

# Forecast Skill Scores and Examples from Recent Winters

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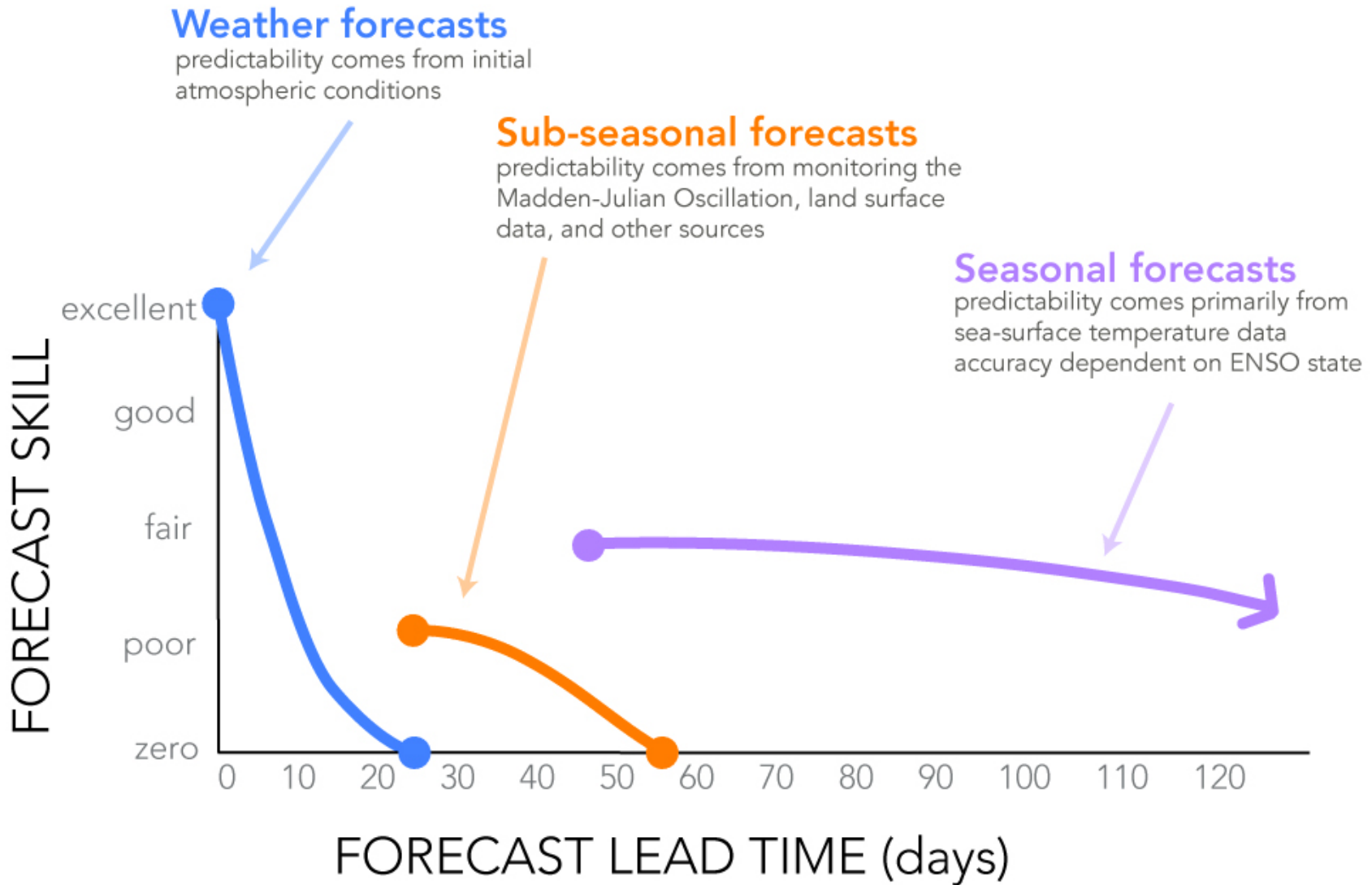
National Weather Service – Western Region HQ  
Science and Technology Division



DWR Winter Outlook Workshop  
UCS/Irvine, Irvine, CA – December 5<sup>th</sup>, 2018



# CPC Precipitation Outlook DJF 2015-2016



# CPC Precipitation Outlook DJF 2015-2016

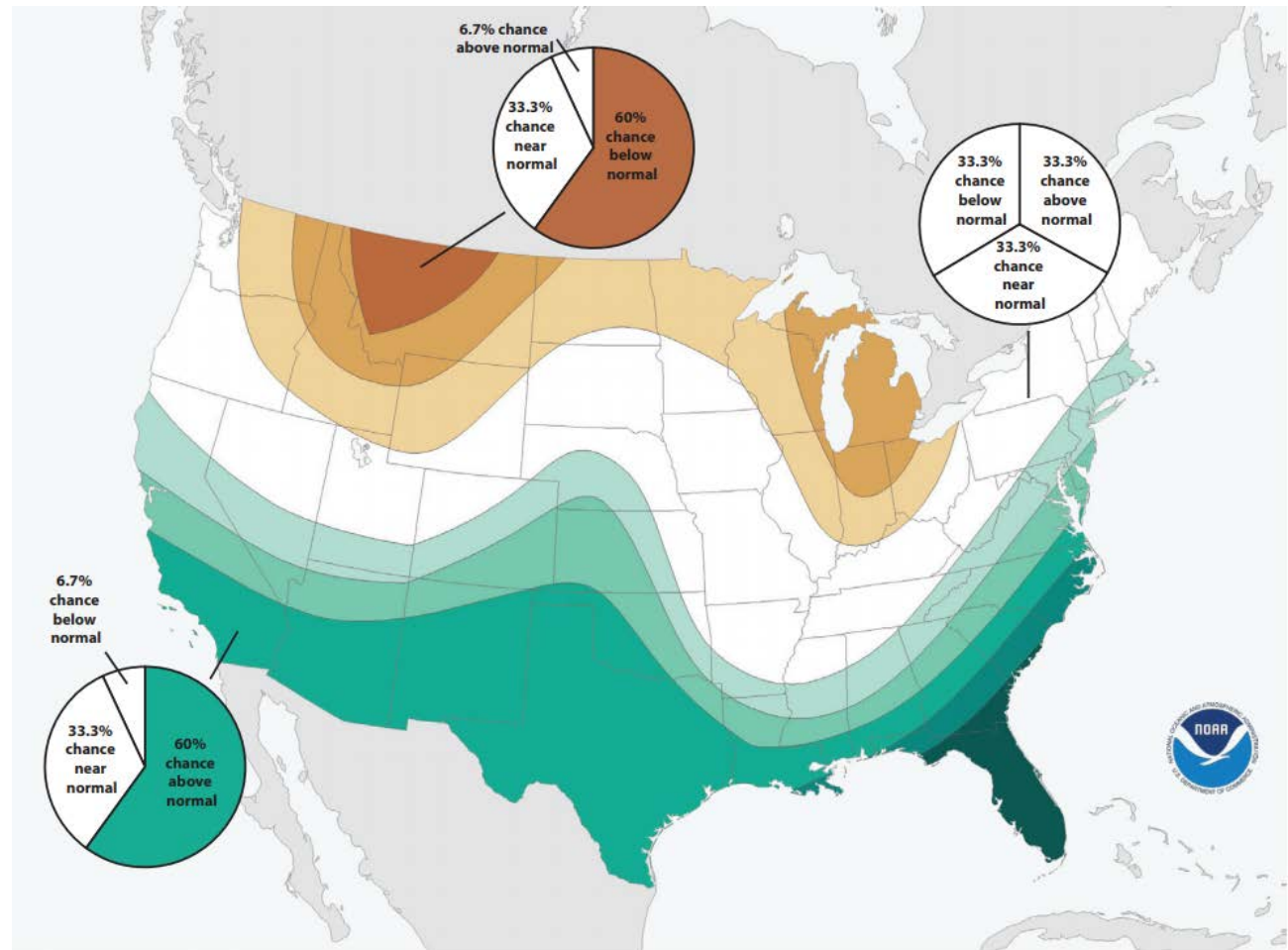
## What it does say

The probability that precipitation will be above, near, or below the median (*not mean*) value.

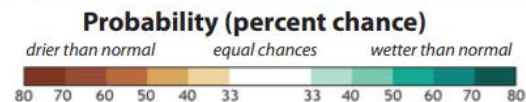
These three classes (above, near, and below) are defined by separating the climatological (1981–2010) distribution into thirds, so that each has a 33.3% probability of occurrence.

## What it does not say

How far above or below the median precipitation the outcome will be.



Precipitation Outlook  
for December-February  
Issued 2015 Oct 13



Climate.gov  
Data: CPC

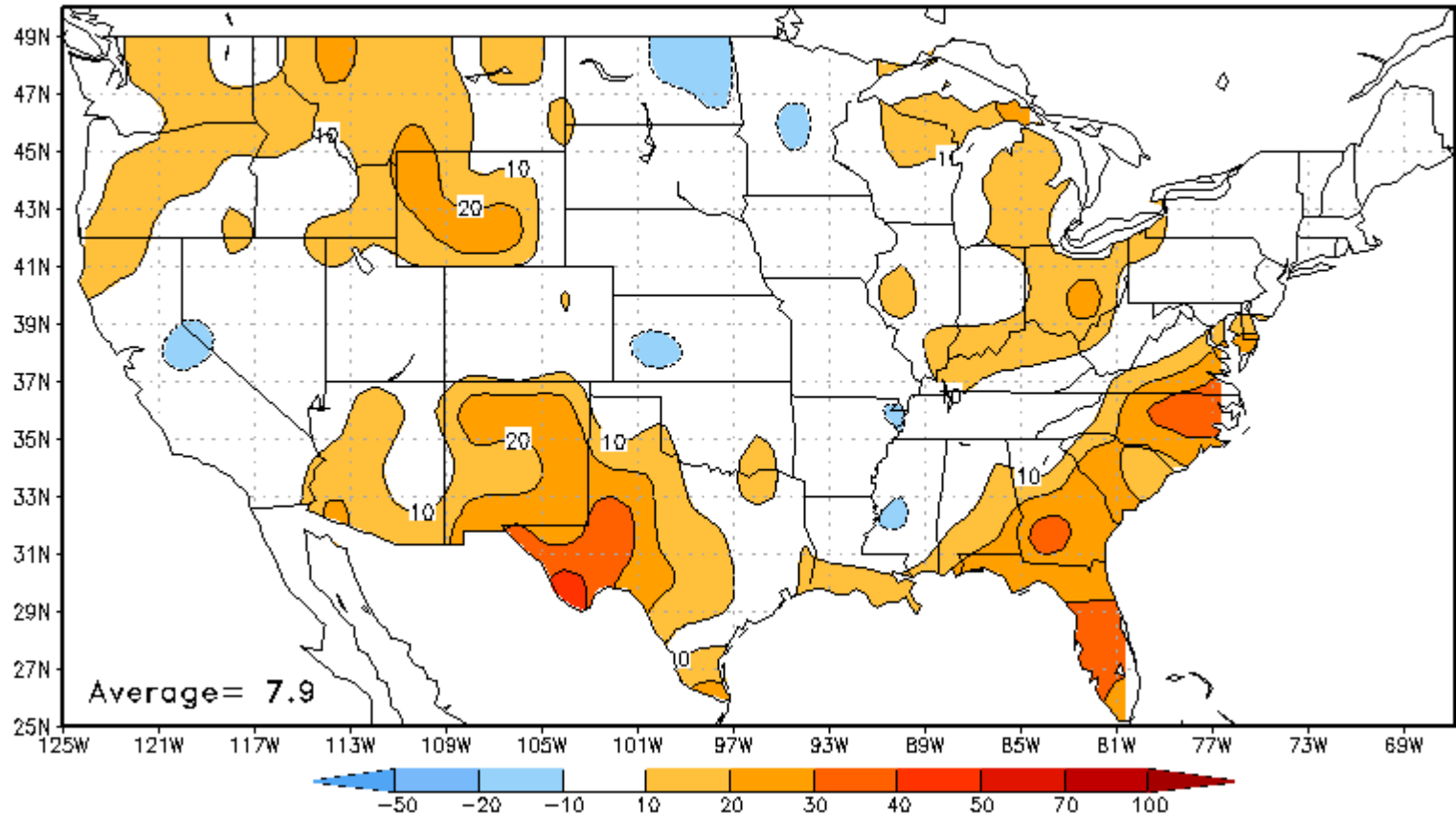
Description: [http://www.cpc.ncep.noaa.gov/products/predictions/long\\_range/tools.html](http://www.cpc.ncep.noaa.gov/products/predictions/long_range/tools.html)

# Skill Score Basics

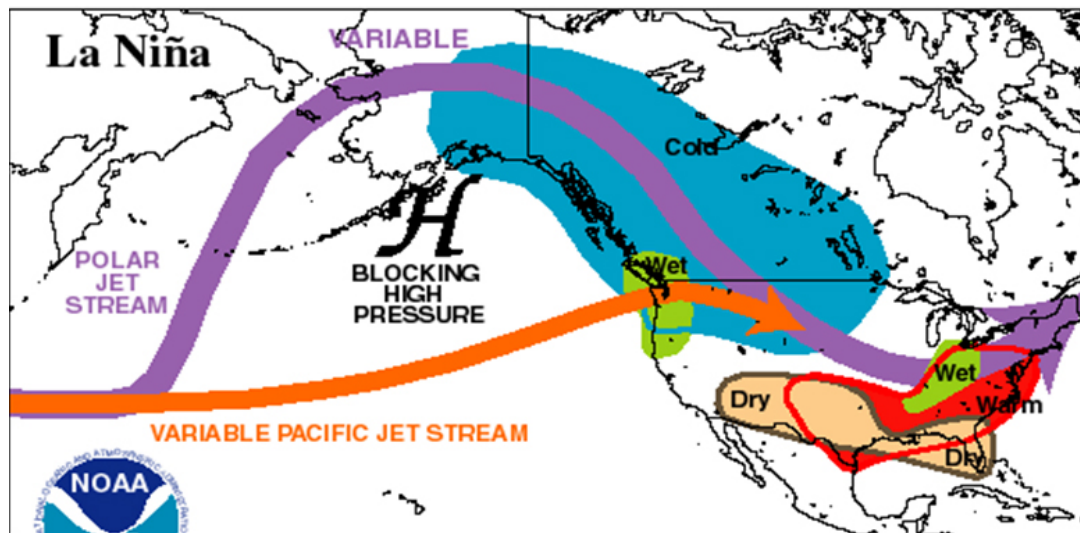
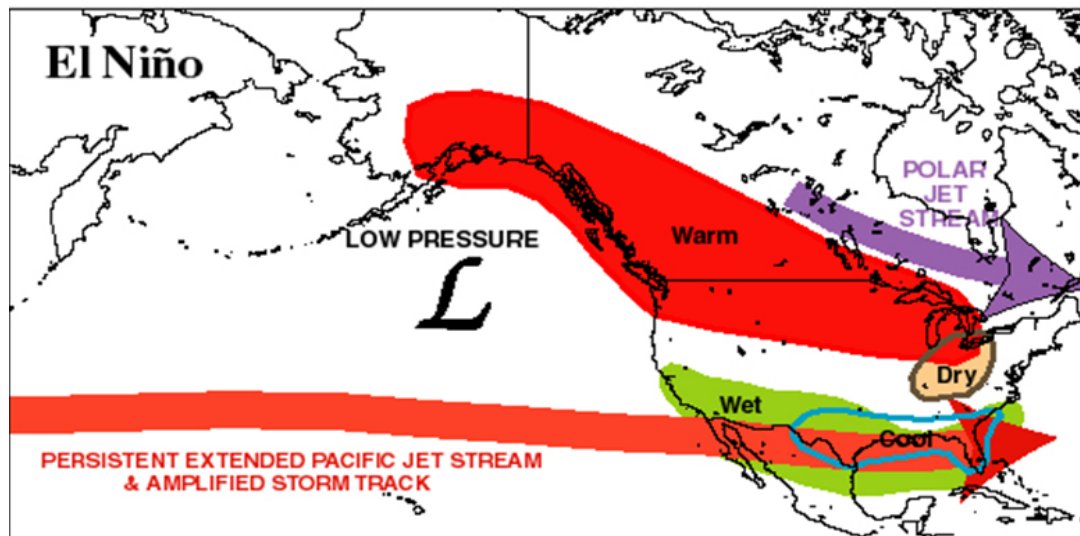
- Many ways to verify weather/seasonal forecasts
- Heidke Skill Score (HSS) and Brier Skill Score (BSS) both measure value added, and are popular with meteorologists
- HSS perhaps more intuitive
  - Measures improvement over climatology
- BSS also useful, particularly for measuring the skill of probabilistic forecasts

# CPC Precipitation Outlook DJF 2015-2016

Seasonal (Lead 0.5 Months) Precipitation Heidke Skill Score  
DJF Manual Forecasts From 1995 to 2018

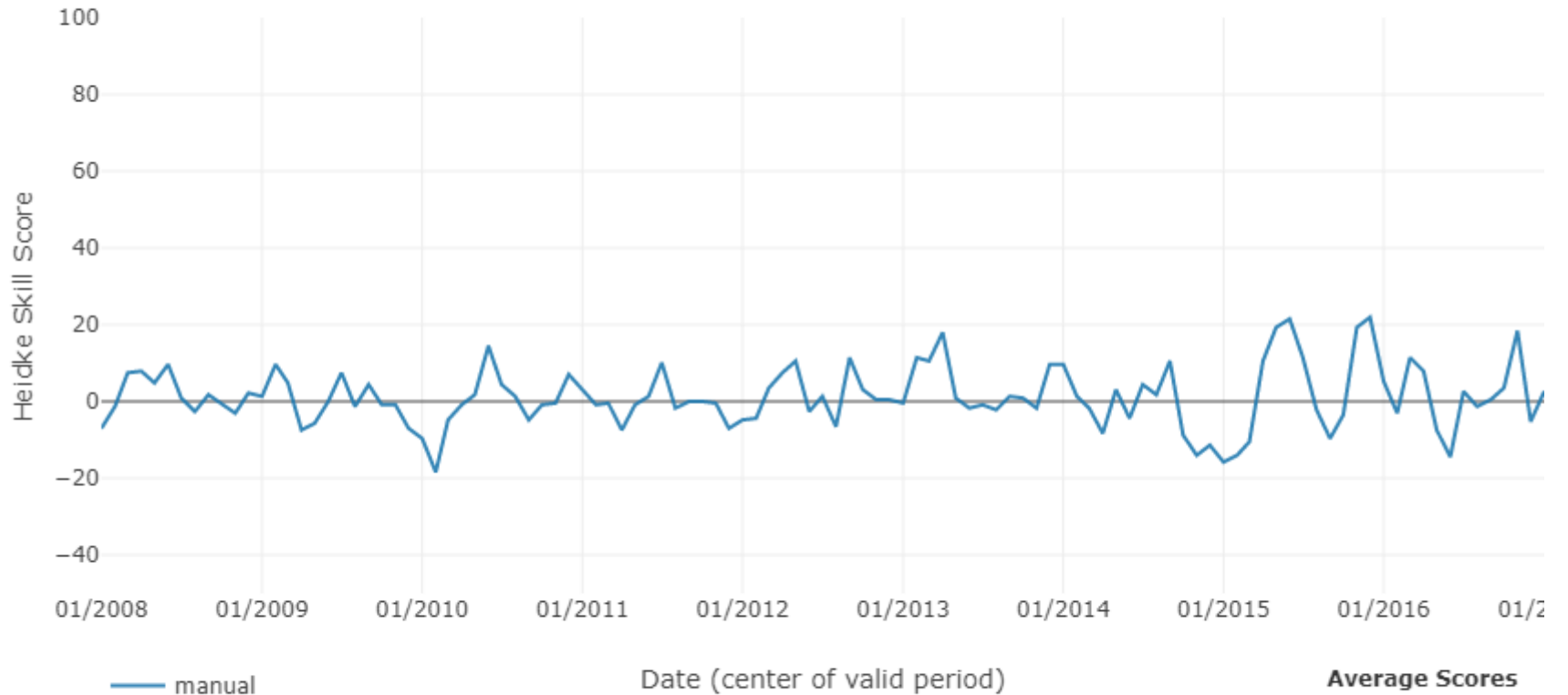


# CPC Precipitation Outlook DJF 2015-2016



# Precipitation (0.5-Month Forecast, CONUS)

seasonal Precipitation Heidke Skill Score (Combined Categories)

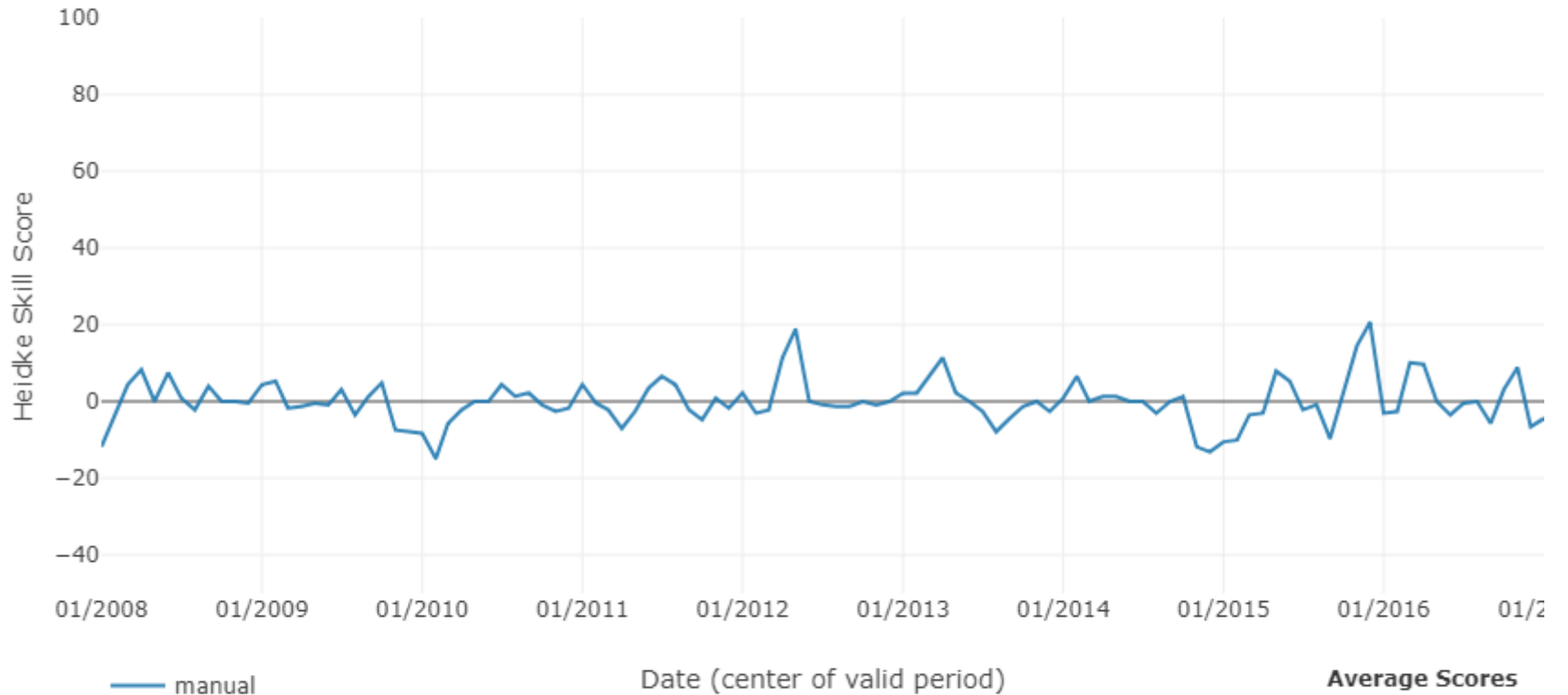


**Average Scores**

manual: 1.151

# Precipitation (3.5-Month Forecast, CONUS)

seasonal Precipitation Heidke Skill Score (Combined Categories)



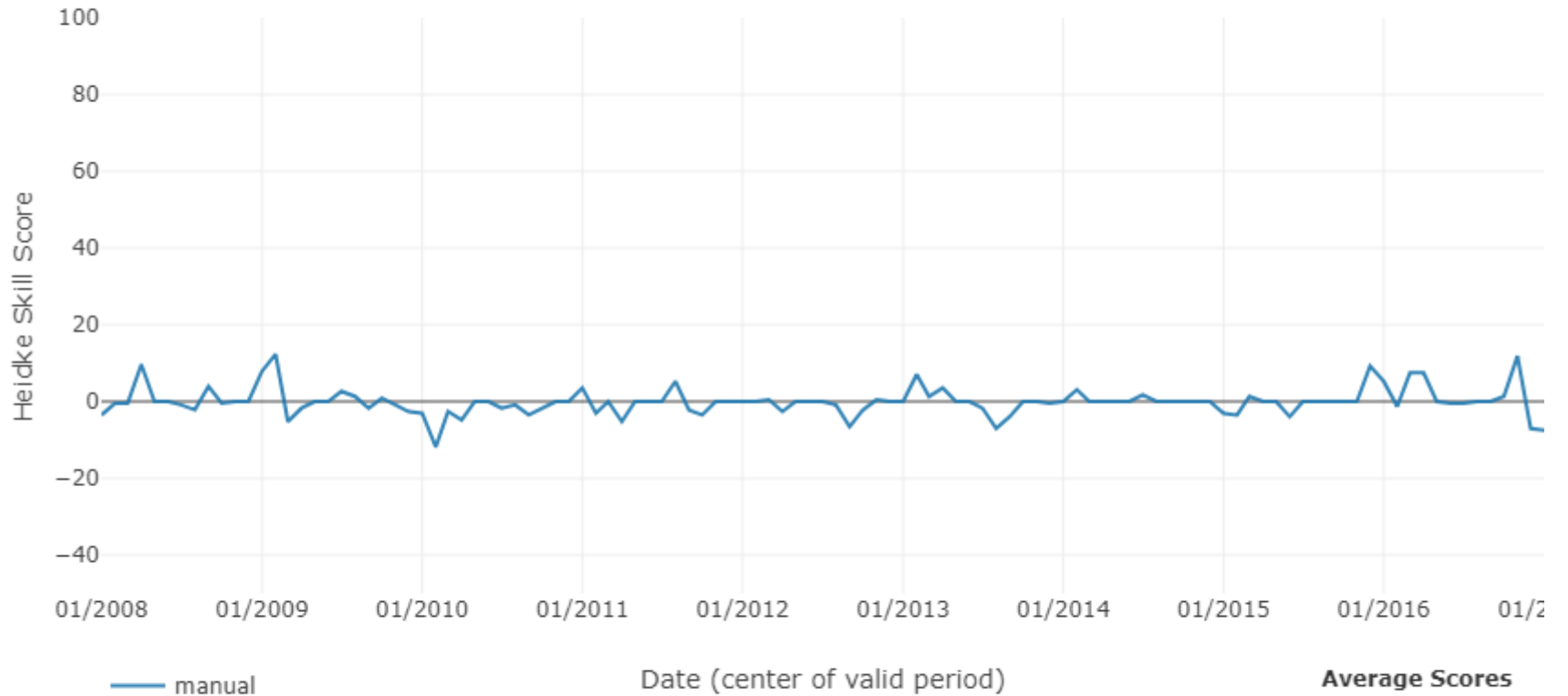
**Average Scores**

manual: 0.012



# Precipitation (6.5-Month Forecast, CONUS)

seasonal Precipitation Heidke Skill Score (Combined Categories)

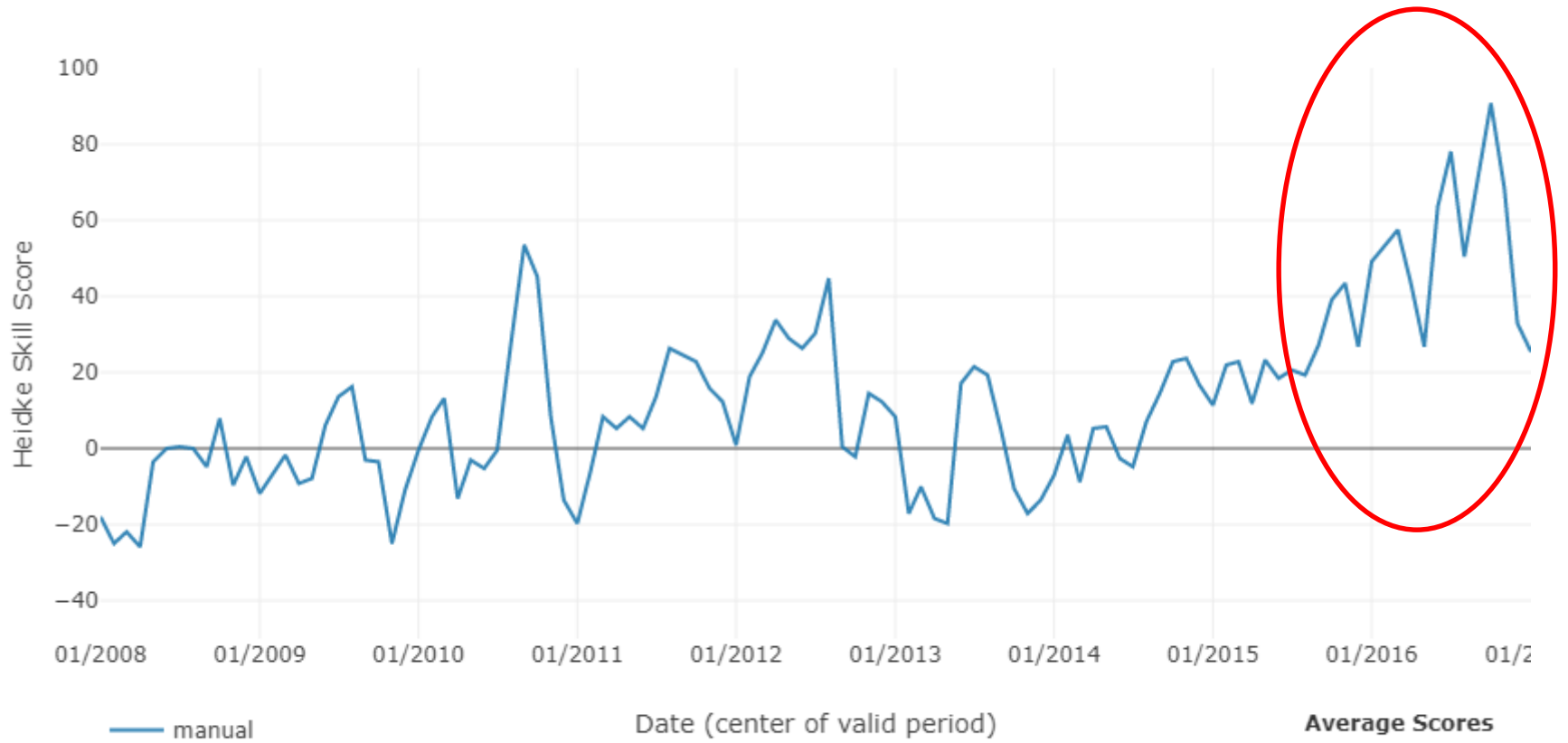


**Average Scores**

manual: -0.076

# Temperature (0.5-Month Forecast, CONUS)

seasonal Temperature Heidke Skill Score (Combined Categories)



— manual

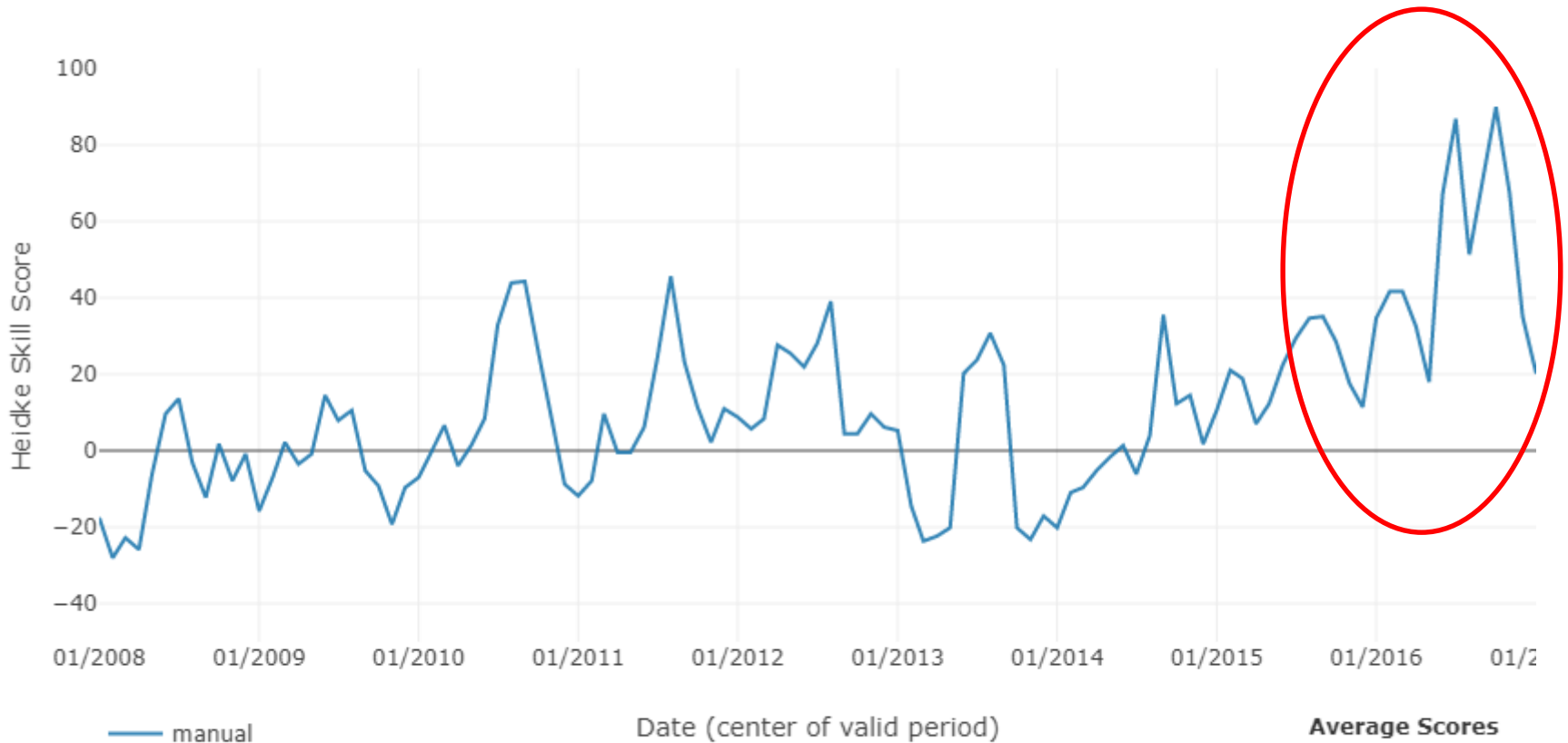
Date (center of valid period)

**Average Scores**

manual: 12.486

# Temperature (3.5-Month Forecast, CONUS)

seasonal Temperature Heidke Skill Score (Combined Categories)



— manual

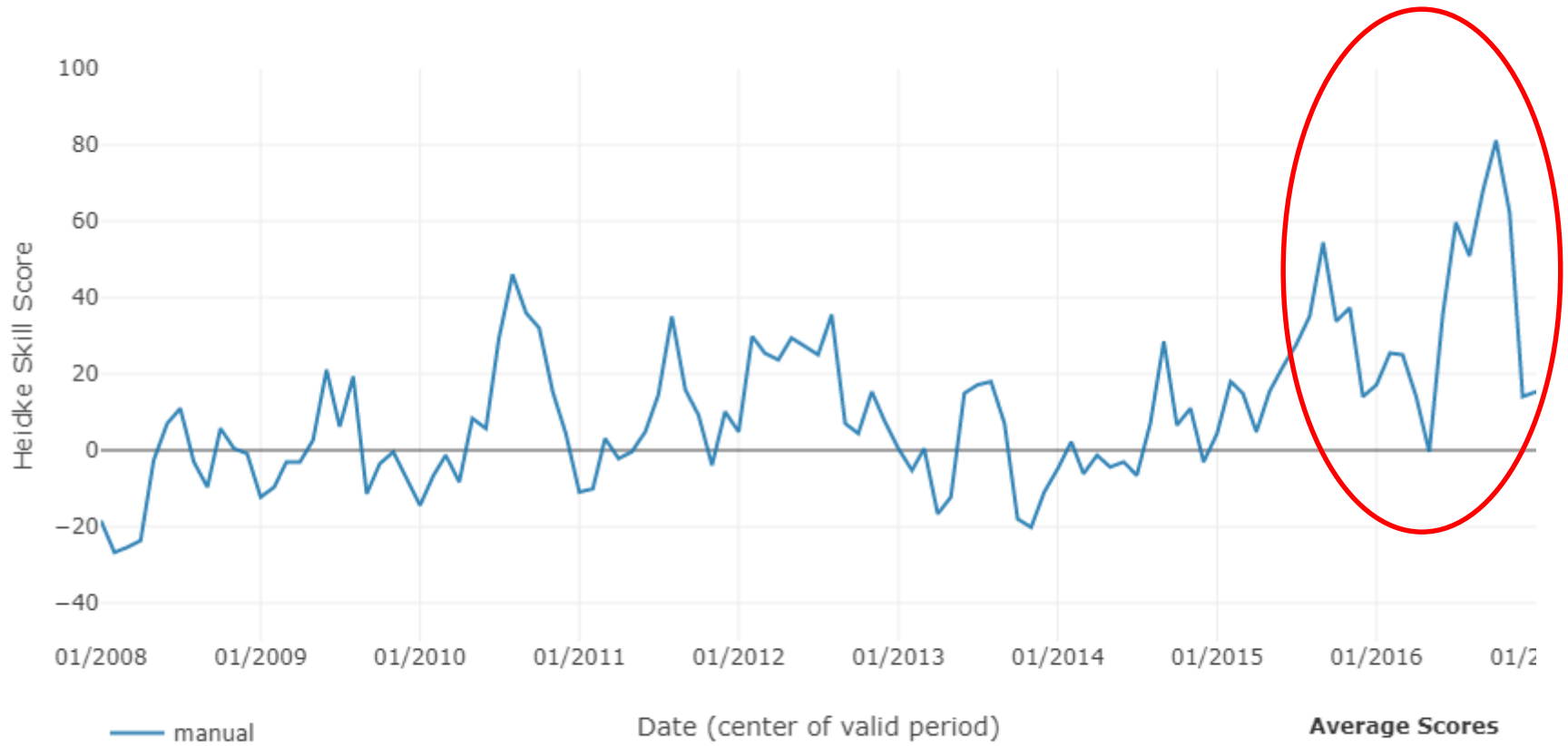
Date (center of valid period)

**Average Scores**

manual: 11.033

# Temperature (6.5-Month Forecast, CONUS)

seasonal Temperature Heidke Skill Score (Combined Categories)

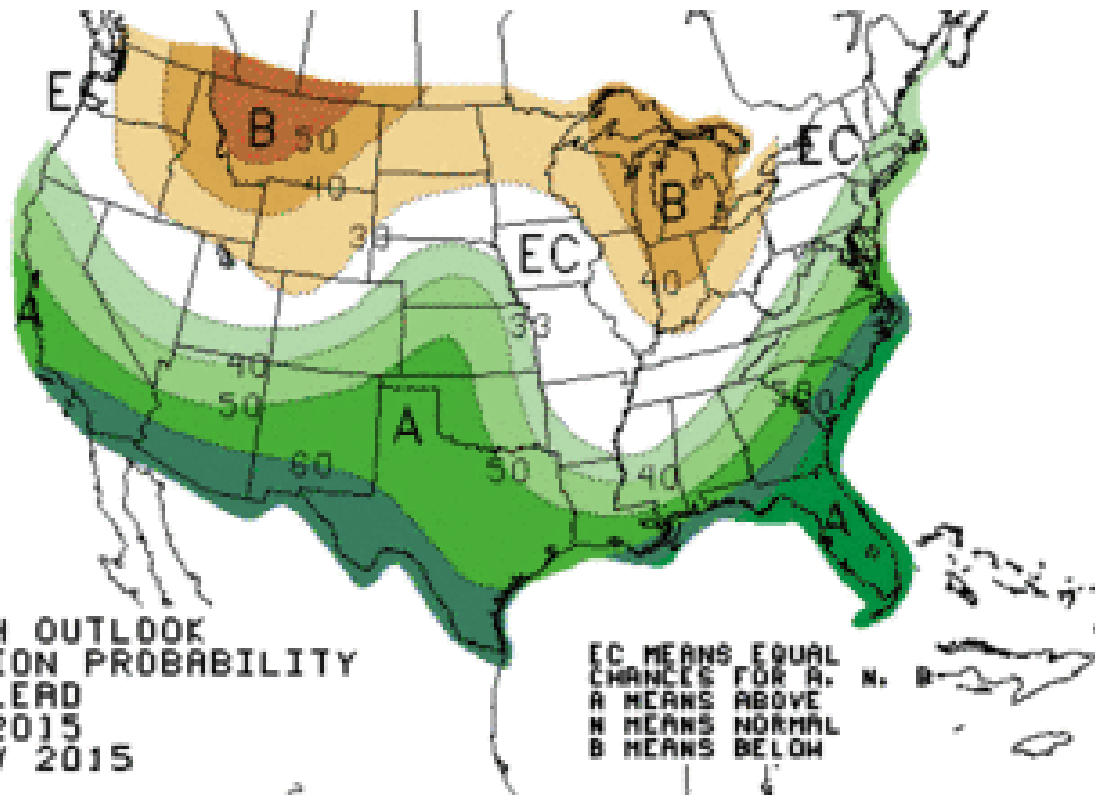


**Average Scores**  
manual: 10.172

# Seasonal Precipitation Forecast 2015/16

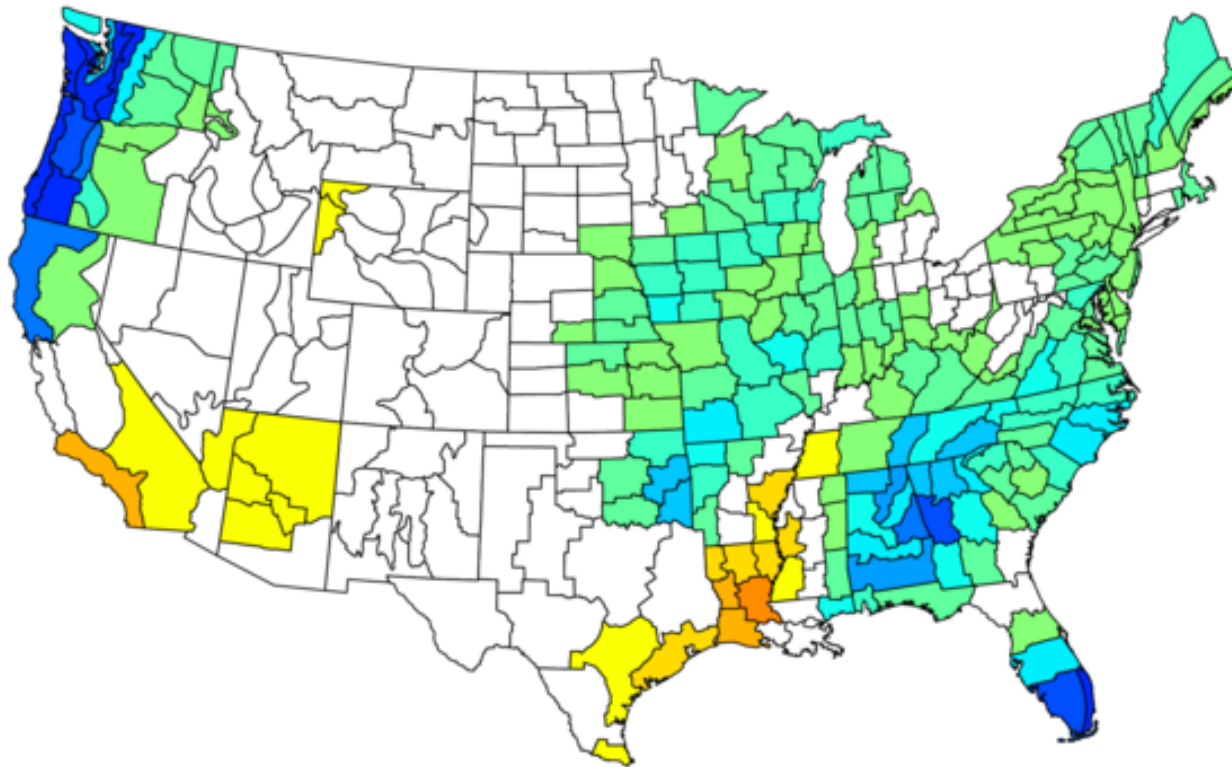


THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
0.5 MONTH LEAD  
VALID DJF 2015  
MADE 19 NOV 2015

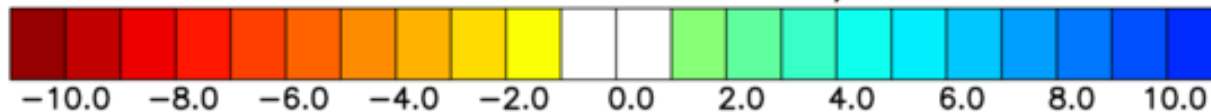


# Seasonal Precipitation Observations 2015/16

NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Dec to Feb 2015–16  
Versus 1895–2000 Longterm Average

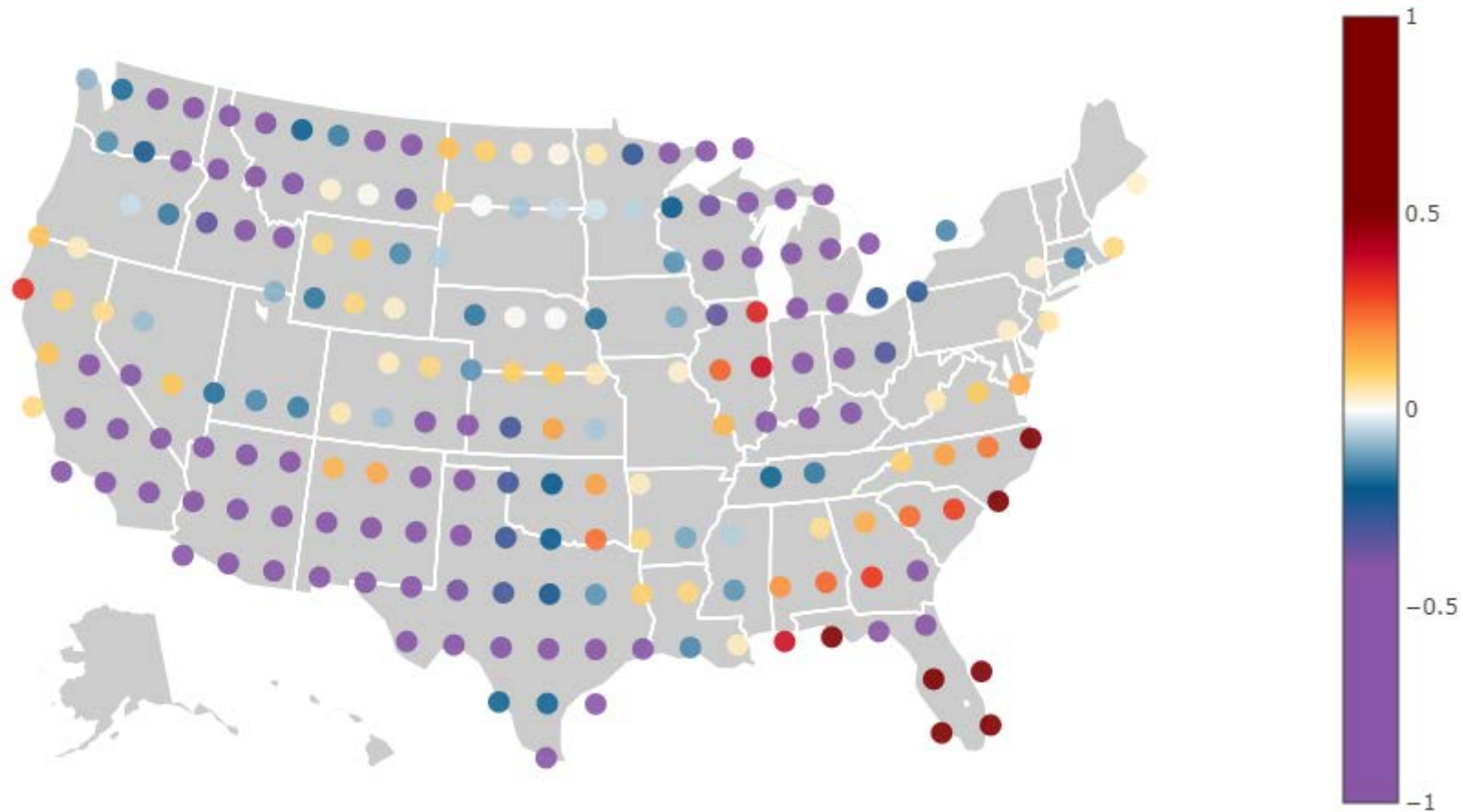


NOAA/ESRL PSD and CIRES-CU



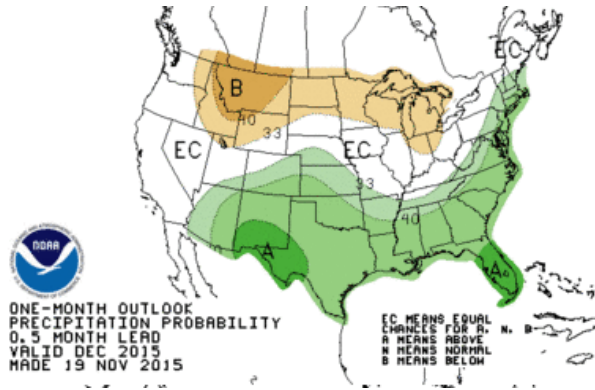
# Seasonal Precipitation Skill 2015/16

seasonal Precipitation Brier Skill Score (Combined Categories)

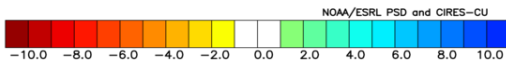
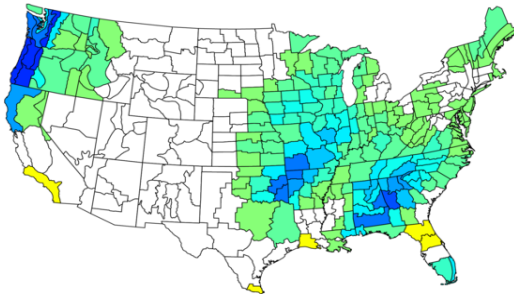


# Monthly Precipitation 2015/16

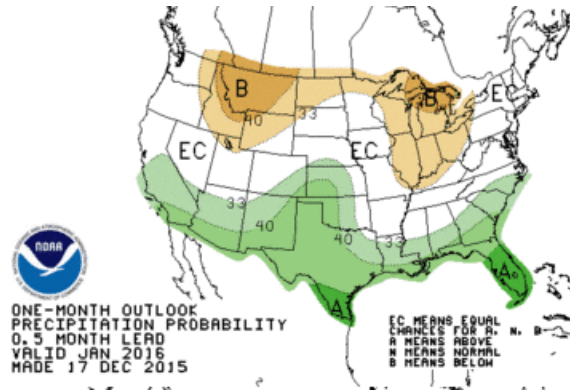
## December 2015



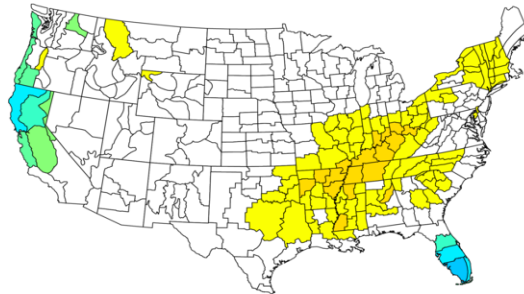
NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Dec 2015  
Versus 1895–2000 Longterm Average



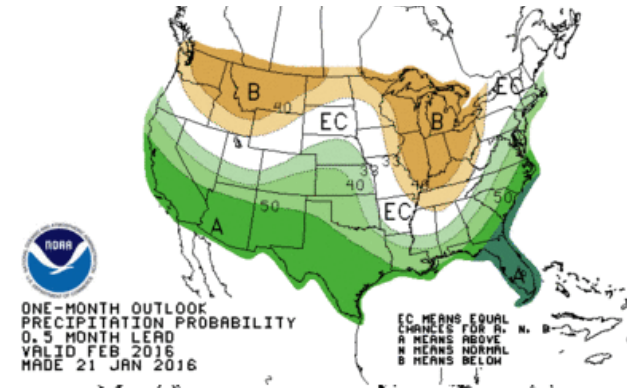
## January 2016



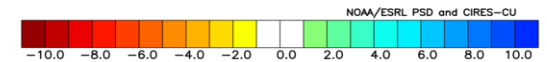
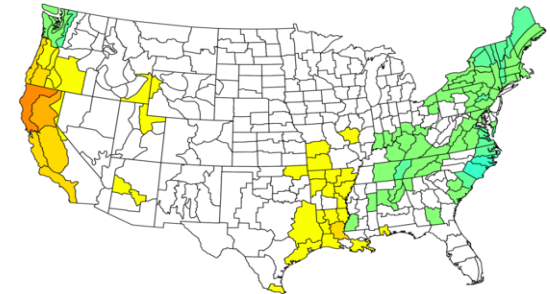
NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Jan 2016  
Versus 1895–2000 Longterm Average



## February 2016



NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Feb 2016  
Versus 1895–2000 Longterm Average

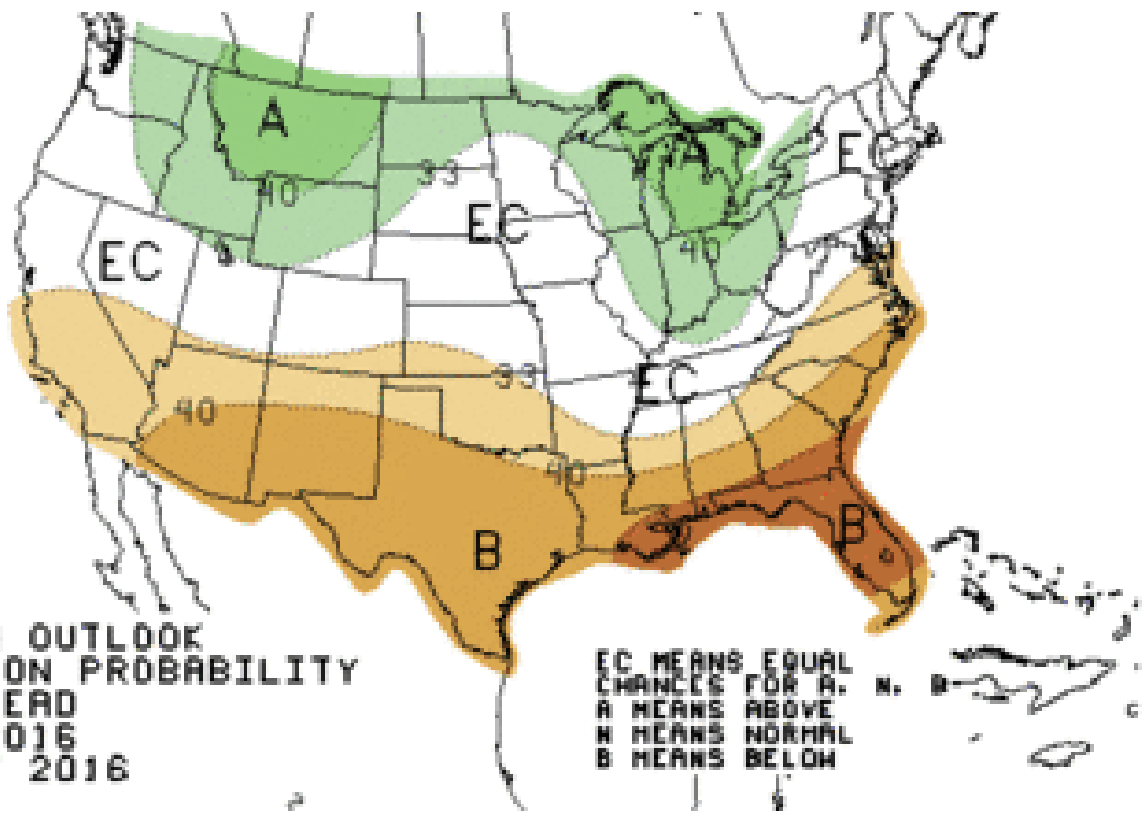




# Seasonal Precipitation Forecast 2016/17

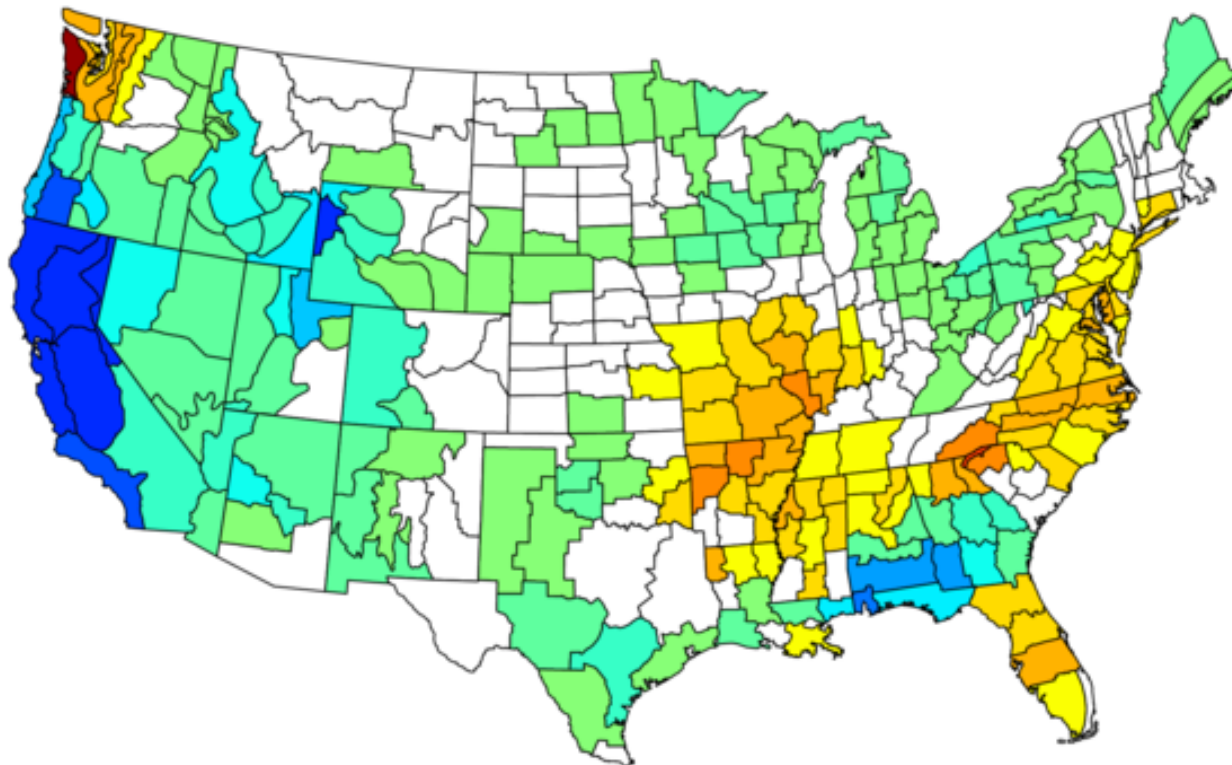


THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
0.5 MONTH LEAD  
VALID DJF 2016  
MADE 17 NOV 2016



# Seasonal Precipitation Observations 2016/17

NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Dec to Feb 2016–17  
Versus 1895–2000 Longterm Average

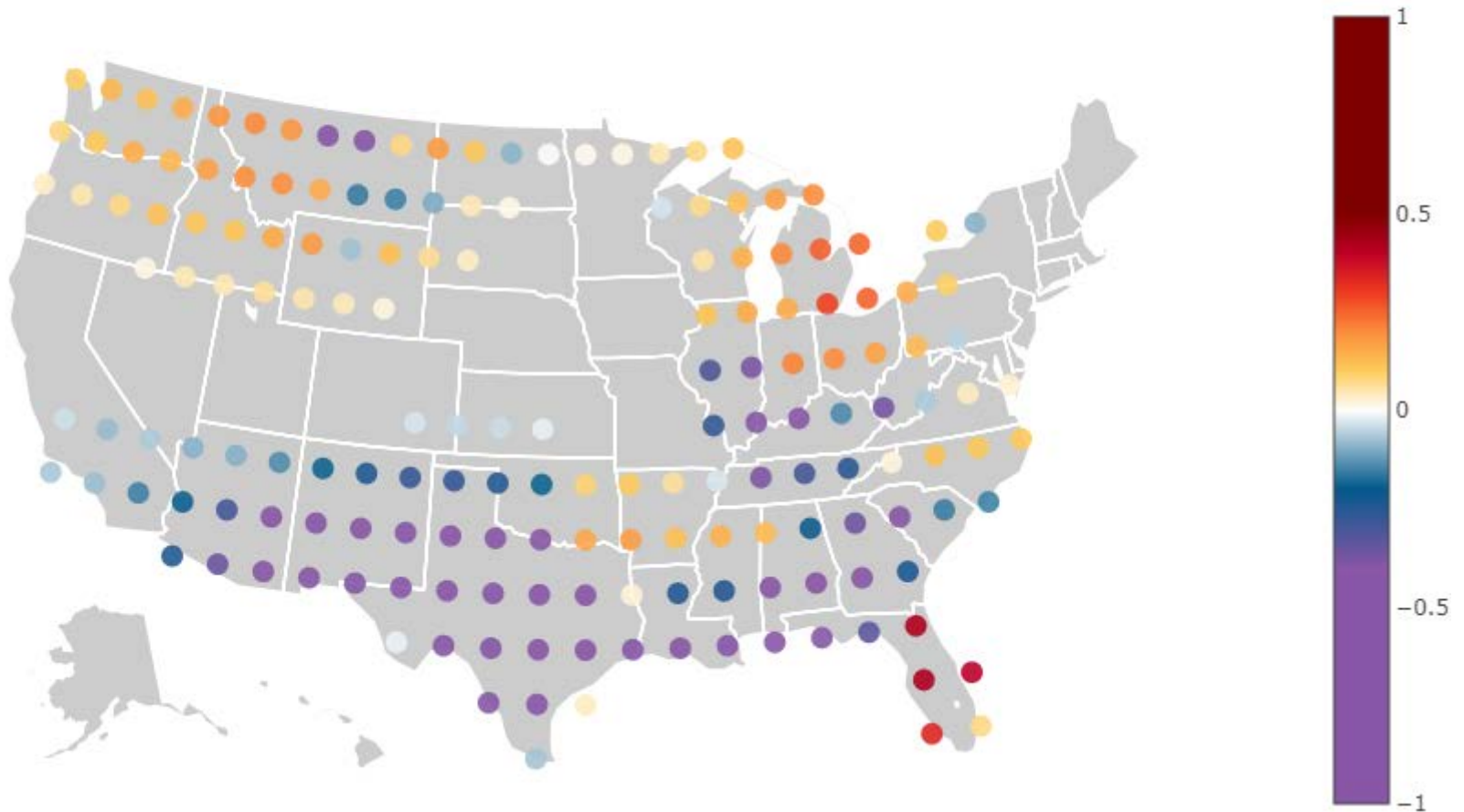


NOAA/ESRL PSD and CIRES-CU



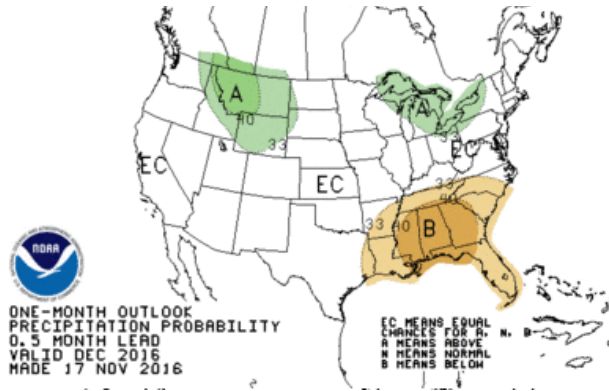
# Seasonal Precipitation Skill 2016/17

seasonal Precipitation Brier Skill Score (Combined Categories)

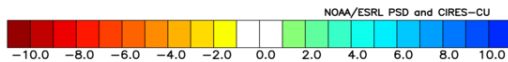
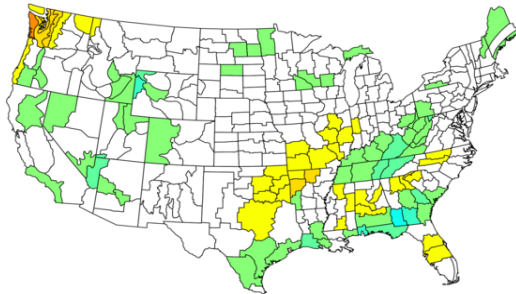


# Monthly Precipitation 2016/17

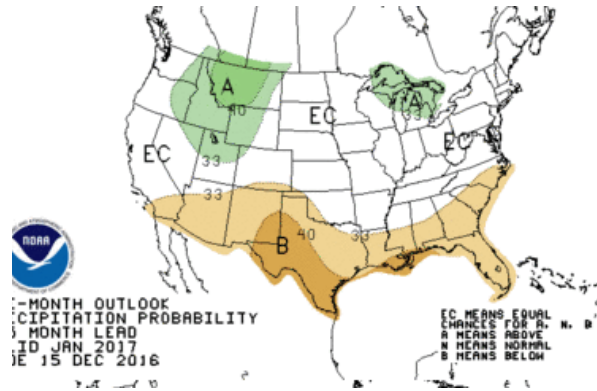
## December 2016



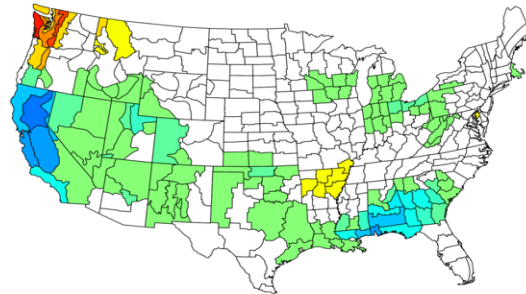
NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Dec 2016  
Versus 1895–2000 Longterm Average



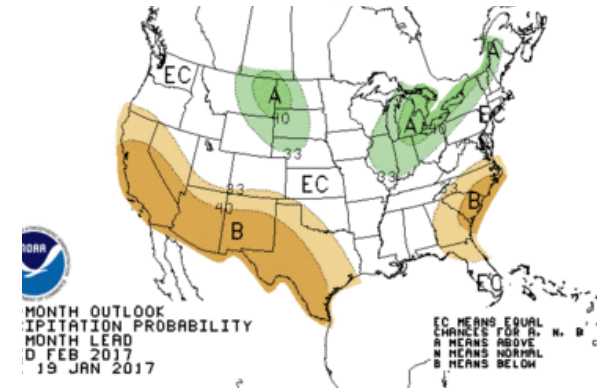
## January 2017



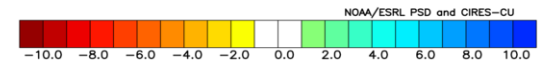
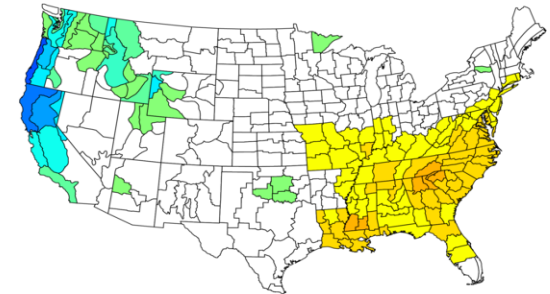
NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Jan 2017  
Versus 1895–2000 Longterm Average



## February 2017



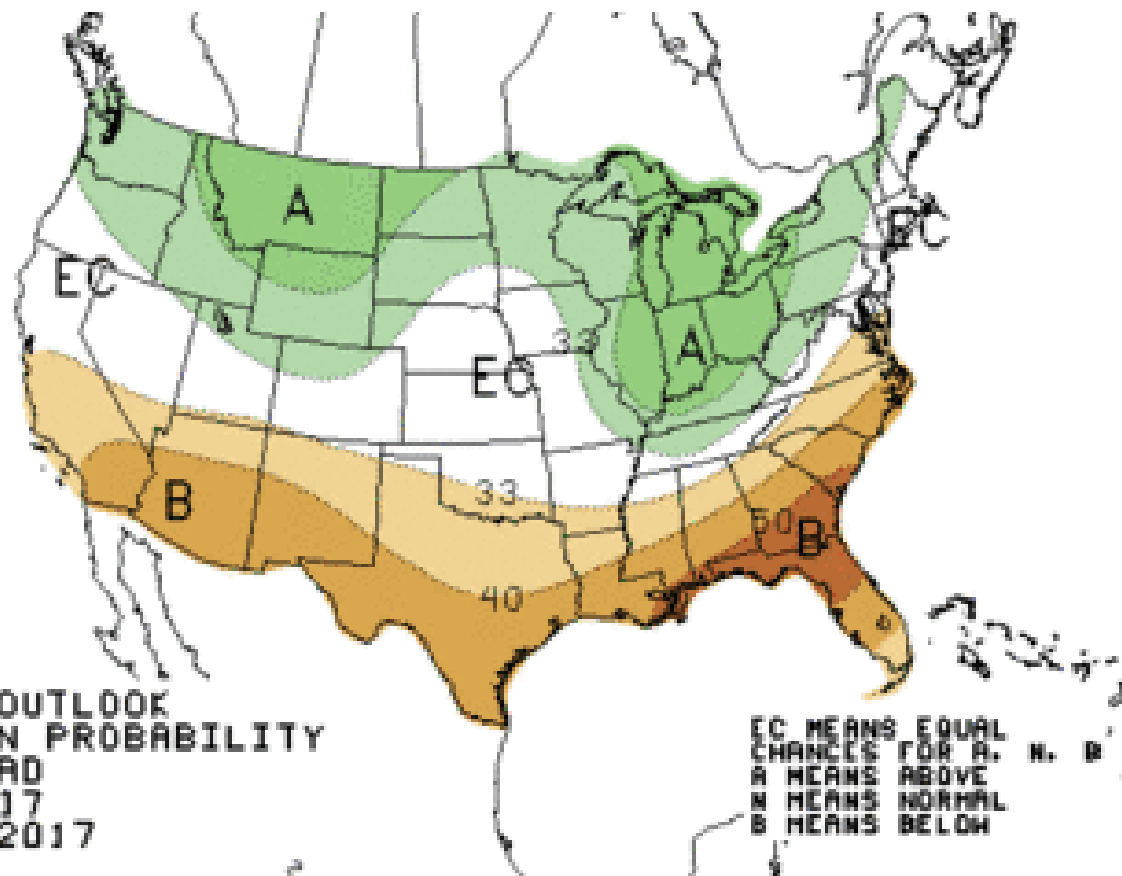
NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Feb 2017  
Versus 1895–2000 Longterm Average



# Seasonal Precipitation Forecast 2017/18

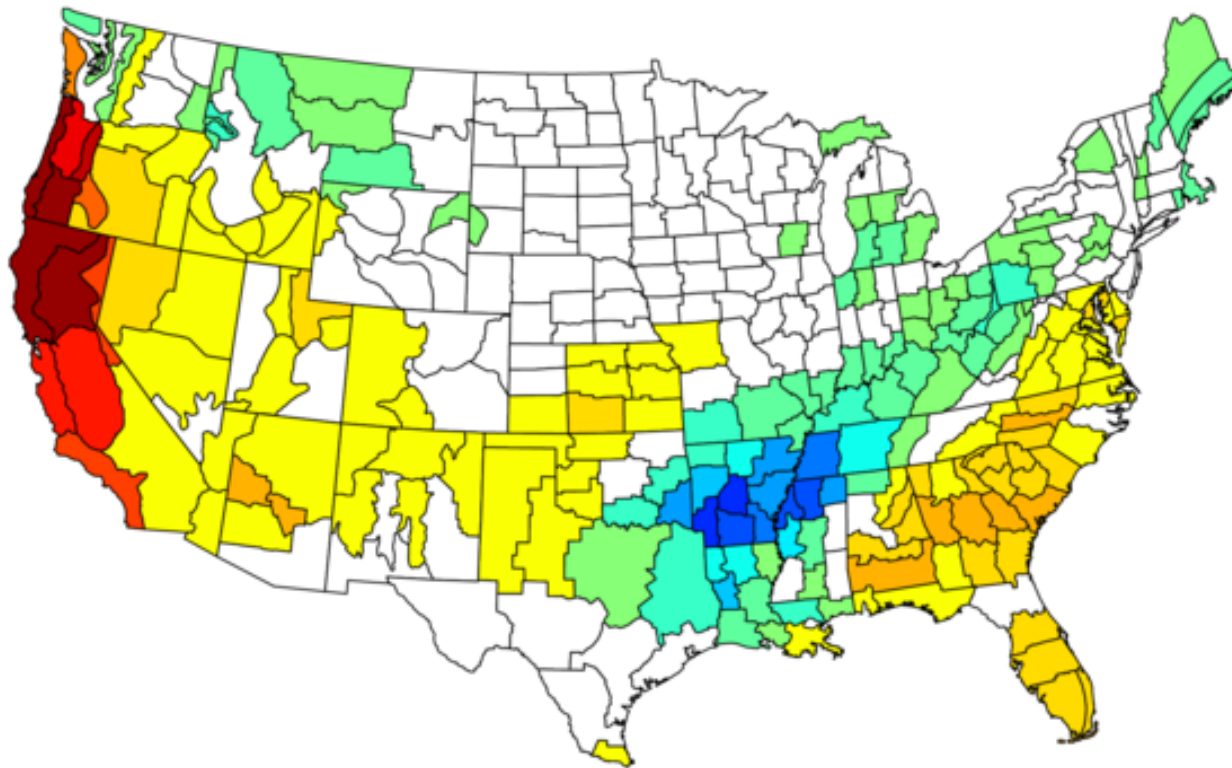


THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
0.5 MONTH LEAD  
VALID DJF 2017  
MADE 16 NOV 2017

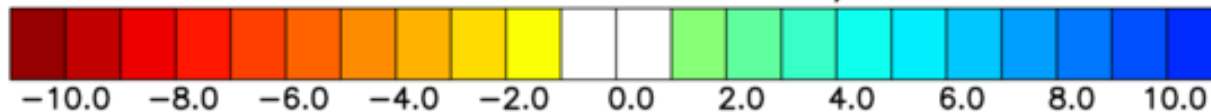


# Seasonal Precipitation Observations 2016/17

NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Dec to Feb 2017–18  
Versus 1895–2000 Longterm Average

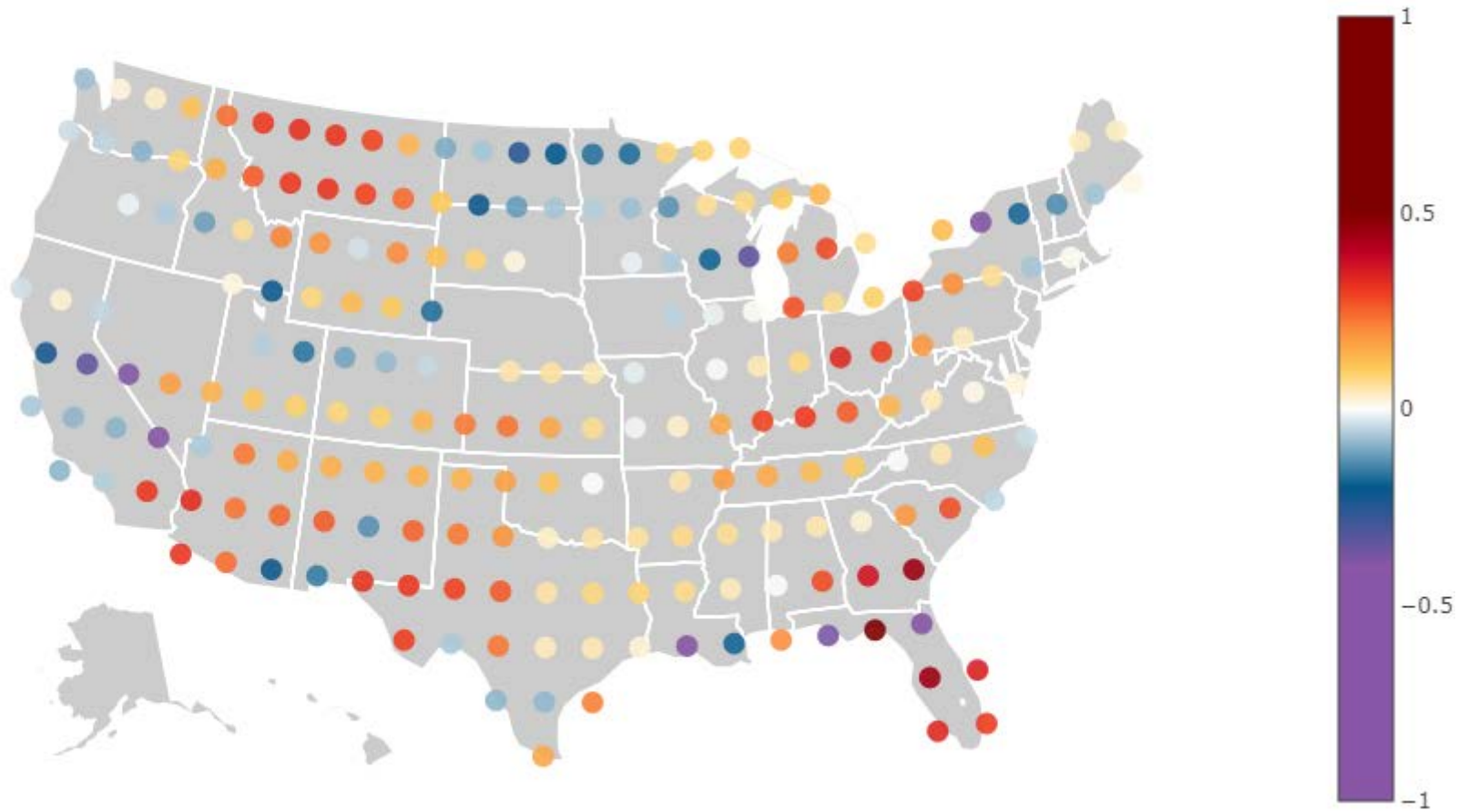


NOAA/ESRL PSD and CIRES-CU



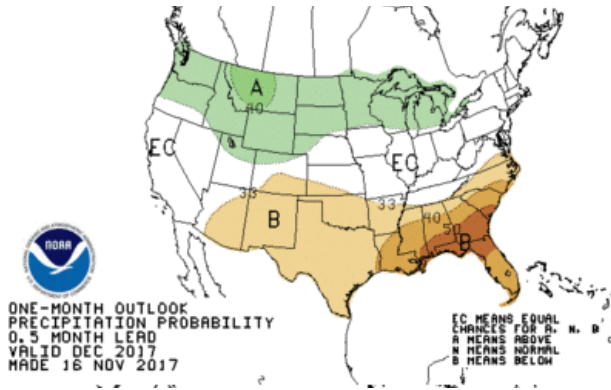
# Seasonal Precipitation Skill 2017/18

seasonal Precipitation Brier Skill Score (Combined Categories)

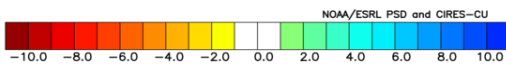
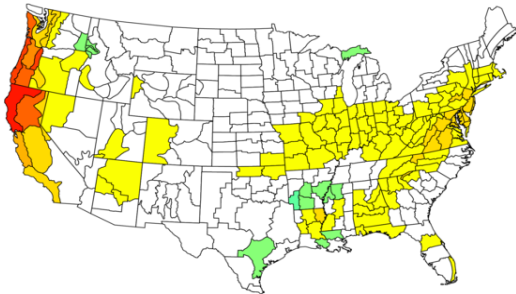


# Monthly Precipitation 2016/17

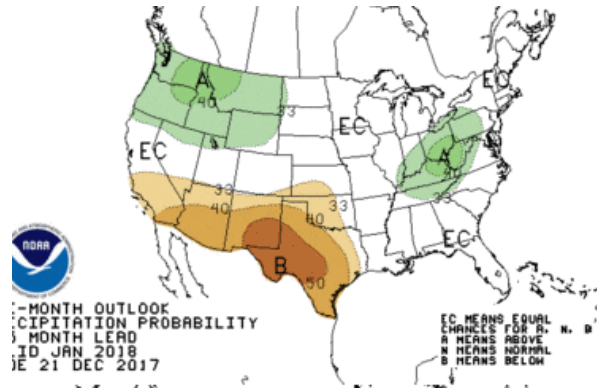
## December 2017



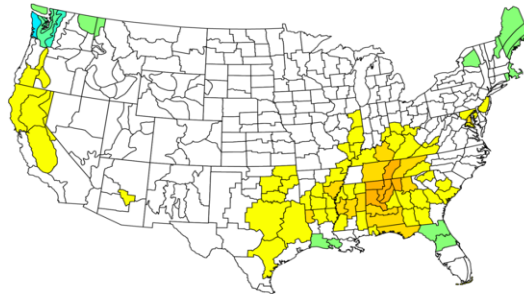
NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Dec 2017  
Versus 1895–2000 Longterm Average



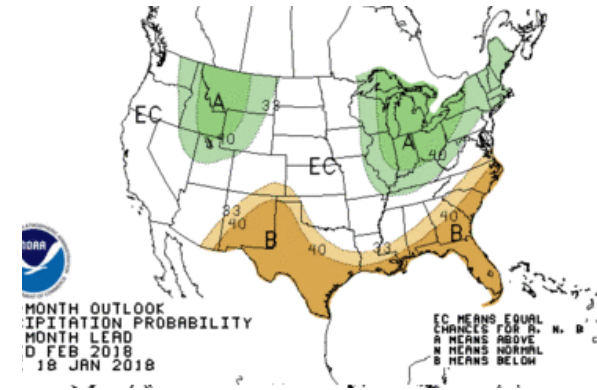
## January 2018



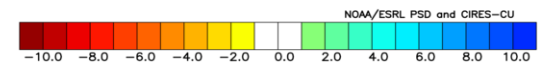
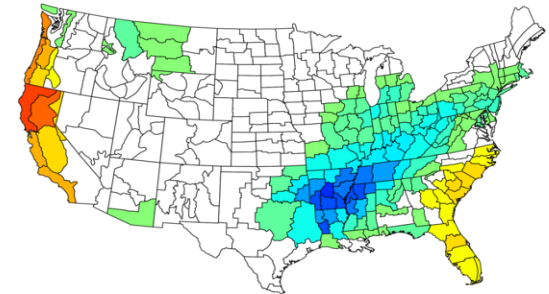
NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Jan 2018  
Versus 1895–2000 Longterm Average



## February 2018



NOAA/NCEI Climate Division Precipitation Anomalies (in)  
Feb 2018  
Versus 1895–2000 Longterm Average

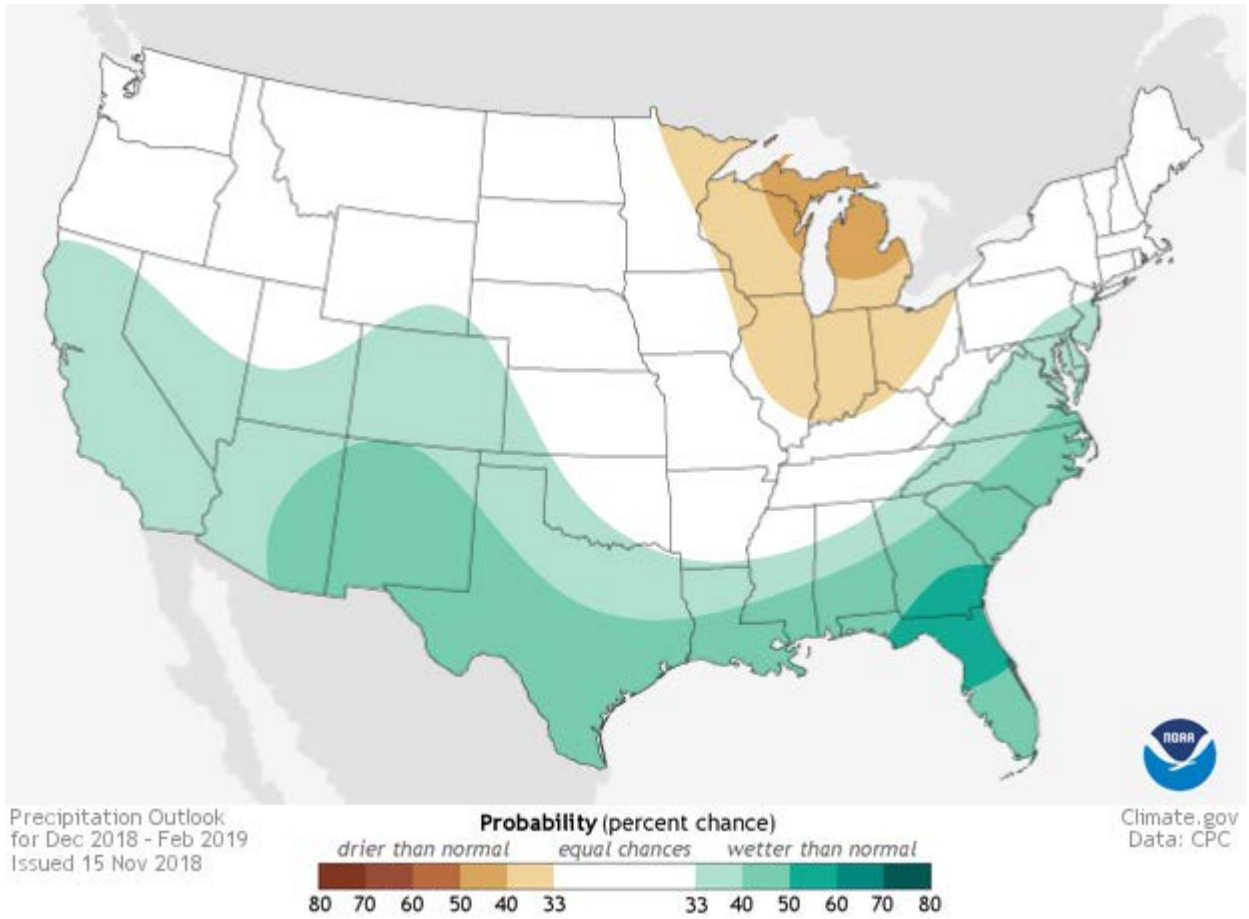




# Summary

- Seasonal temperature forecasts are improving
- Seasonal precipitation forecasts are *not* improving
- Current forecast skill for precipitation seems to rely on ENSO (El Nino / La Nina) patterns
  - The 2015/16 El Nino and 2016/17 La Nina winters did not feature good forecasts based on typical ENSO patterns
  - The 2015/16 and 2016/17 winters shook confidence in ENSO skill/reliability for S2S applications
  - The 2017/18 winter (La Nina) forecast was better

# Seasonal Precipitation Forecast 2018/19



Questions or comments?



DWR Winter Outlook Workshop  
UCSD/Scripps, La Jolla, CA – November 3<sup>rd</sup>, 2017

