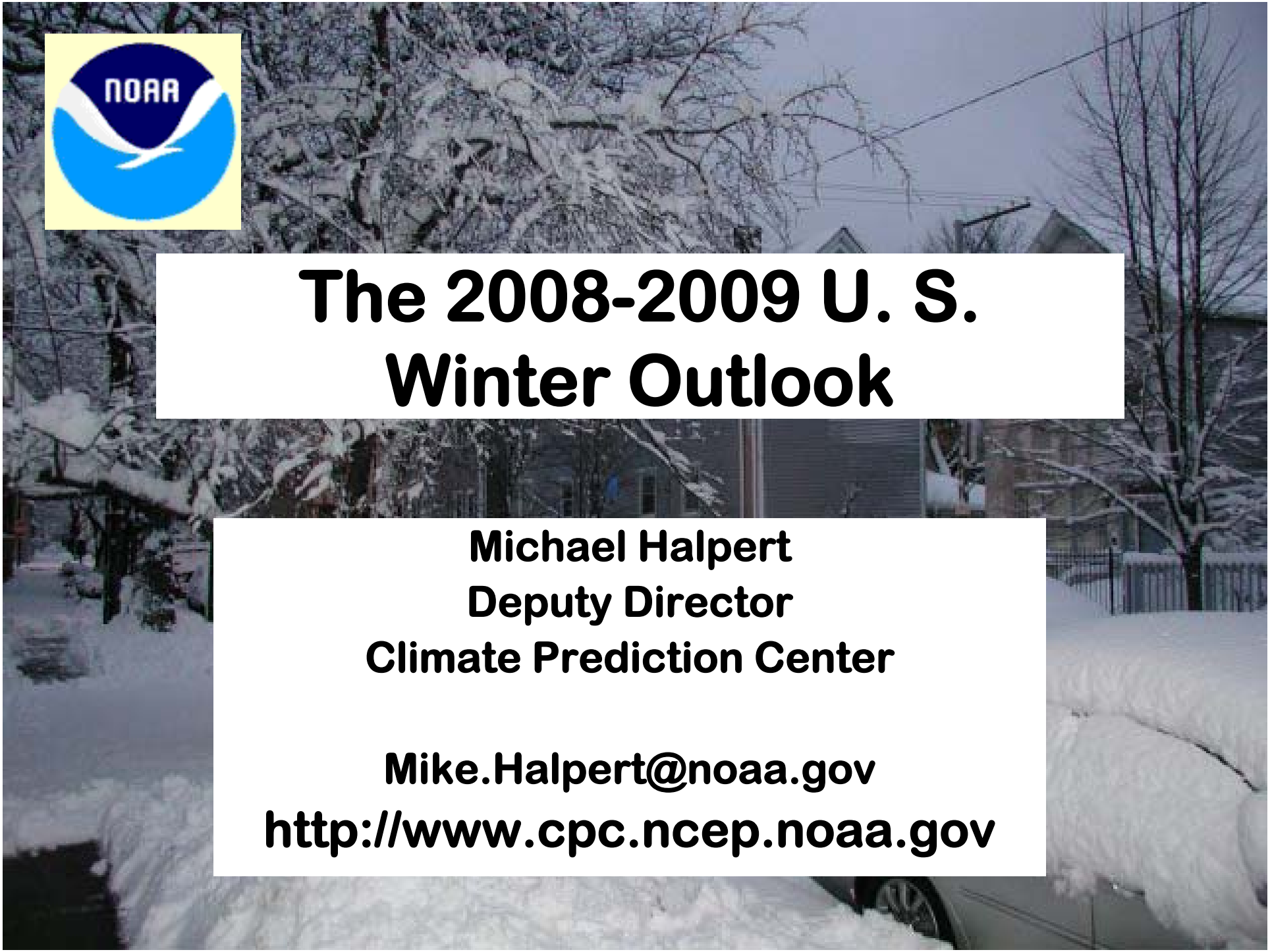

The 2008-2009 U. S. Winter Outlook

Michael Halpert
Deputy Director
Climate Prediction Center

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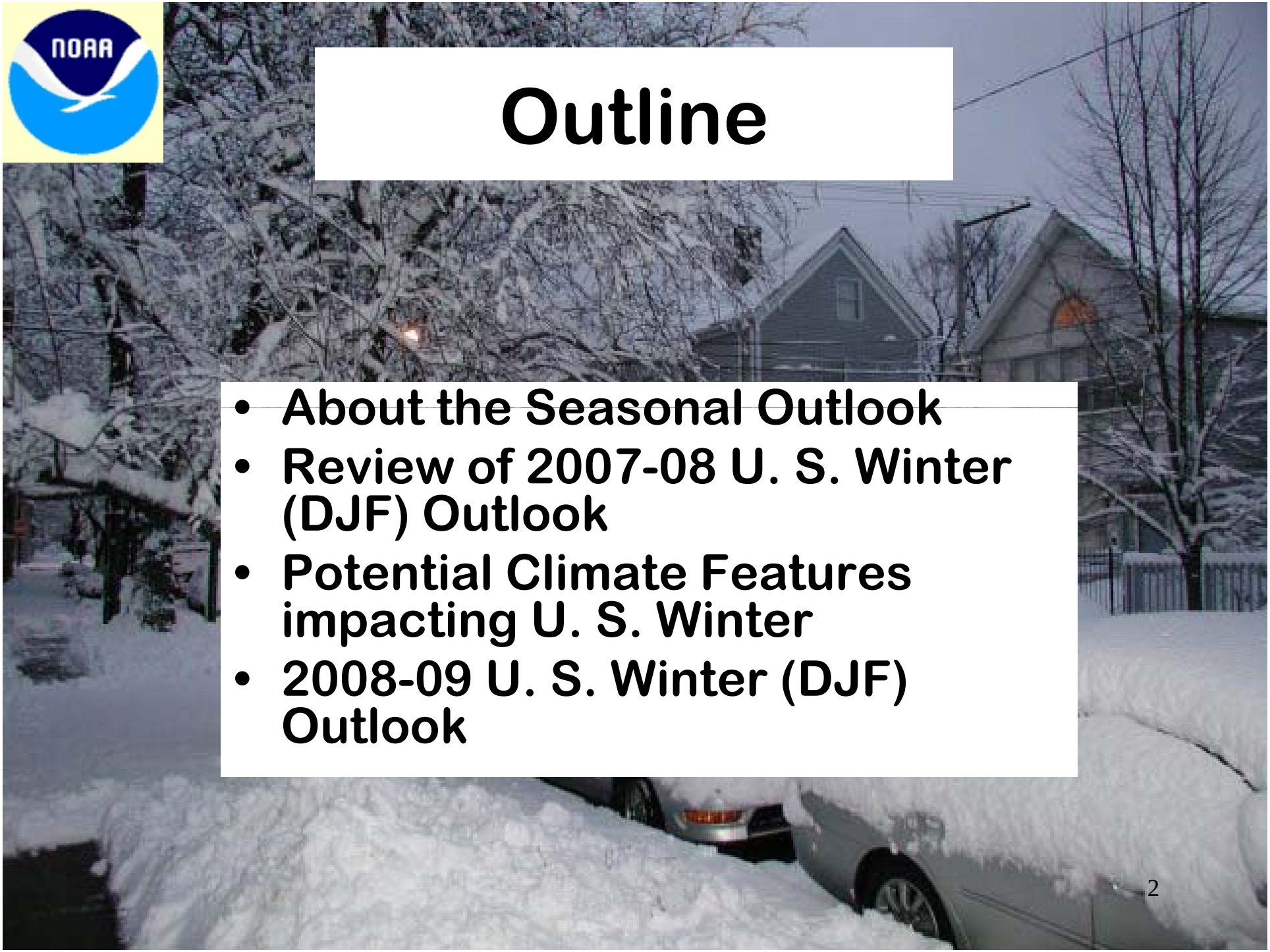


Outline

- About the Seasonal Outlook
- Review of 2007-08 U. S. Winter (DJF) Outlook
- Potential Climate Features impacting U. S. Winter
- 2008-09 U. S. Winter (DJF) Outlook

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 16

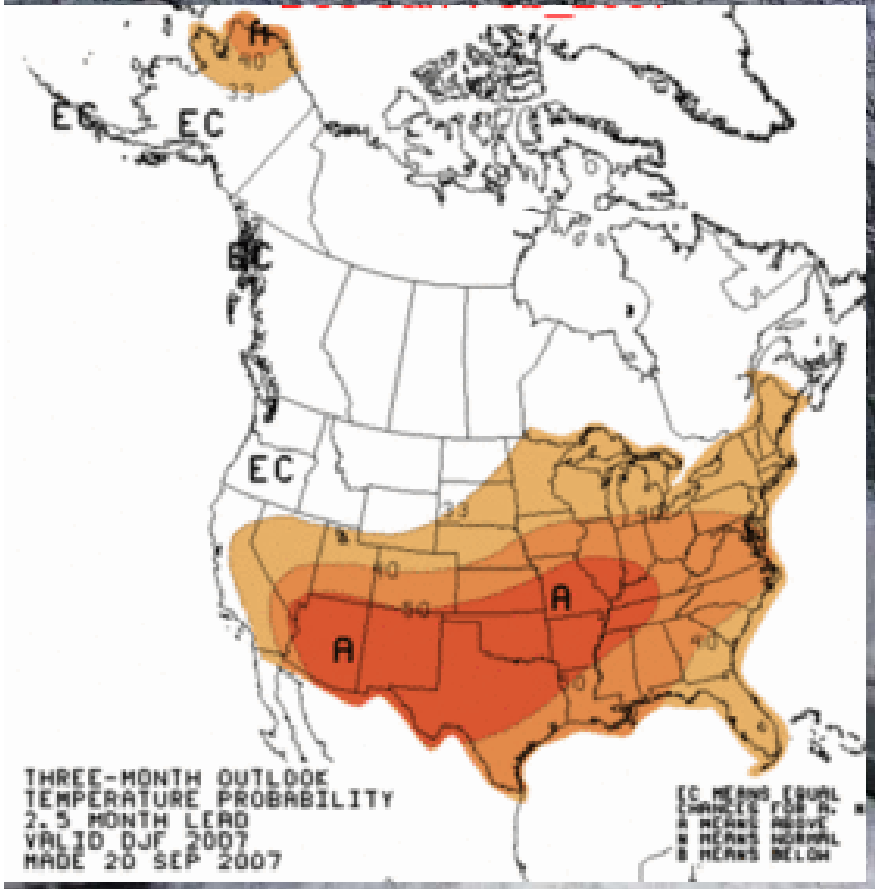
  Final Winter Outlook: November 20

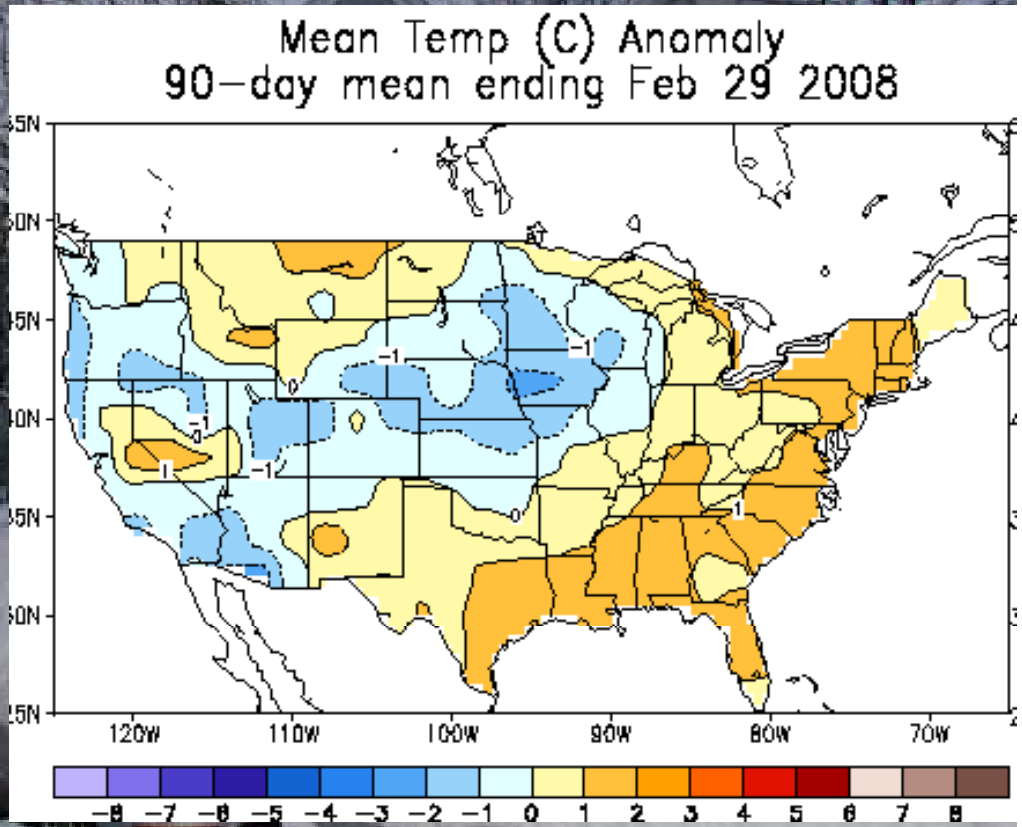
- The outlook for each successive/prior lead time overlaps the prior/successive one by 2 months. This overlap makes for a smooth variation from one map to the next.

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.

Review
Dec 2007 – Feb 2008





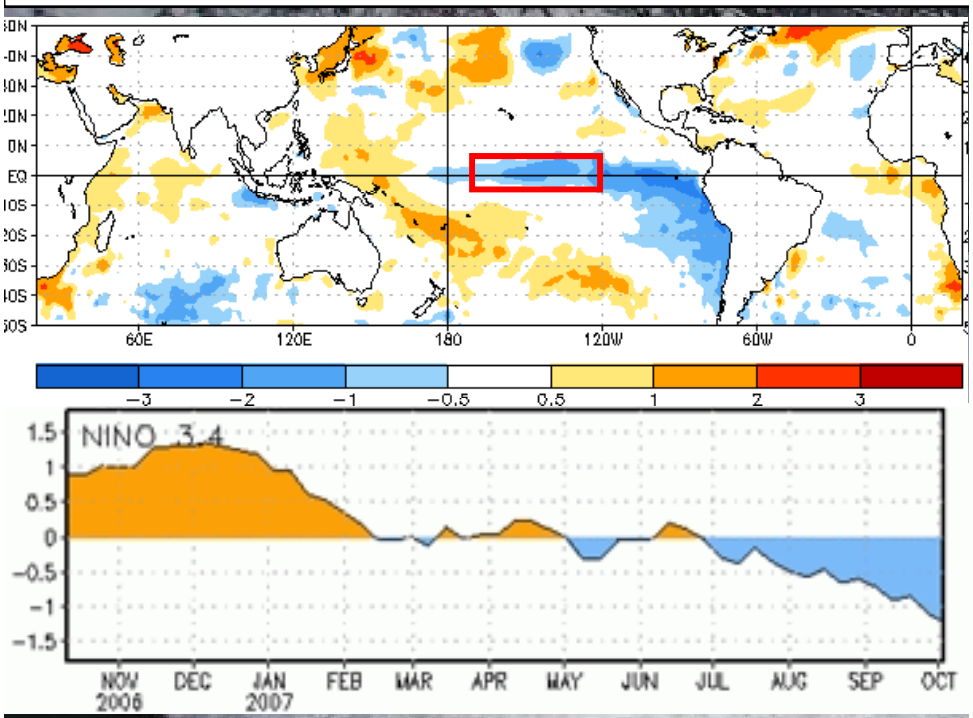
Heidke = 16.3, Coverage = 78%

Review Winter 2007-08 Outlook (DJF) Rationale
(written in October 2007)

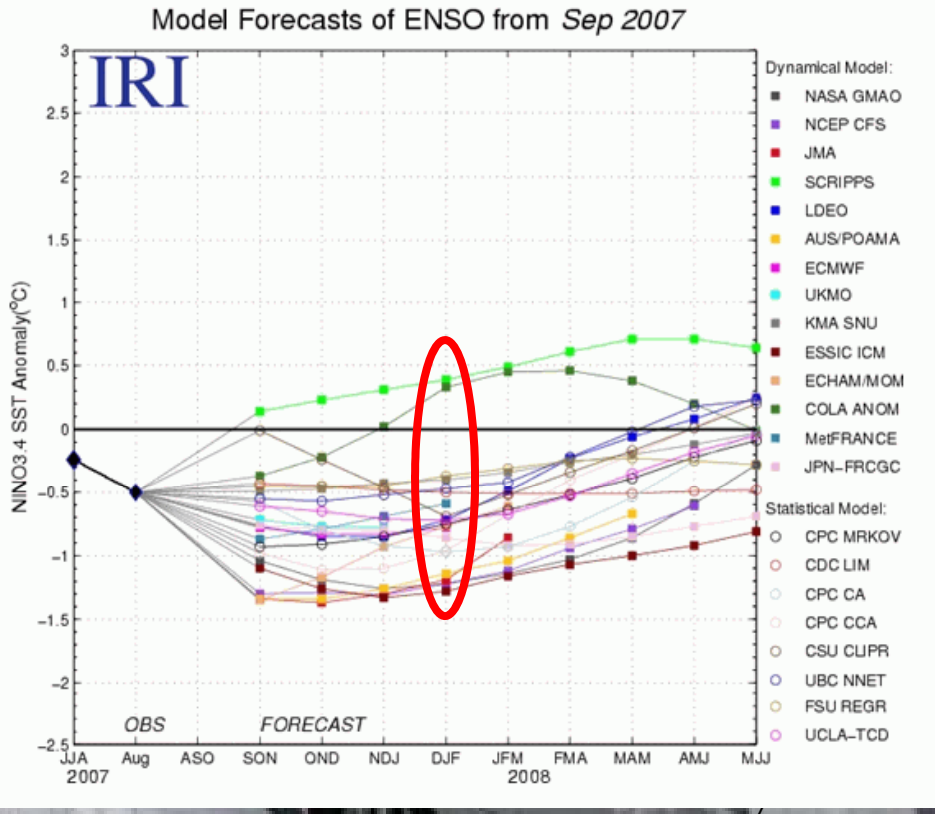
- Weak to moderate La Niña conditions are currently observed in the Pacific
- La Niña expected to maintain and possibly strengthen during next few months
- NAO (AO) has been and continues to be erratic. Large swings possible in any year
- Trends favor above-normal temperatures over much of nation

ENSO Status

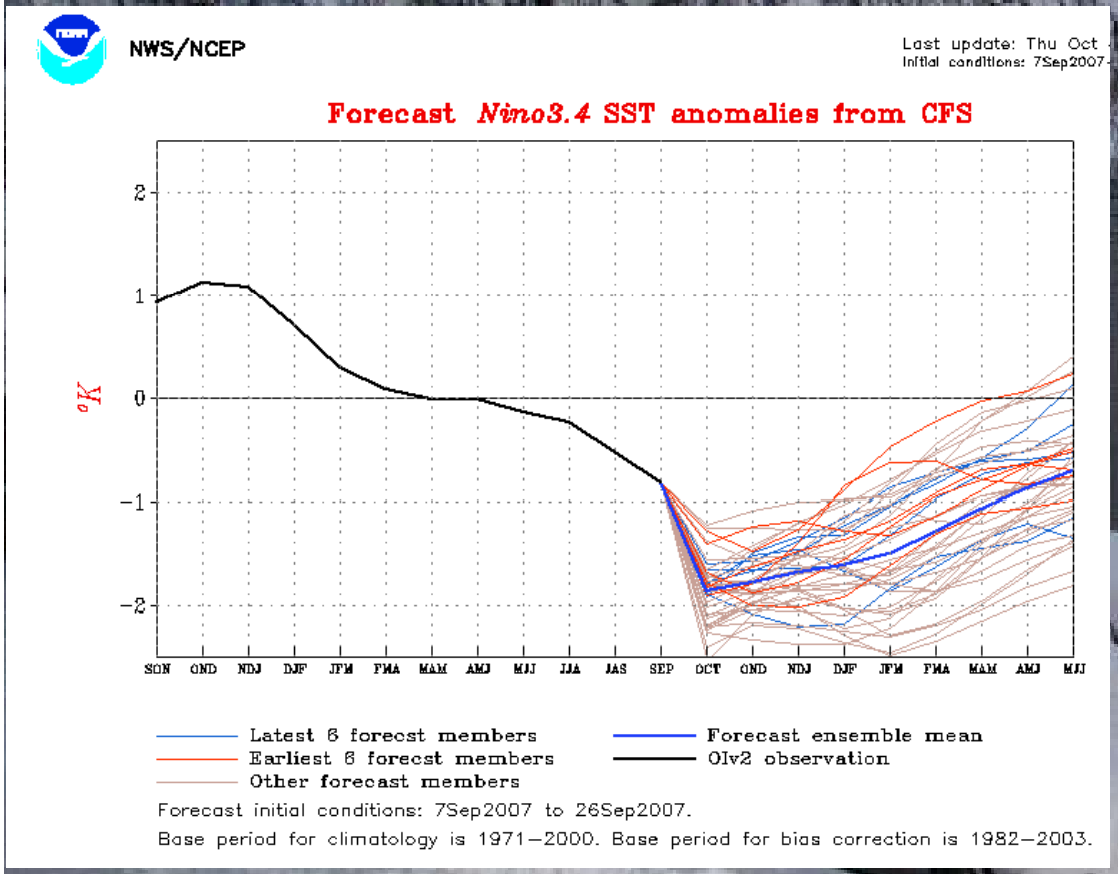
September 2007 SST Anomalies

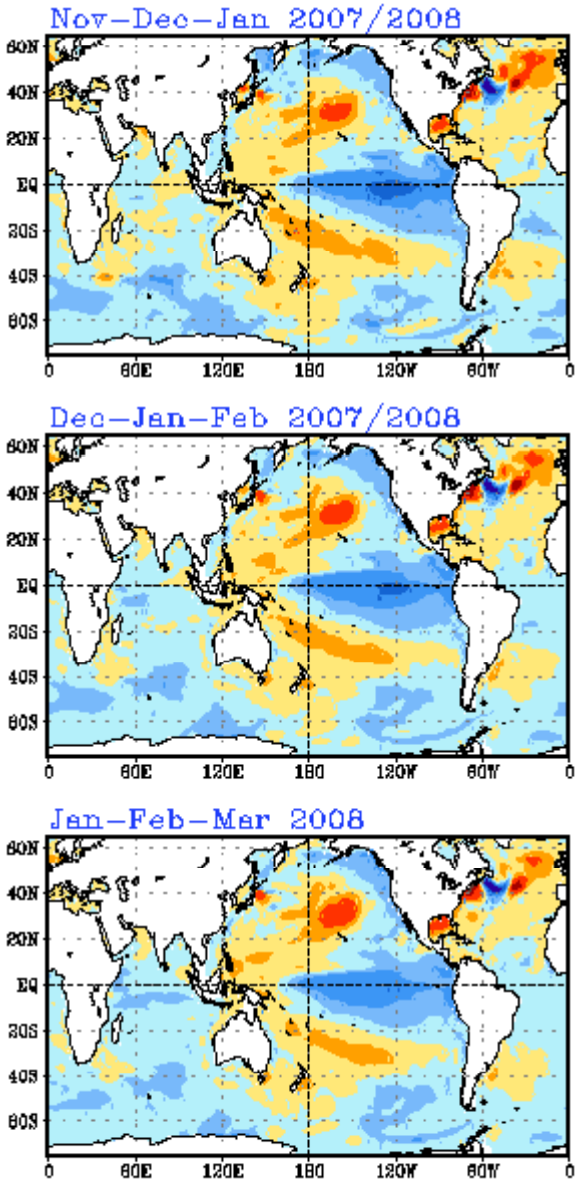


ENSO Forecast

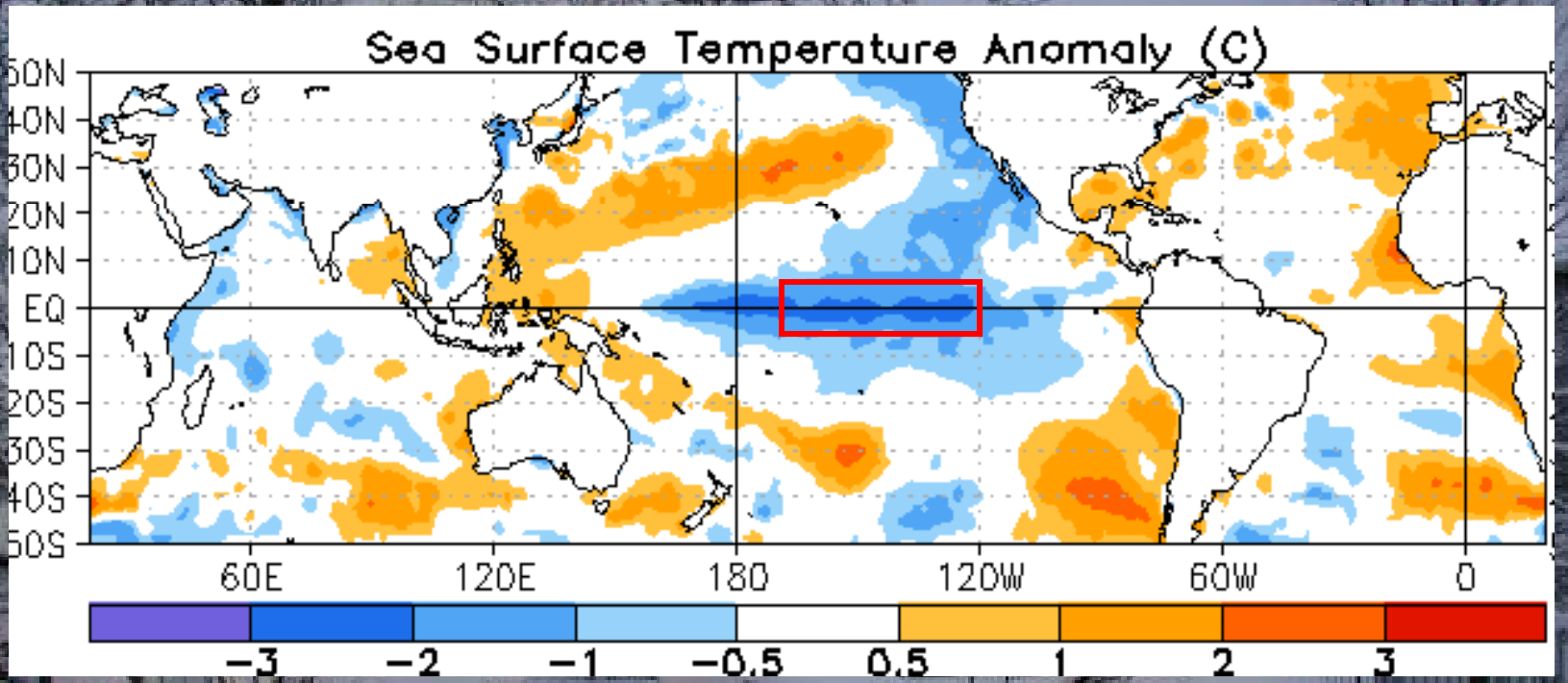


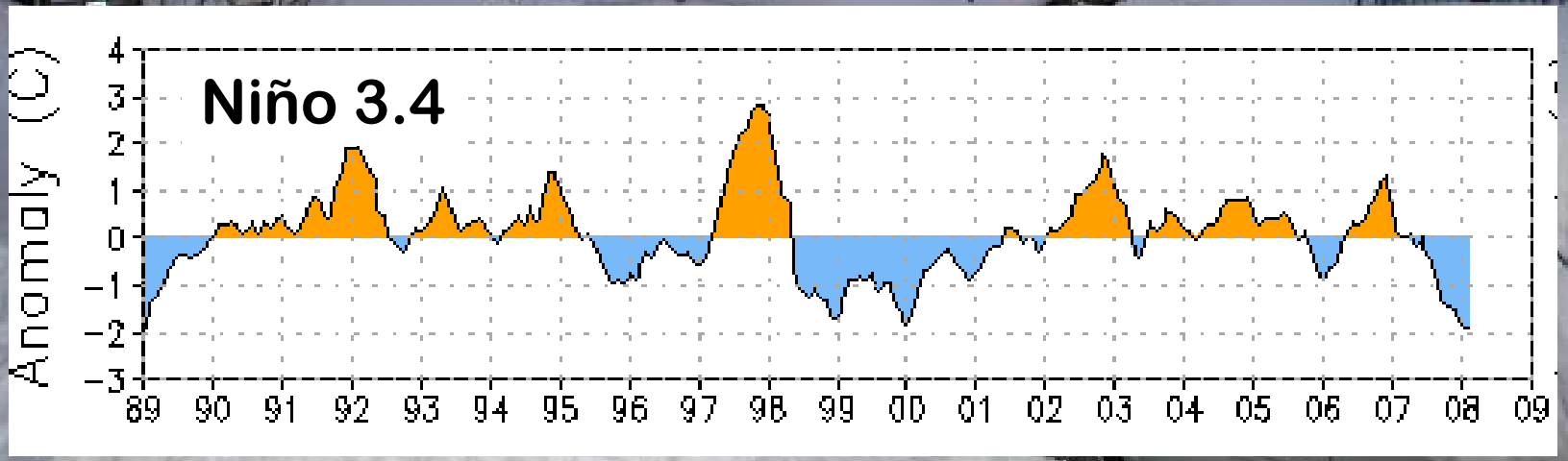
CFS ENSO Forecast



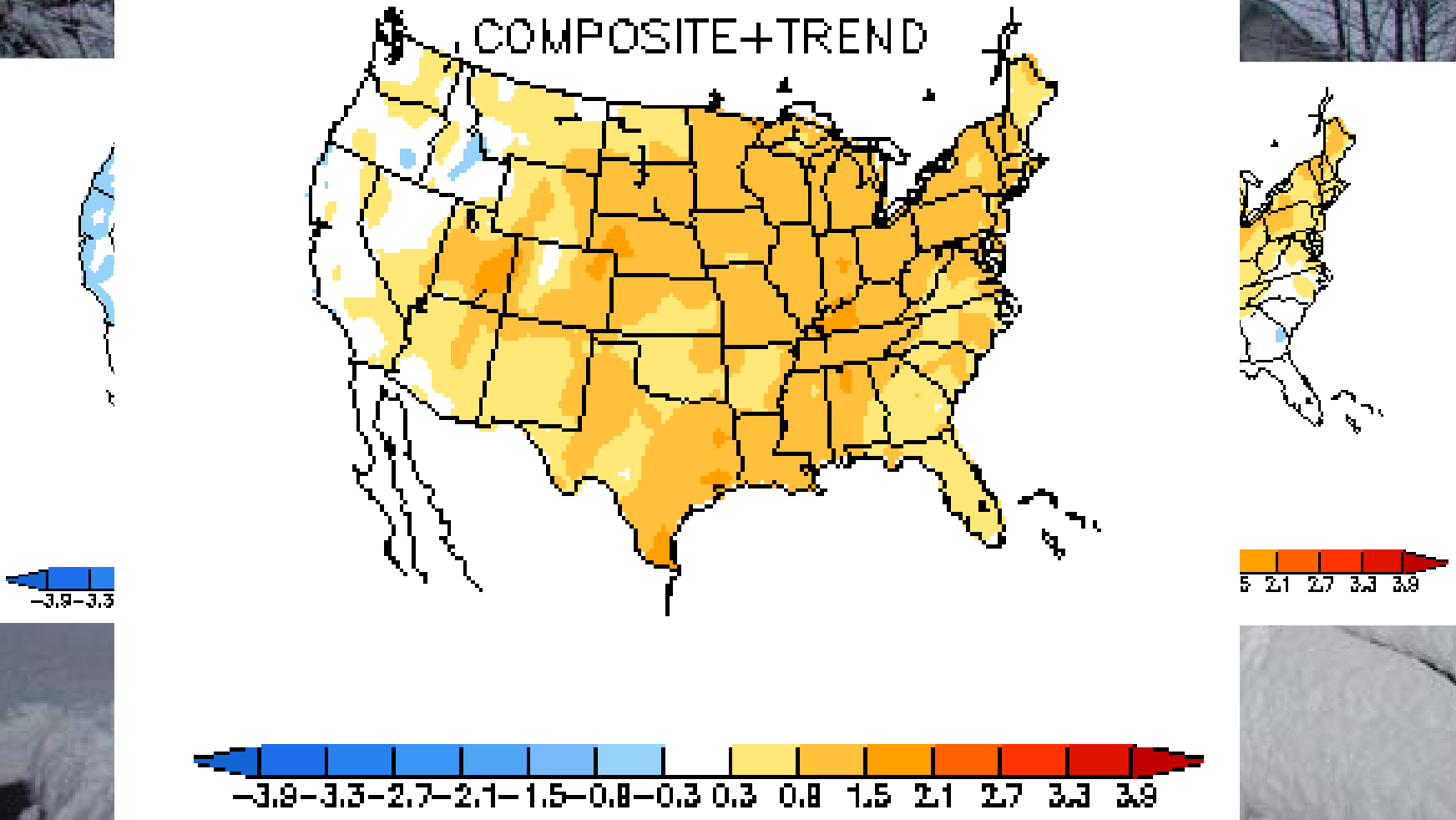


SST Departures (°C) February 2008



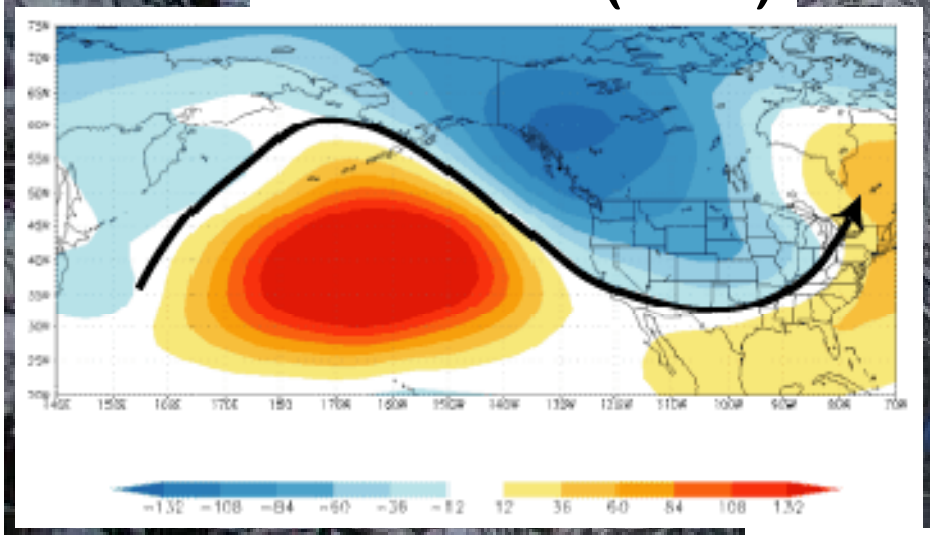


La Niña Temperature Composite

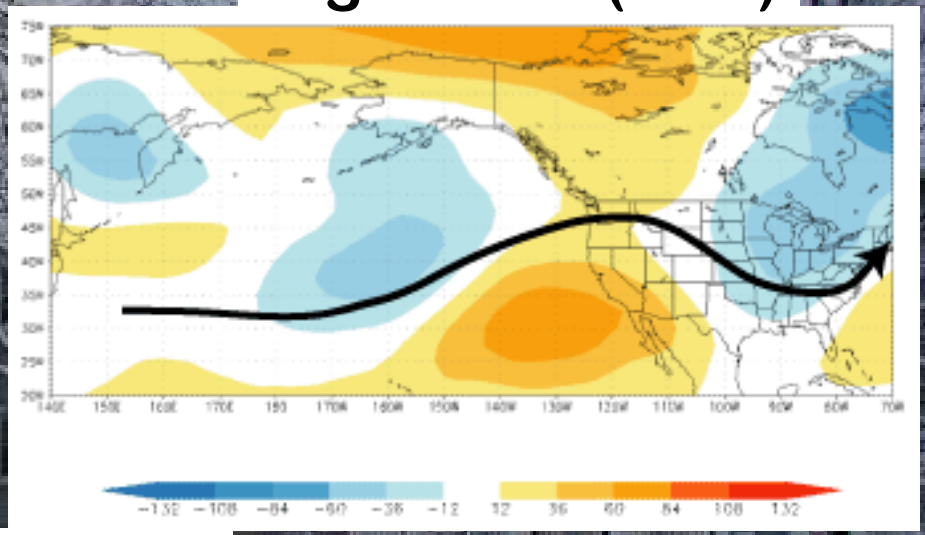


2007-08 Winter Jetstream

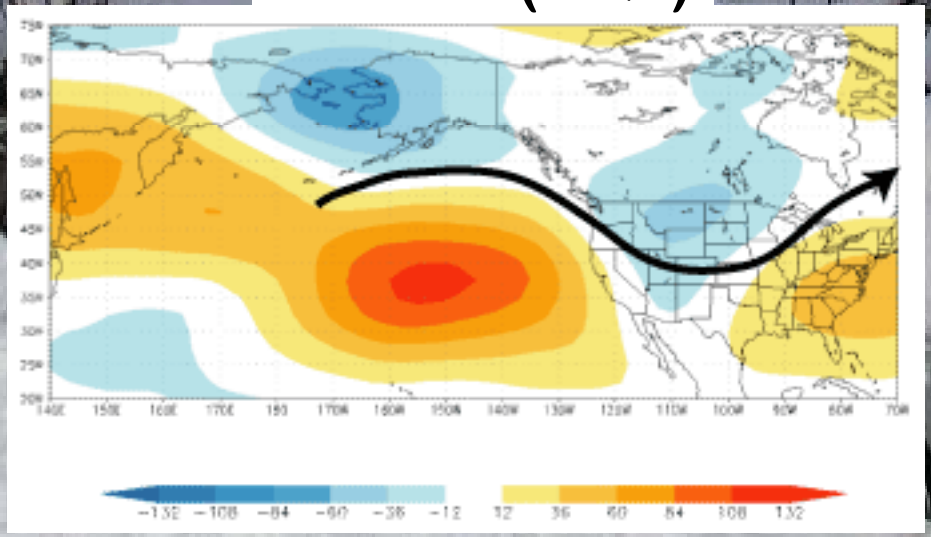
Low Index (25%)



High Index (25%)

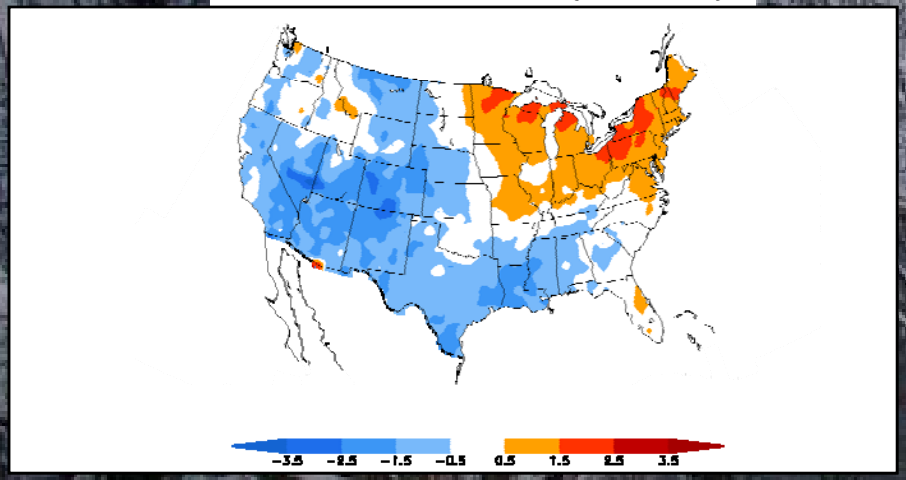


Neutral (50%)

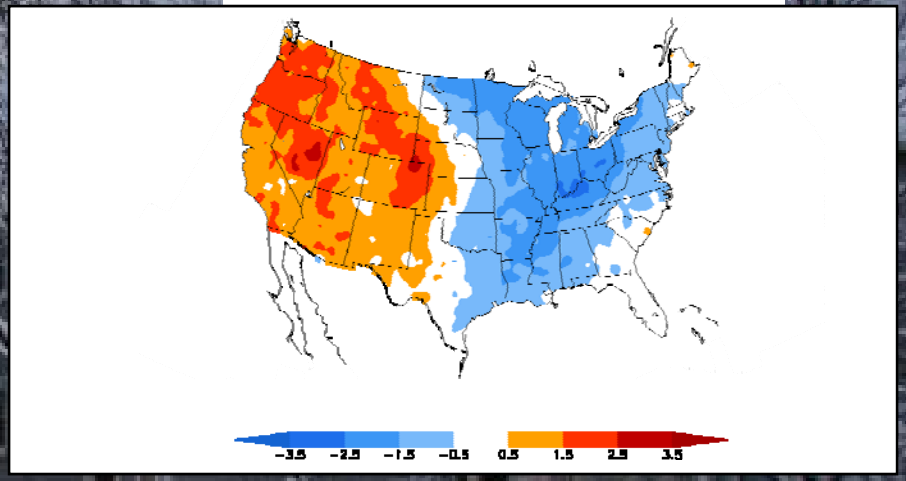


2007-08 Winter Temperatures

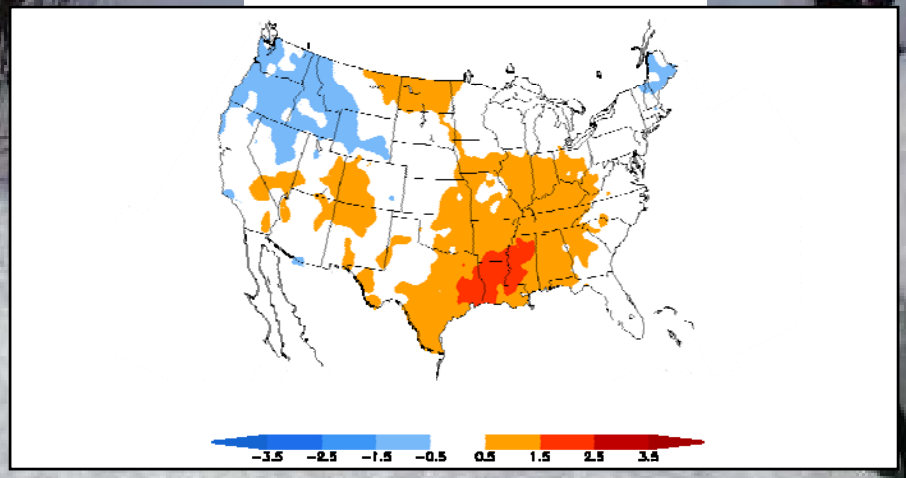
Low Index (25%)



High Index (25%)



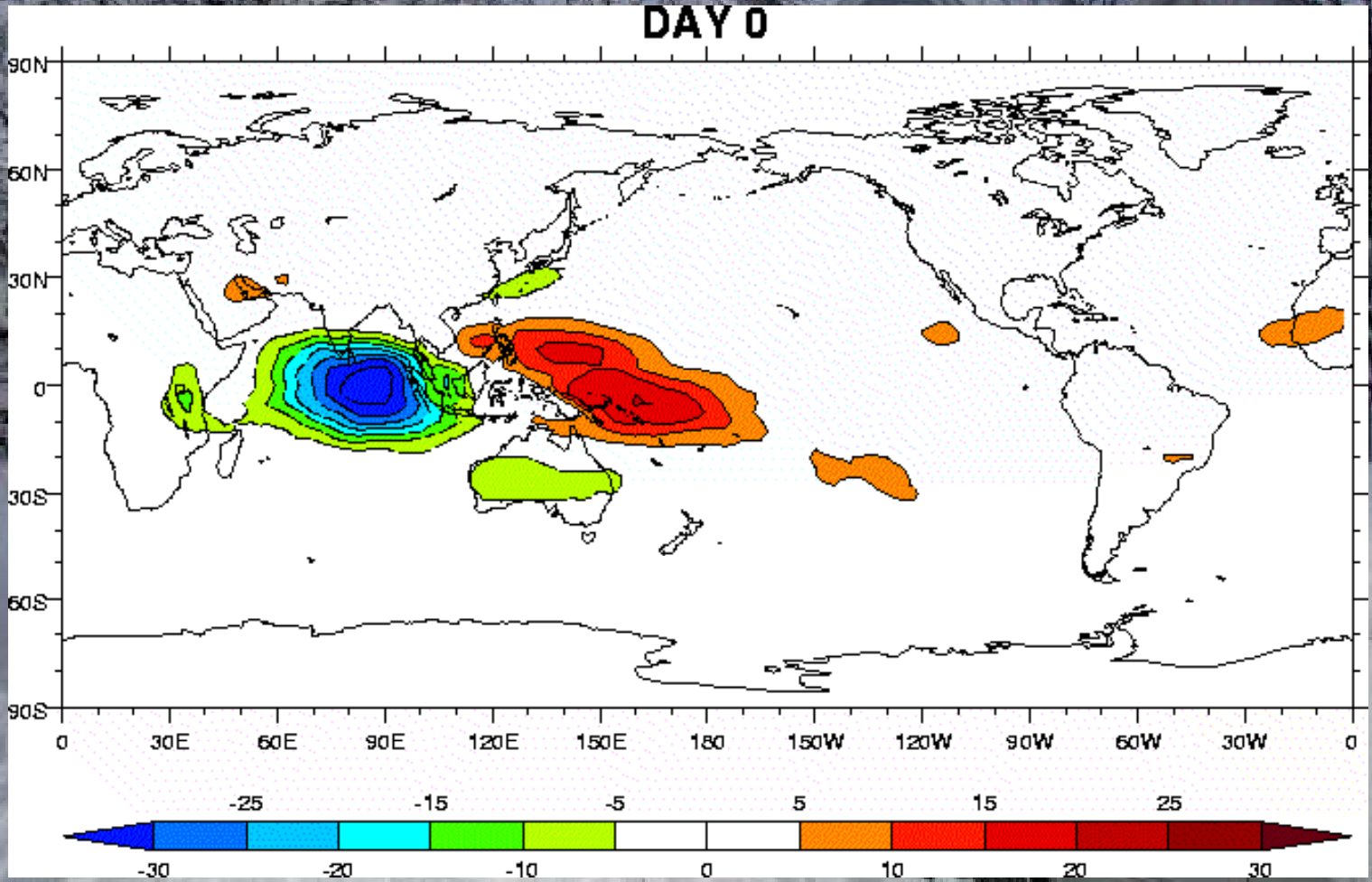
Neutral (50%)



Madden-Julian Oscillation (MJO)

- The MJO is an intraseasonal fluctuation originating in the tropics that is a naturally occurring component of our coupled ocean-atmosphere system.
- The MJO often affects the extratropical circulation
- Typical period of the MJO cycle is approximately 30-60 days
- Acts on a global spatial scale

Animation of the MJO Life Cycle



Madden-Julian Oscillation (MJO)

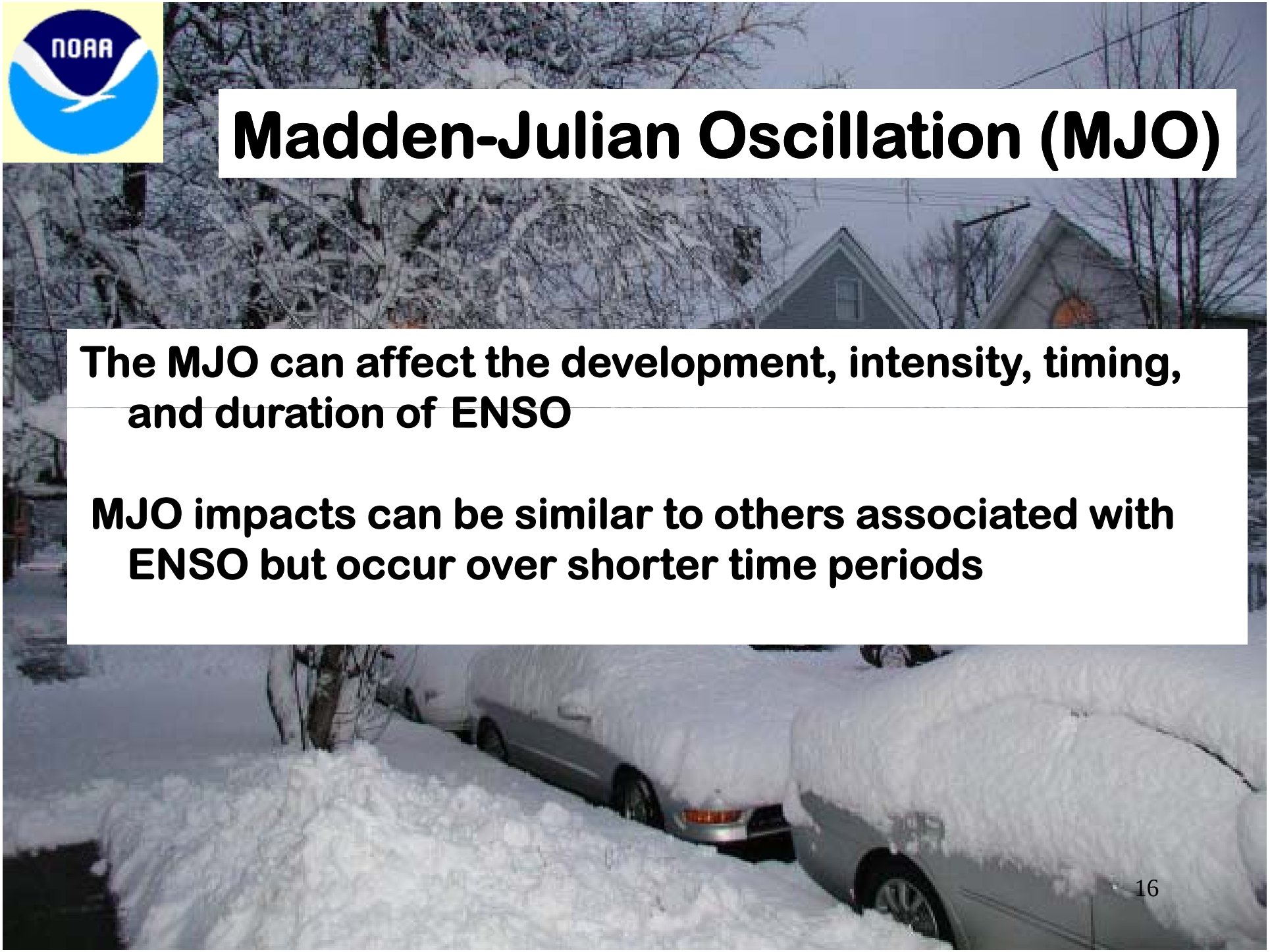
The MJO is often highly variable within the year:

--Extended periods of moderate-to-strong activity often followed by periods of little or no activity;

--Greatest MJO activity - Northern Hemisphere late fall, winter, early spring

The MJO tends to be most active during ENSO neutral years:

--Often absent during strong El Niño/La Niña events



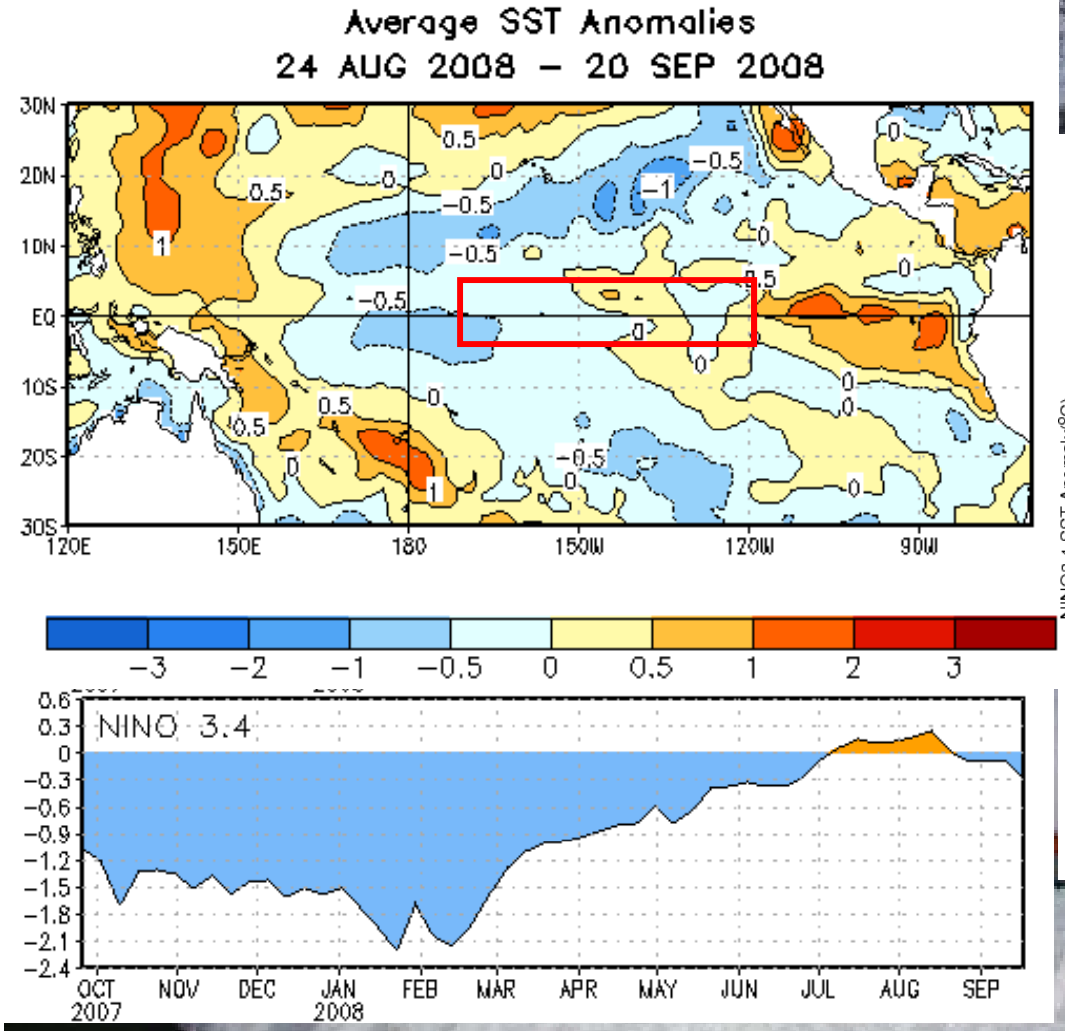
Madden-Julian Oscillation (MJO)

The MJO can affect the development, intensity, timing, and duration of ENSO

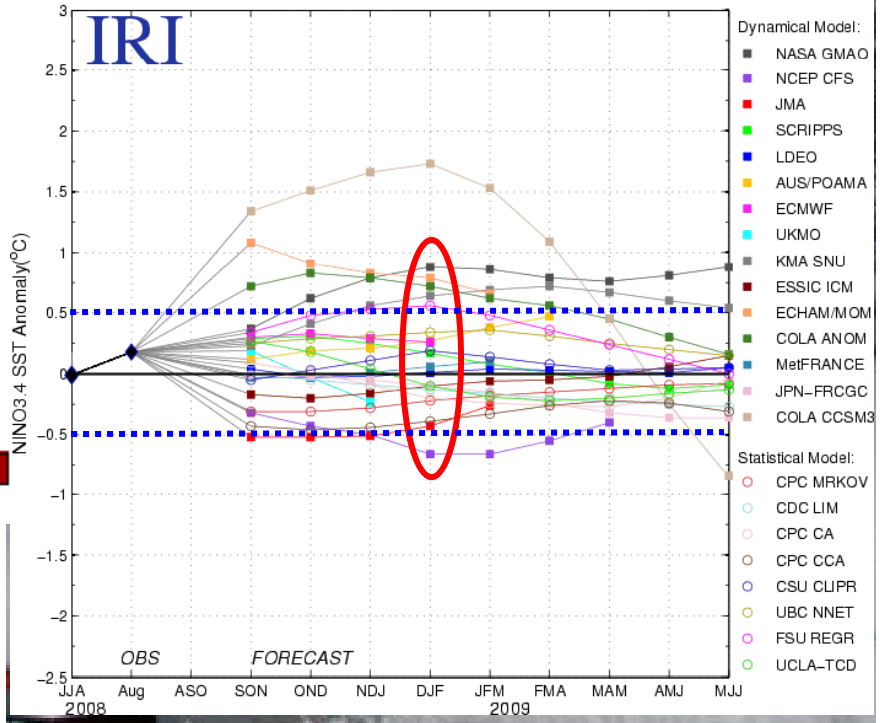
MJO impacts can be similar to others associated with ENSO but occur over shorter time periods

Current ENSO Status

SST Departures (°C)

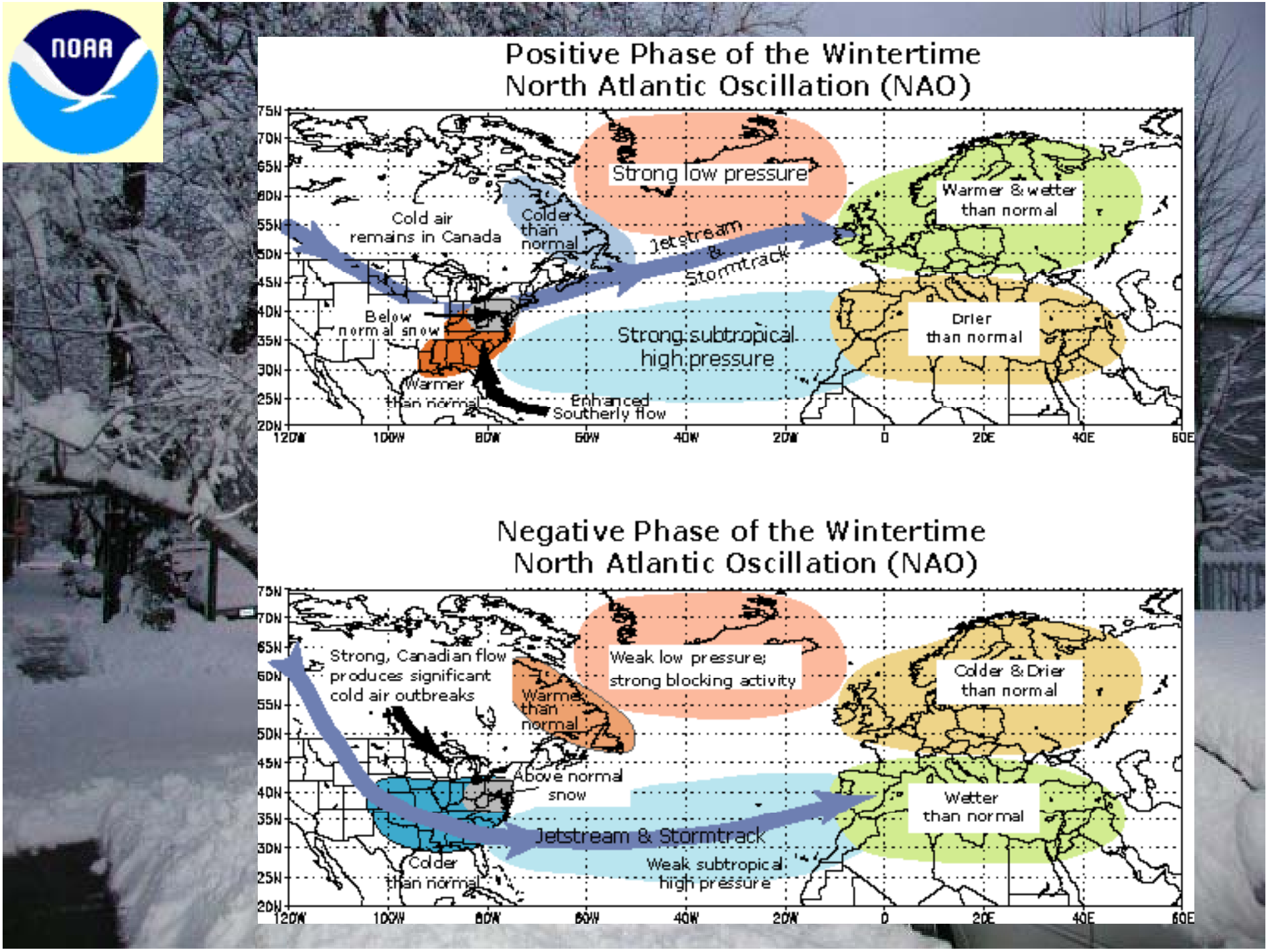


Model Forecasts of ENSO from *Sep 2008*

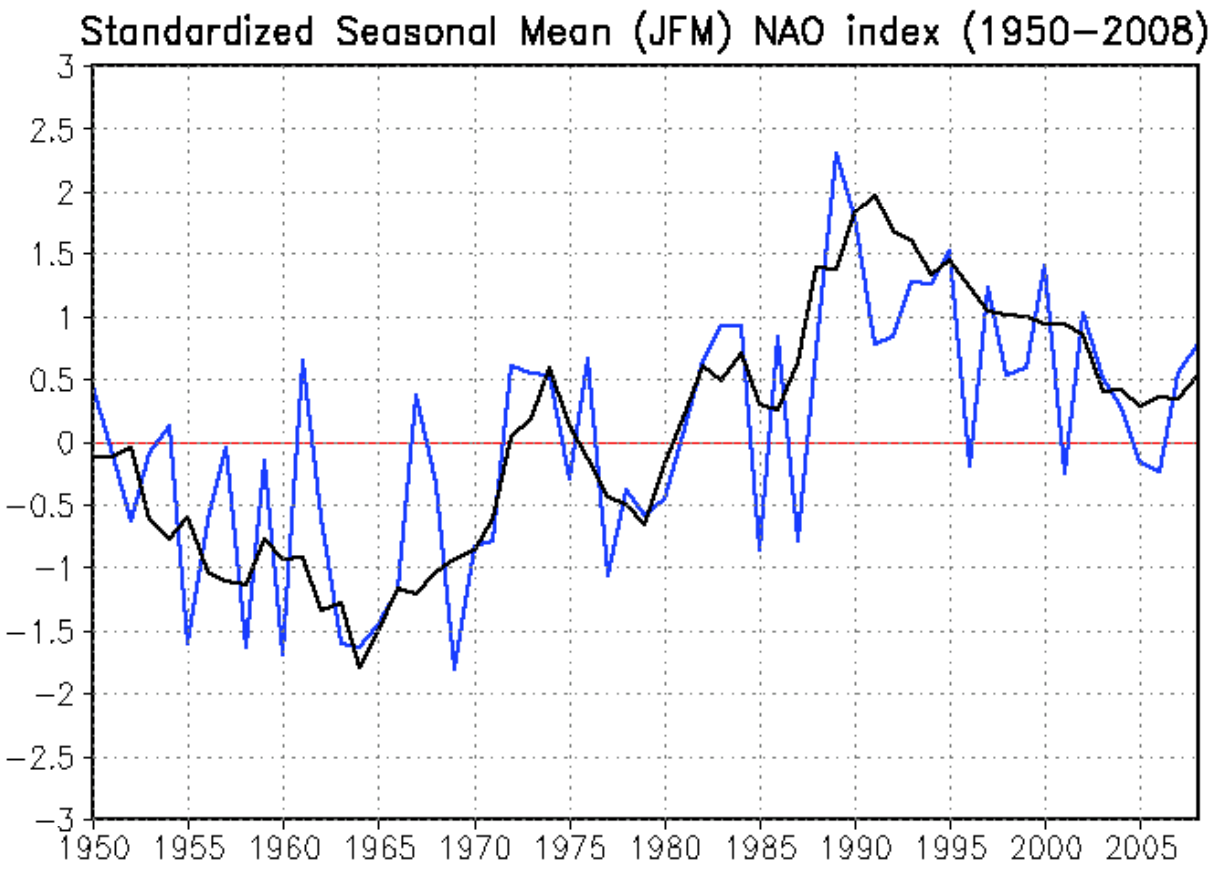


NORTH ATLANTIC OSCILLATION/ ARCTIC OSCILLATION

- 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 .
- A return to the neutral phase of the NAO is suggested by trends over the past decade.


Positive Phase of the Wintertime
North Atlantic Oscillation (NAO)
Strong low pressure
Cold air
remains in Canada
Colder
than
normal
Jetstream
&
Stormtrack
Warmer & wetter
than normal
Below
normal snow
Strong subtropical
high pressure
Drier
than normal
Warmer
than normal
Enhanced
Southerly flow
75N
70N
65N
60N
55N
50N
45N
40N
35N
30N
25N
20N
120W
100W
80W
60W
40W
20W
0
20E
40E
60E
Negative Phase of the Wintertime
North Atlantic Oscillation (NAO)
Strong, Canadian flow
produces significant
cold air outbreaks
Weak low pressure;
strong blocking activity
Colder & Drier
than normal
Warmer
than
normal
Above normal
snow
Wetter
than normal
Jetstream & Stormtrack
Colder
than normal
Weak subtropical
high pressure

NAO Time Series



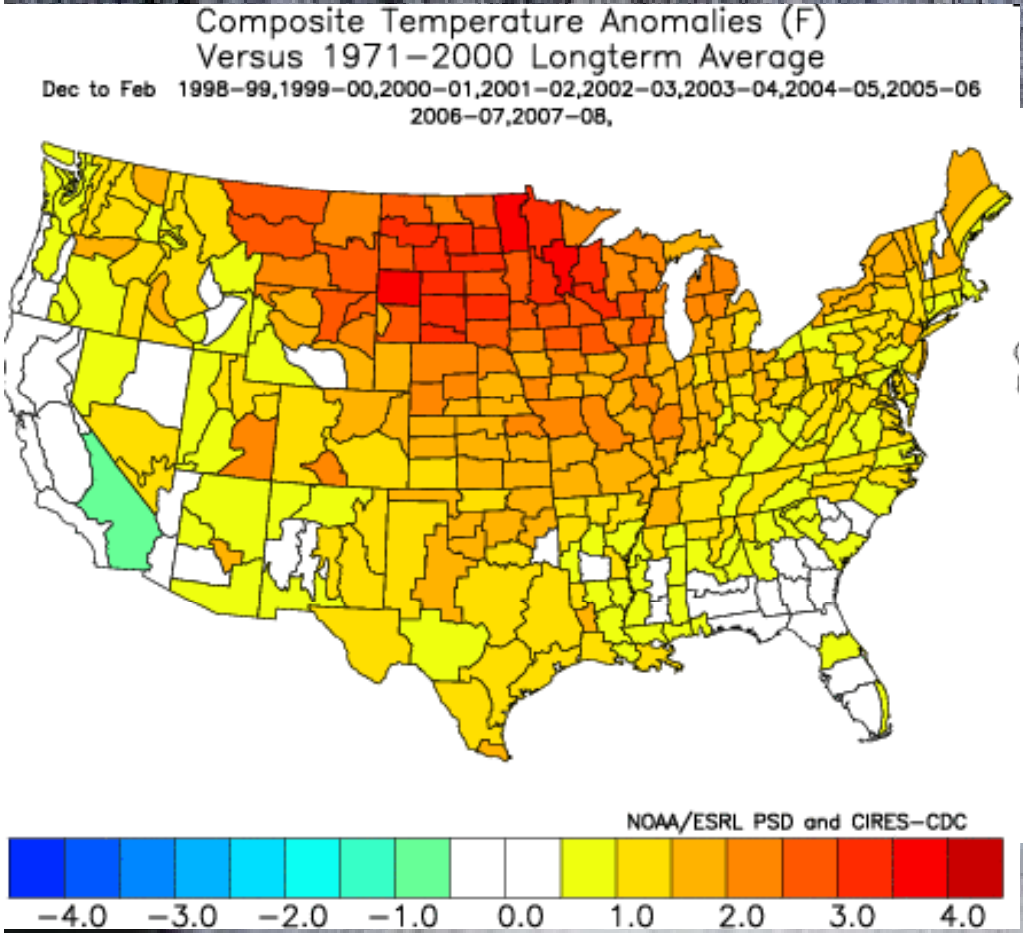
NAO exhibits strong multi-decadal variability
Negative phase in 1950s-1970s
Positive Phase 1980s- 1990s

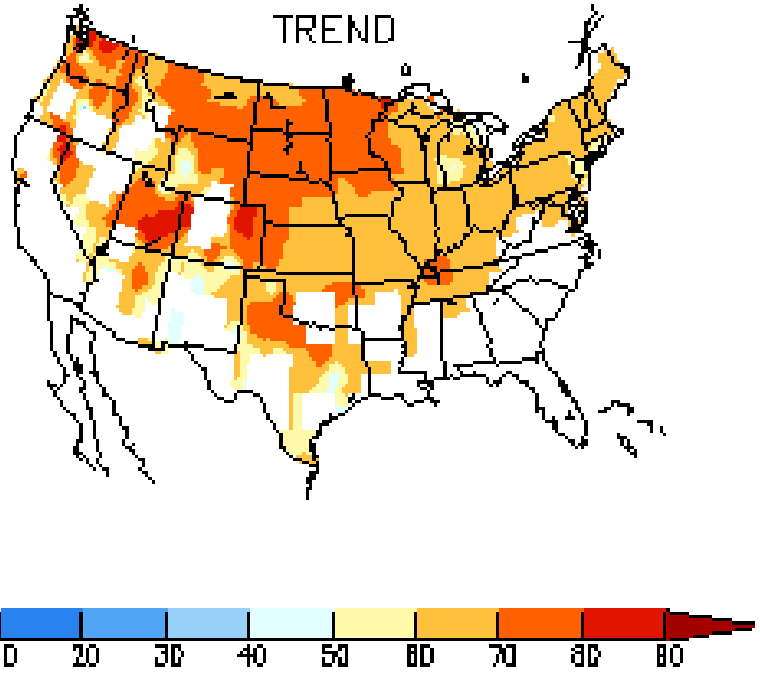
Optimal Climate Normal (OCN)

- 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 10 years and the 30 year climatology.

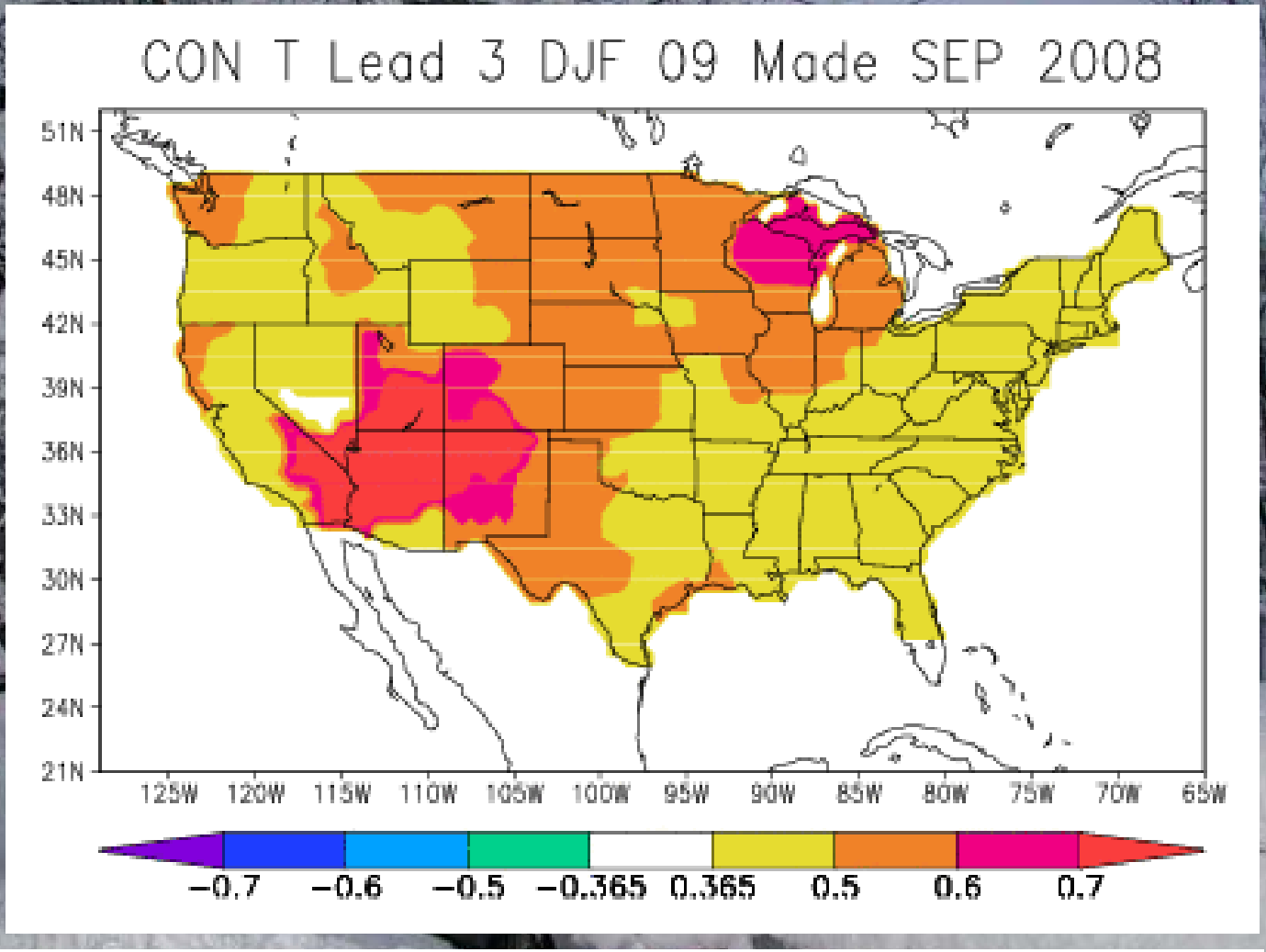
December - February OCN

1998-2007





Consolidation Forecast

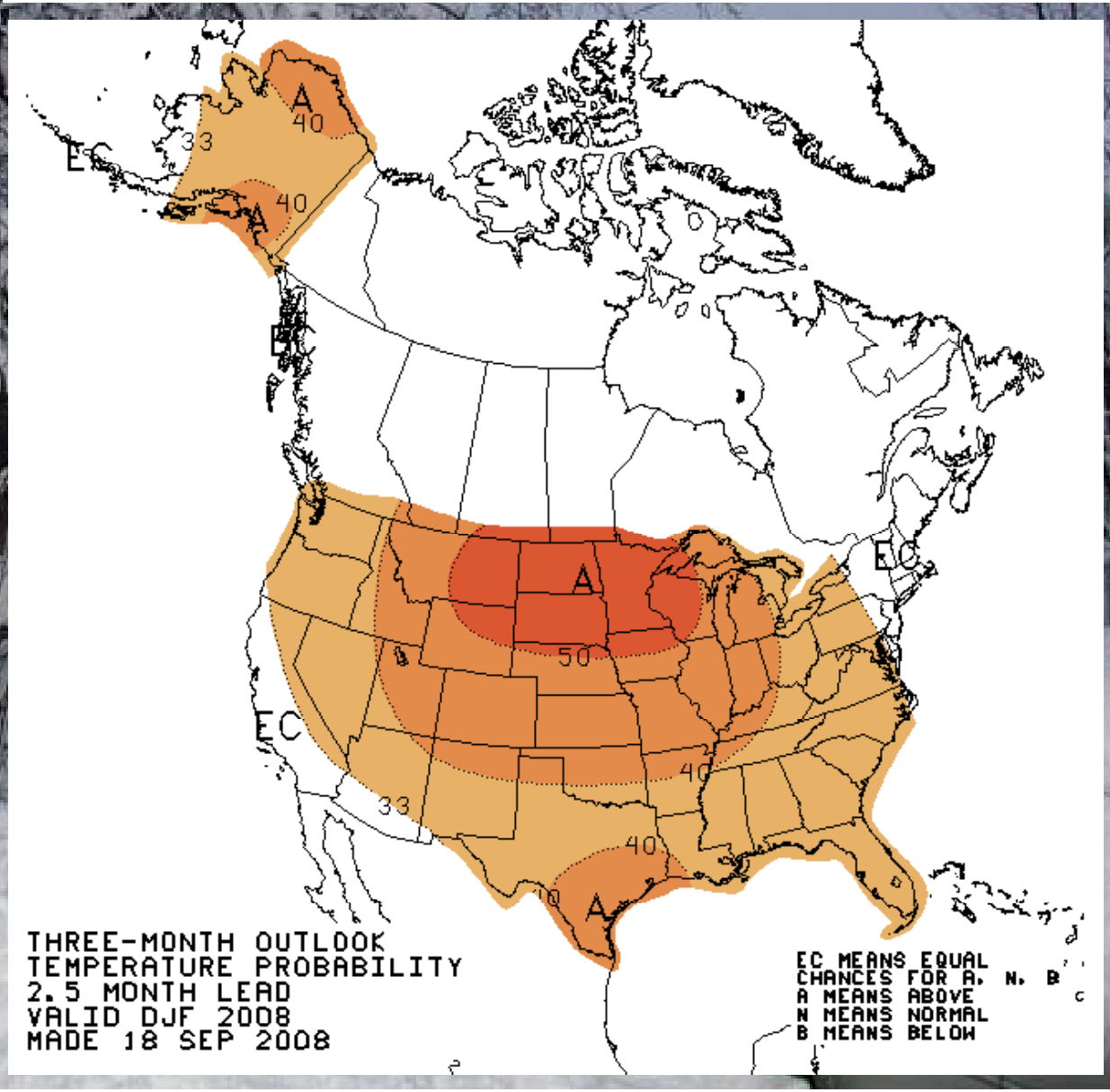


Objective skill-weighted combination of statistical tools, CFS, trend

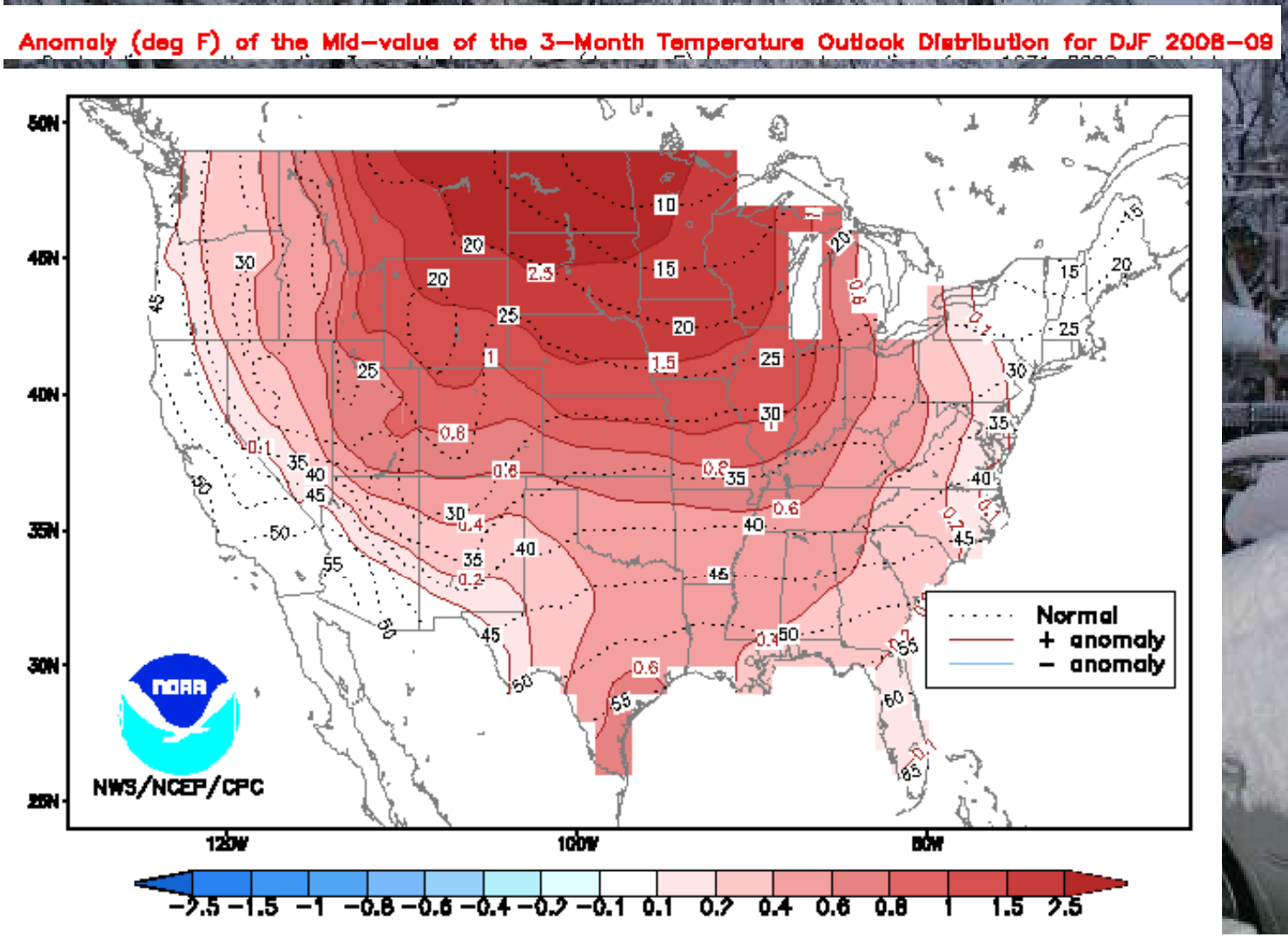
Winter 2008-09 Outlook Rationale

- ENSO-neutral conditions are currently observed in the Pacific.
- This is expected to persist through the winter.
- NAO (AO) has been and continues to be erratic. Large swings possible in any year
- Variability due to intraseasonal oscillations possible
- Trends favor above-normal temperatures over much of nation

December 2008 – February 2009 Temperature Outlook



Average Departure of Mid-Value Temperature Outlook Distribution

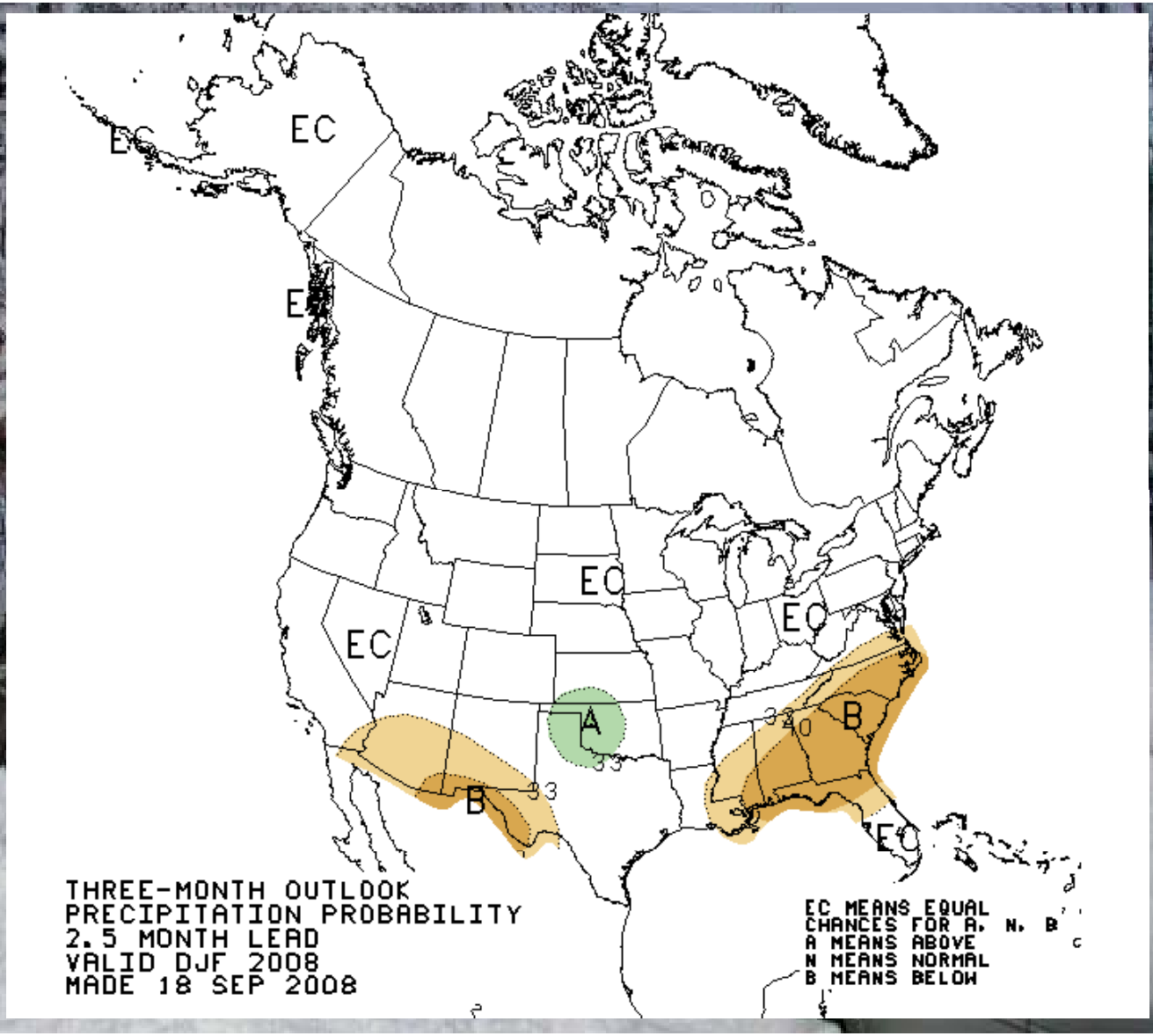


HDD Projections:

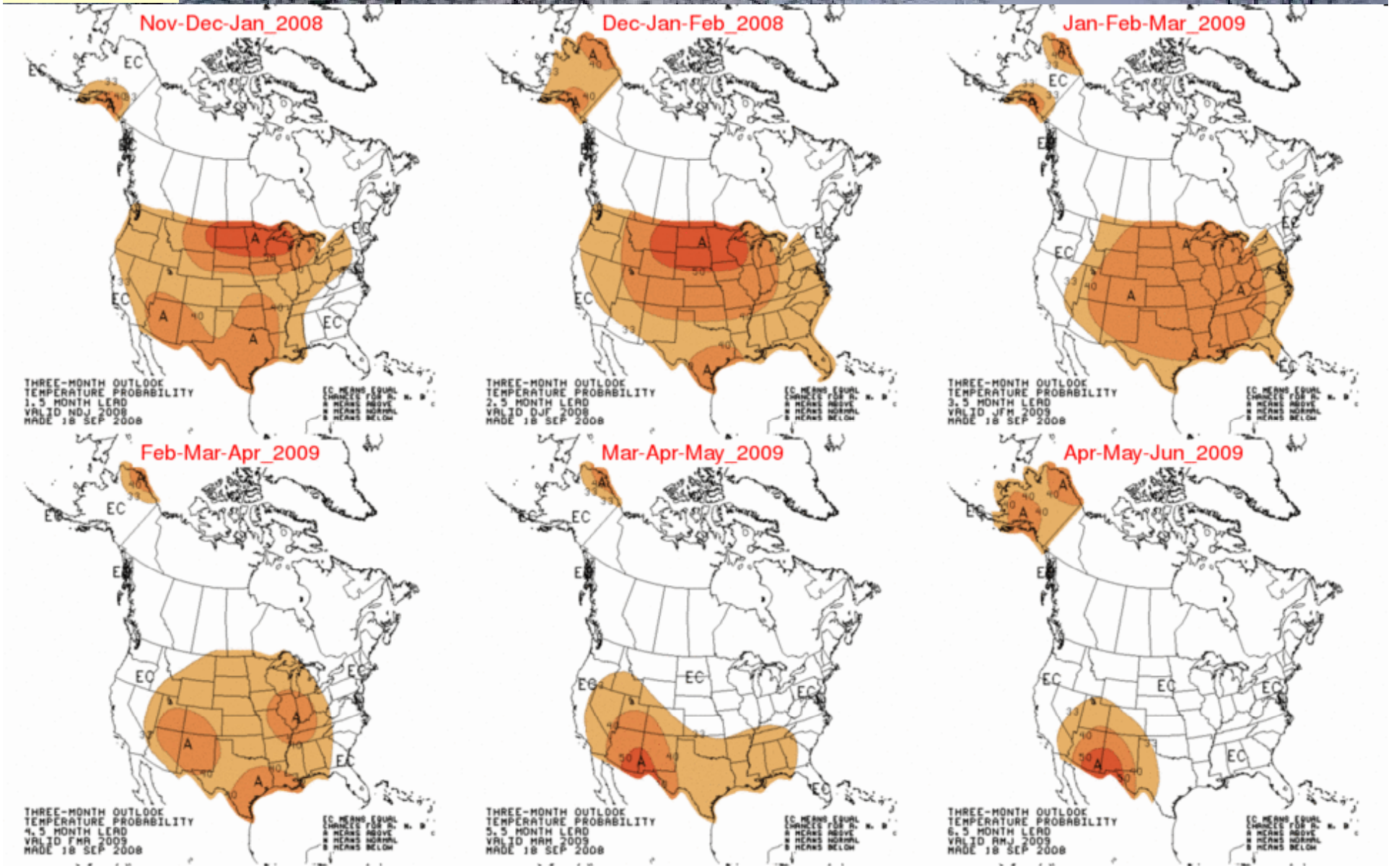
2% less than 1971-2000

Similar to 2007-08

December 2008 – February 2009 Precipitation Outlook



Seasonal Temperature Outlooks
NDJ 2008 – AMJ 2009



U. S. Winter 2008-09 Outlook: Forecast Summary

- Warmer than average in most of the country, except for coastal California and the Northeast
- Central and Eastern Alaska: Warmer than average; Western Hawaii: Warmer than average
- Drier than average across the Southwest and Southeast
- Northern Texas and Oklahoma: Wetter than average