

2015/2016 Winter Outlook



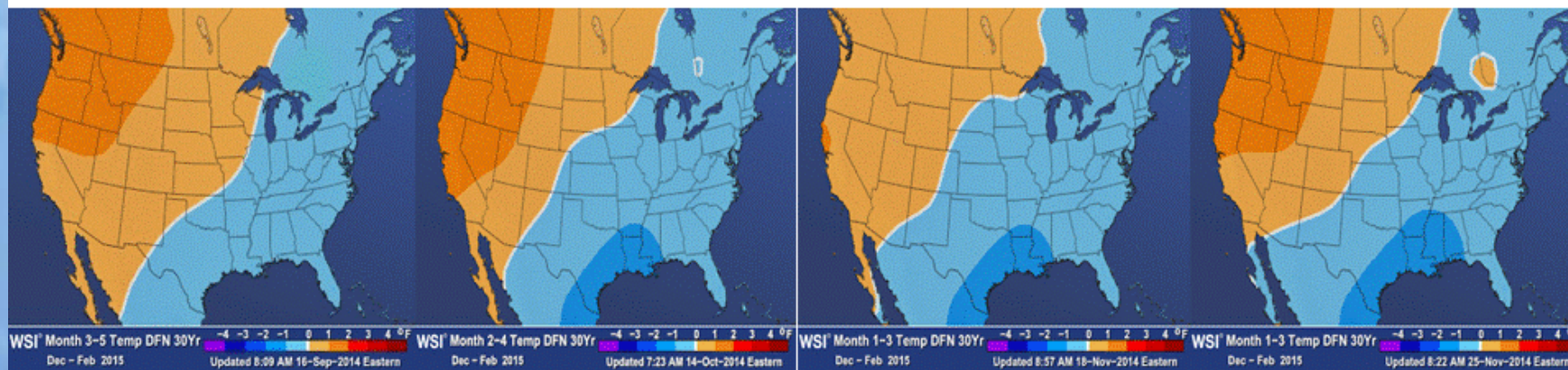
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dan.leonard@weather.com
[@danleonard_wx](https://twitter.com/danleonard_wx)

Predicting Snowfall I-95 cities seasonally



2014/2015 Verification



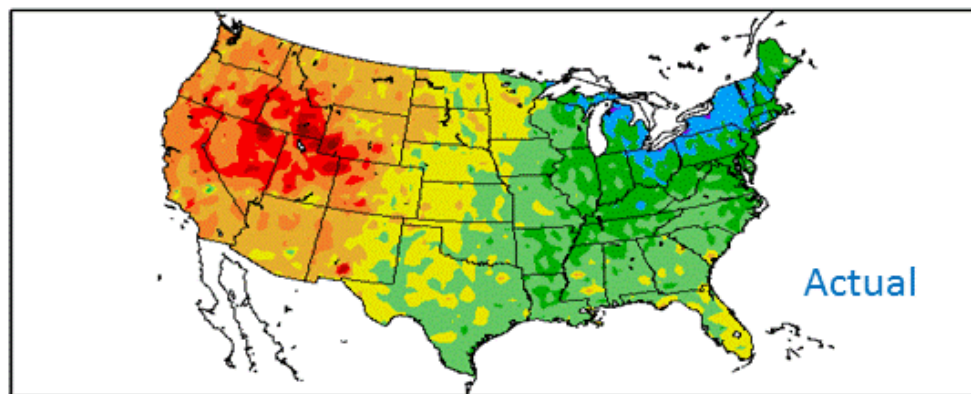
Issued Sep. 16

Issued Oct. 14

Issued Nov. 18

Issued Nov. 25

Departure from Normal Temperature (F)
12/1/2014 – 2/28/2015

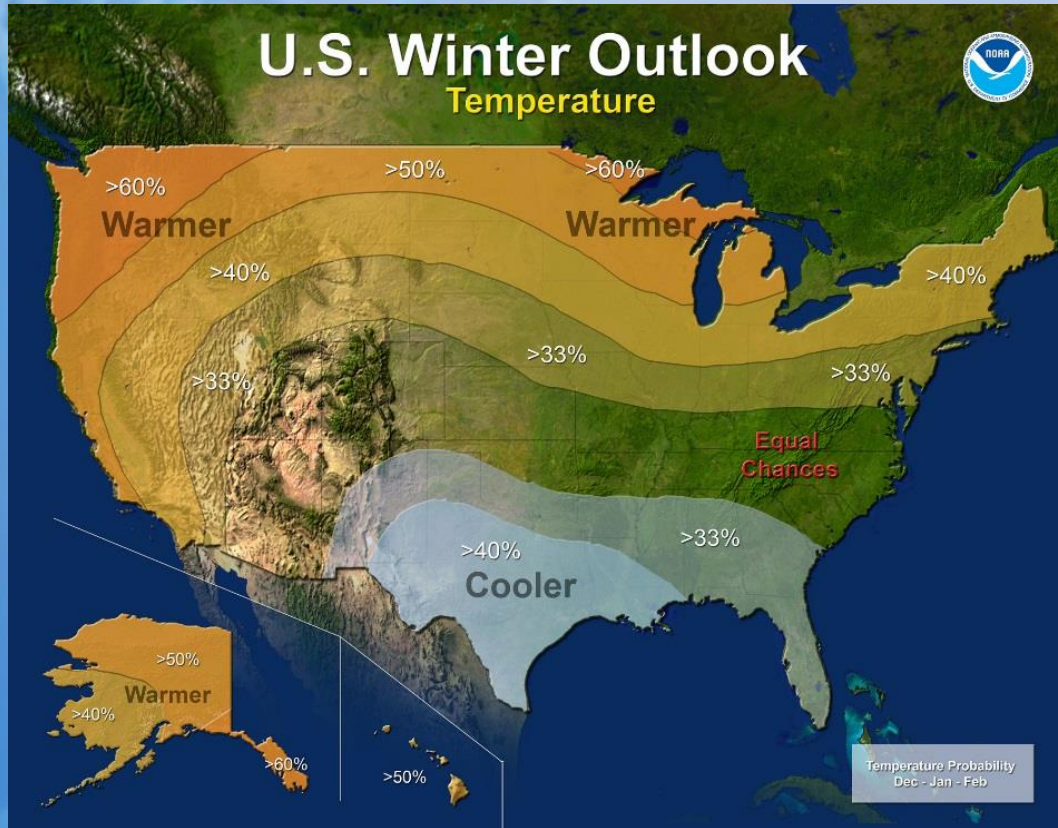


Generated 3/2/2015 at HPRDC using provisional data.

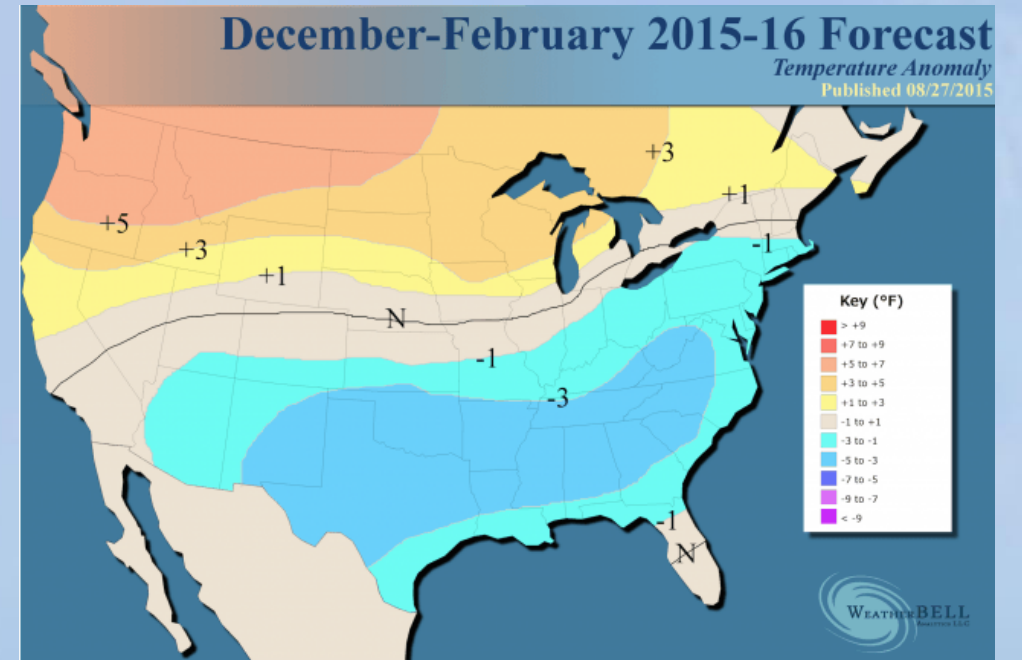
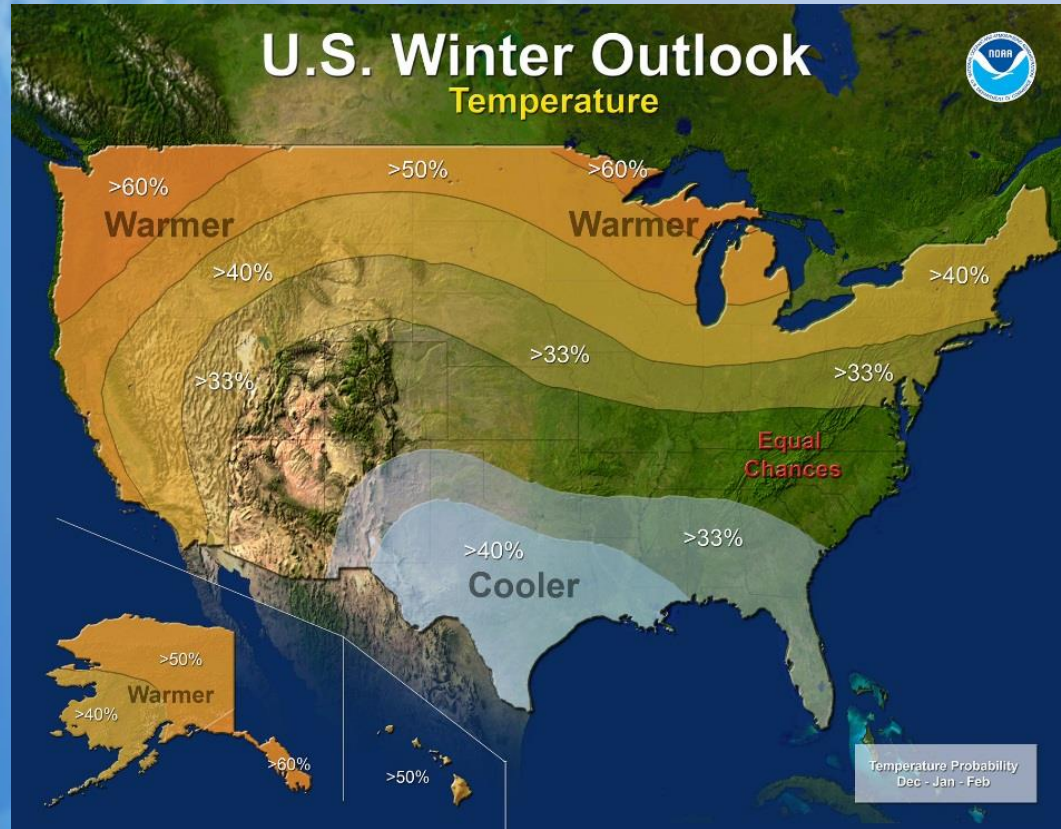
Regional Climate Centers

	Dec.-Feb. Gas-weighted HDD
1981-2010 Normal	2623
Sep. 16 WSI Fcst	2656
Oct. 14 WSI Fcst	2674
Nov. 18 WSI Fcst	2692
Nov. 25 WSI Fcst	2681
Actual	2708
Last Winter	2854

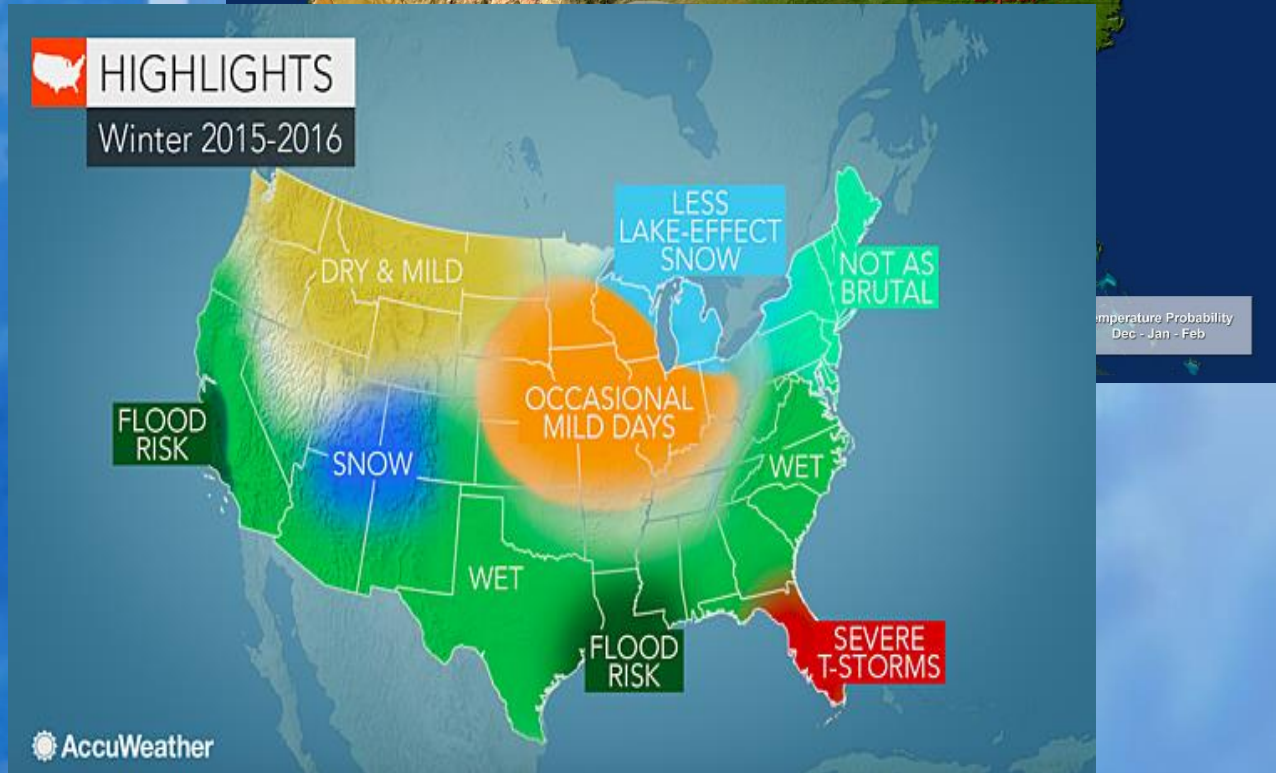
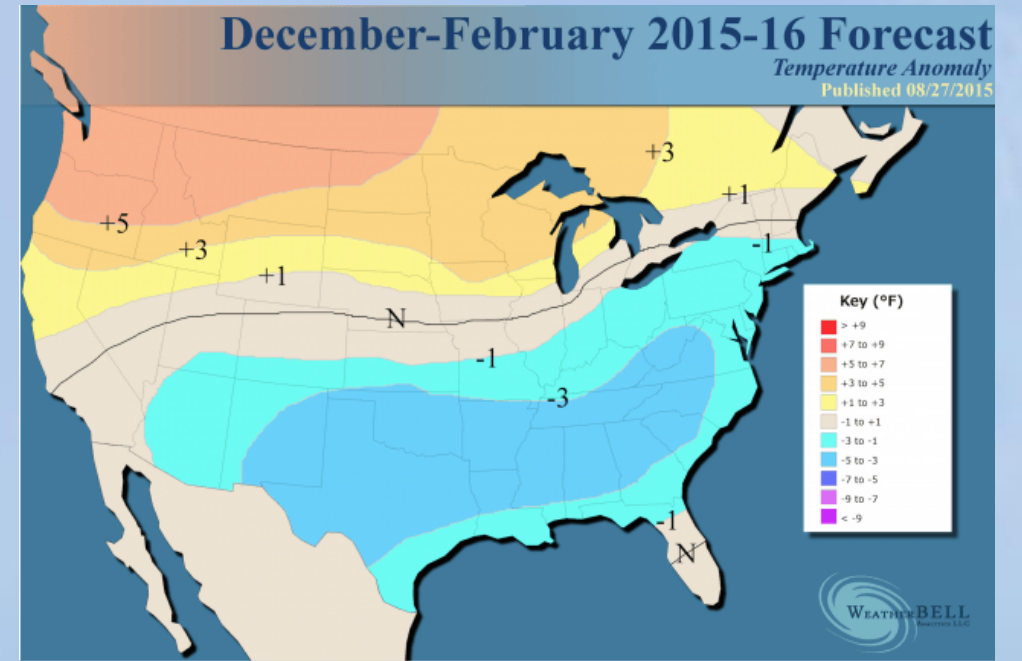
2015/2016 Outlook



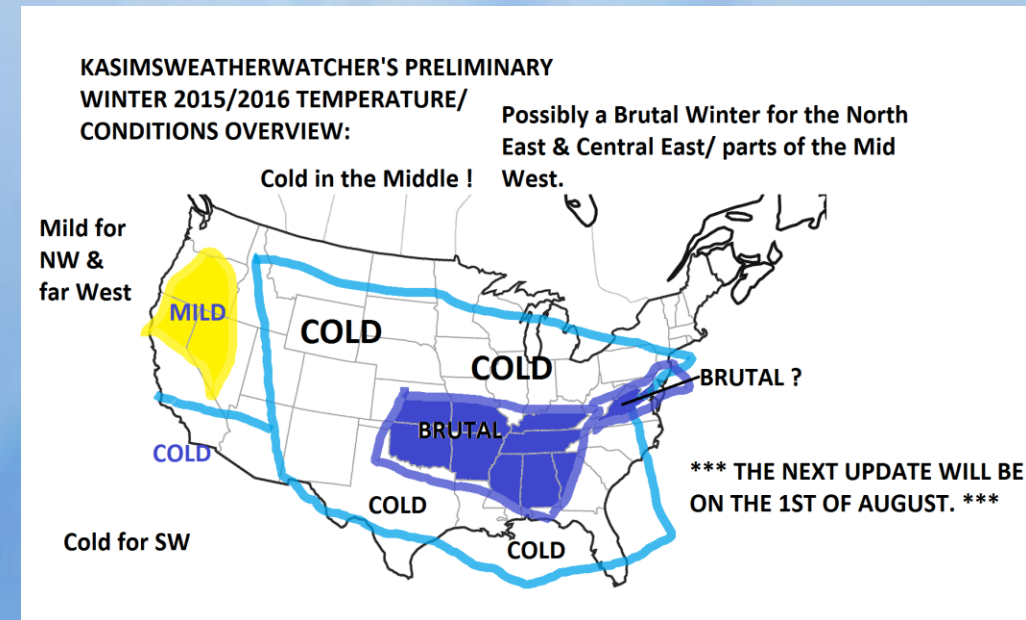
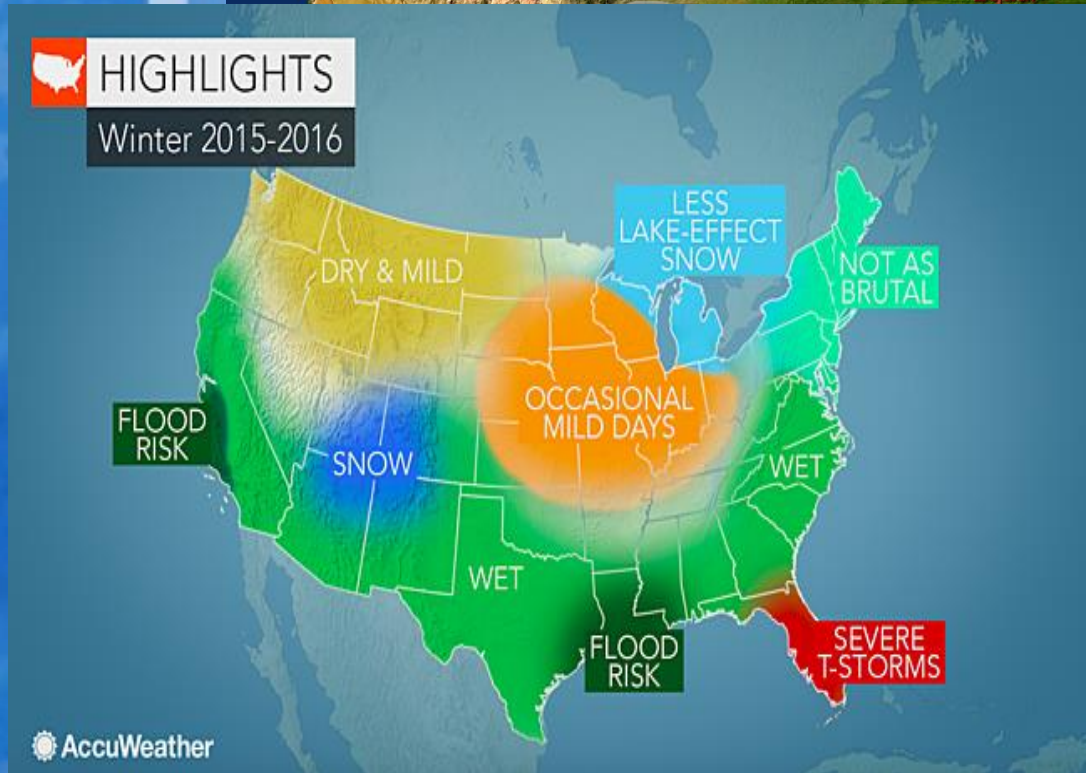
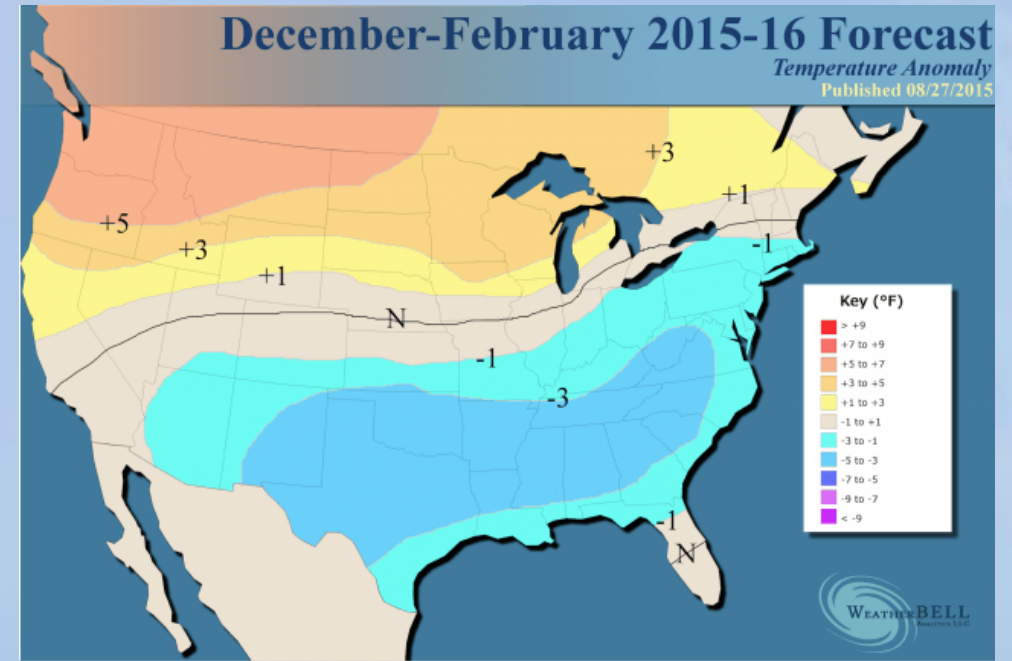
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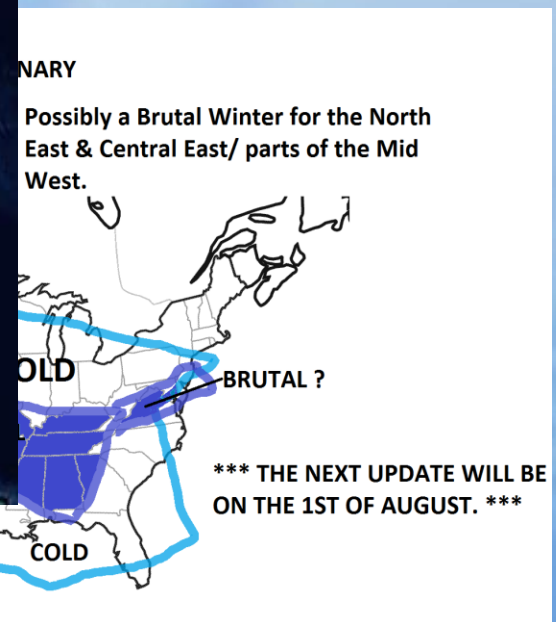
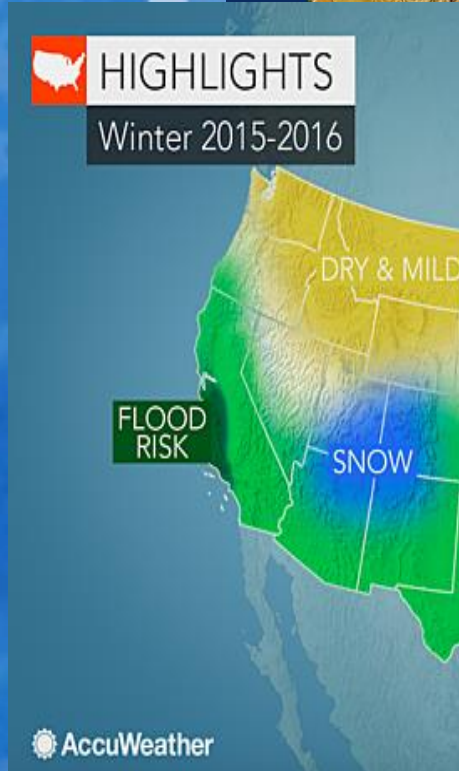
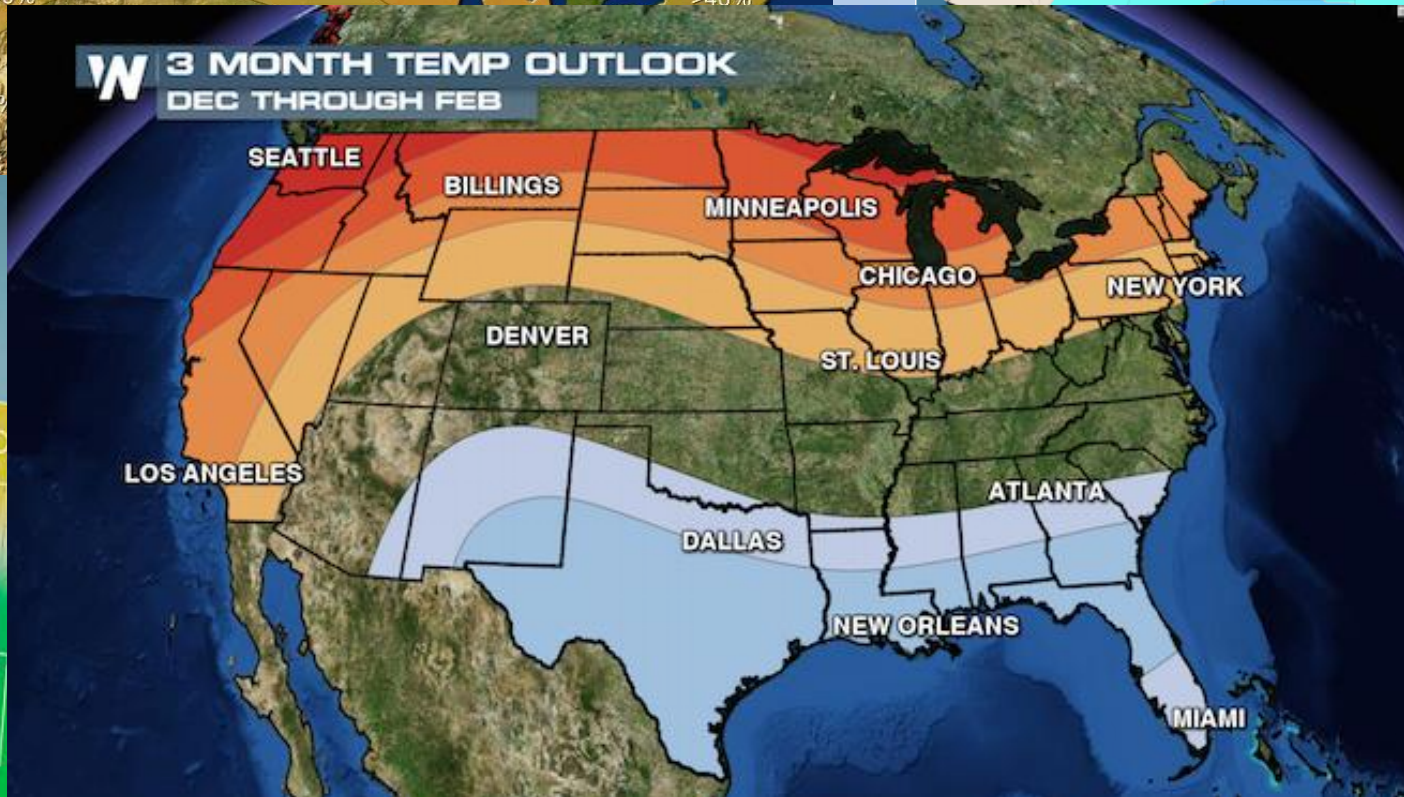
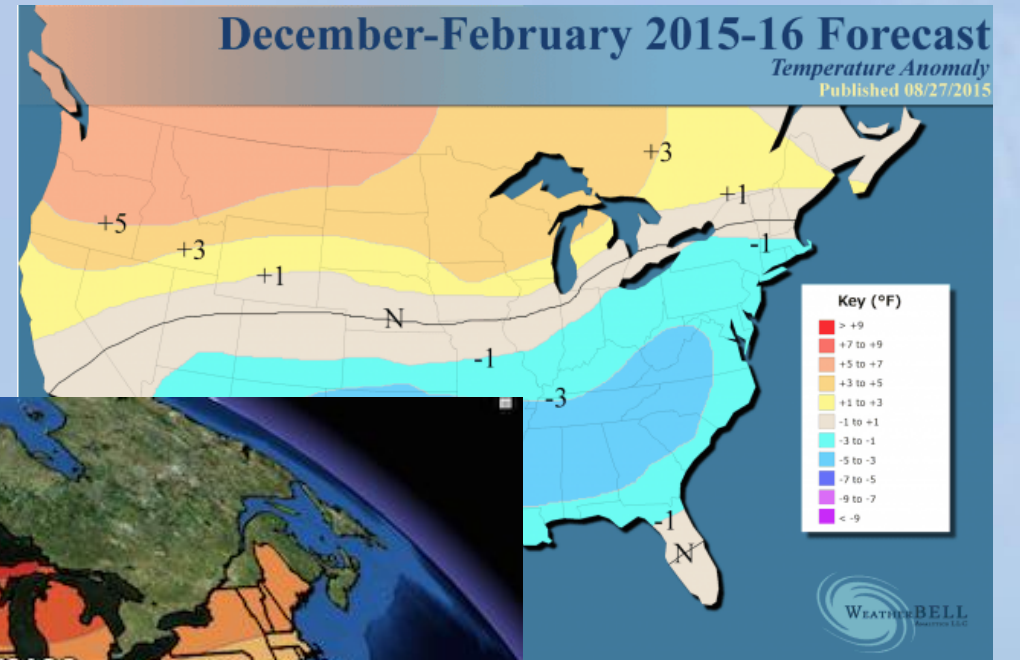
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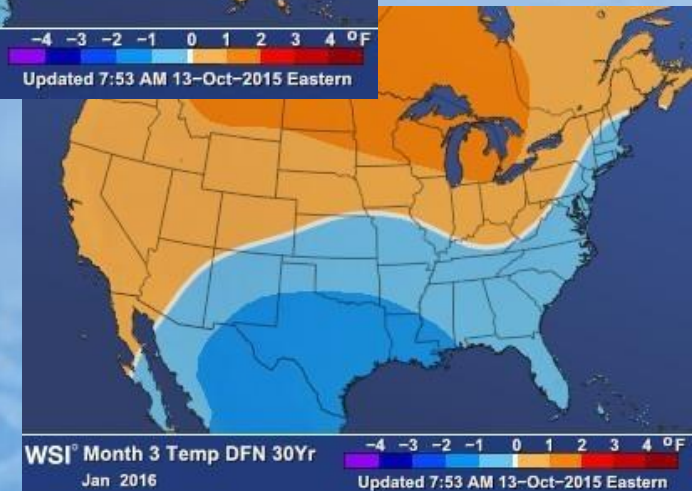
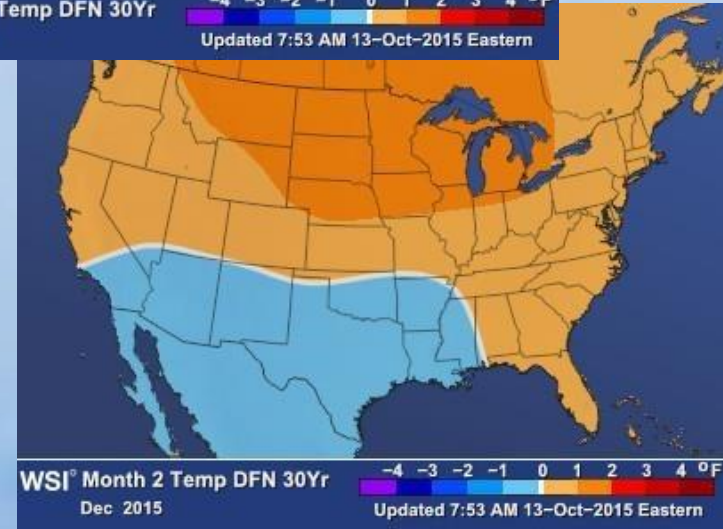
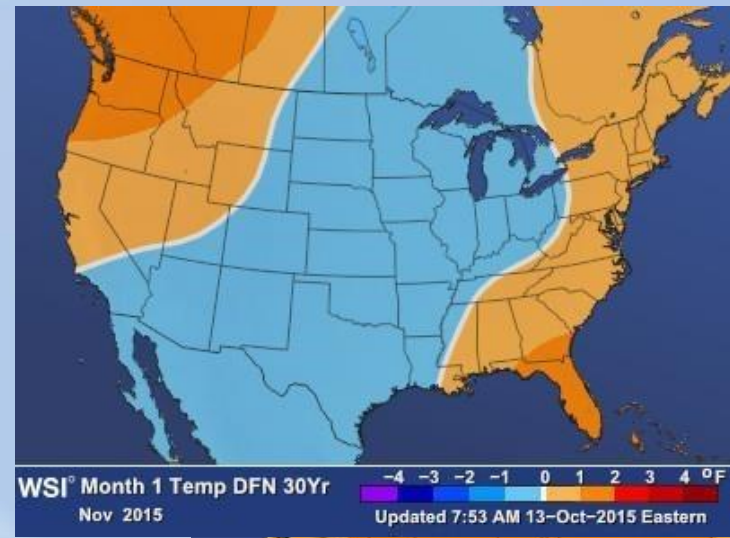
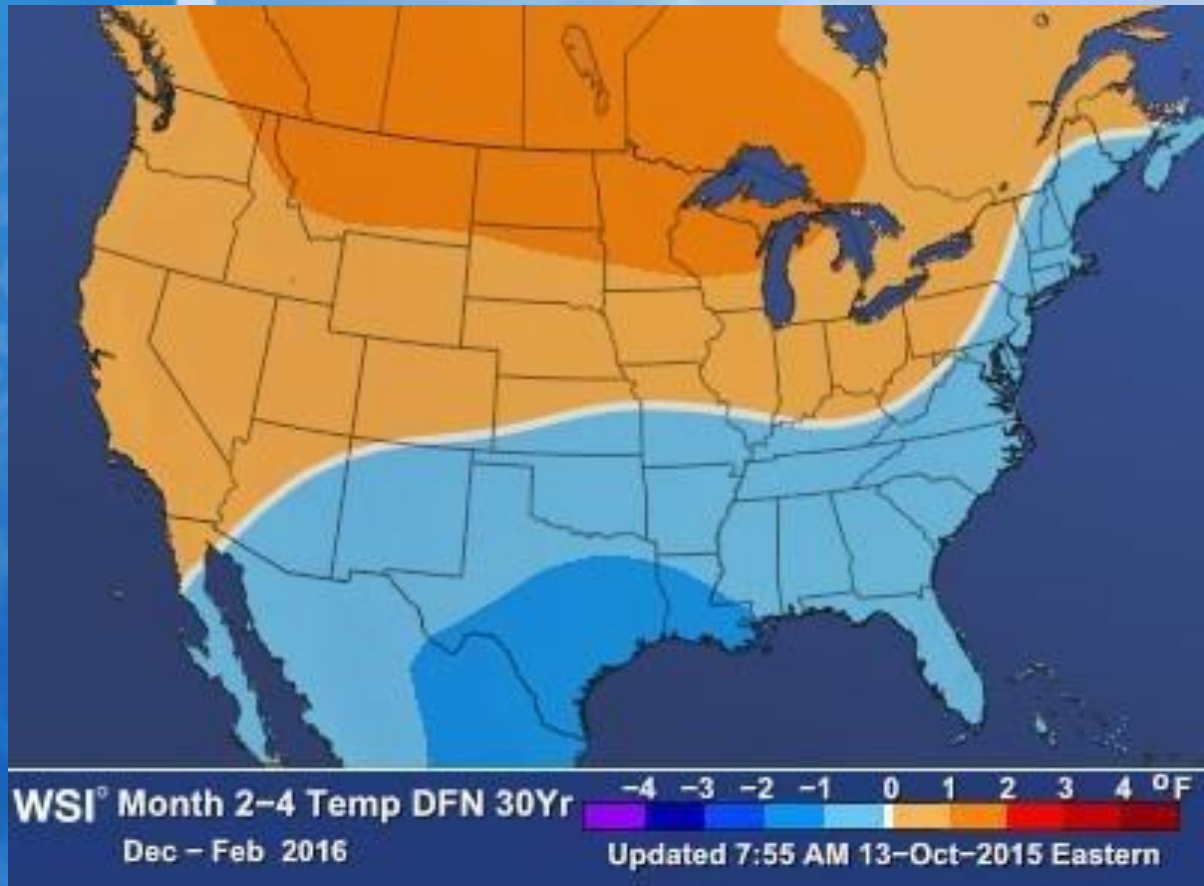


Cold for SW

COLD

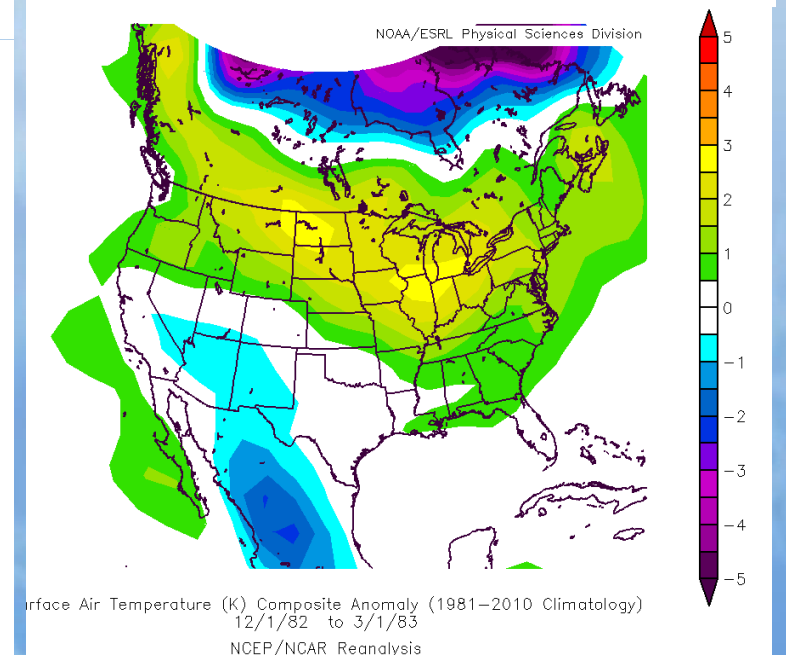
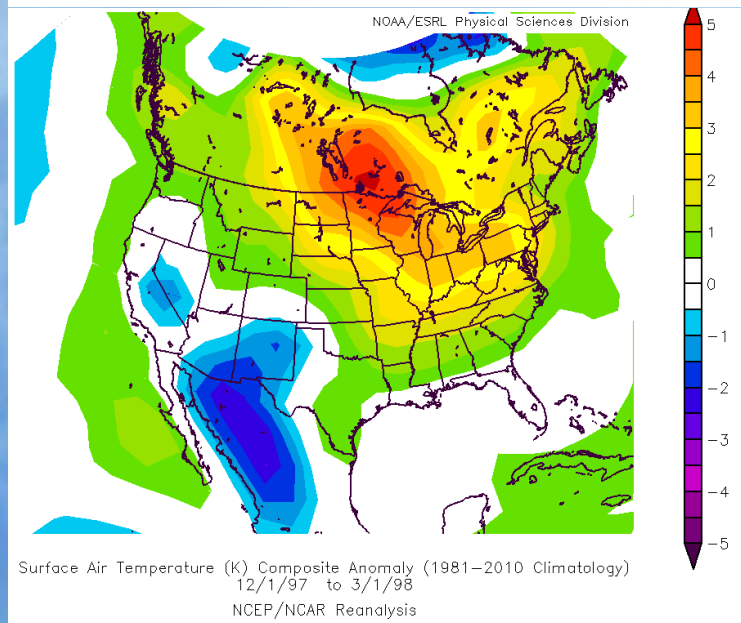
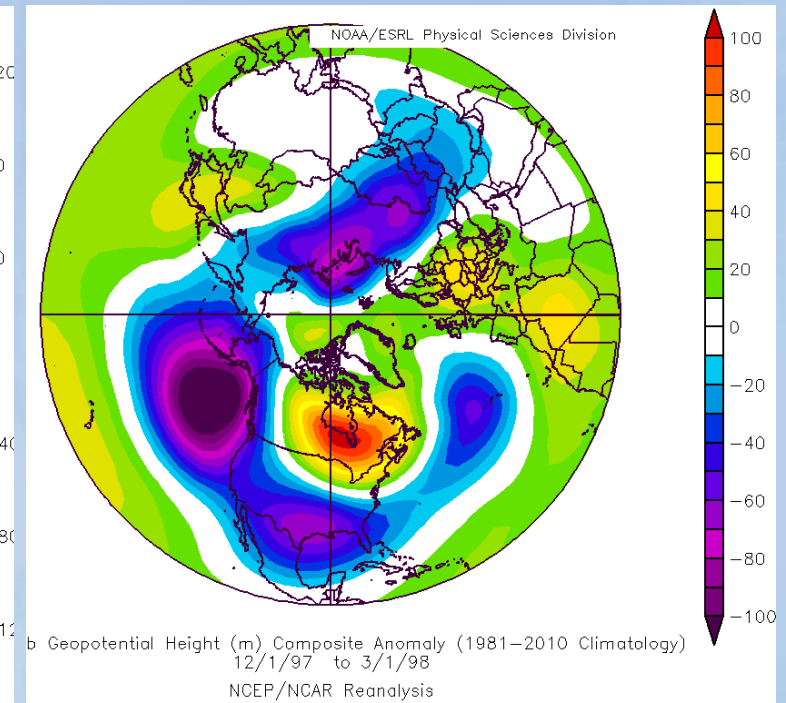
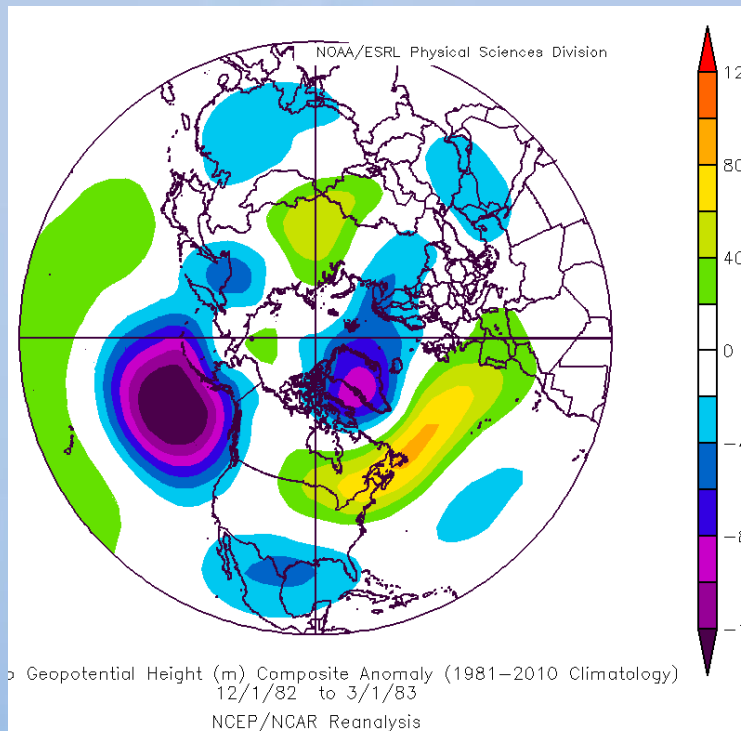
COLD

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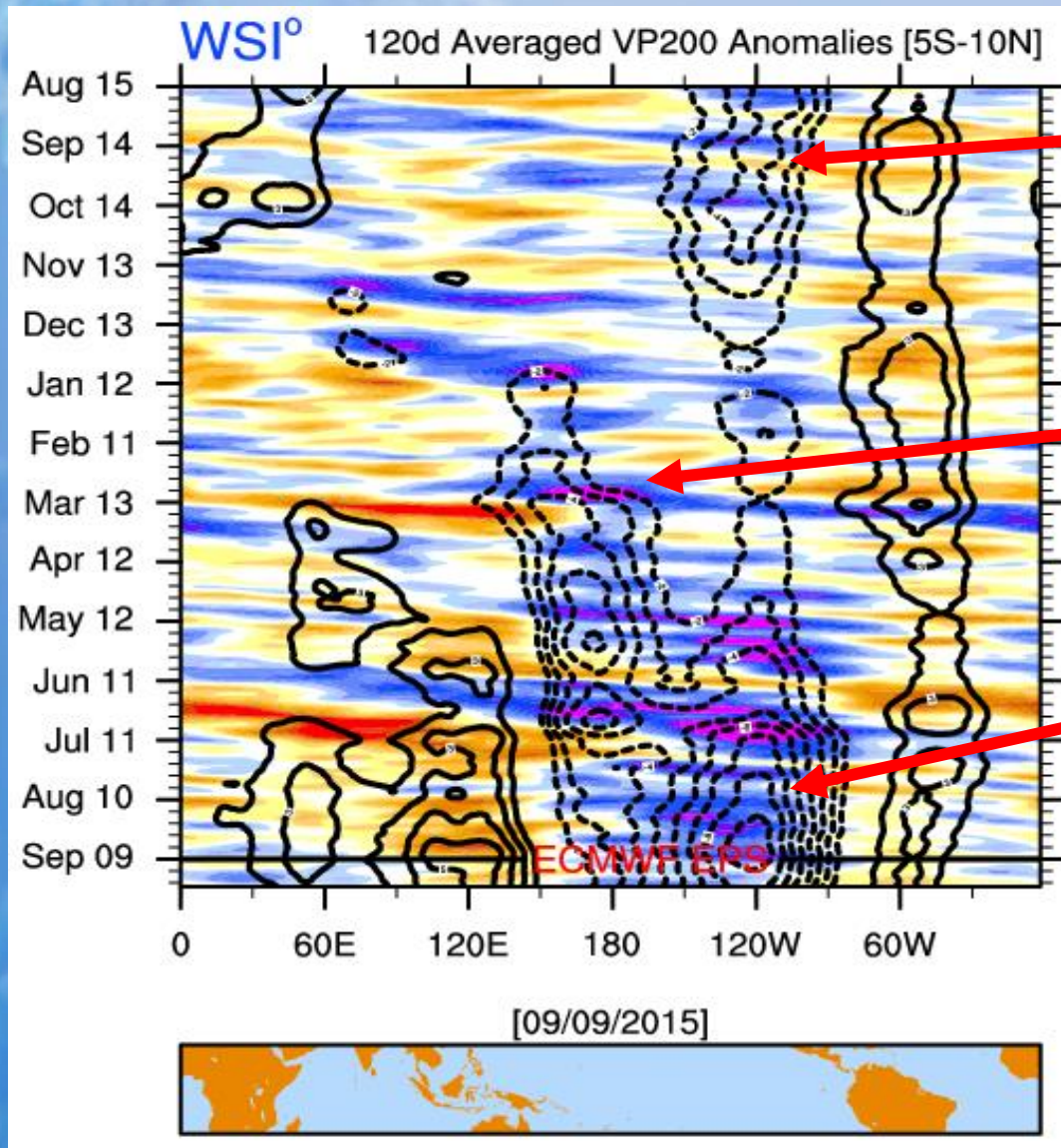


Super El Ninos

- Strong Subtropical Pacific Jet
- Deep GOA trough
- Split flow pattern over North America



Developing an Atmospheric ENSO Index

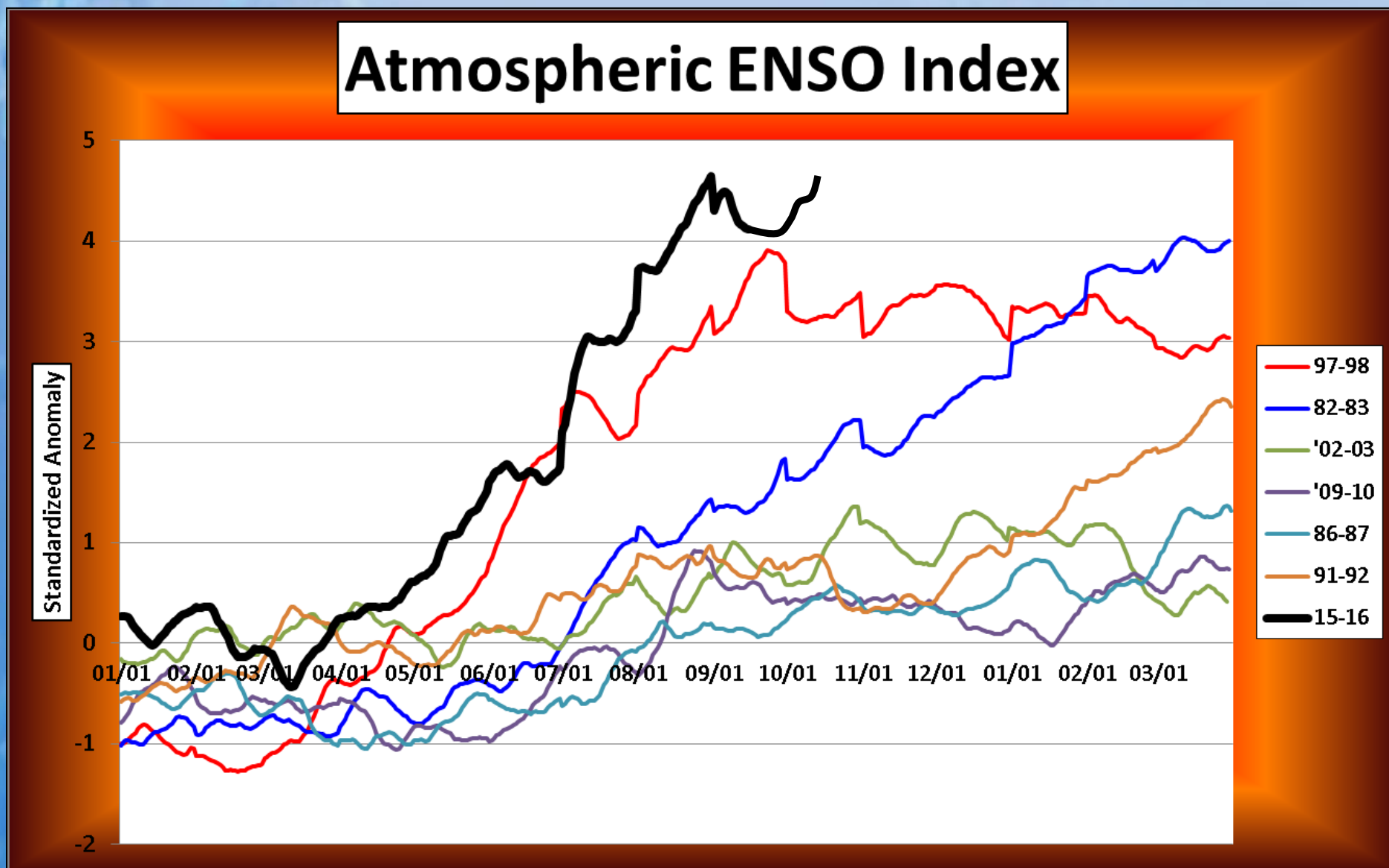


Weak El Nino conditions prevailed last Summer

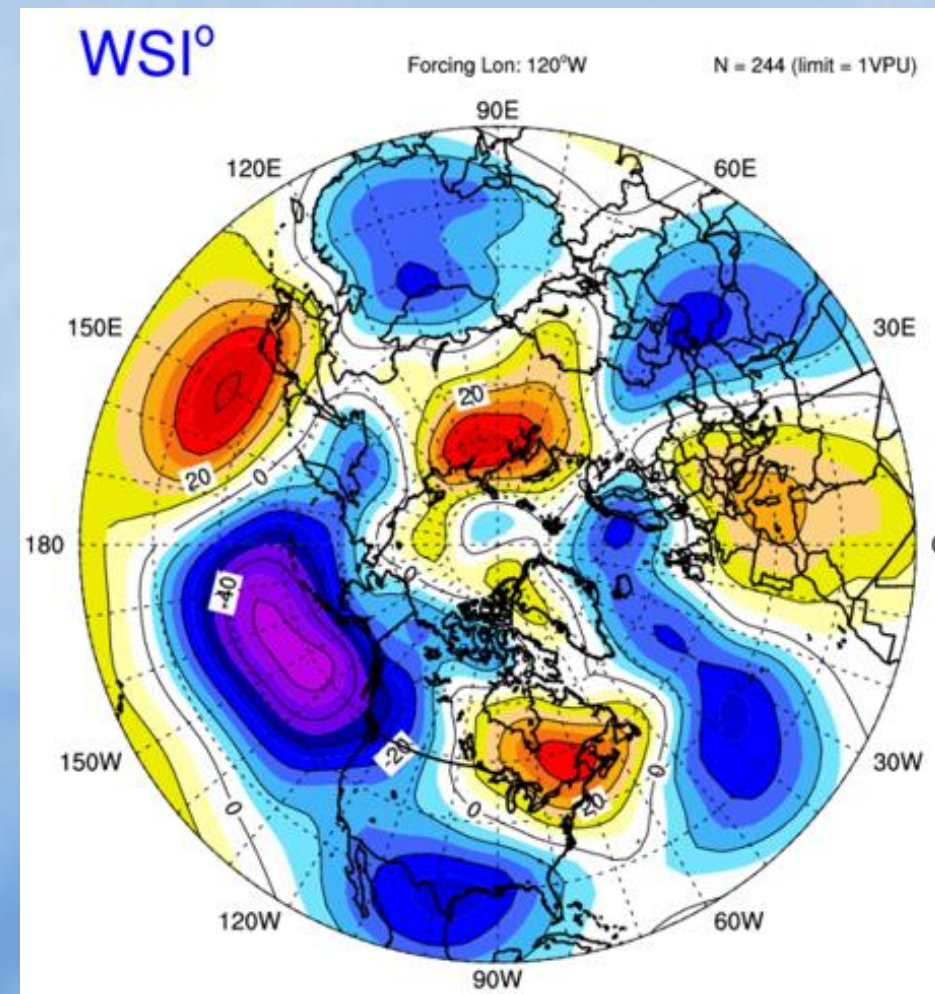
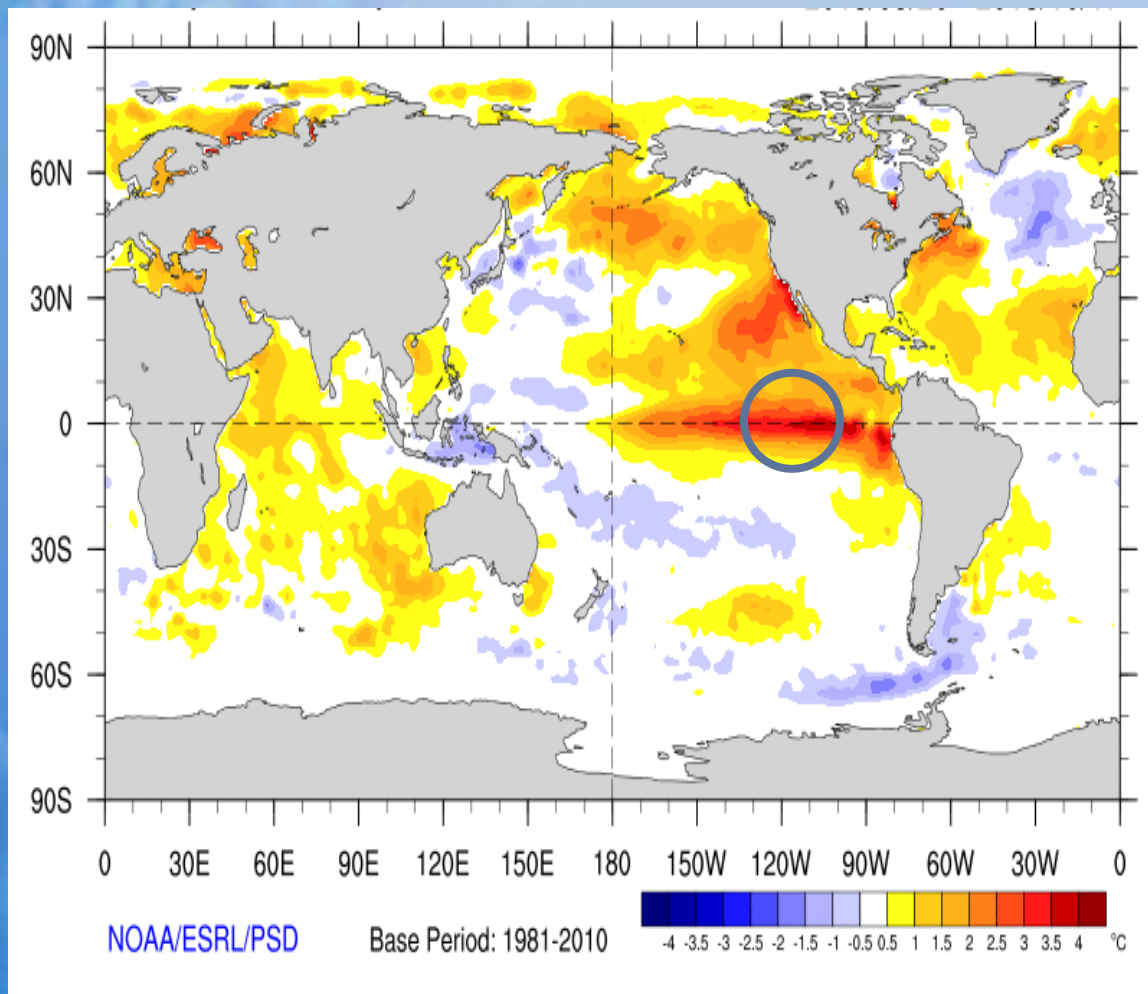
Strong Oceanic Kelvin wave coupled with Convection

MAJOR El Nino Signal

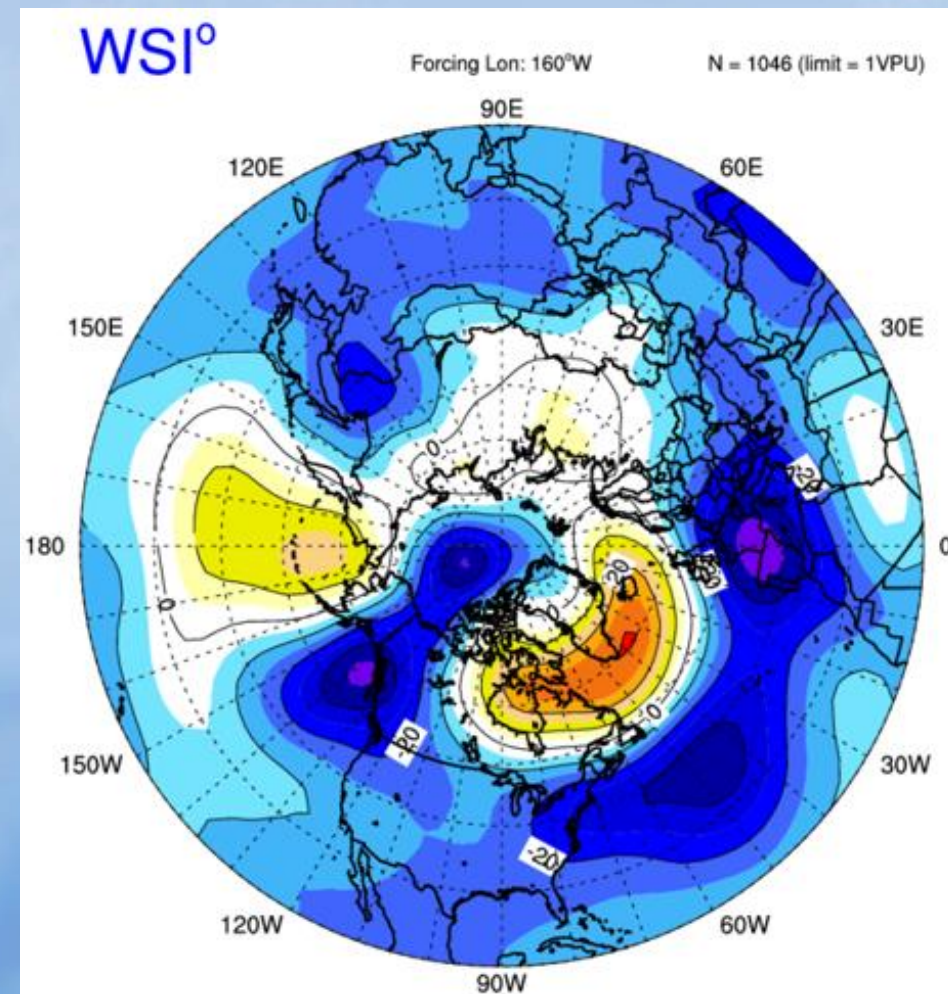
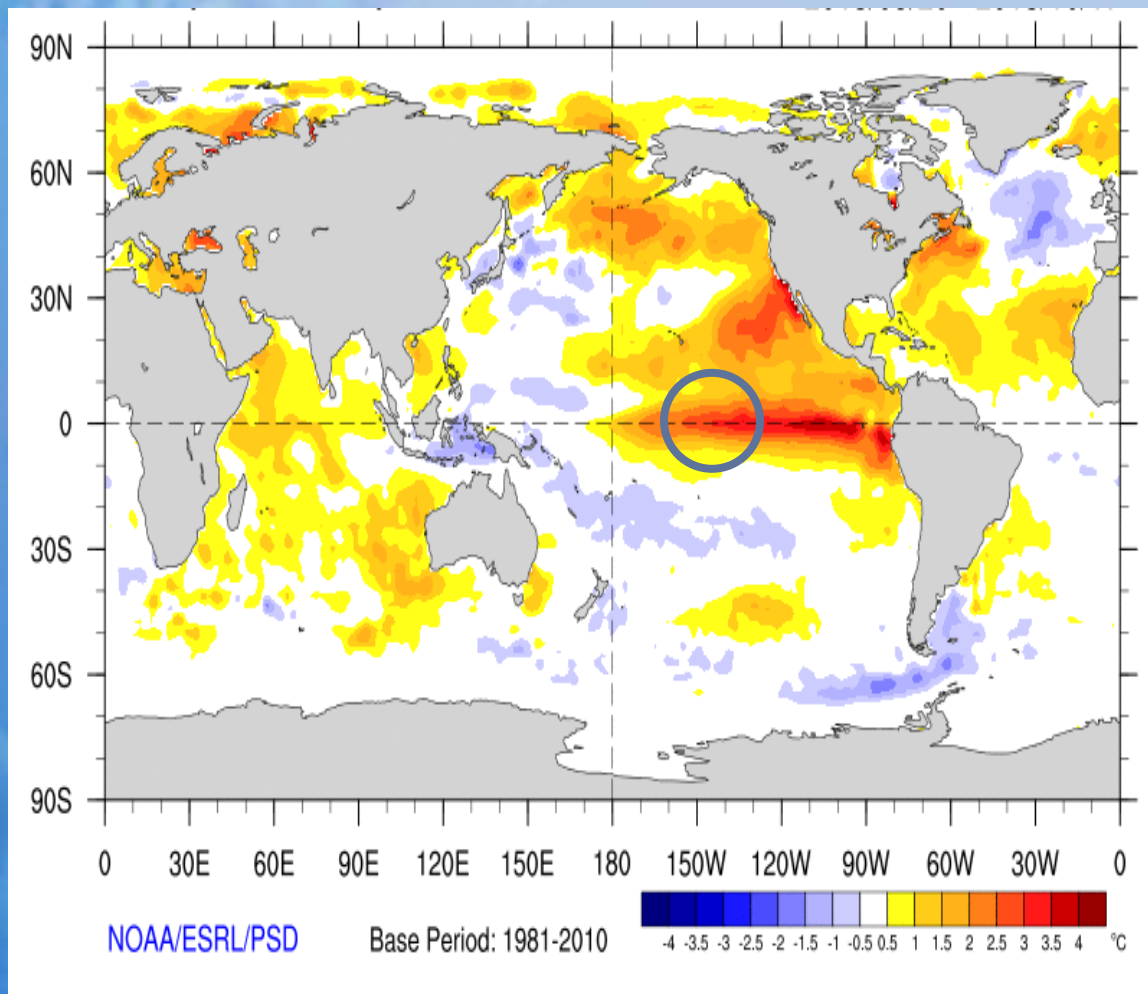
Atmospheric ENSO Index by Season



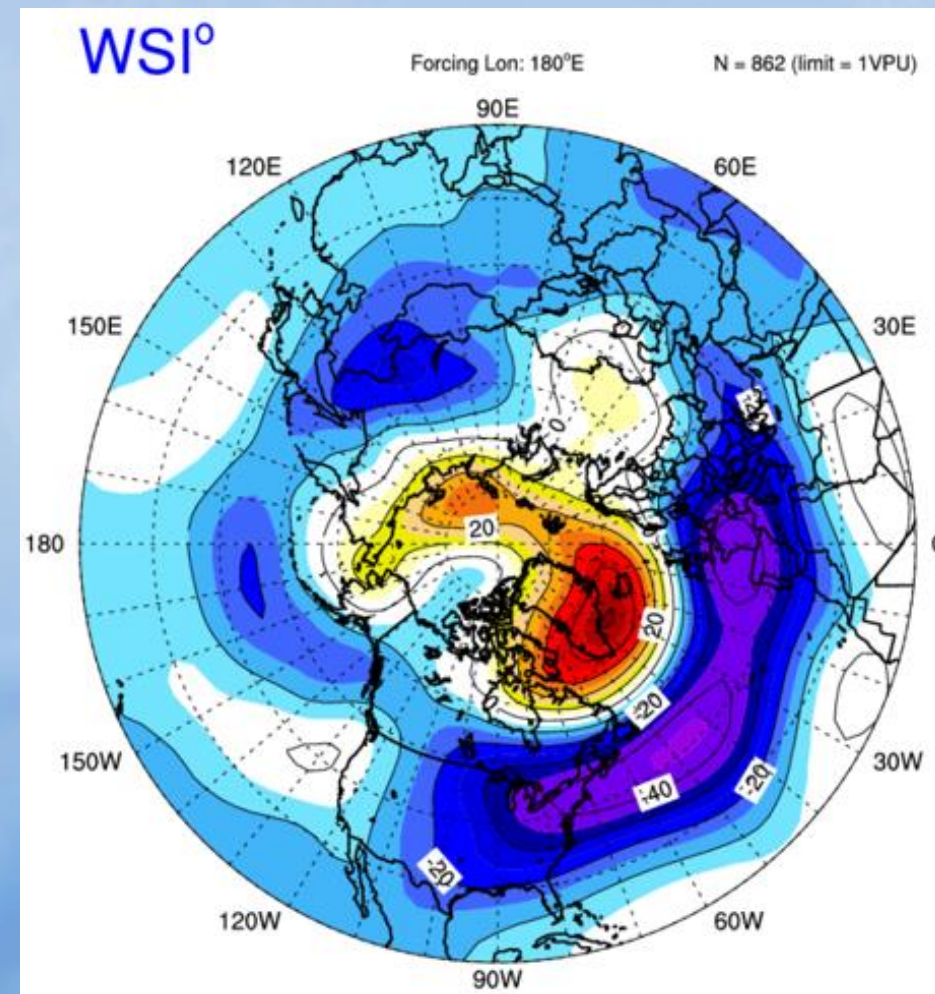
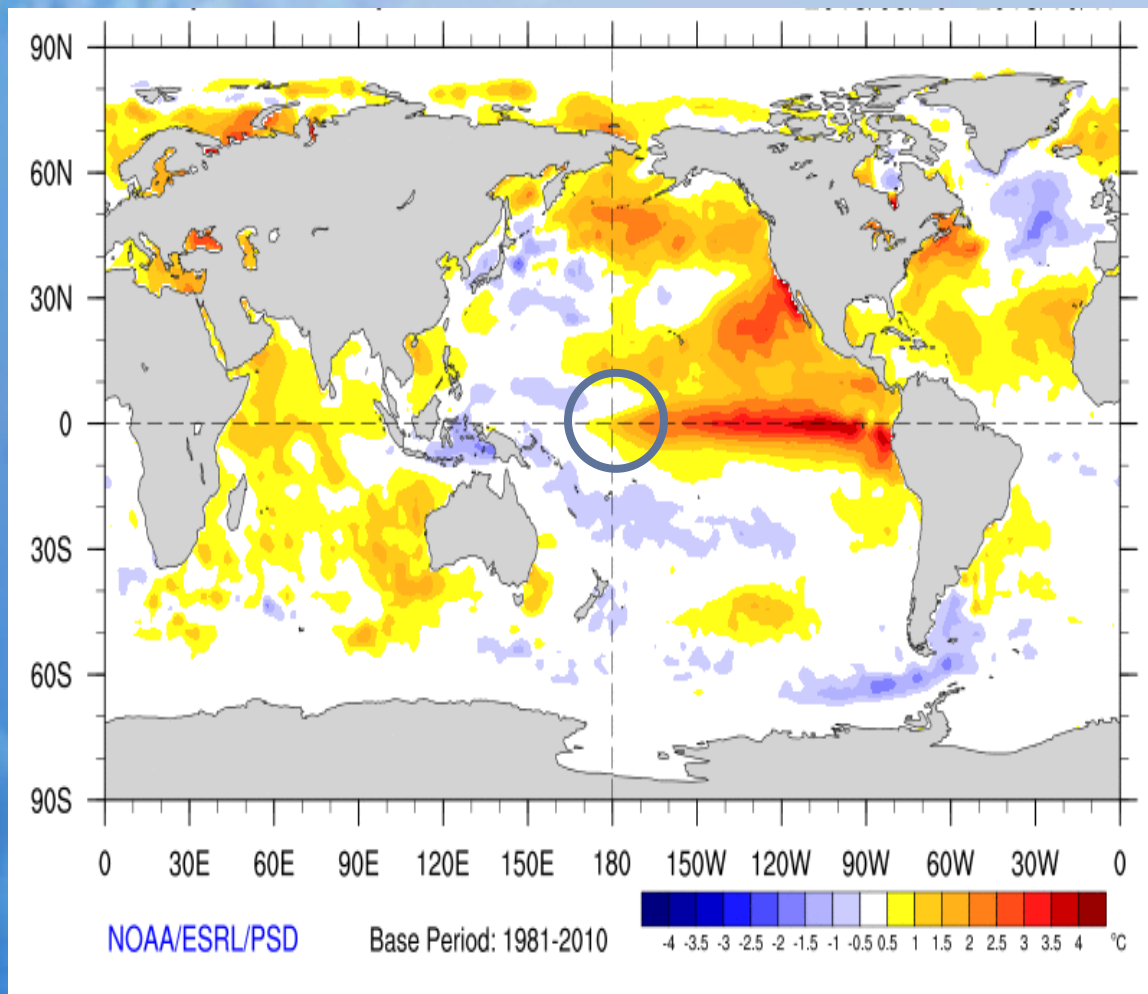
West vs. East Based Forcing



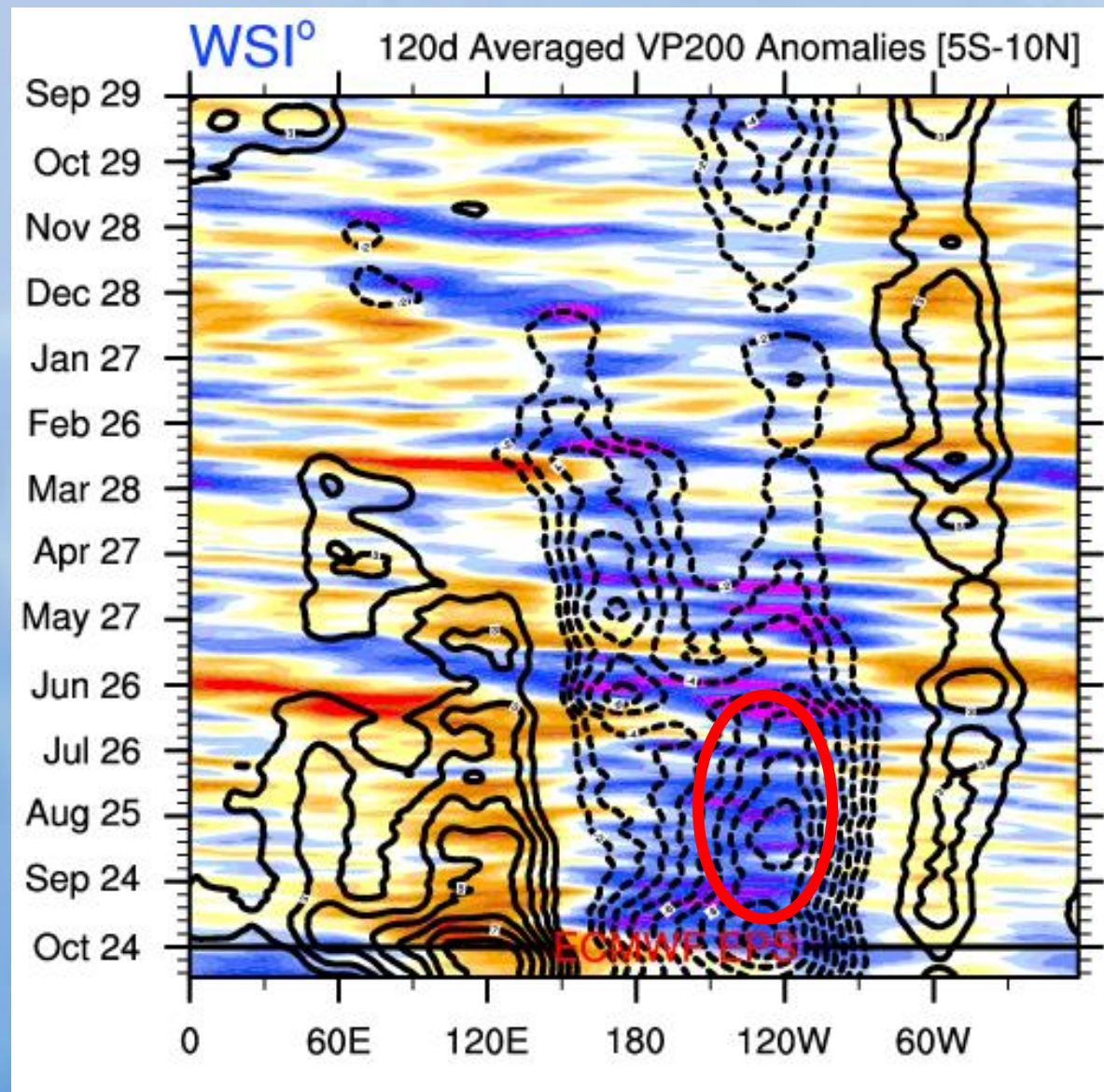
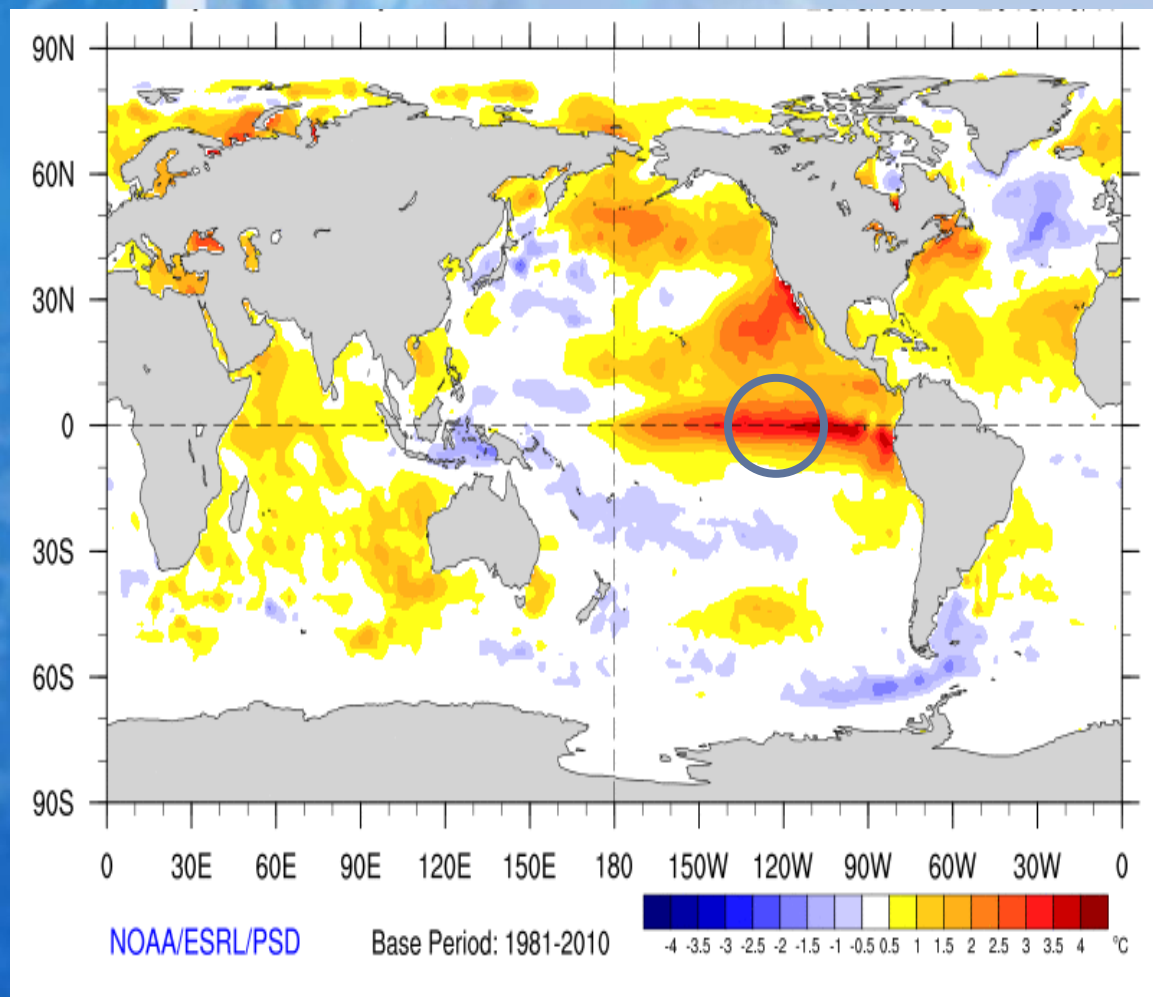
West vs. East Based Forcing



West vs. East Based Forcing

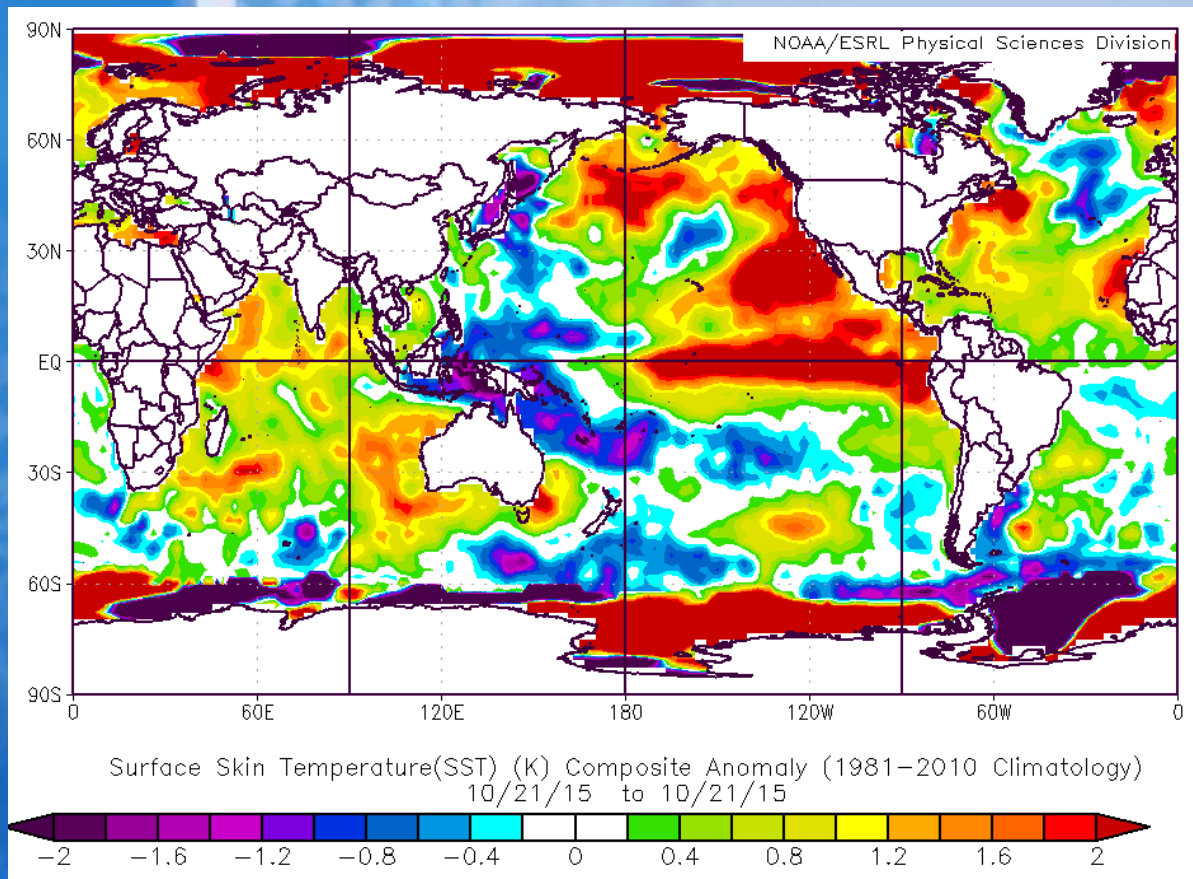


West vs. East Based Forcing

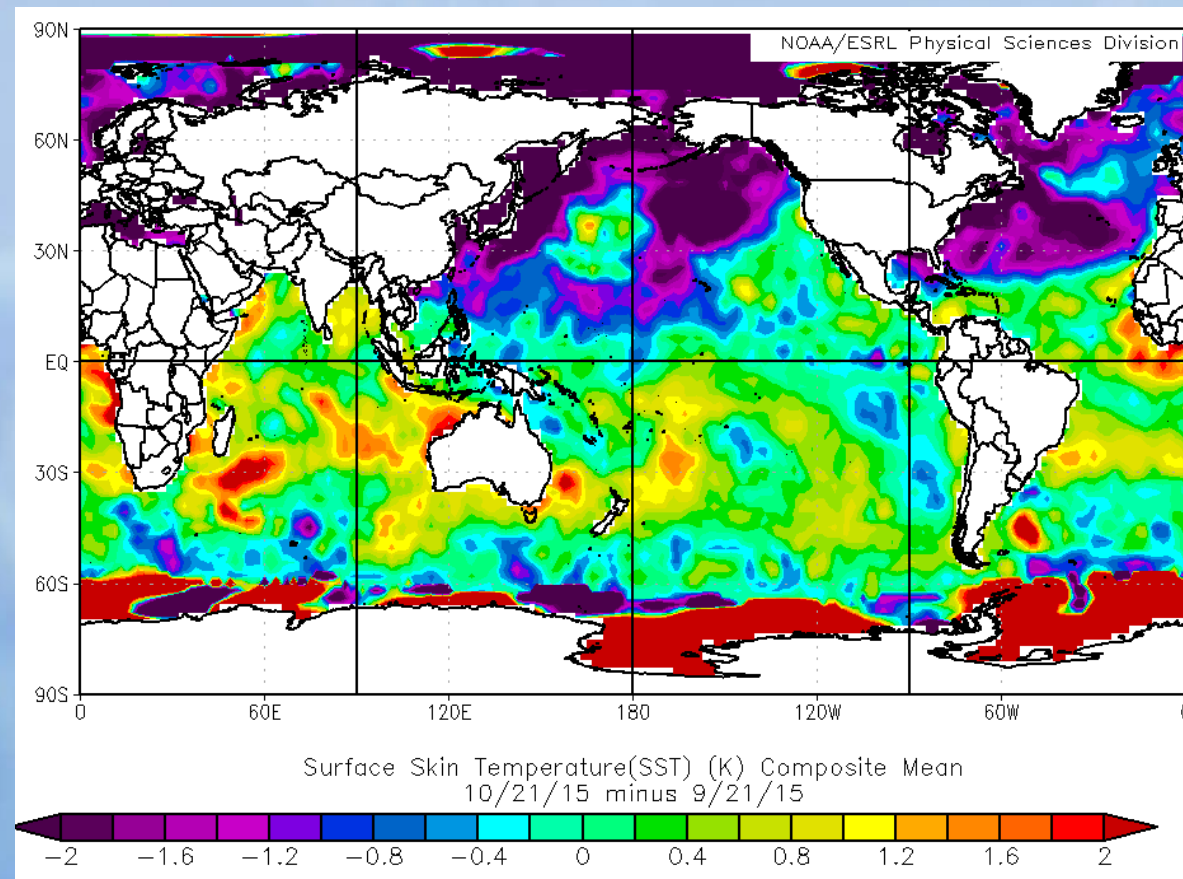


Convection focused near 120W, i.e. East Based

SST State in the Pacific

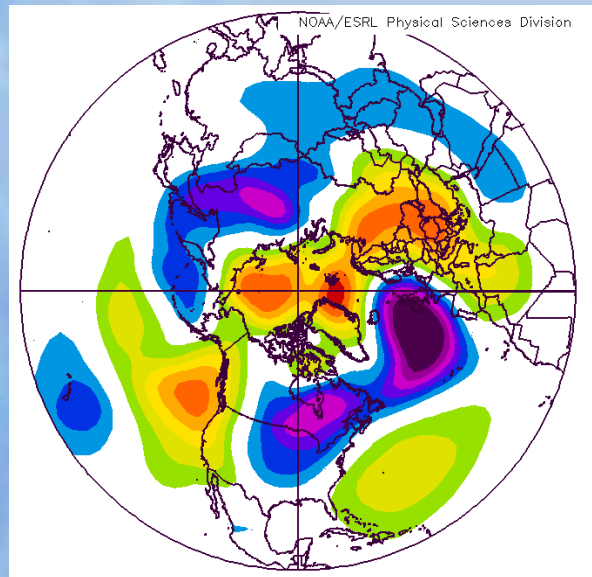


Current SST anomalies

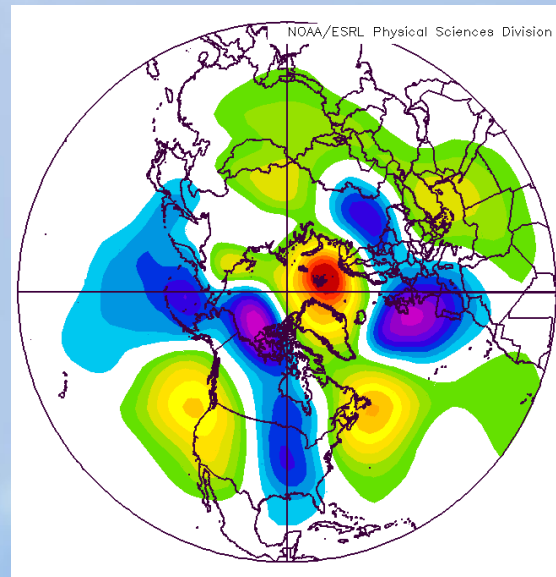


Monthly Trend

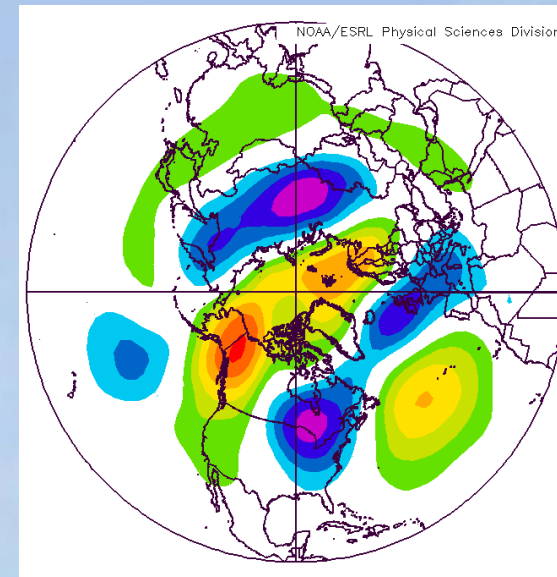
500 MB
Anomaly



Jan 1-10



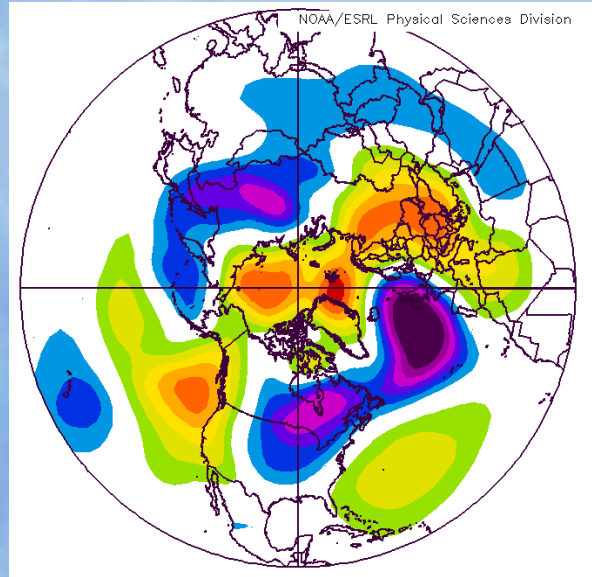
Jan 11-21



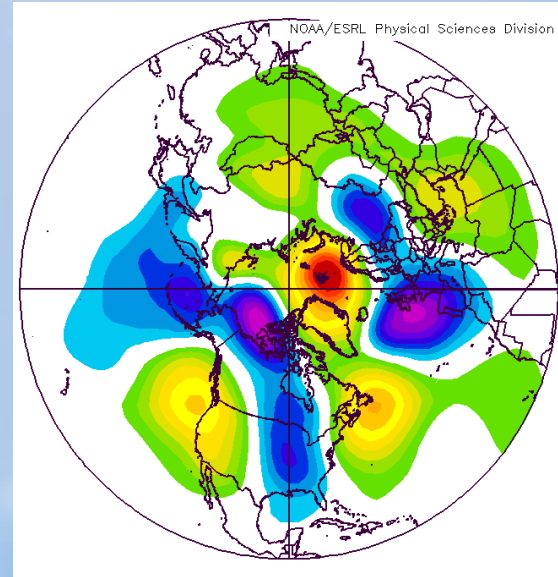
Jan 22-31

Sfc Temp
Anomaly

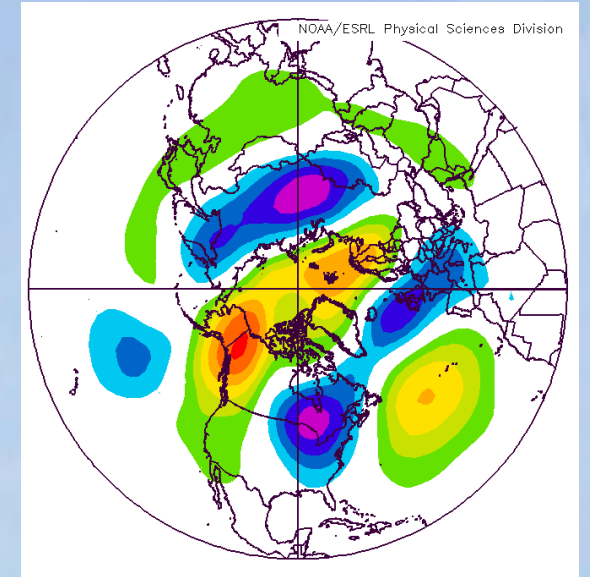
500 MB Anomaly



Jan 1-10

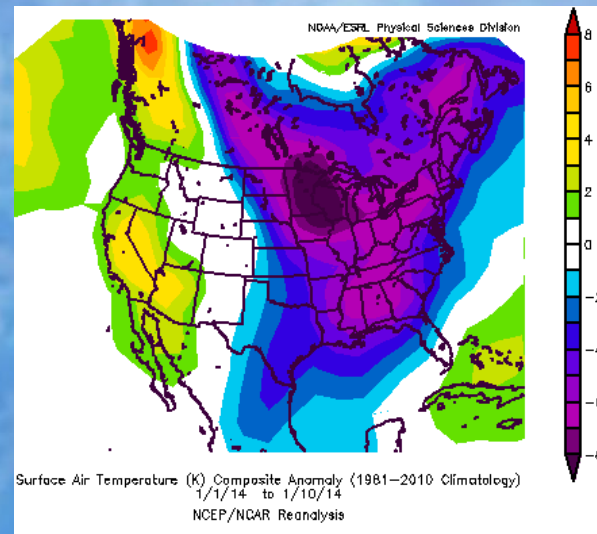


Jan 11-21

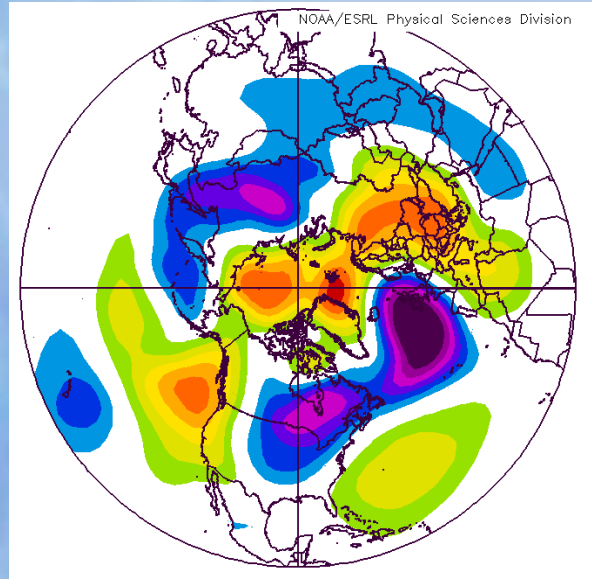


Jan 22-31

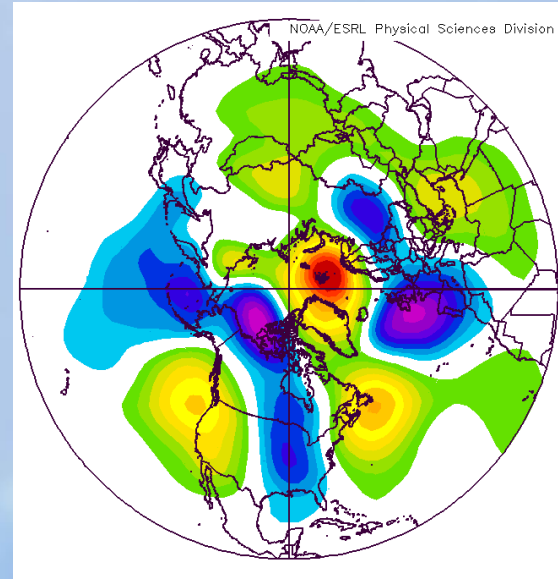
Sfc Temp Anomaly



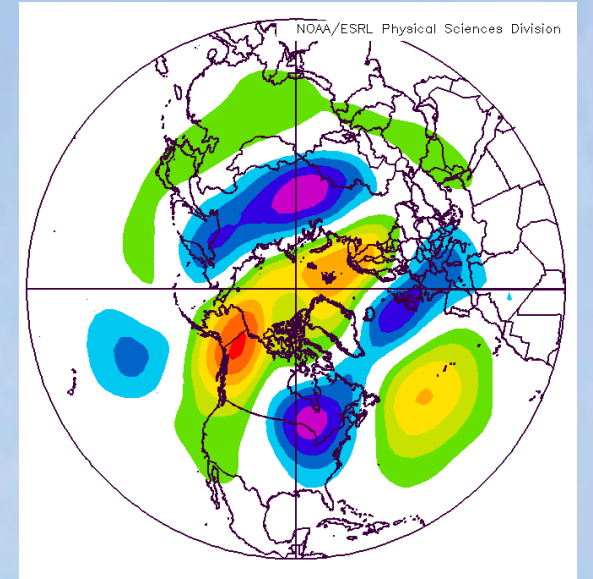
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Jan 1-10

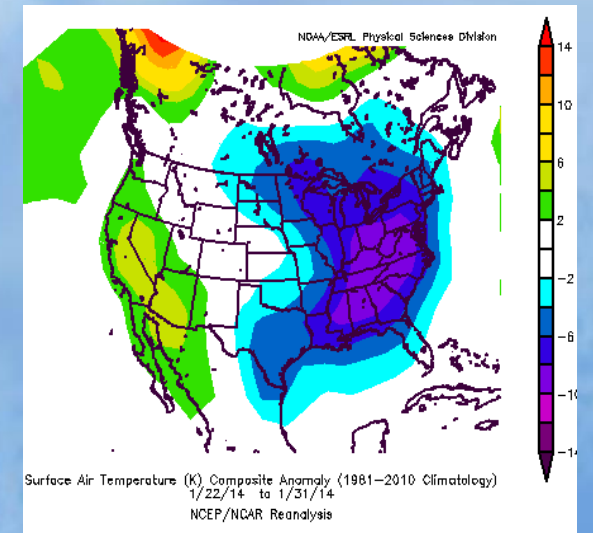
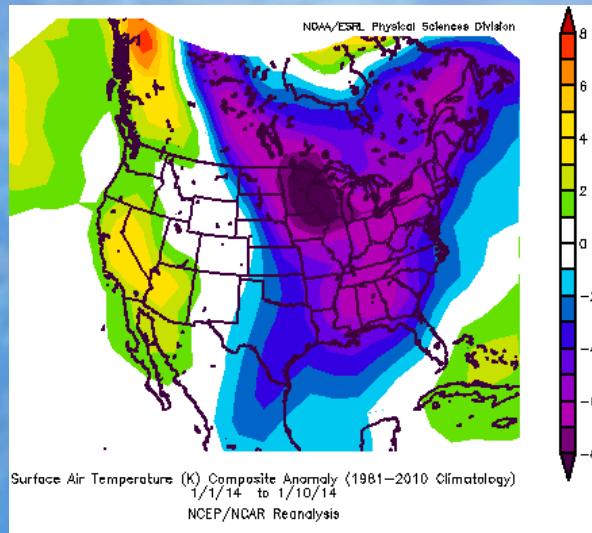


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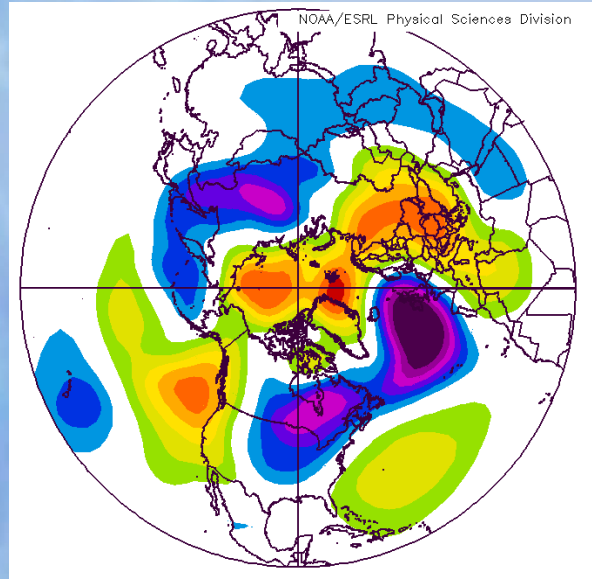


Jan 22-31

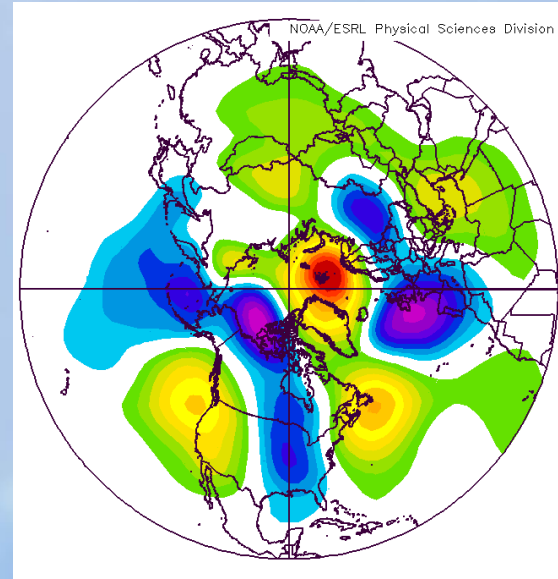
Sfc Temp Anomaly



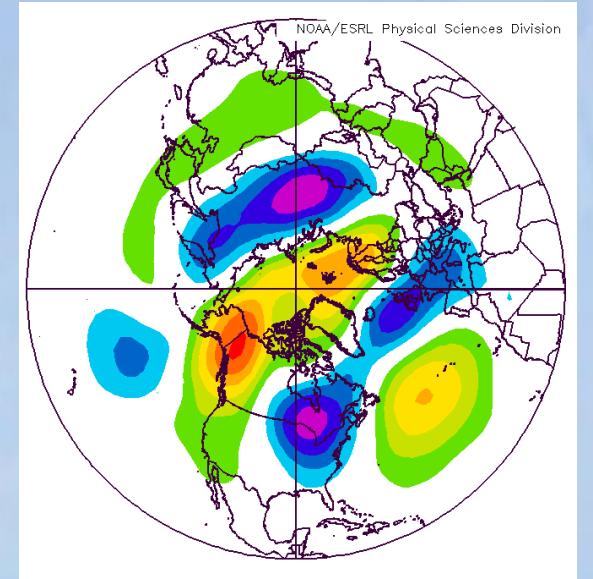
500 MB Anomaly



Jan 1-10

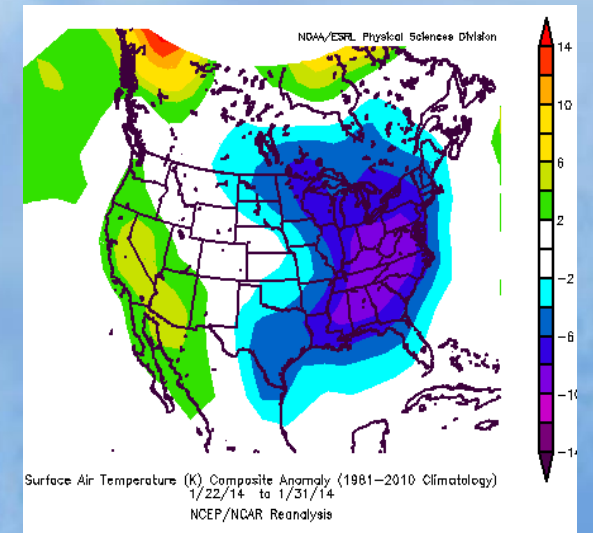
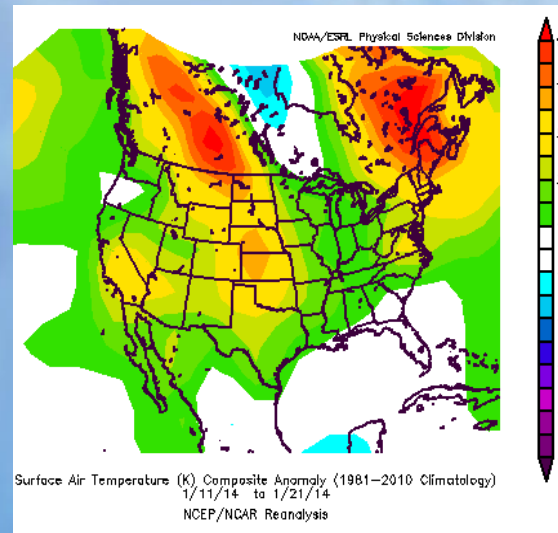
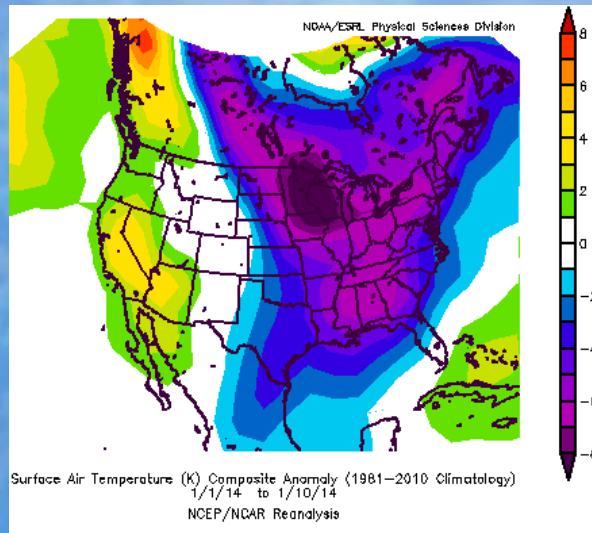


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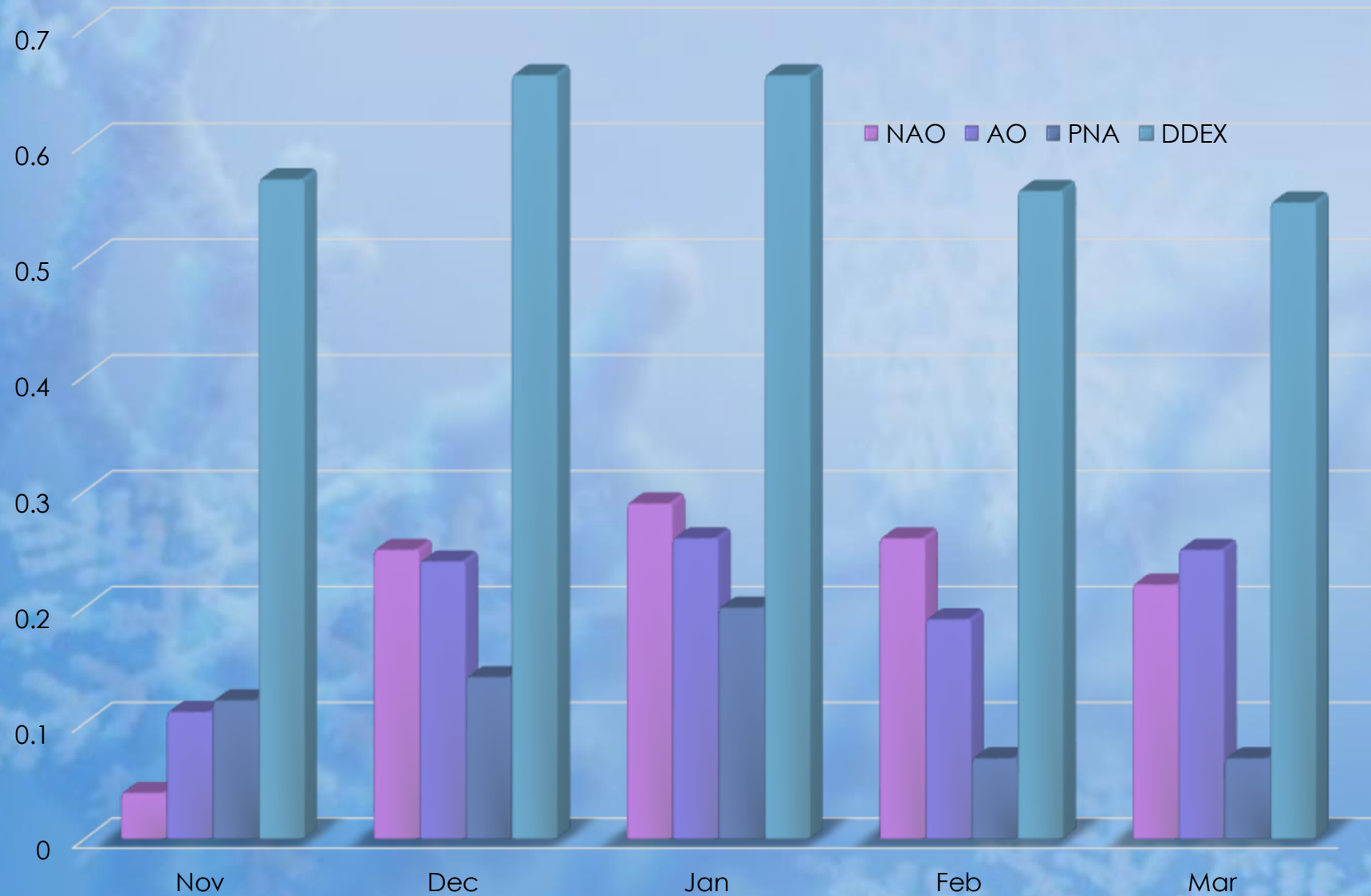


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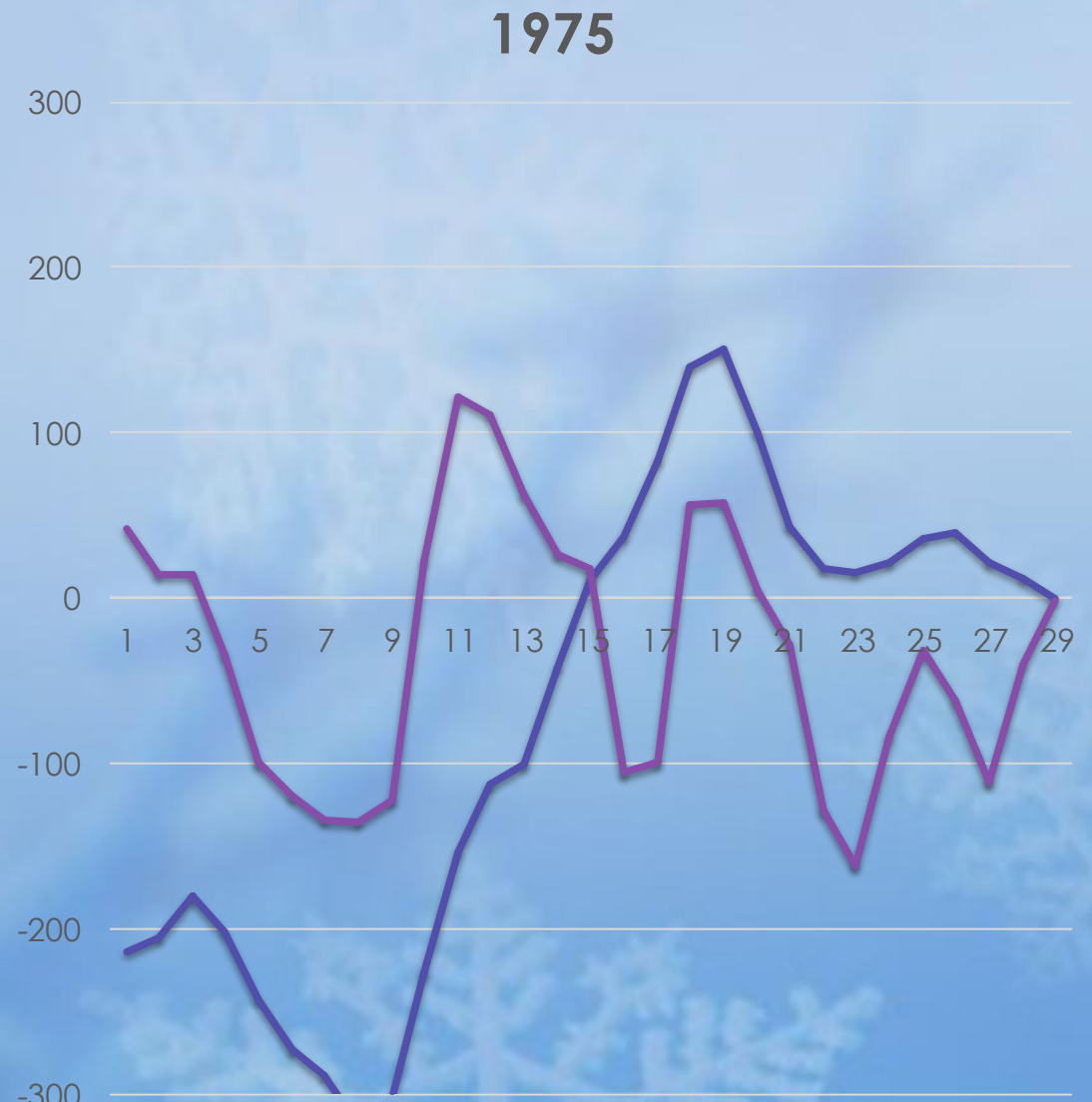
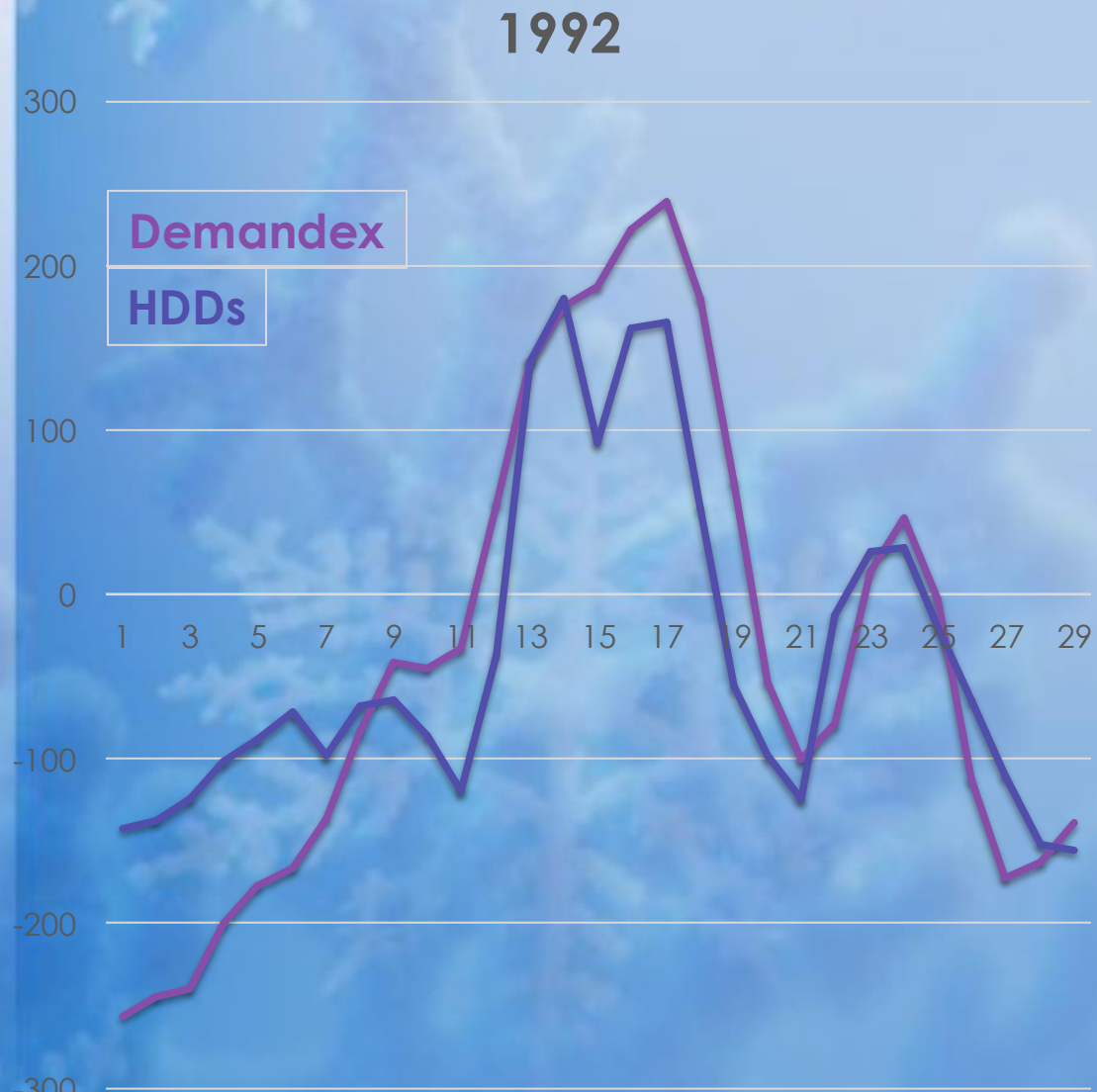
Sfc Temp Anomaly



The Big 3 Teleconnections vs. Demandex

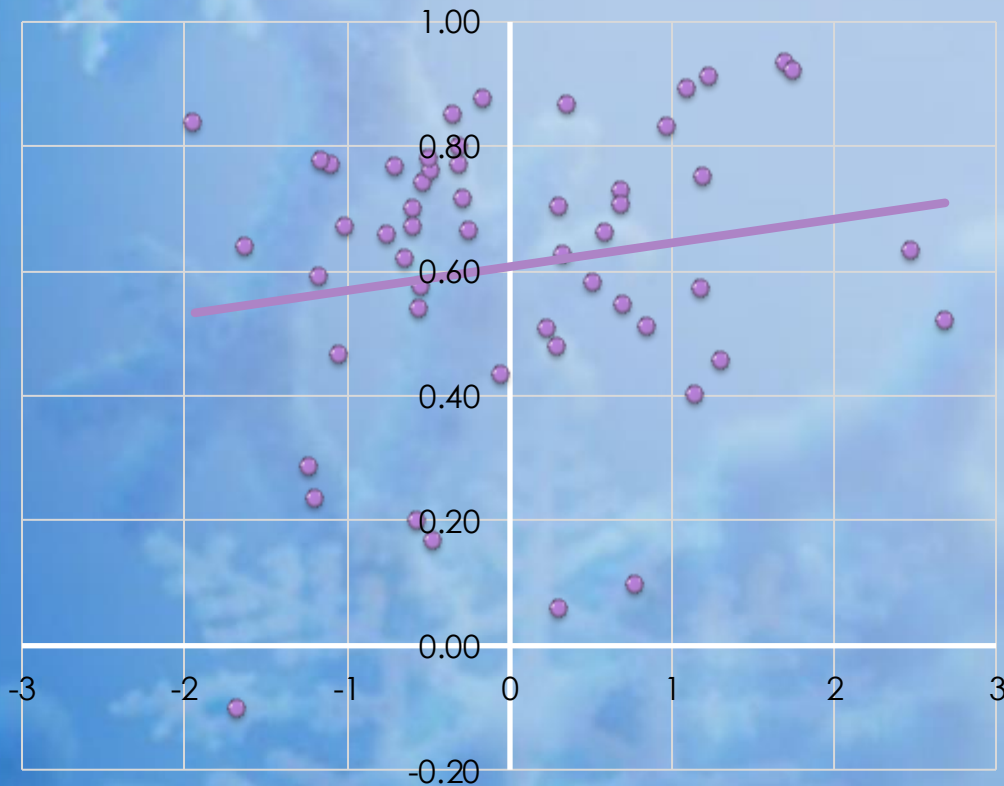


Demandex: Good Year vs Bad Year



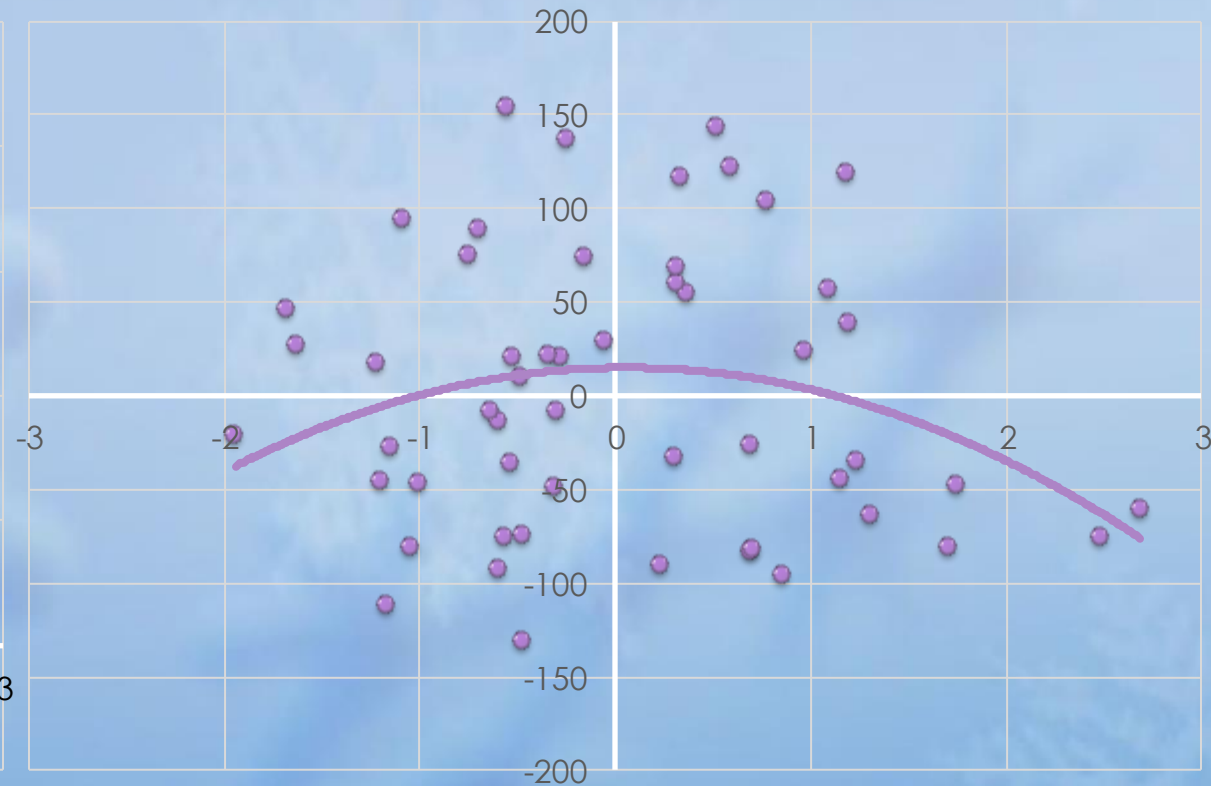
Demandex Correlation to ENSO

MEI vs Correlation Coefficient



Demandex Performs better in Nino winters than Nina Winters

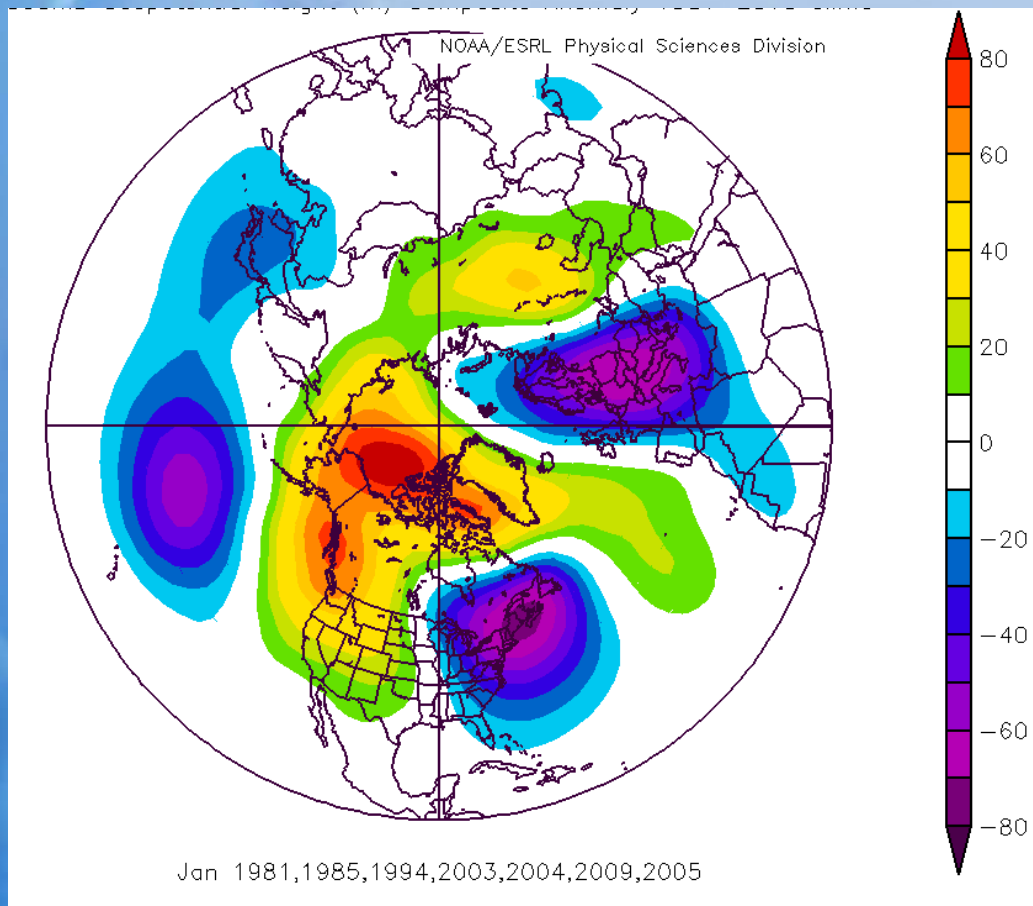
MEI vs Demandex



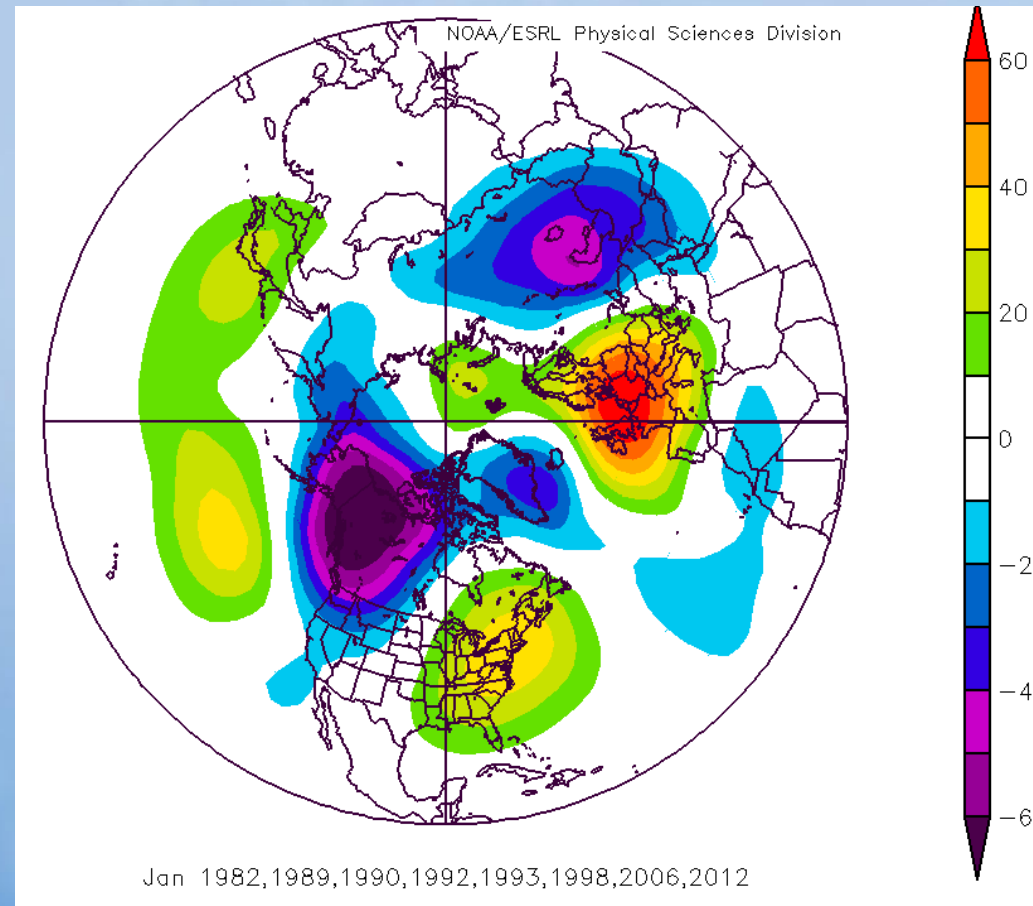
Demandex is highest in ENSO neutral years while lowest during extreme ENSO events

Predicting Demandex on a Seasonal Level

- Demandex is the strongest correlated teleconnection to US temps, but is it predictable on a seasonal scale?



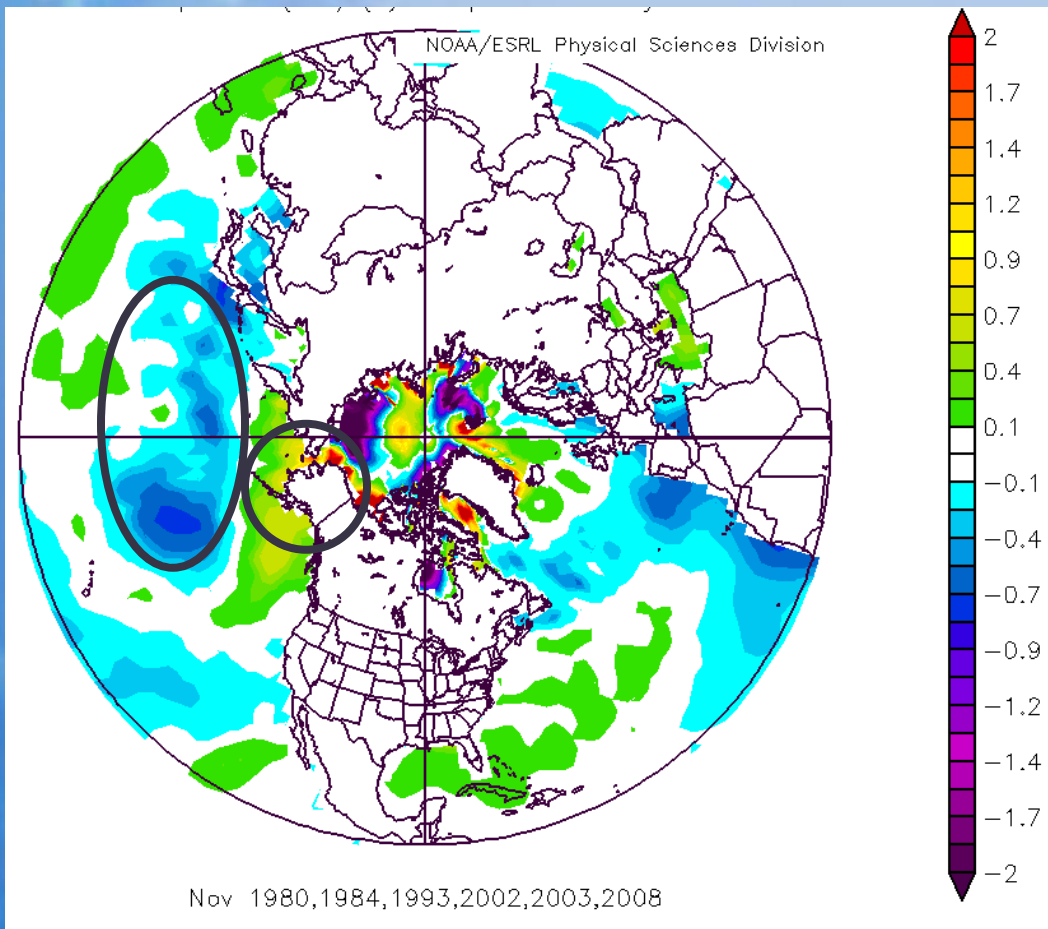
Highest Demandex Januarys



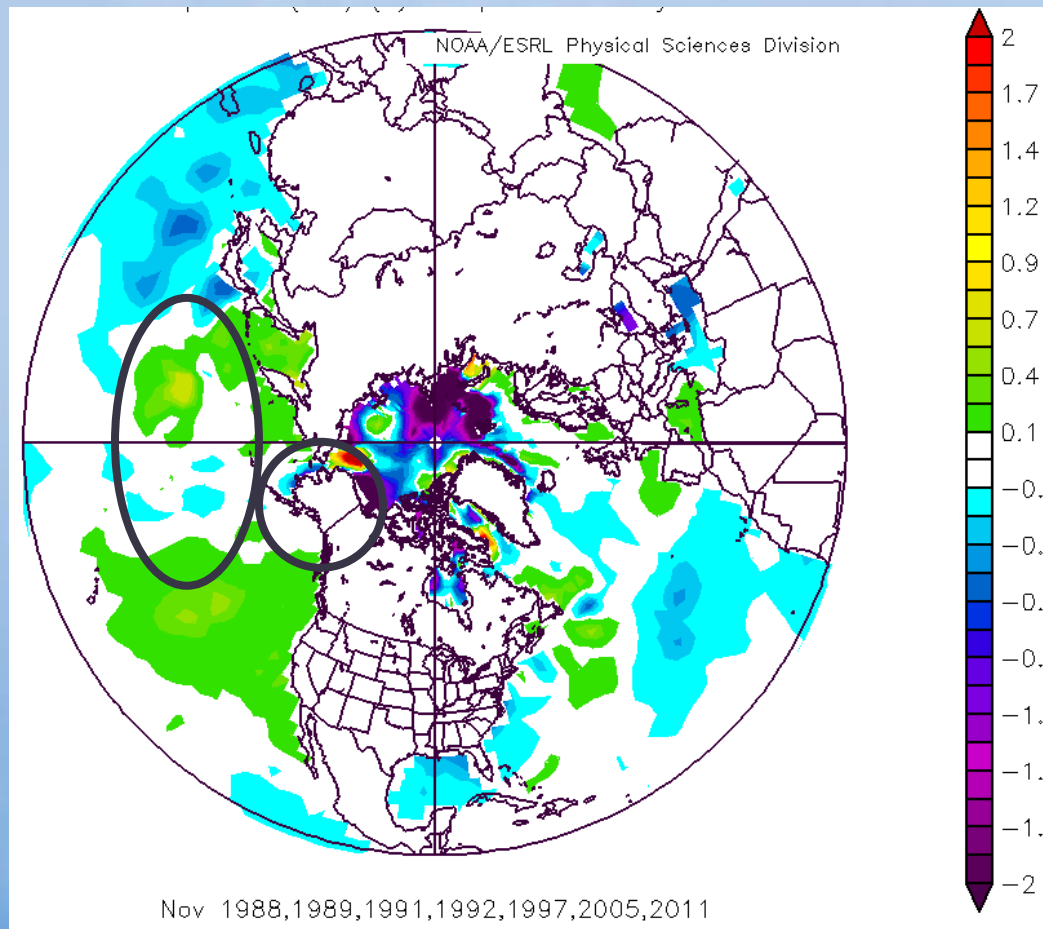
Lowest Demandex Januarys

Predicting Demandex on a Seasonal Level

- Seems to be a slight correlation between SSTs in November, but not a smoking gun



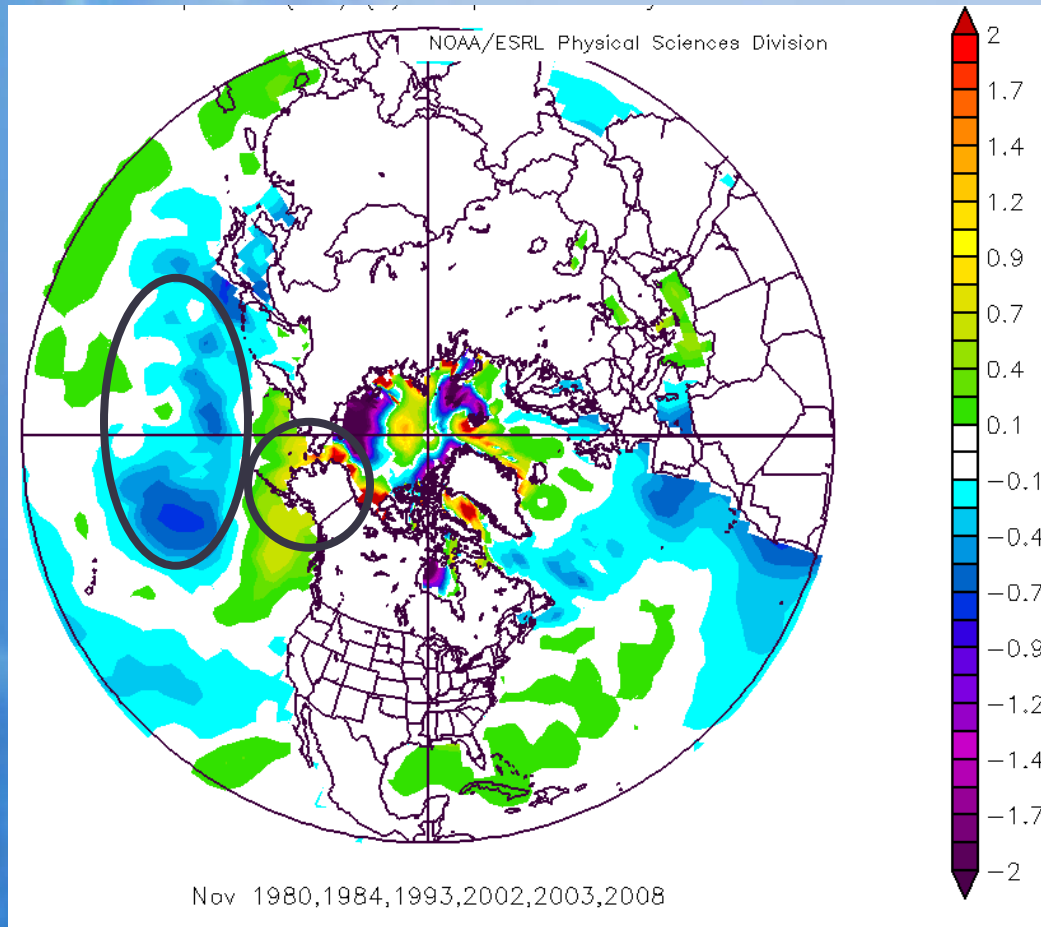
Nov SSTs before Highest ddex Jans



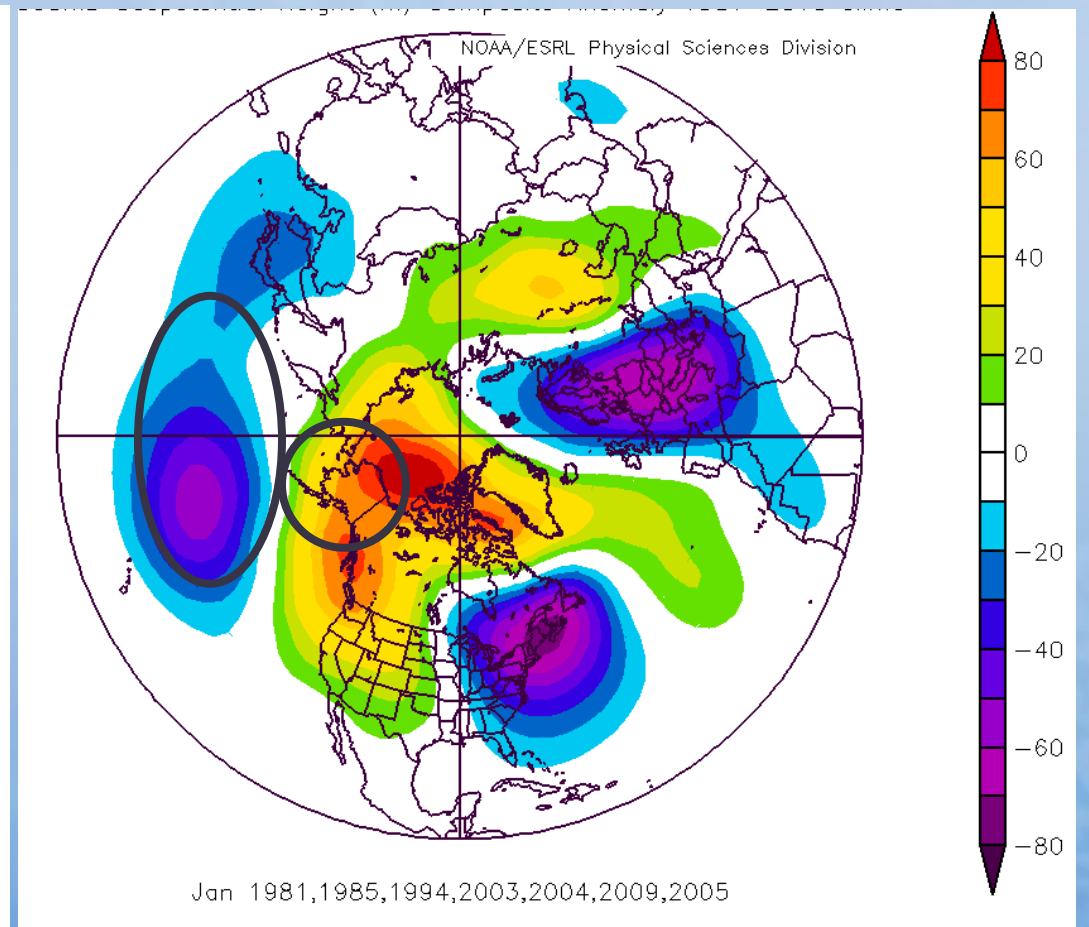
Nov SSTs before Lowest ddex Jans

Predicting Demandex on a Seasonal Level

- NOV cool pool aligns with January Trough; Warm pool with AK ridge



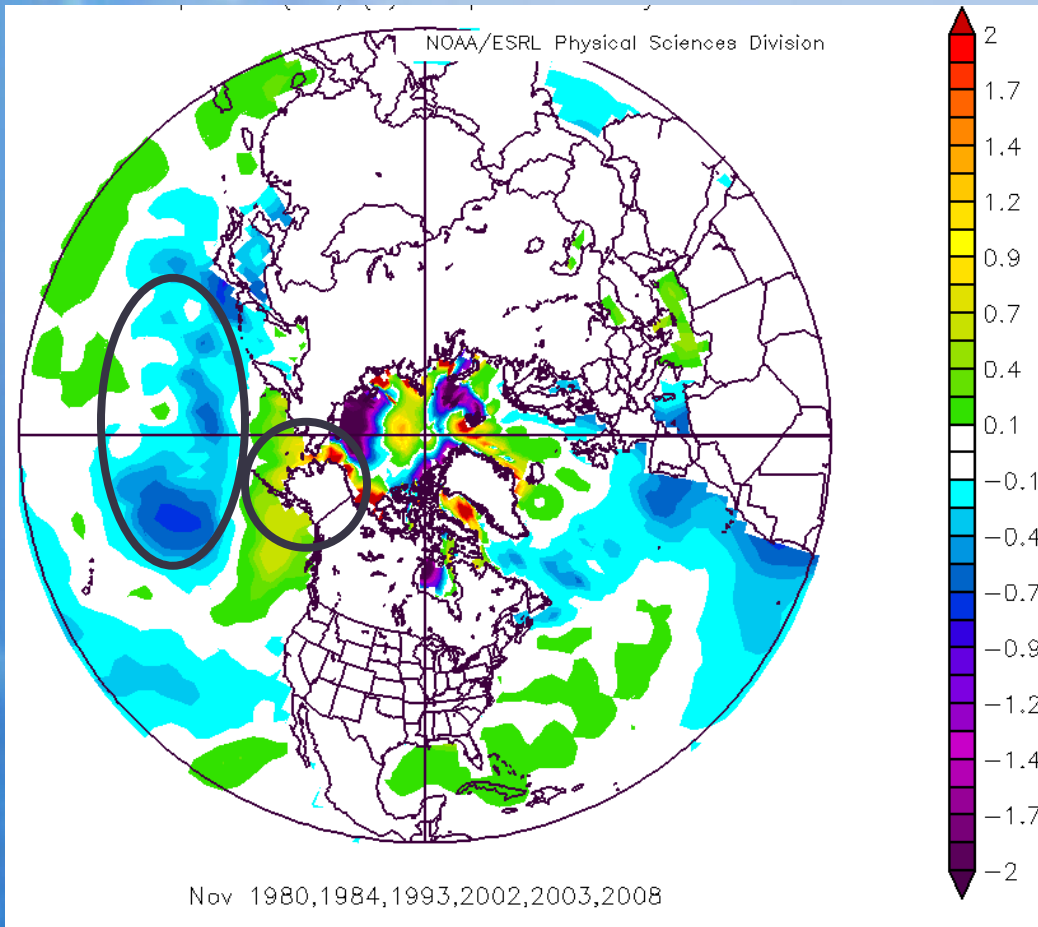
November SSTs



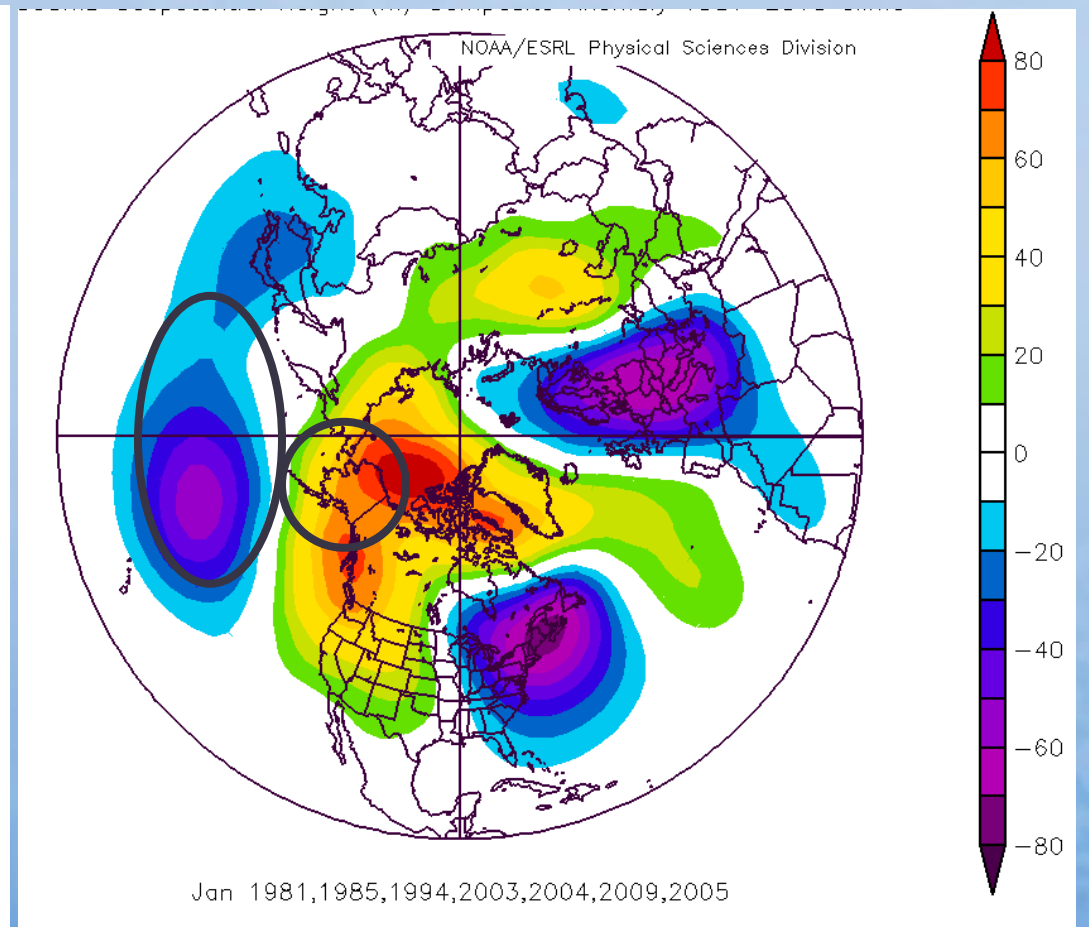
Following January Pattern

Predicting Demandex on a Seasonal Level

- NOV cool pool aligns with January Trough; Warm pool with AK ridge



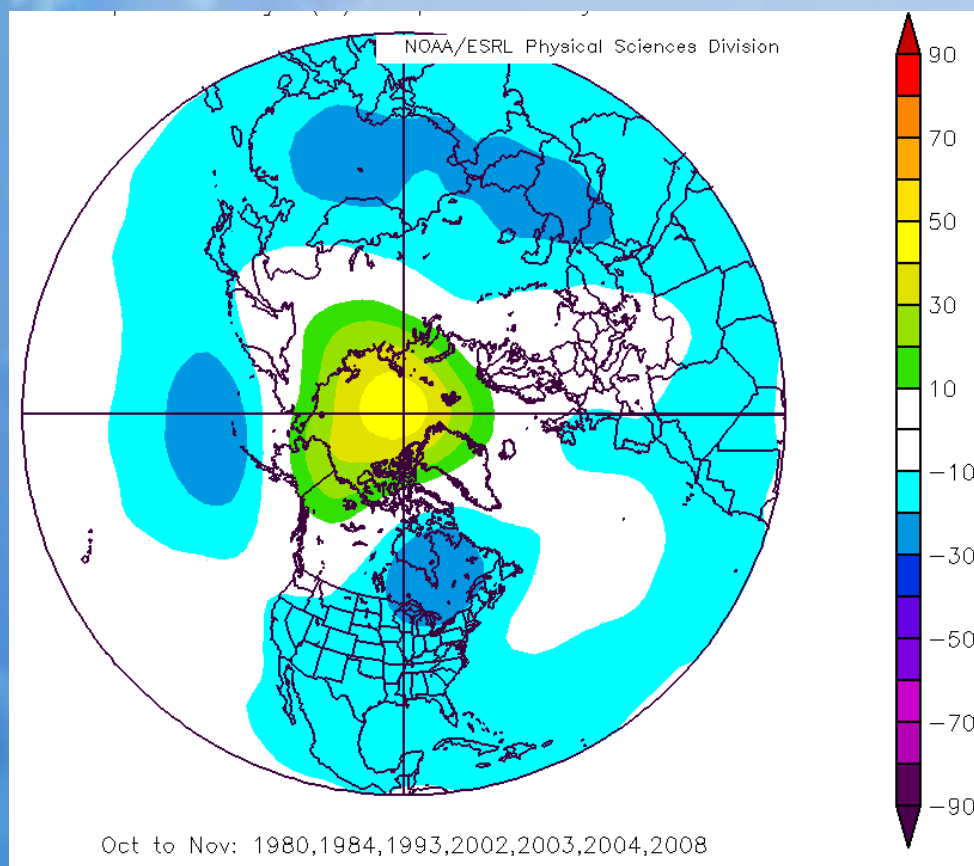
November SSTs



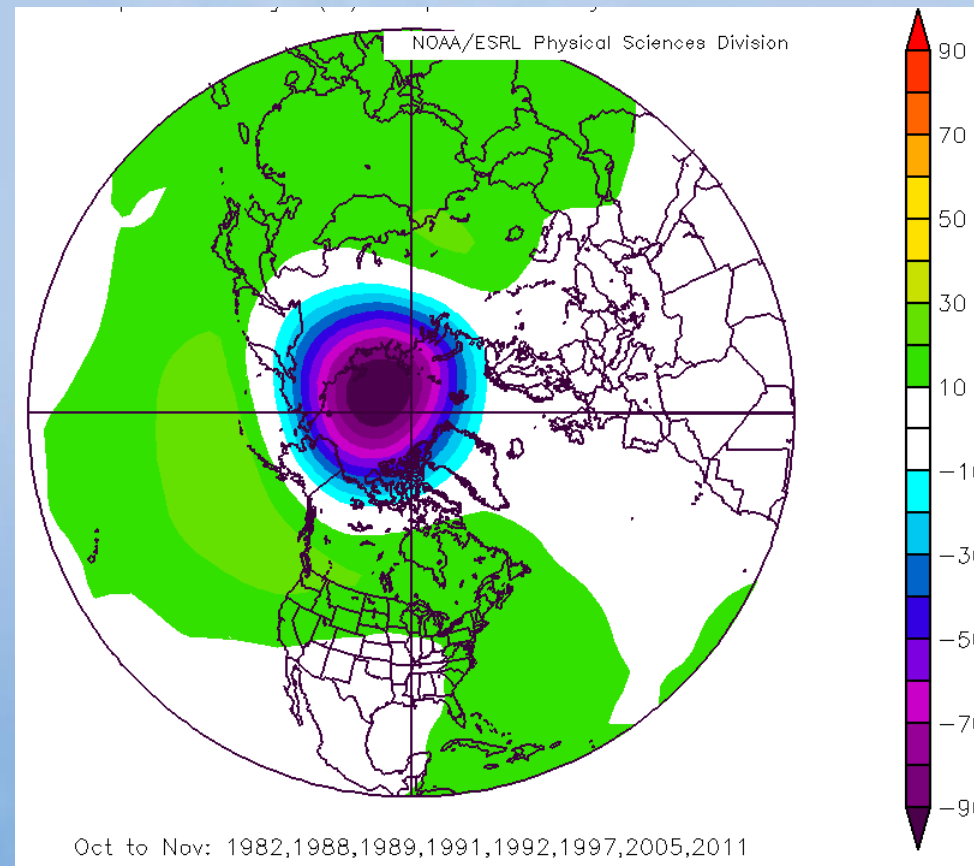
Following January Pattern

Predicting Demandex on a Seasonal Level

- 50mb Heights appear to be a good leading indicator of Jan Demandex

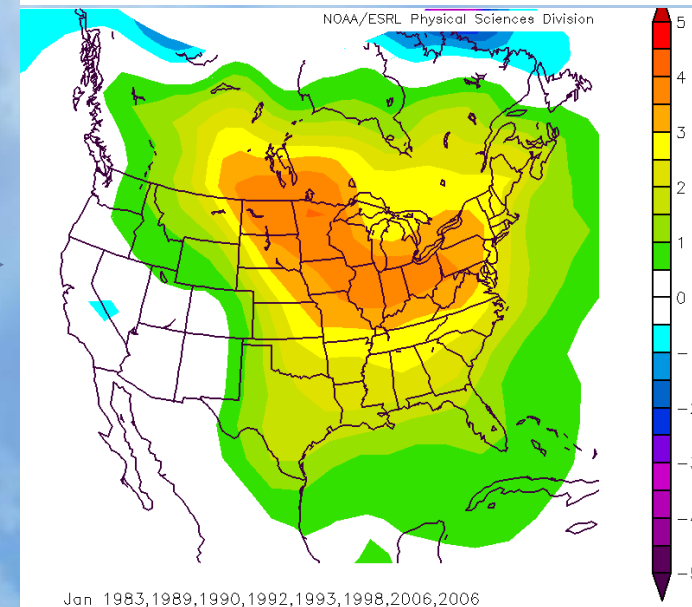
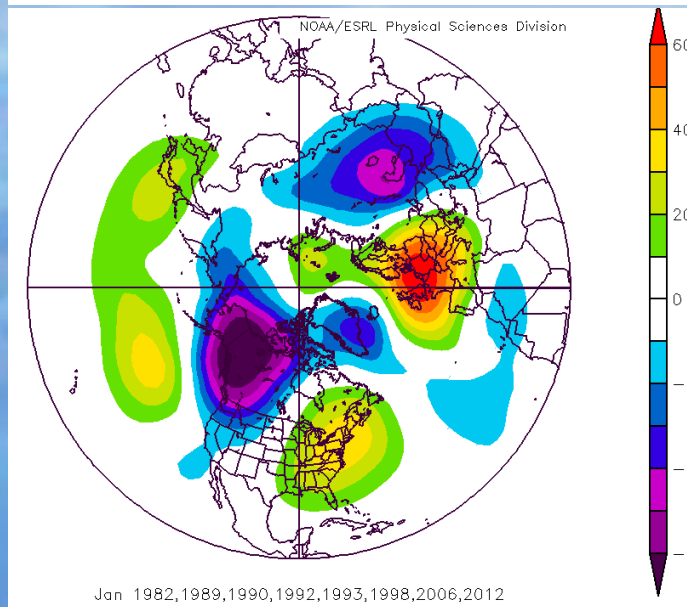
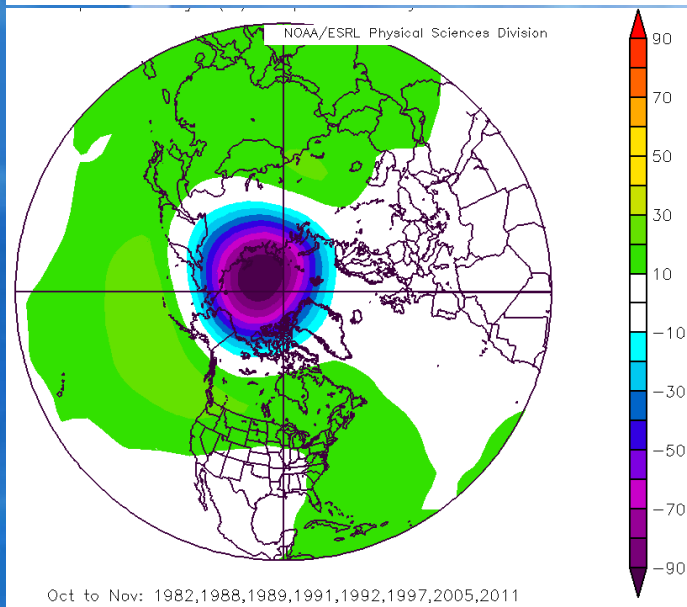
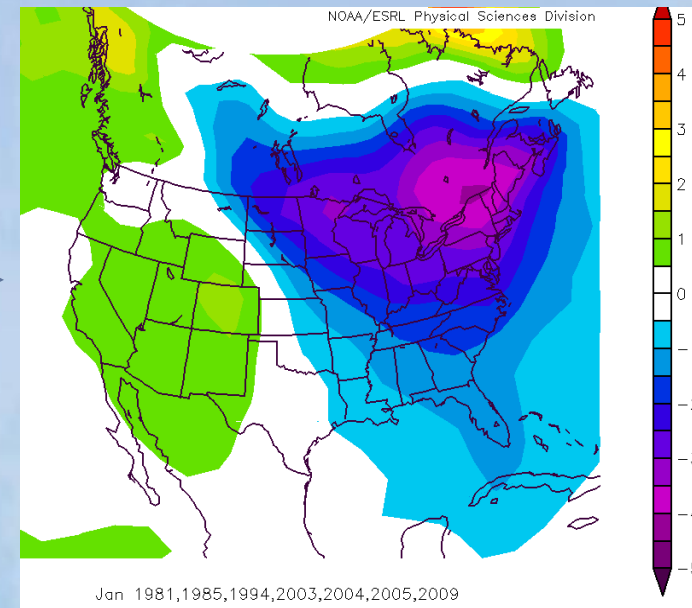
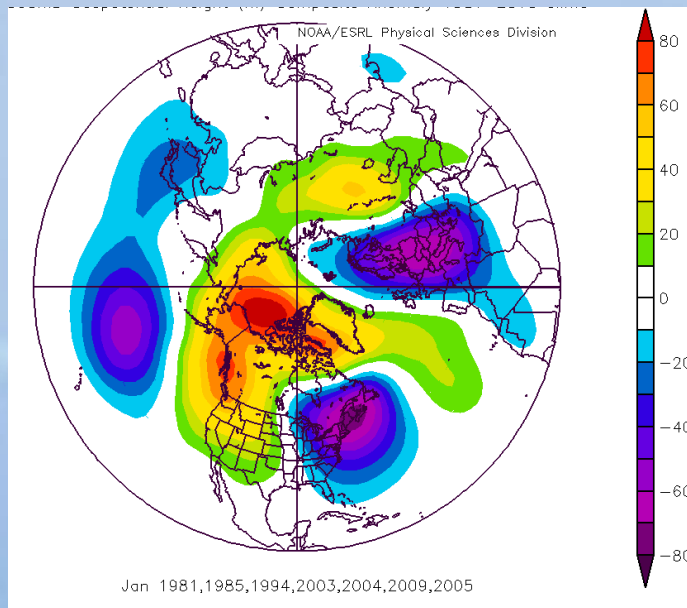
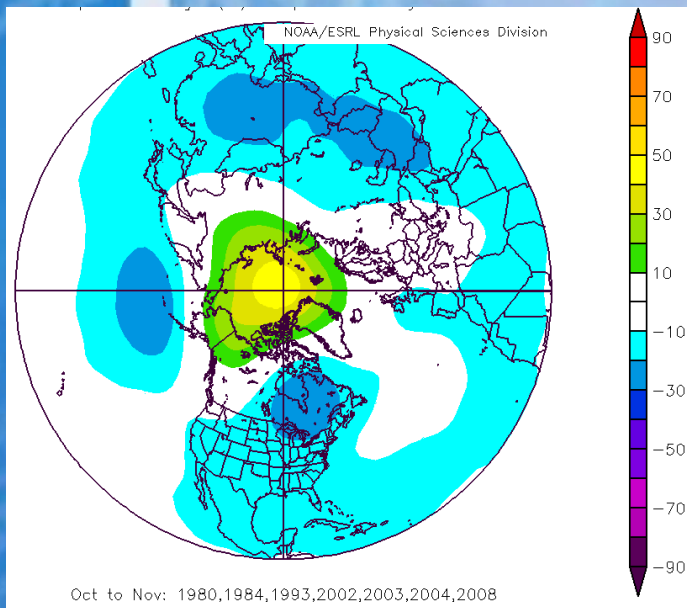


Oct/Nov Stratosphere before
Highest January demandex



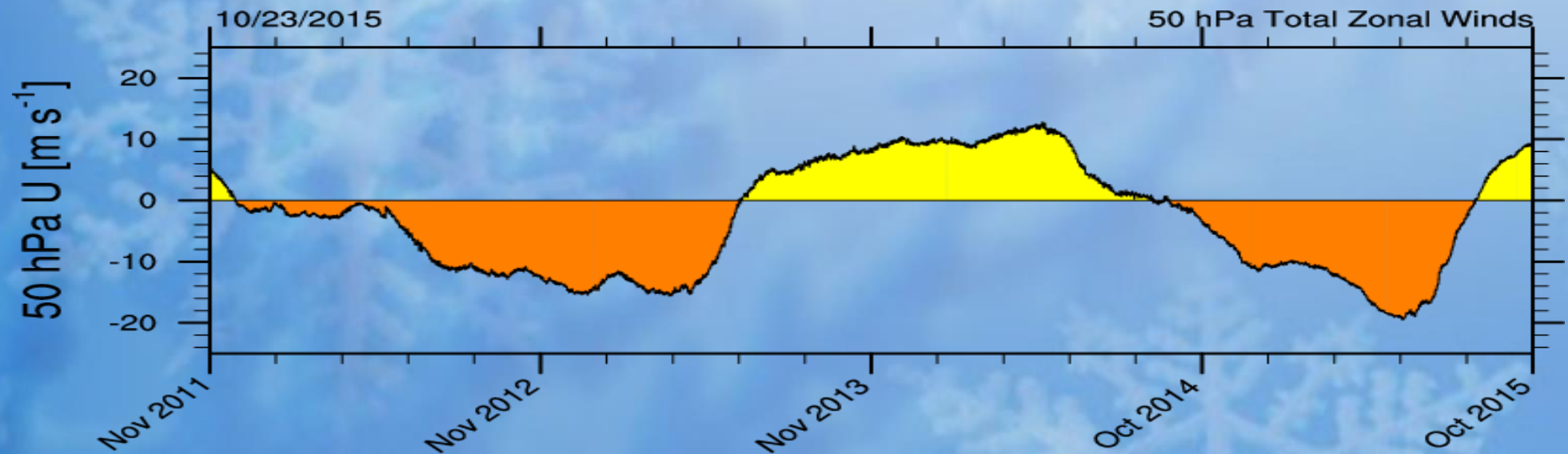
Oct/Nov Stratosphere before
Lowest January demandex

Predicting Demandex on a Seasonal Level

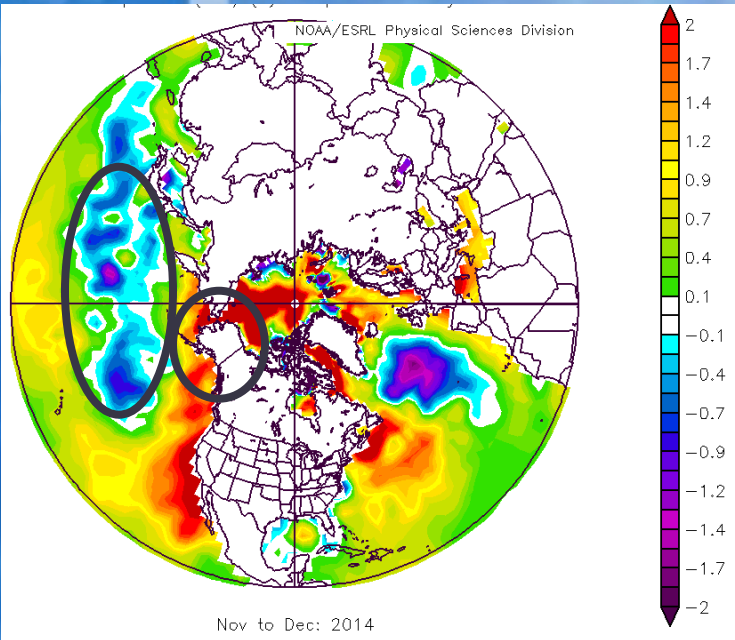
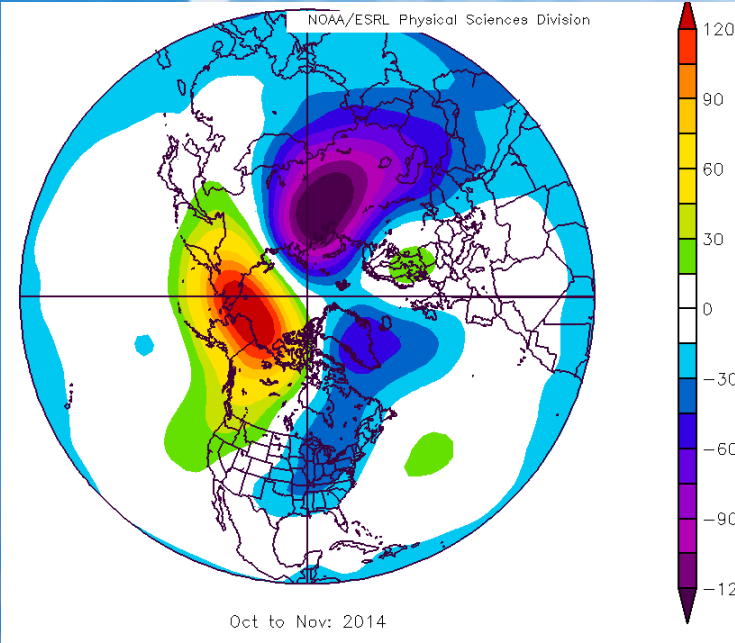


Predicting Demandex on a Seasonal Level

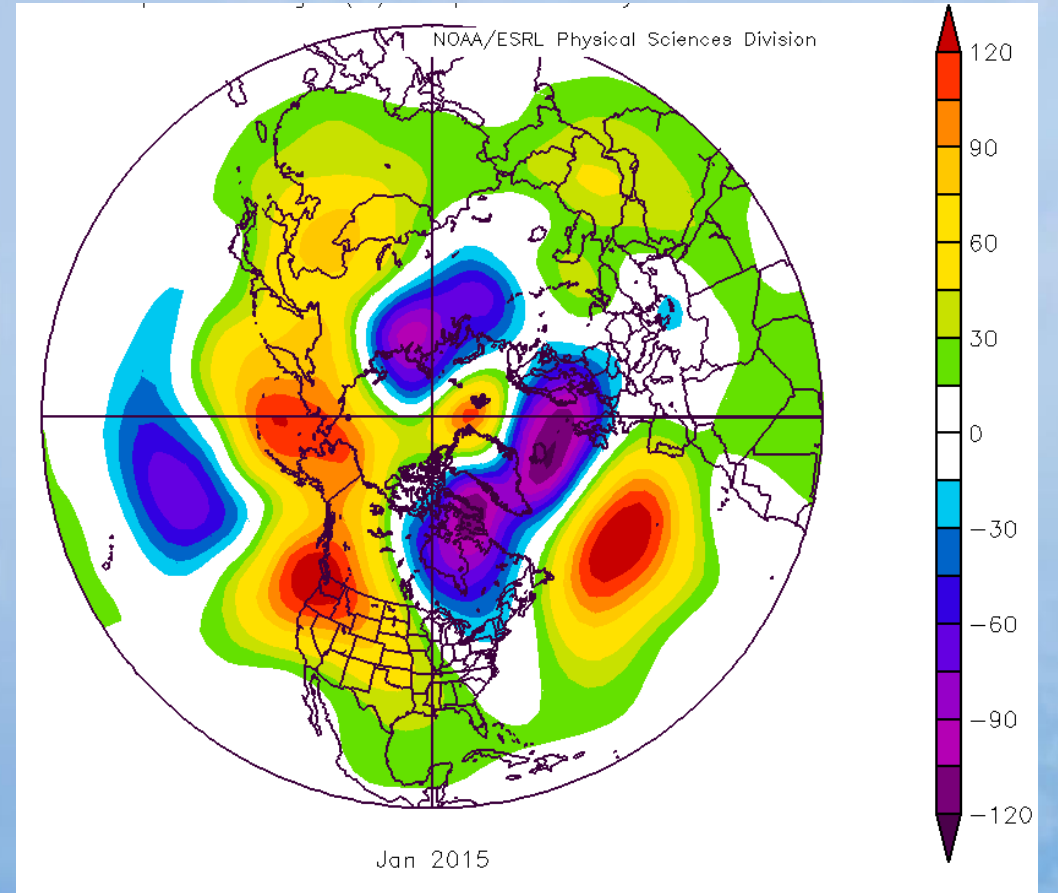
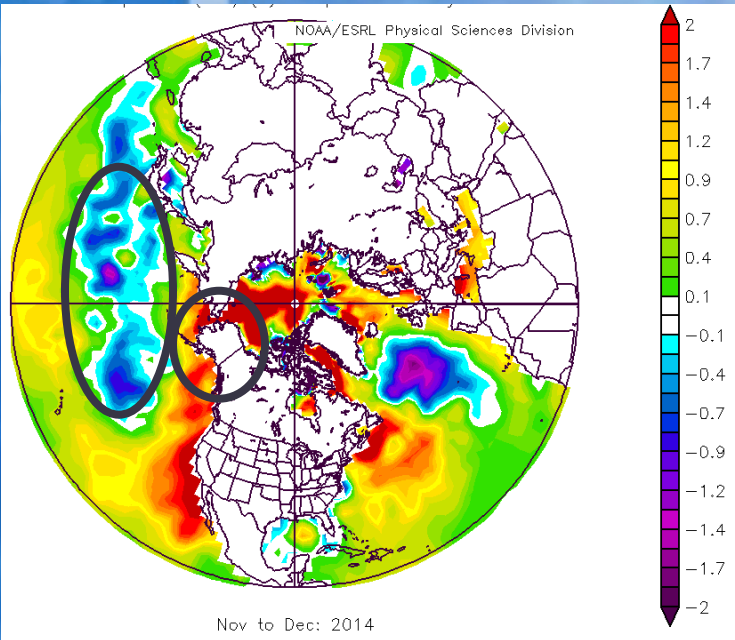
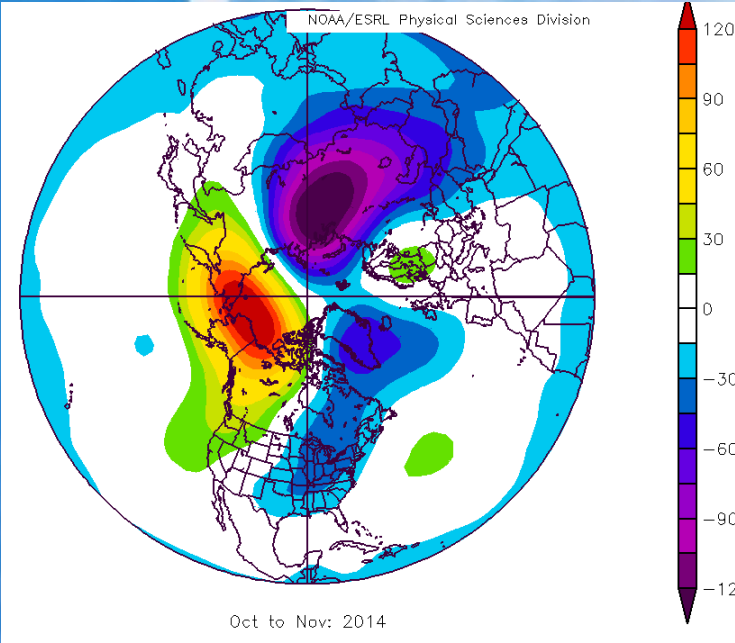
- **Demandex has a positive correlation to the Quasi-Biannual Oscillation (QBO)**
 - In years with a strong Oct-Nov stratospheric polar vortex *and* a +QBO, probability of +DDEX Jan is very high
 - In years with a weak and/or displaced Oct/Nov vortex *and* a -QBO, probability of a -DDEX Jan is very high
 - In years with a mixed signal, QBO can offset an unfavorable Stratosphere (05/06 weak vortex but -QBO; 08/09 strong vortex but +QBO)



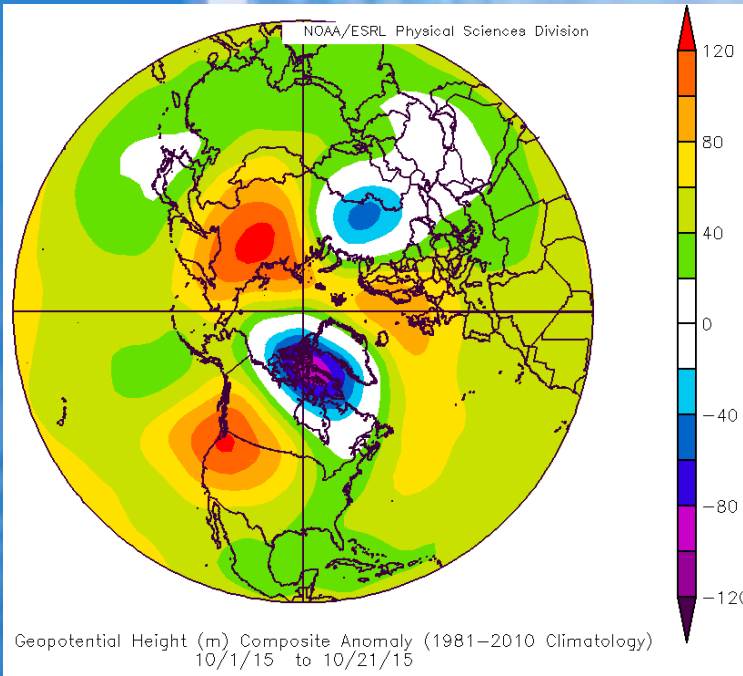
Case Study: Winter 2014/15



Case Study: Winter 2014/15

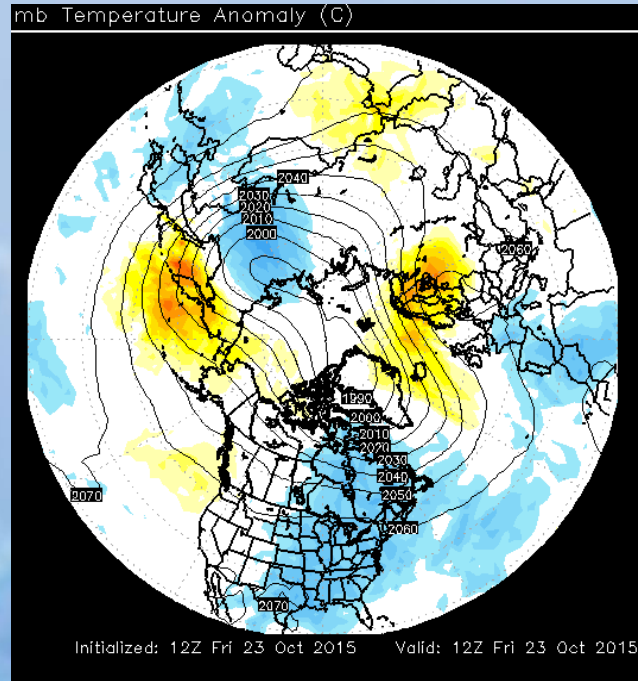


State of the Stratosphere



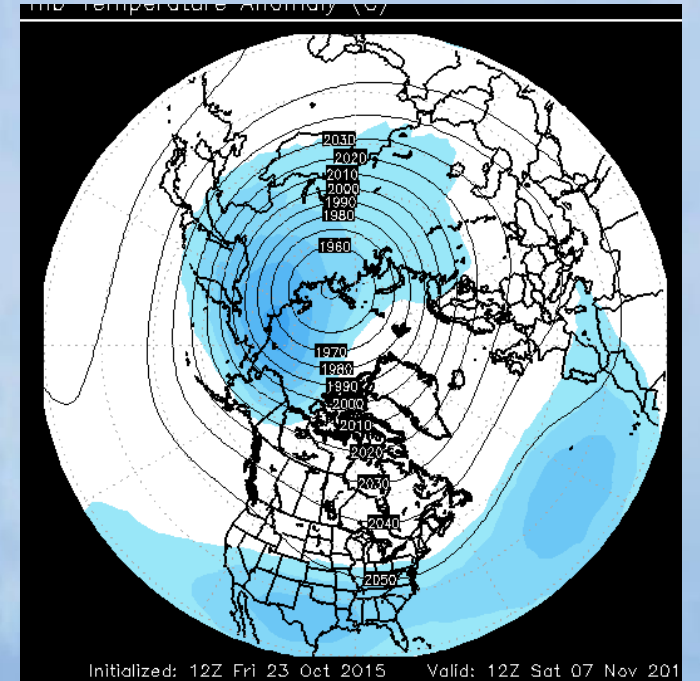
Oct so far

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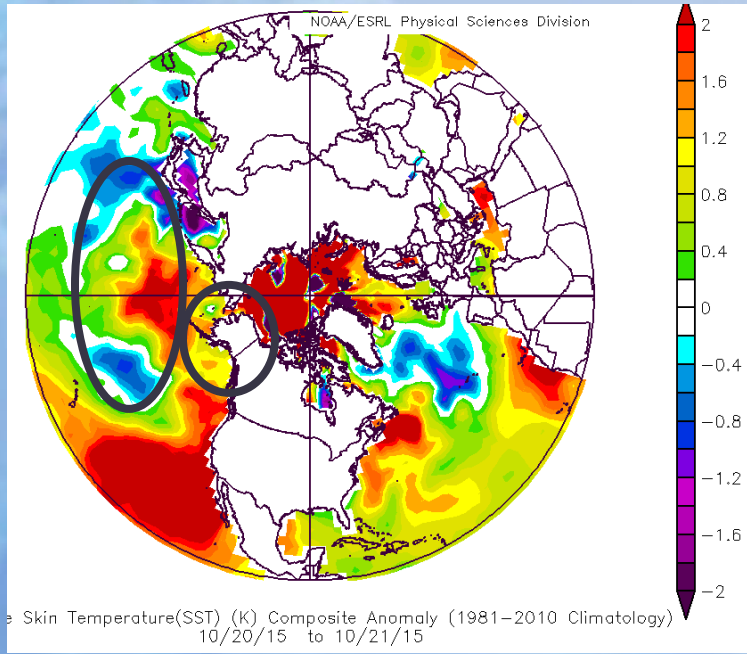
Now

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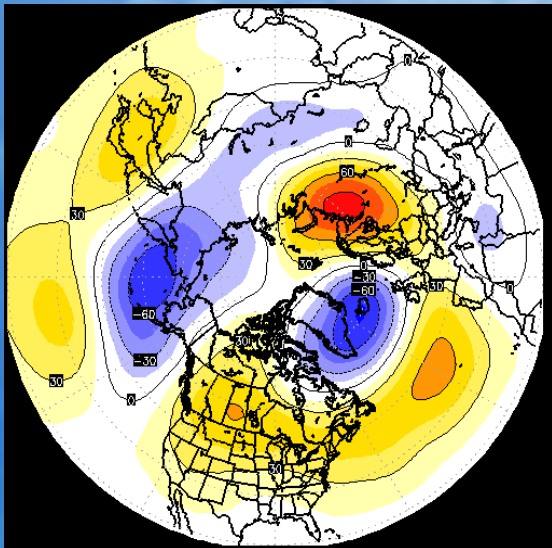


D+15

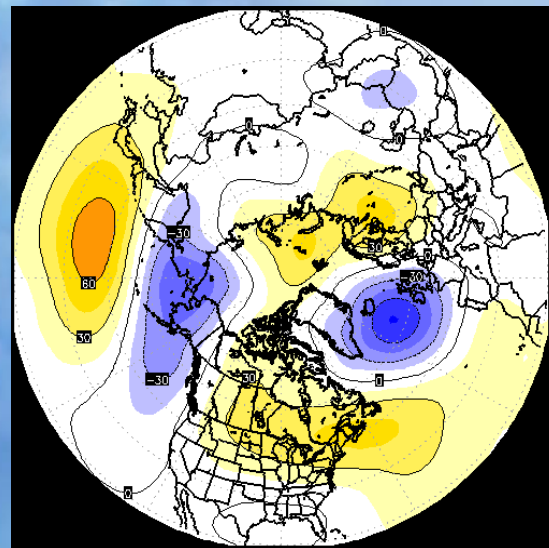
- Weak/displaced vortex now, but forecast to strengthen dramatically and move toward pole over next 2 weeks



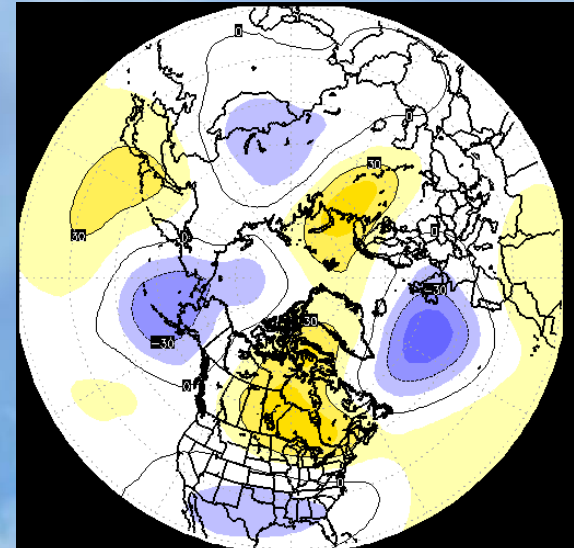
State of the North Pacific



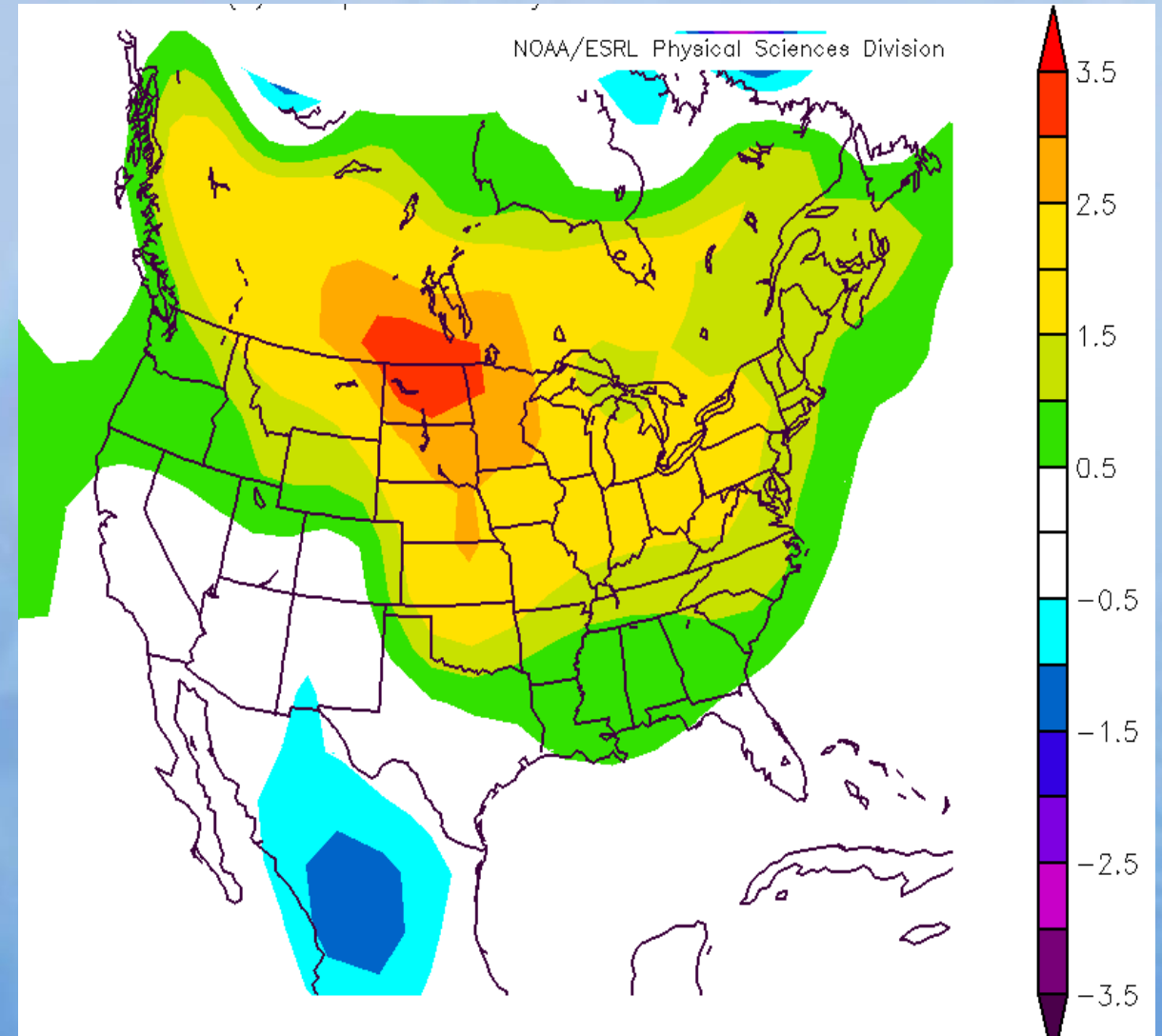
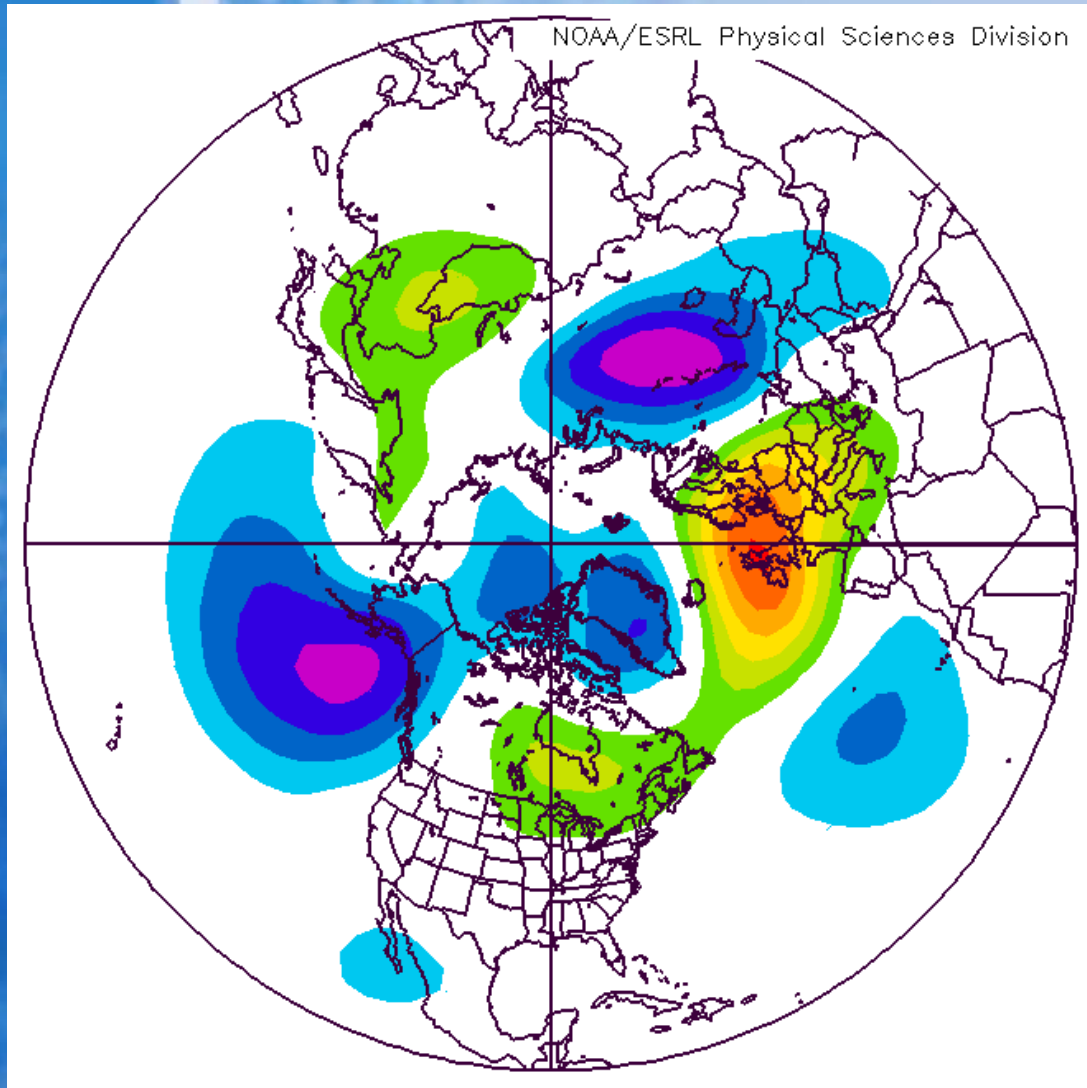
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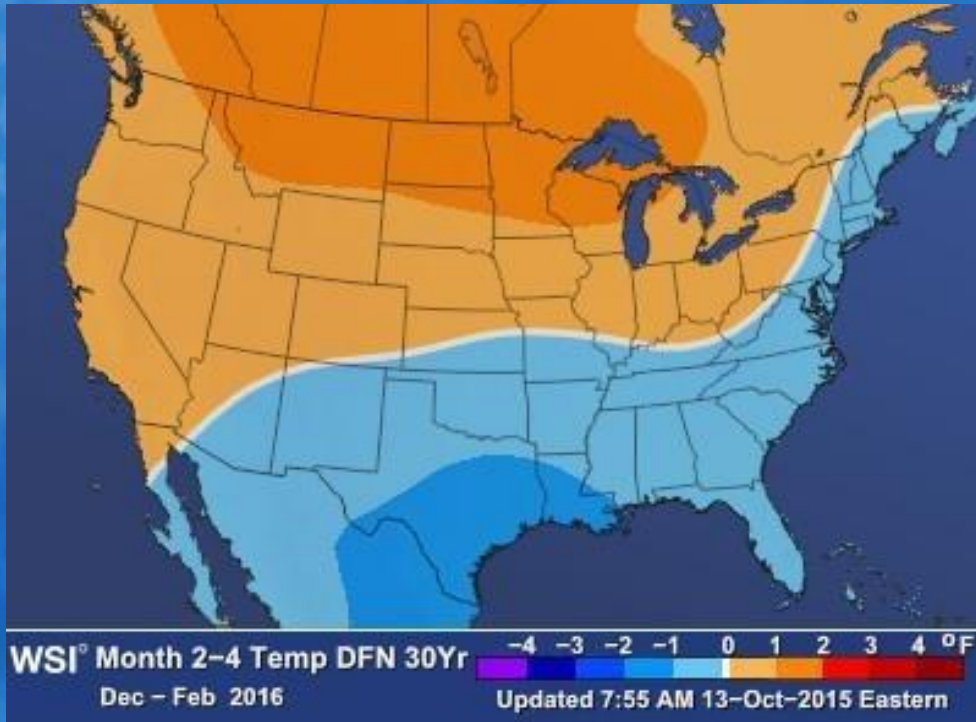
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Possible Outcome: Winter 2014/15



2015/2016 Winter Outlook



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