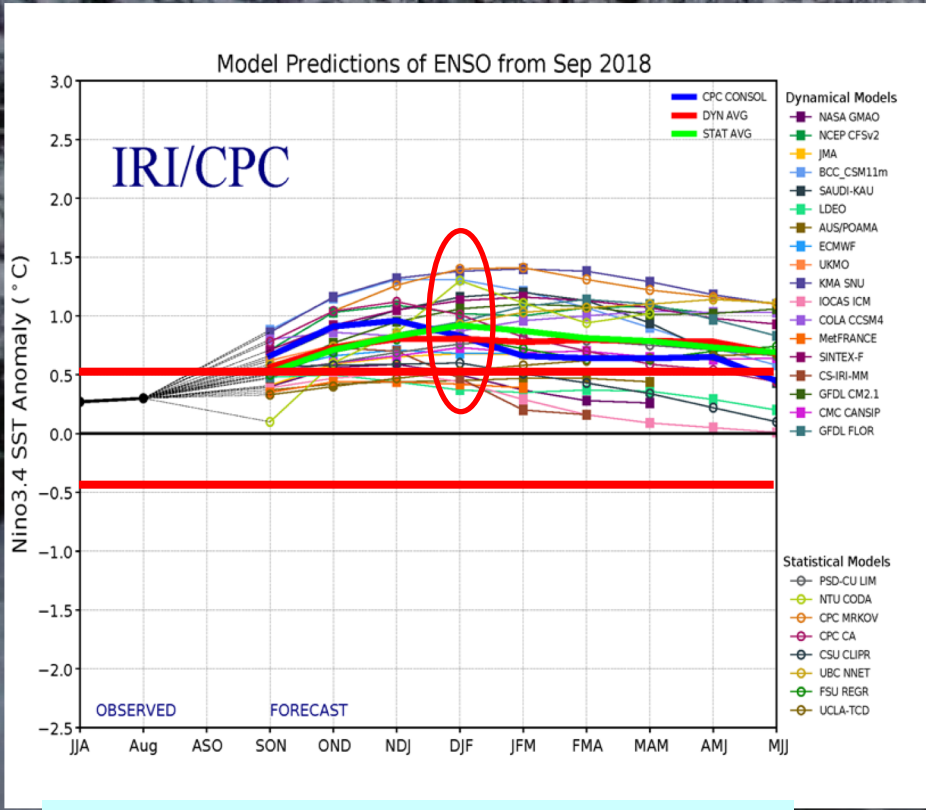
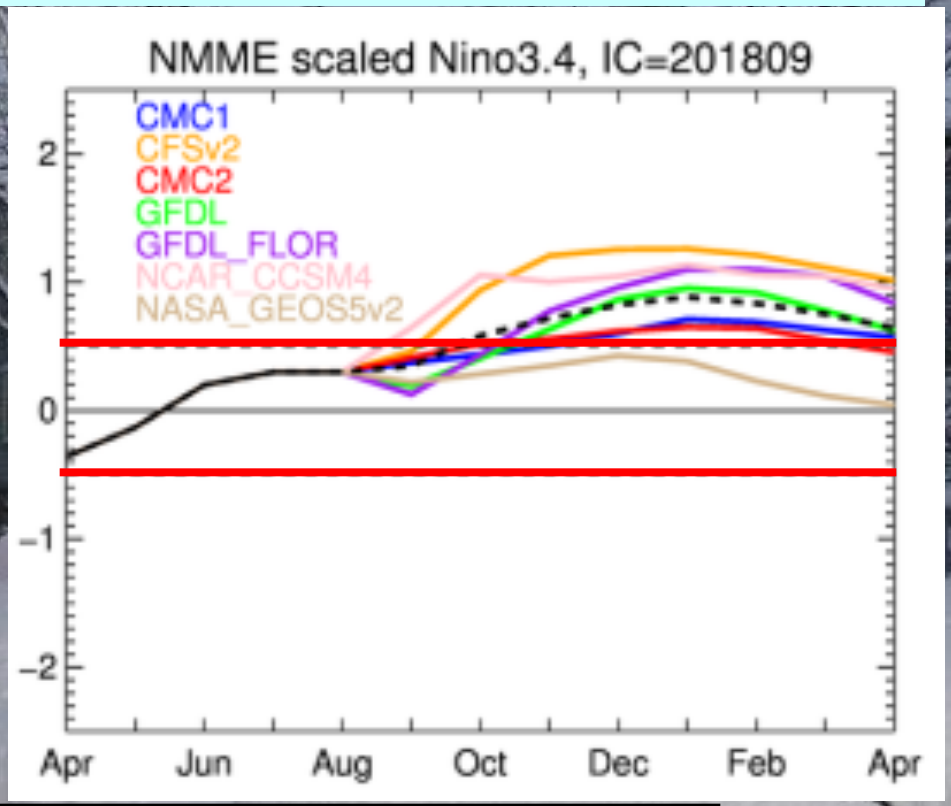




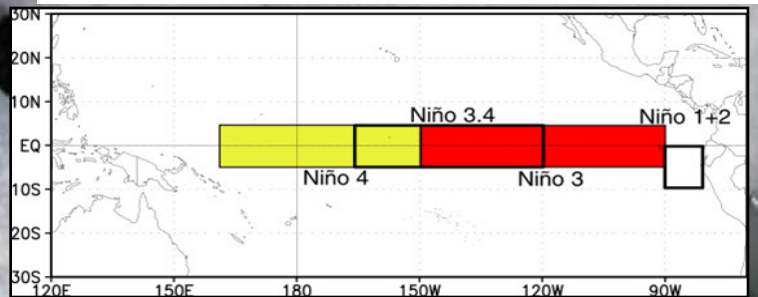
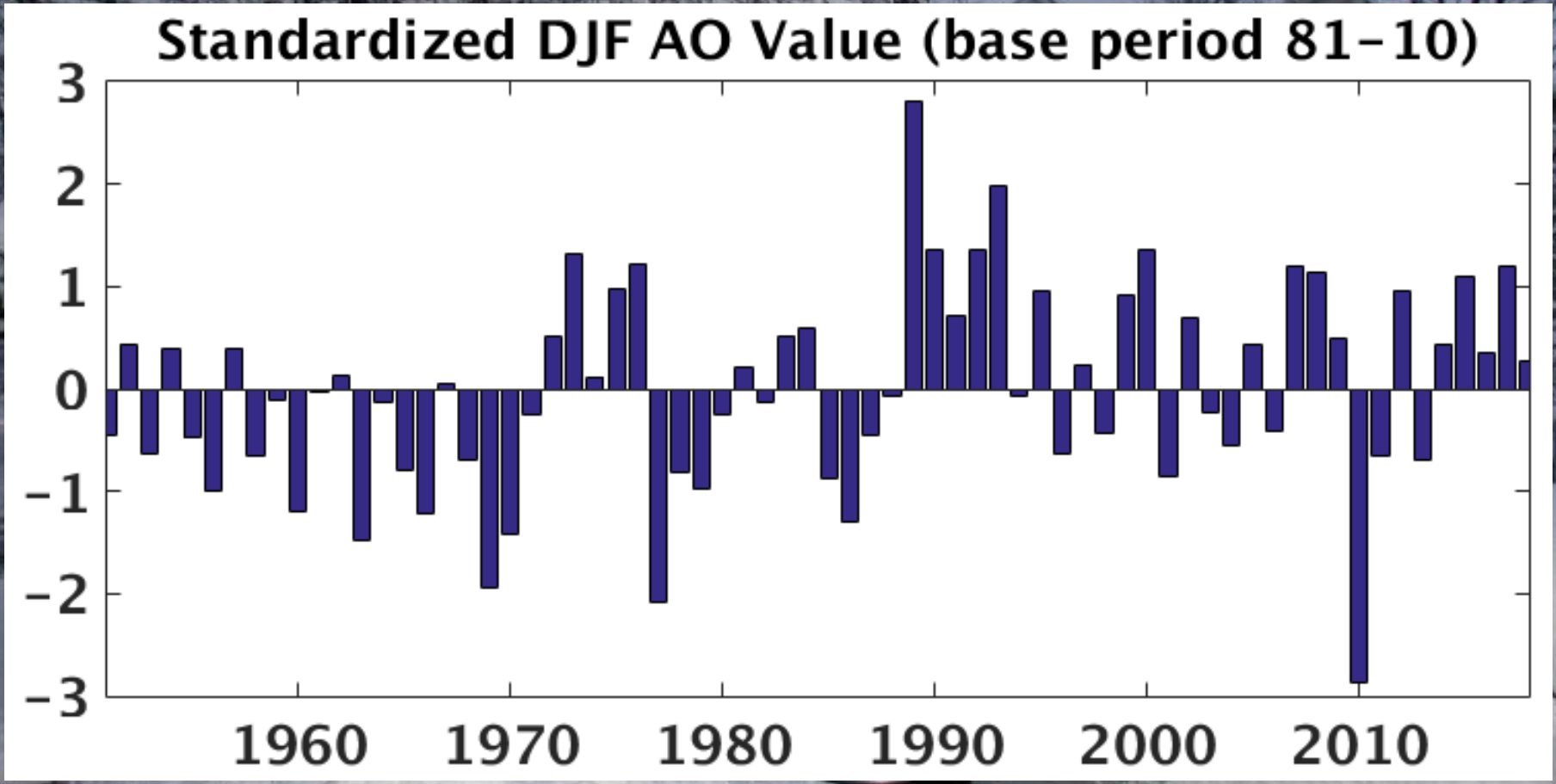


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 September 2017).

NORTH ATLANTIC OSCILLATION/ ARCTIC OSCILLATION

- A major source of intraseasonal variability over the U. S., Atlantic and Europe during winter.
- Modulates the circulation pattern over the high latitudes thereby regulating the number and intensity of significant weather events affecting the U.S., such as cold air outbreaks.
- Currently there is no reliable capability to forecast the seasonal phase.

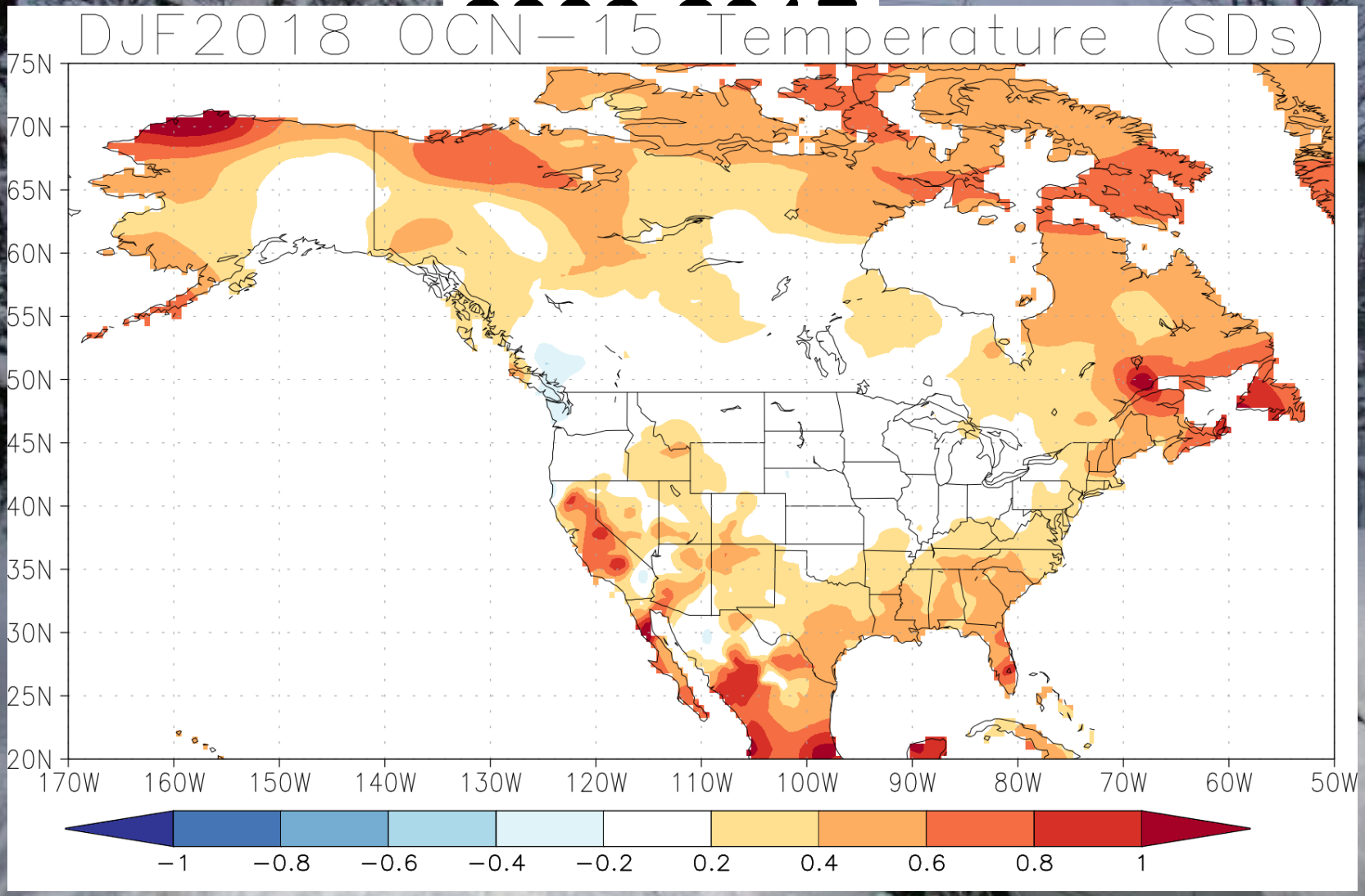
NH Winter Arctic Oscillation (AO)



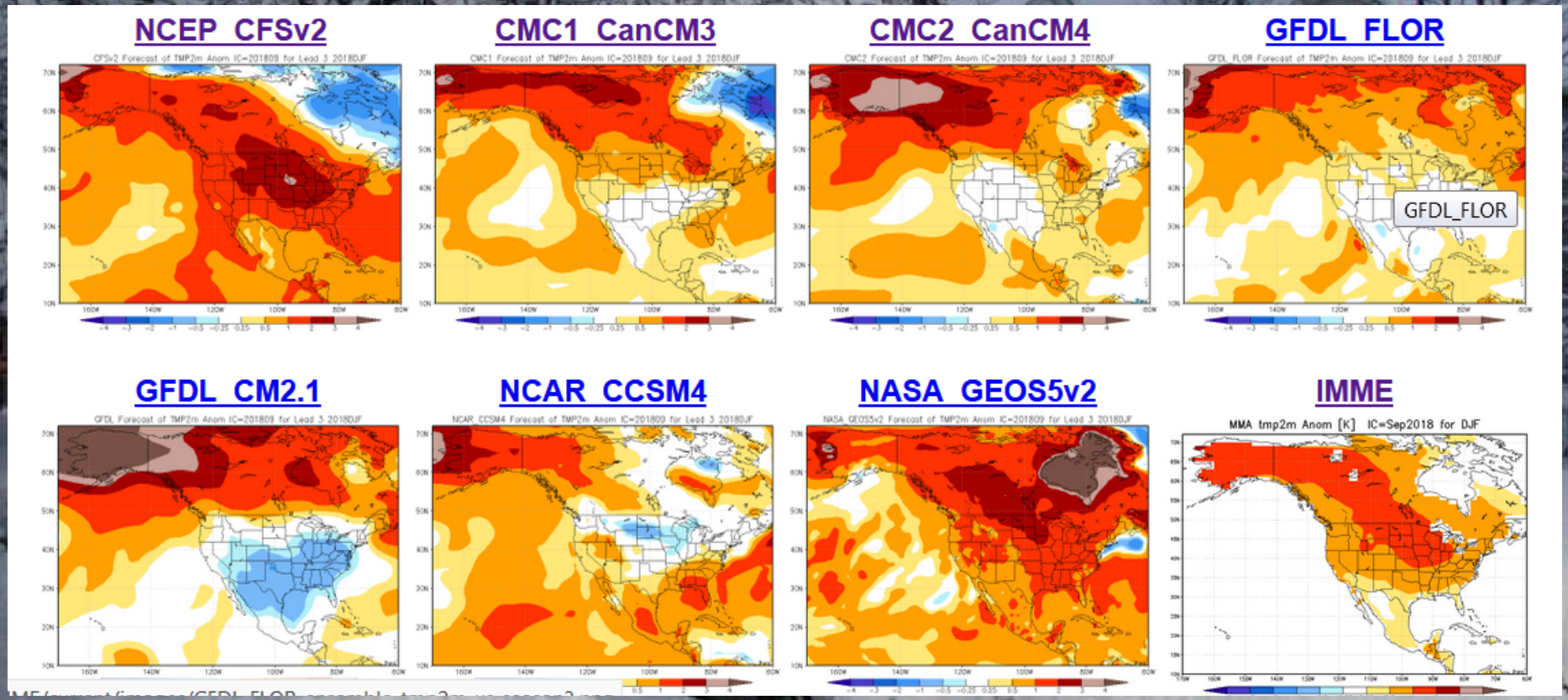
Optimal Climate Normal (OCN)

- OCN, as it is used as a tool at CPC is, quite simply, a measure of the trend. For a given station and season, the OCN forecast is the difference between the seasonal mean temperature during the last 15 years and the 30 year climatology.

December - February OCN



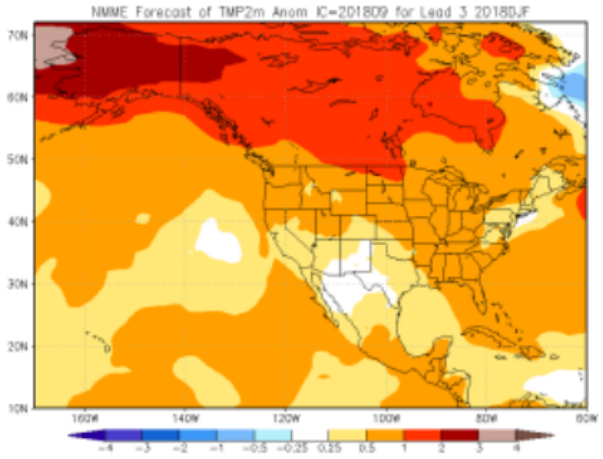
Individual NMME Model Forecasts DJF



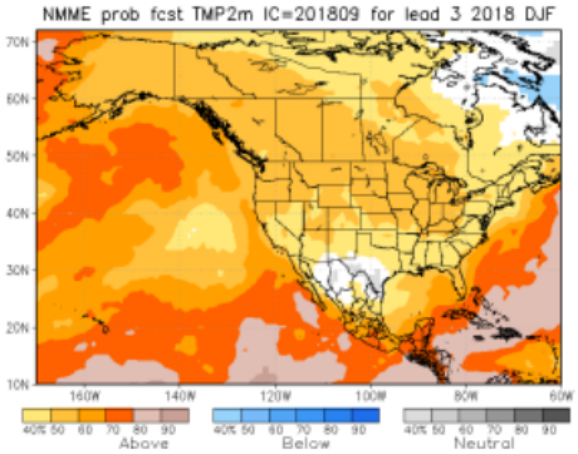
Forecast updated Sept. 8, 2018

National Multi-Model Ensemble

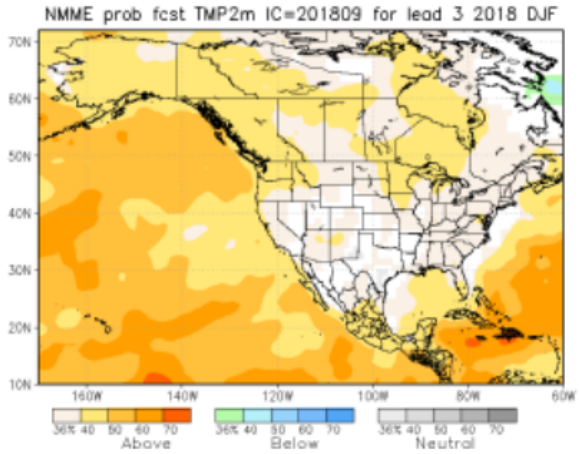
NMME



Prob fcst



PAC calib. prob fcst



Forecast updated Sep. 8, 2018

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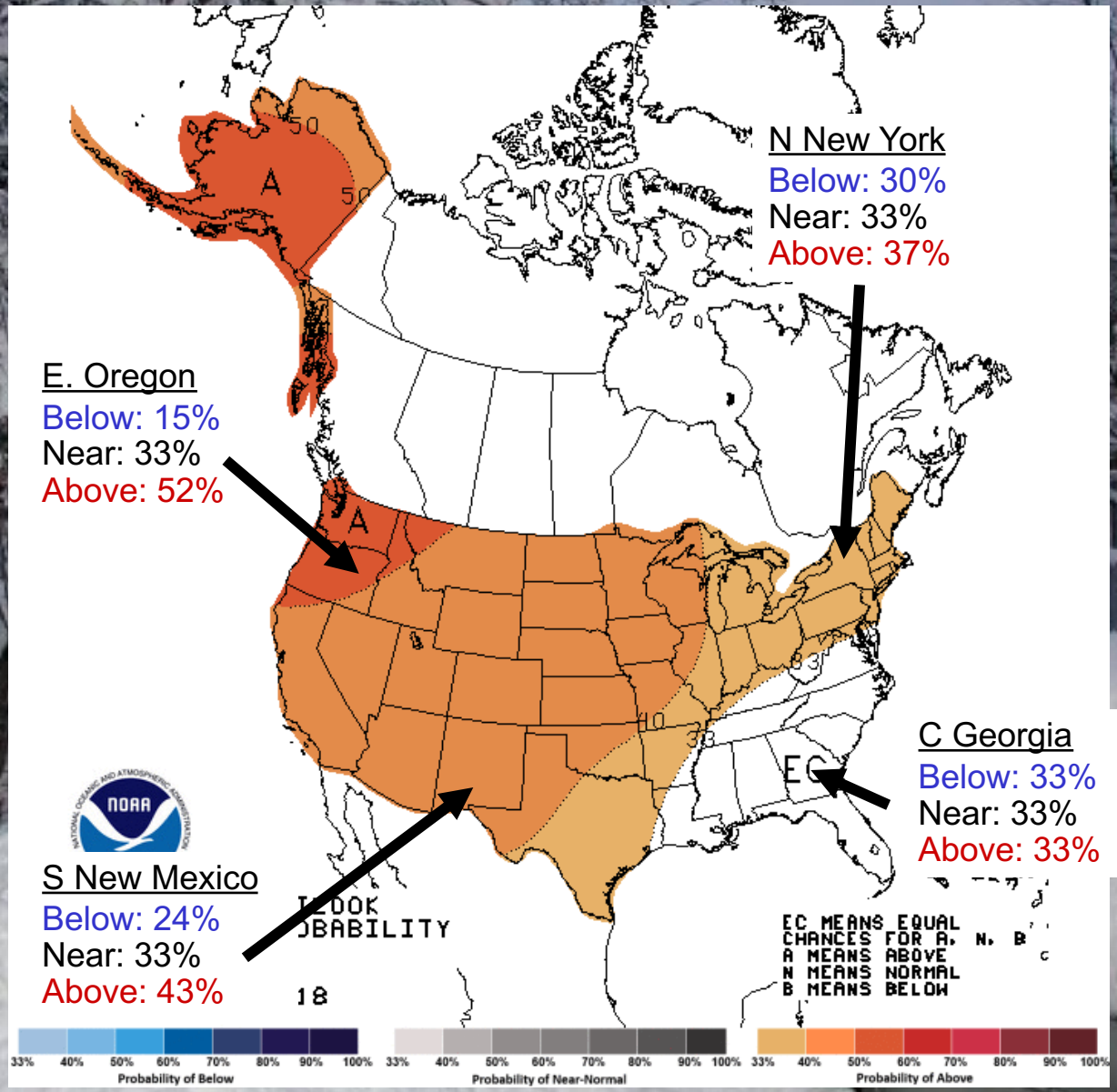
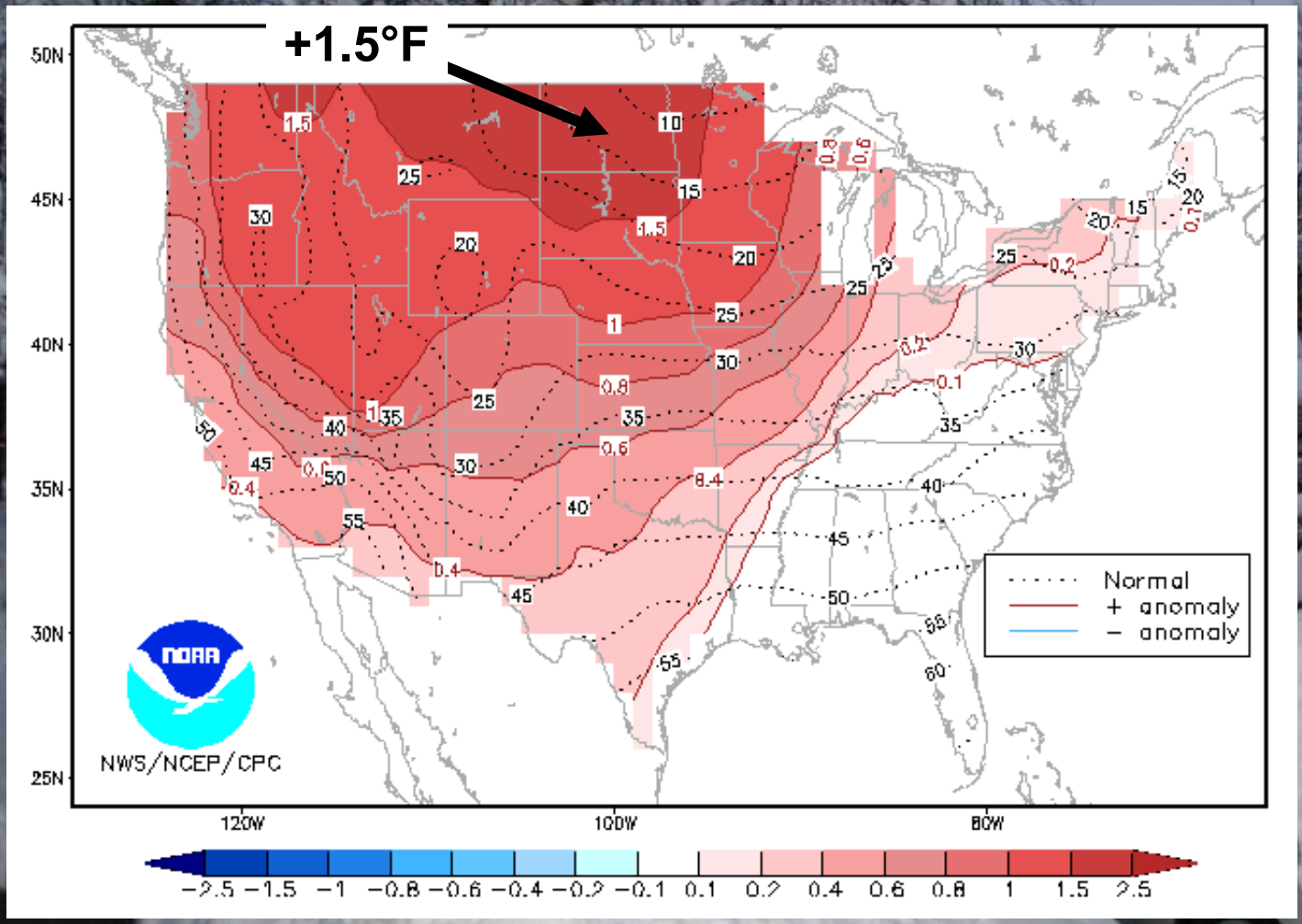
- ENSO-neutral conditions have prevailed since last winter's La Niña faded during the Spring.
- El Niño is favored to develop during the fall and persist through the winter (~65-70% chance).
- AO has been weakly positive last 5 years. Large swings are still possible in any year (e.g. DJF 2009-10).
- DJF temperature trends relative to 1981-2010 base period are generally small but mainly positive over country; precipitation trends resemble La Niña.
- Forecast consistent with models with nod toward weak El Niño. Adjustments possible as we get closer to winter.

December 2018 – February 2019 Temperature Outlook



Average Departure of Mid-Value Temperature Outlook Distribution

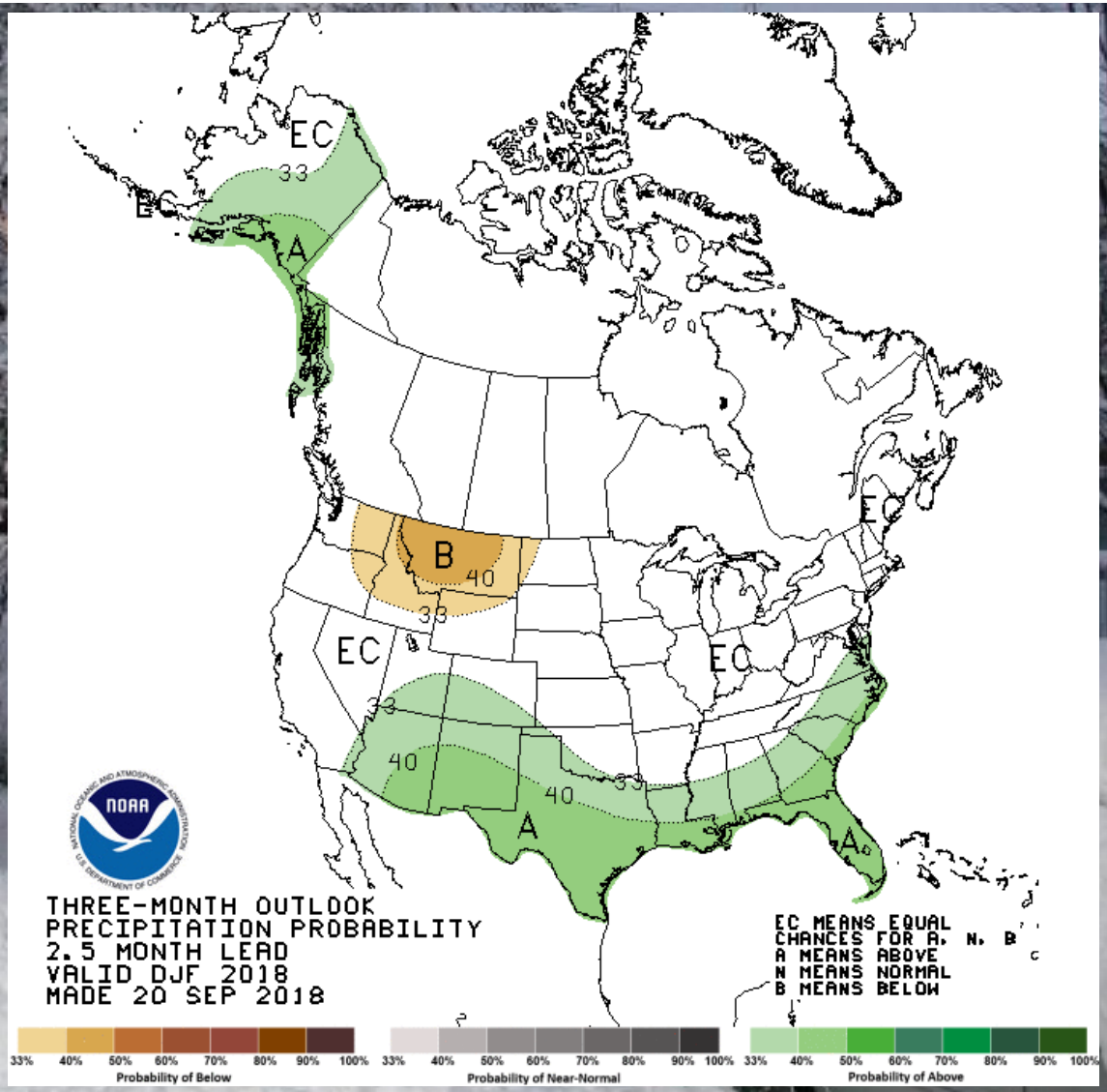


HDD Projections:

~2.0% less than 1981-2010

~2.1% more than 2017-18

December 2018 – February 2019 Precipitation Outlook



Seasonal Temperature Outlooks
NDJ 2018-19 – AMJ 2019