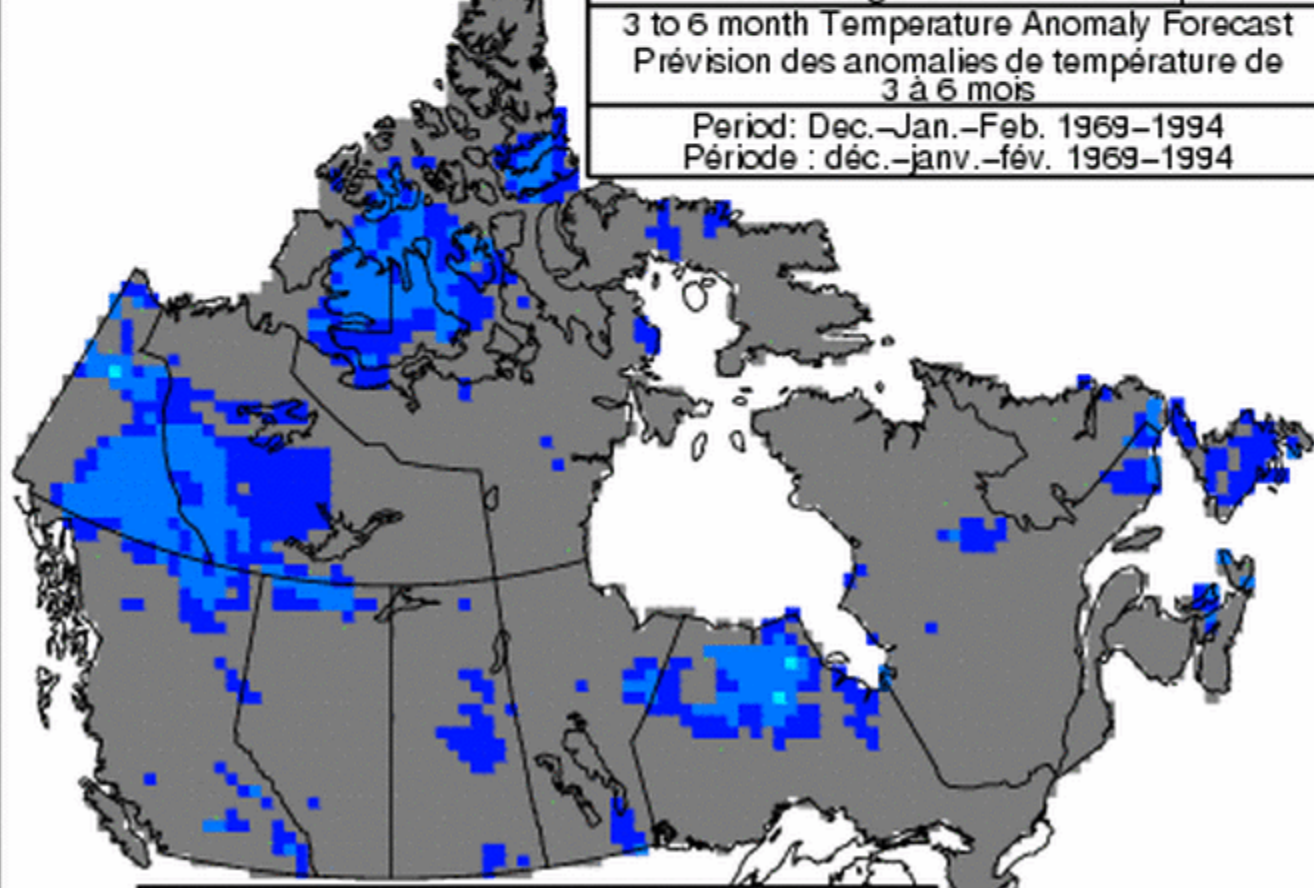


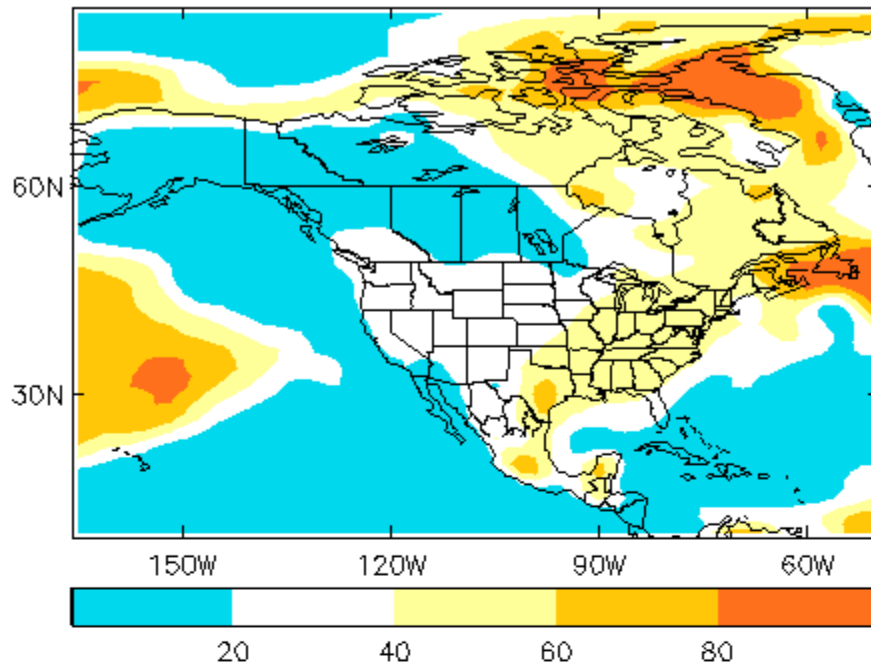
<b>Temperature Anomaly Outlook</b> <b>Period: December 2011 - January - February 2012</b> Issued on September 1 2011 Based on 3 equiprobable categories from 1961 - 1990 climatology	<b>Aperçu de l'anomalie de la température</b> <b>Période: décembre 2011 - janvier - février 2012</b> Émis le 1 septembre 2011 Basé sur 3 catégories équiprobables de la climatologie 1961 - 1990
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**Historical Percent Correct**  
**Pourcentage correct historique**  
**3 to 6 month Temperature Anomaly Forecast**  
**Prévision des anomalies de température de 3 à 6 mois**  
**Period: Dec.-Jan.-Feb. 1969-1994**  
**Période : déc.-janv.-fév. 1969-1994**

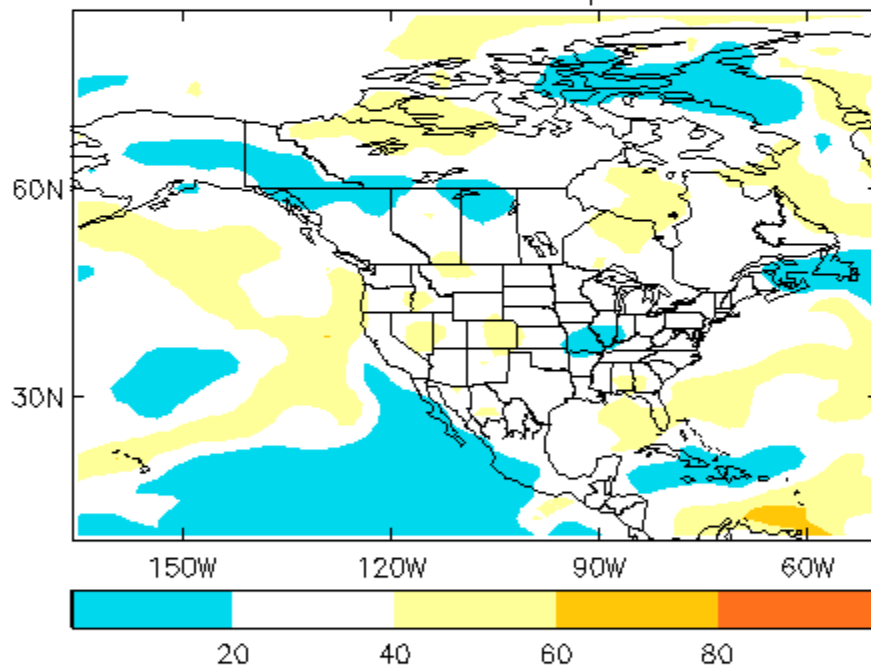


The UKMET office over in England offers a percentage chance of whether an area is warmer, cooler or near normal. They really don't have a strong signal on whether they want to go warm or cool. There is an ensemble mean temperature forecast with a large near to slightly above normal distribution, no strong signal there.

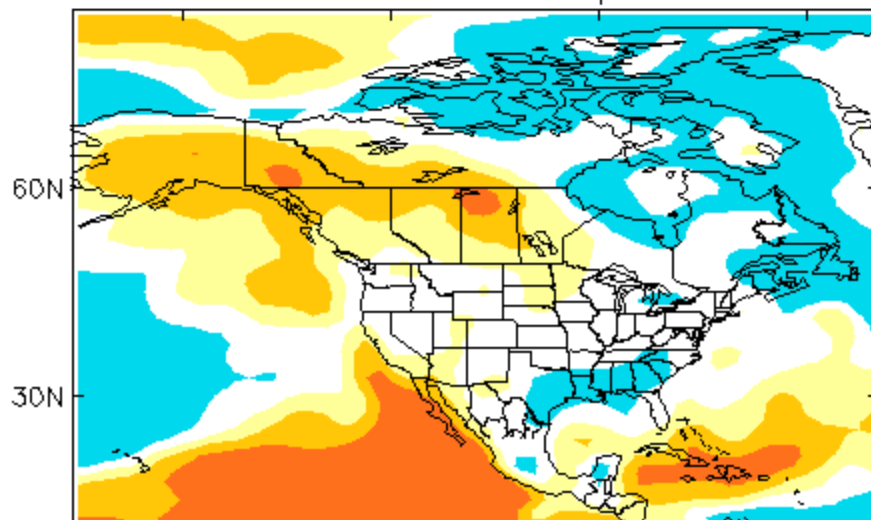
Probability of tercile categories Nov/Dec/Jan Issued Oct 2011  
above-normal 2m temperature



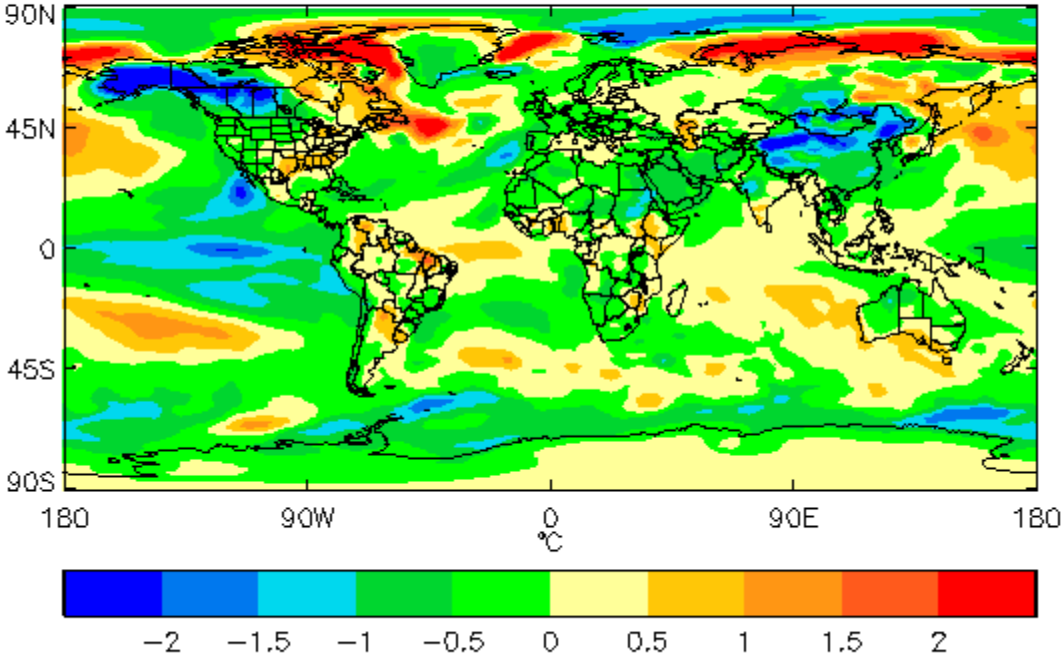
near-normal 2m temperature



below-normal 2m temperature



Ensemble mean anomaly : 2m temperature : Nov/Dec/Jan  
Issued October 2011



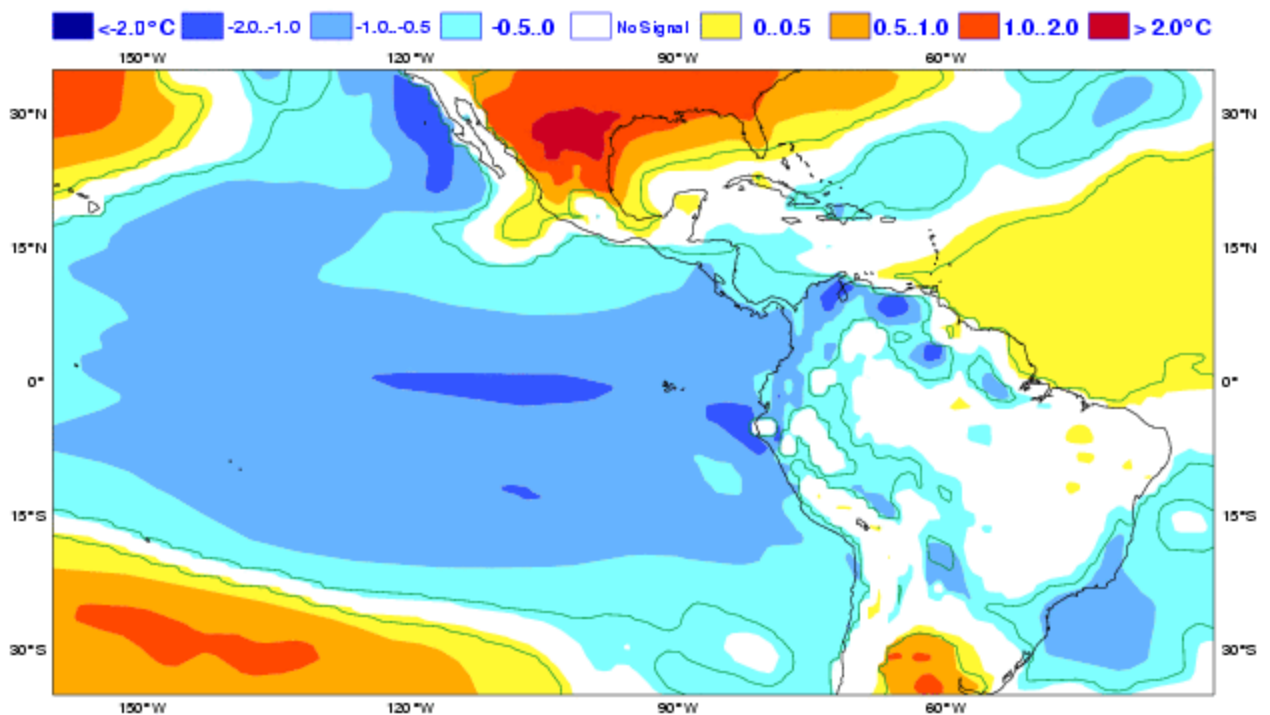
From the ECMWF, we have this outlook appearing quite warm over the southern half of the U.S.

ECMWF Seasonal Forecast  
Mean 2m temperature anomaly

Forecast start reference is 01/10/11  
Ensemble size = 41, climate size = 275

System 3  
DJF 2011/12

Shaded areas significant at 10% level  
Solid contour at 1% level



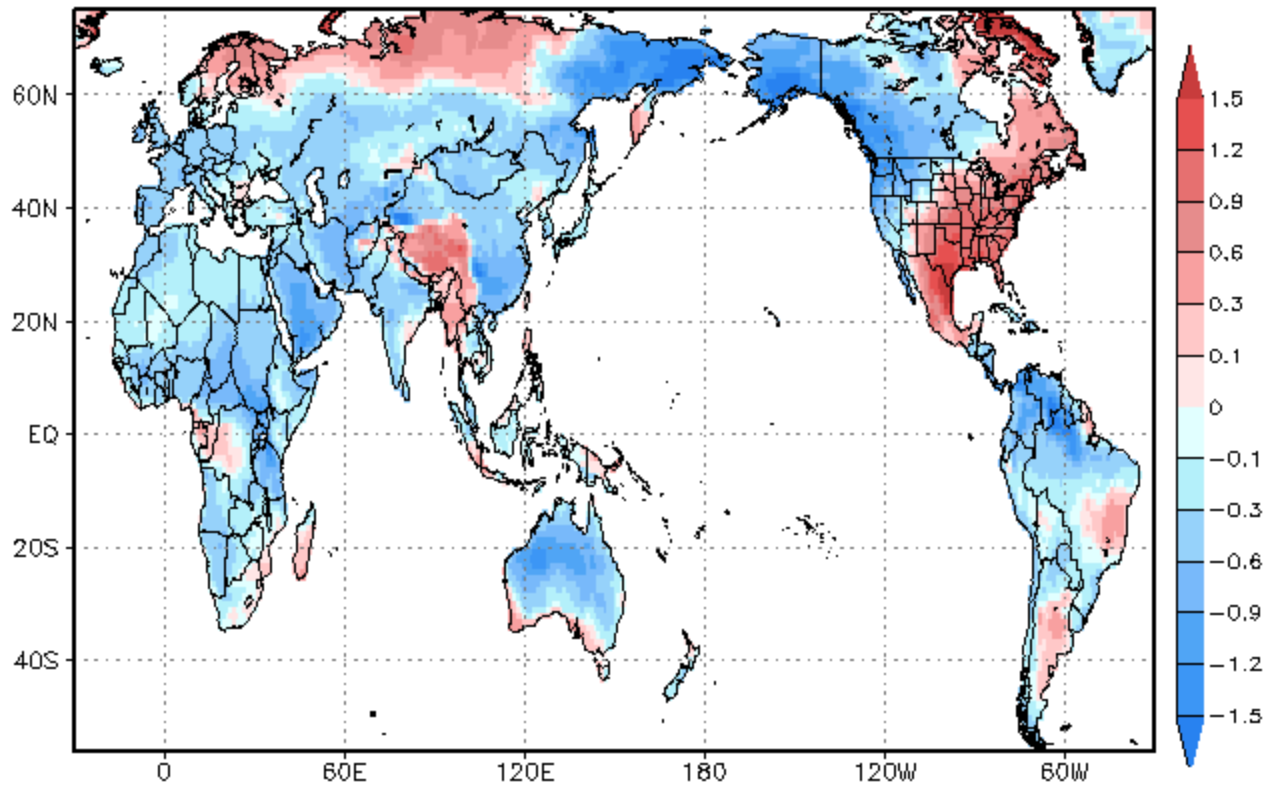
Forecast issue date: 15/10/2011

CEA

I also have access to individual monthly climate forecasts based off of the European model, but they are proprietary and I am unable to post the maps here. They show December widespread warm, but January and February warm at a higher anomaly over the south and east with some cooling in the north and west.

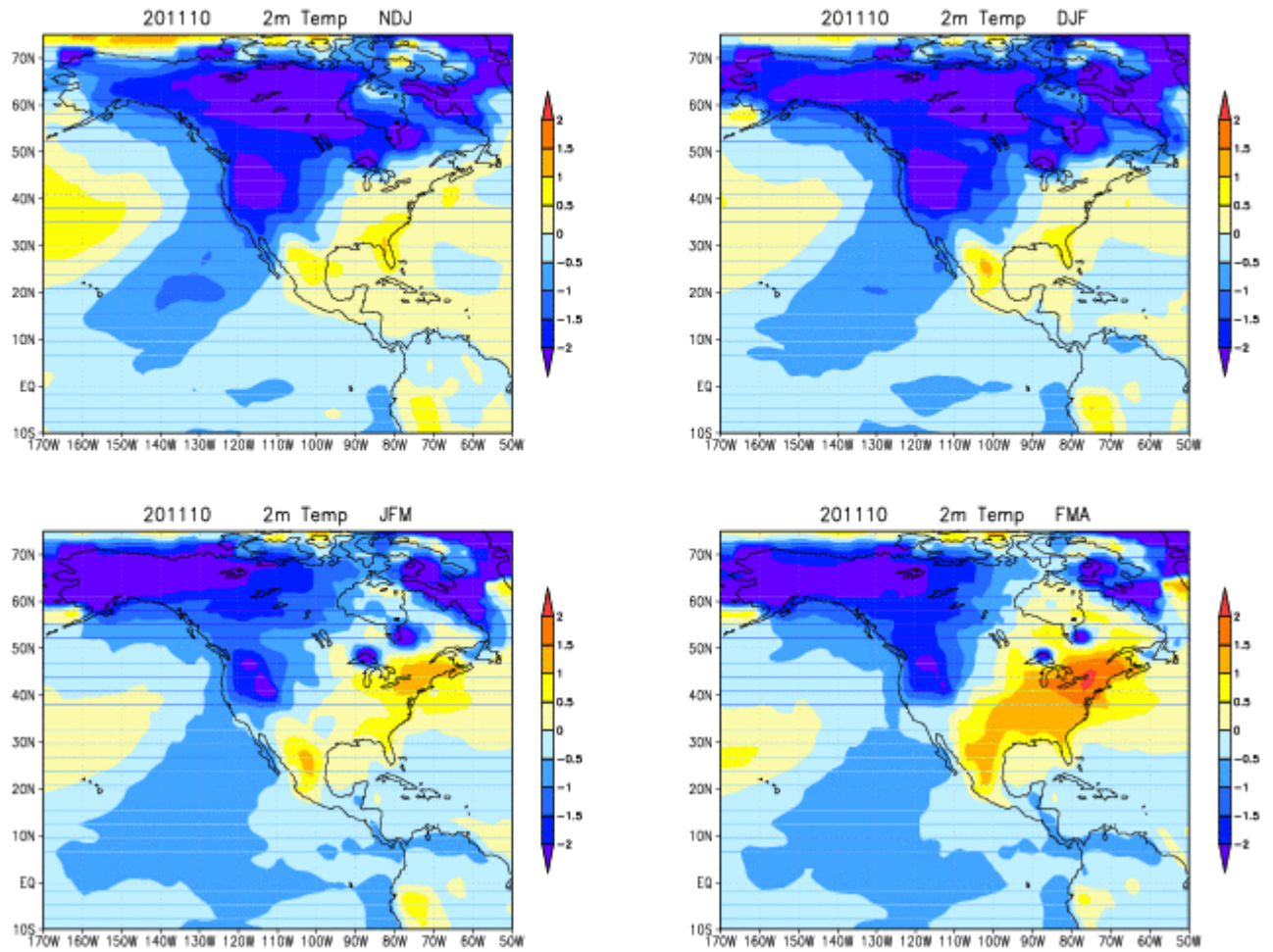
The Japanese Meteorological Association has an excellent seasonal model which shows a cool north and west and warmth for the south and east.

Predicted DJF2011/2012 temp2 from 1oct2011 (27-member)



That takes care of the official weather sites, now I'll move on to some of the experimental global climate models. The Experimental Climate Prediction Center (ECPC) offers a different opinion. The December-February outlook (DJF) shows a warmer than normal winter for the south and to a limited degree east. It is going colder in the north and west and solidly below normal in much of Canada.

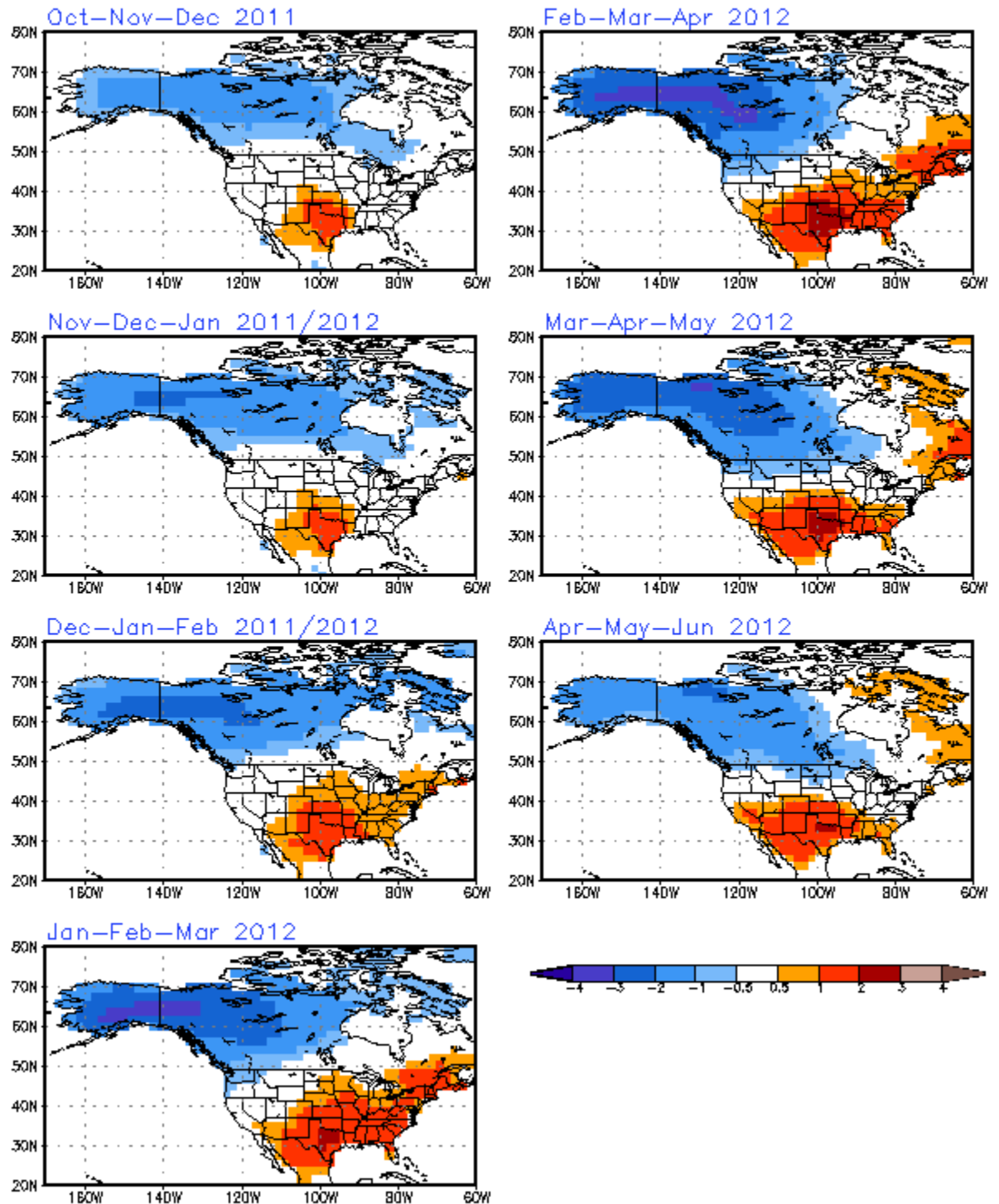
# COAPS Seasonal Forecast – Anomalies



The Climate Forecast system (CFS) from NOAA is widespread warm for the December-February period.



CFS seasonal T2m (K)

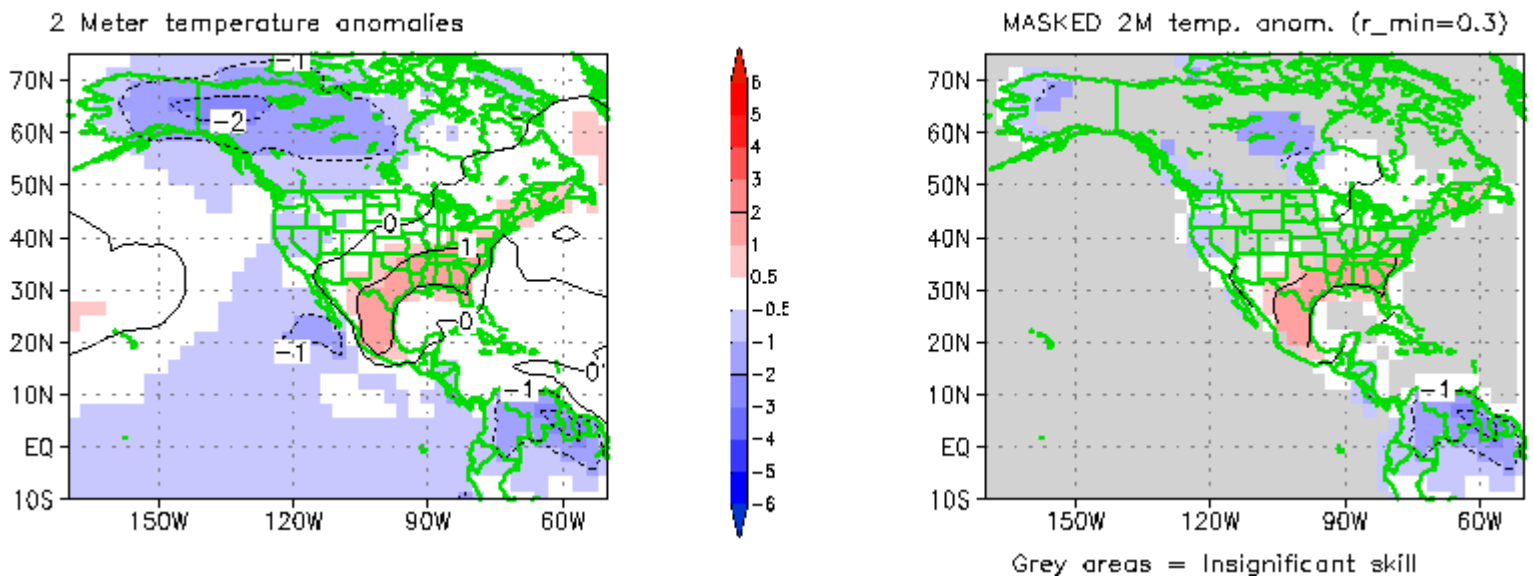


The folks at the International Research Institute (IRI) have a number of climate models available for viewing. Most in some form are on the cooler north and west, warmer south and east viewpoint.

## DEC-JAN-FEB 2012 Forecast from Oct 2011

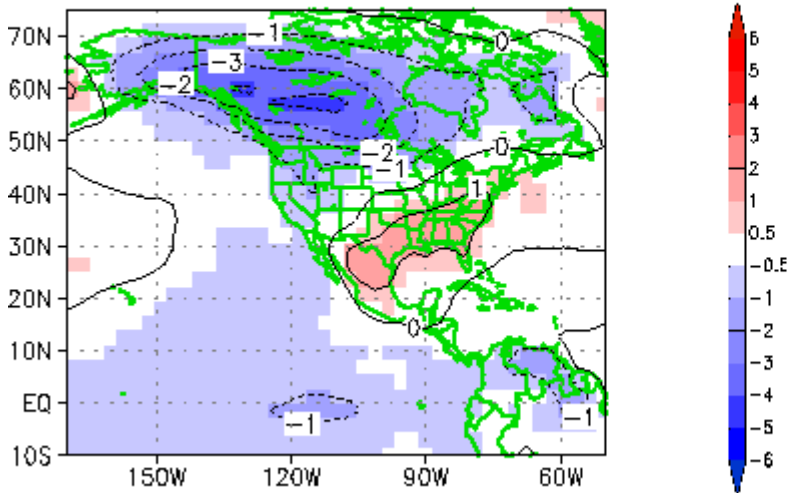
### 2m Air Temperature: Ensemble Mean

#### ECHAM4.5 (SSST)

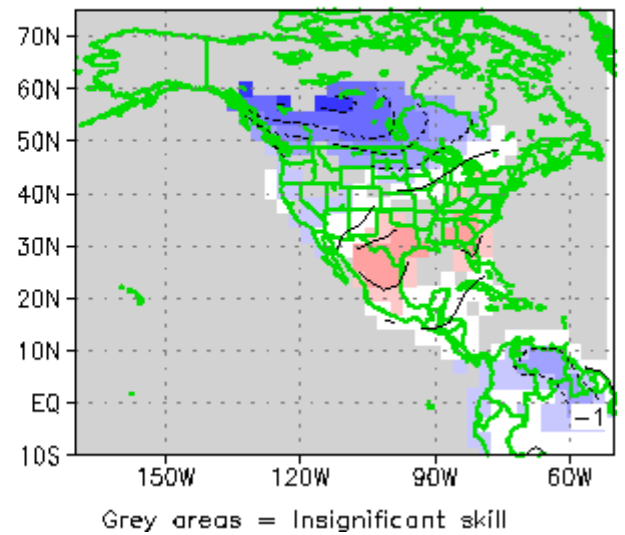


## CCM3 (SSST)

2 Meter temperature anomalies

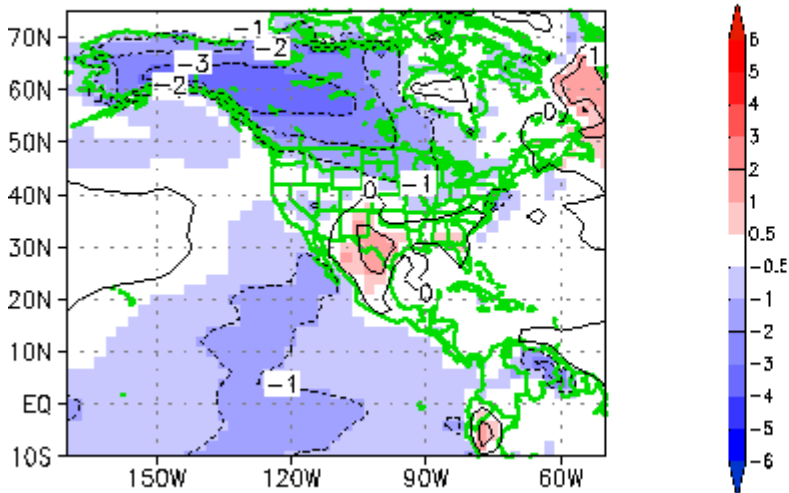


MASKED 2M temp. anom. ( $r_{\min}=0.3$ )

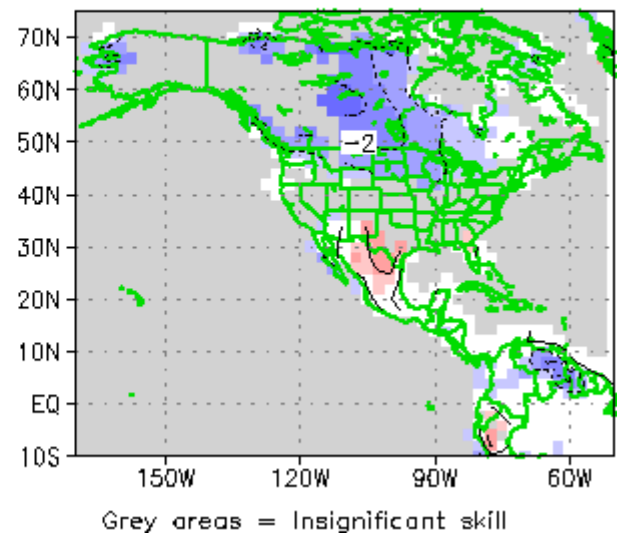


## NSIPP (SSST)

2 Meter temperature anomalies

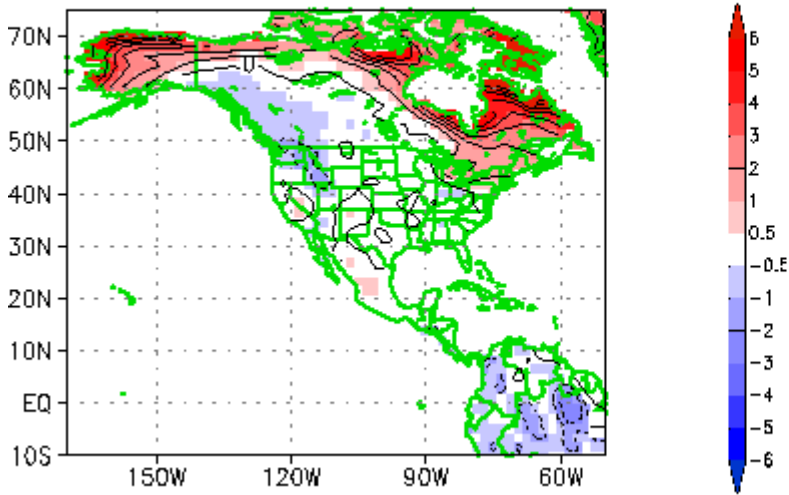


MASKED 2M temp. anom. ( $r_{\min}=0.3$ )

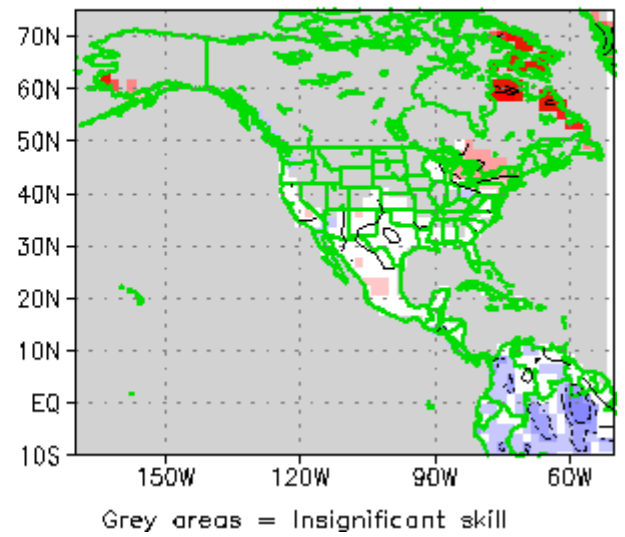


## COLA (SSST)

2 Meter temperature anomalies

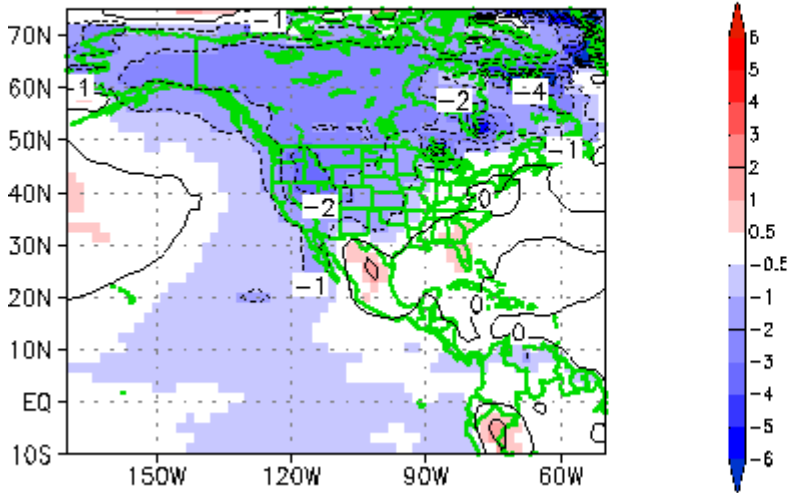


MASKED 2M temp. anom. ( $r_{\min}=0.3$ )

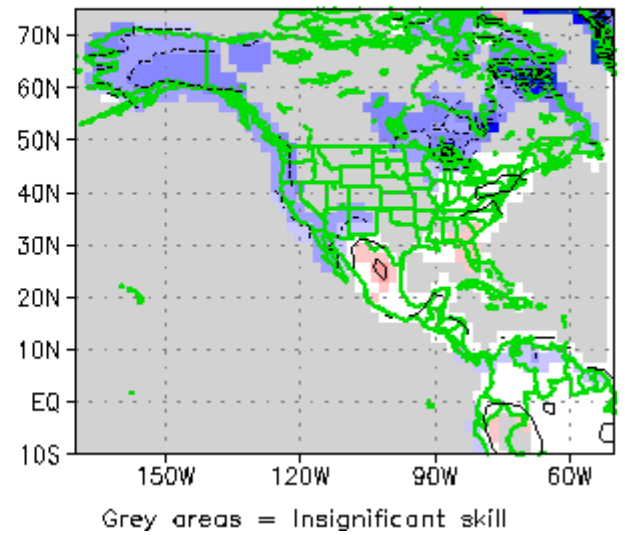


## ECPC (SSST)

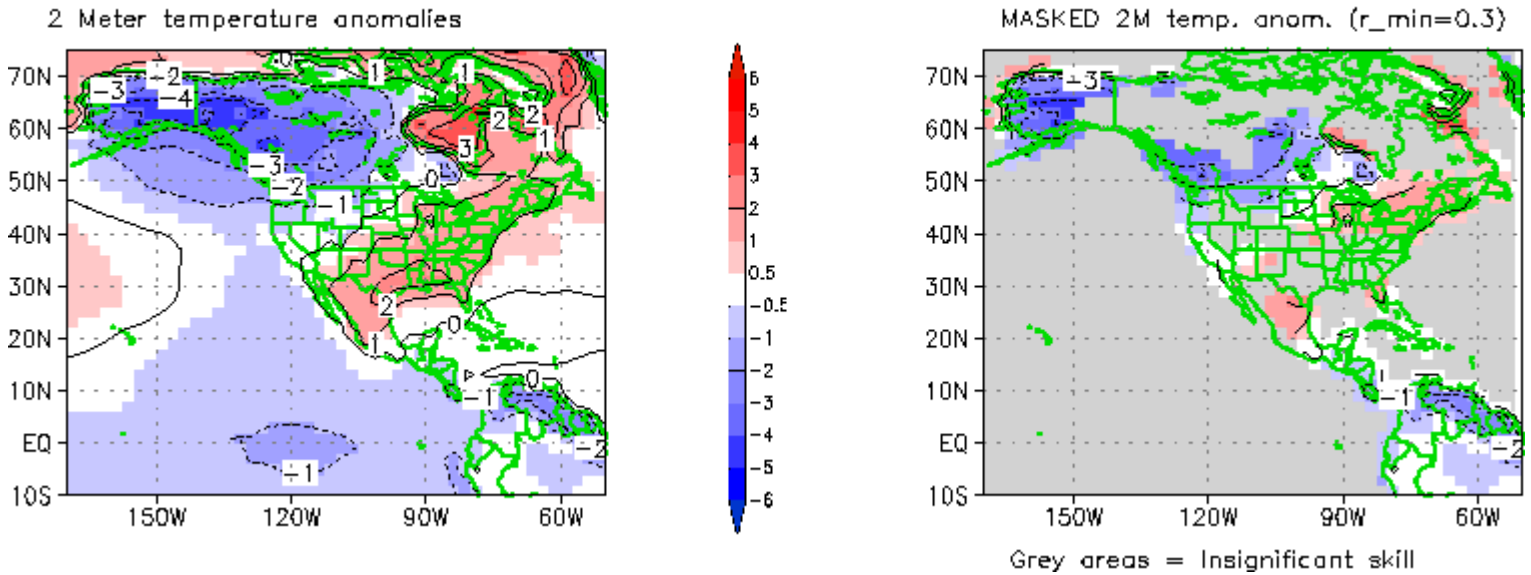
2 Meter temperature anomalies



MASKED 2M temp. anom. ( $r_{\min}=0.3$ )



# GFDL (SSST)



Here is a summary of what the raw data shows.

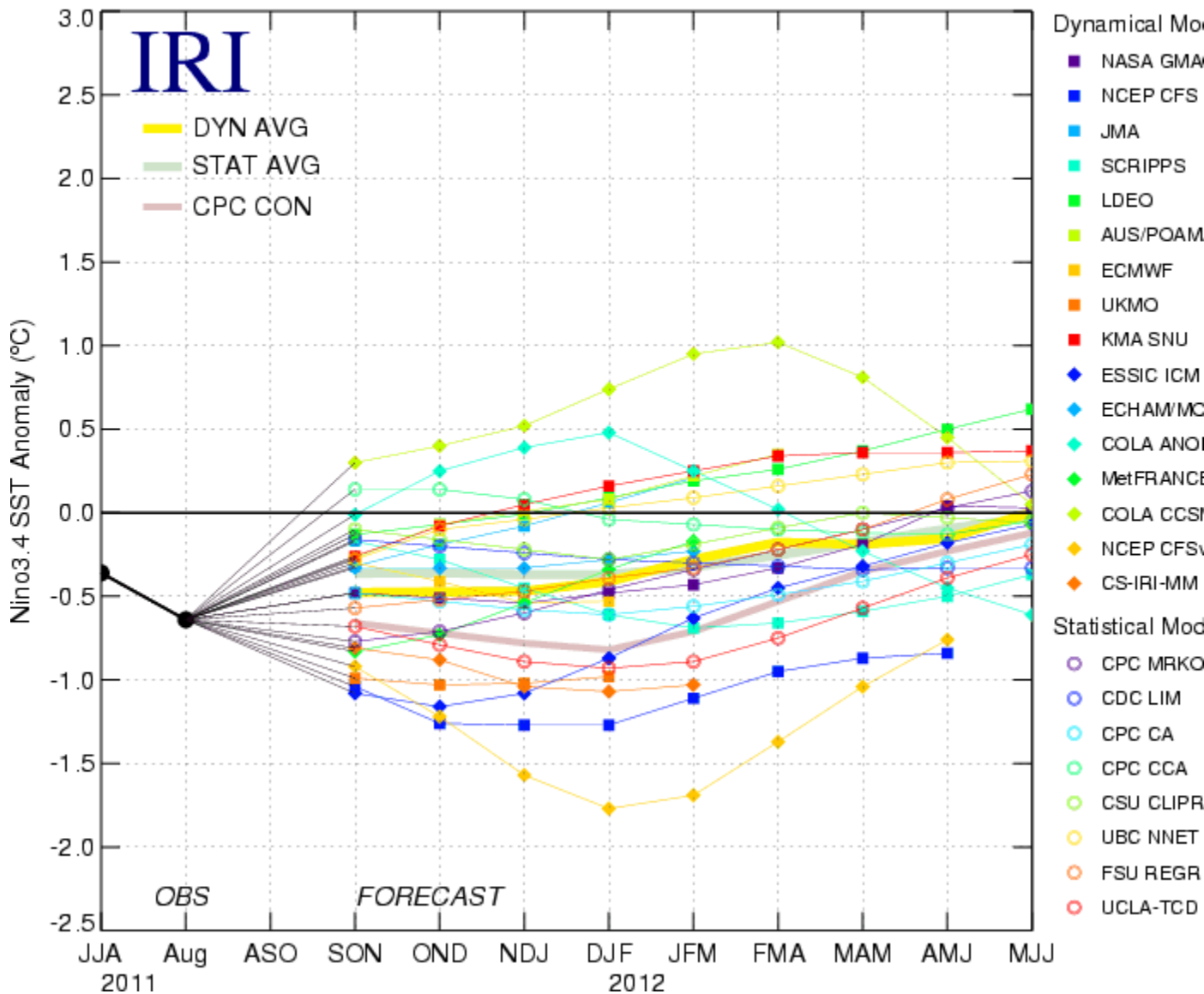
Model	Forecast
NWS	Cool N&W...warm south 50/50 elsewhere
Canadian	Below Normal NE, Above SW
UKMET	Near to a little above normal
European	Above S&E, some below N&W
Japanese	Cool N&W... warm S&E
ECPC	Cool N&W... warm S&E
CFS	Widespread near to above normal
IRI	Cool N&W... warm S&E

Most years the computer models will show a lot of different solutions. But, this year is not that way. Most of the data in some form can be simplified to a cool bias in the N & W and a warm bias S & E. Many are similar to the forecast out last year which was also a La Nina year.

2. ENSO. This is a determination of the state of the El Nino/LA Nina. We have returned to a La Nina state in the last few weeks after being neutral much of the spring and summer. This will apparently be the second straight La Nina winter. I have always been a proponent of the theory that ENSO changes are slow and this is no exception as we have been either neutral or weak La Nina for over a year now. Many forecasts will use this as

their only determination and if they do they should go cool in the NW and warm in the south, not too far from the majority of climate models I discussed above. When this signal is strong such as it is now it can be a very strong driver of the overall pattern. In some ways that makes seasonal forecasting easier. The tropical season has been active in a general sense with 16 named storms to date with 3 strong hurricanes. Last year at this time, there had also been 16 named storms but with 4 strong hurricanes. The two seasons have been very similar. Here are the ensemble forecasts of the strength of this La Niña. They show it remaining mostly at a weak status peaking in a couple of months and then slowly diminishing into next spring.

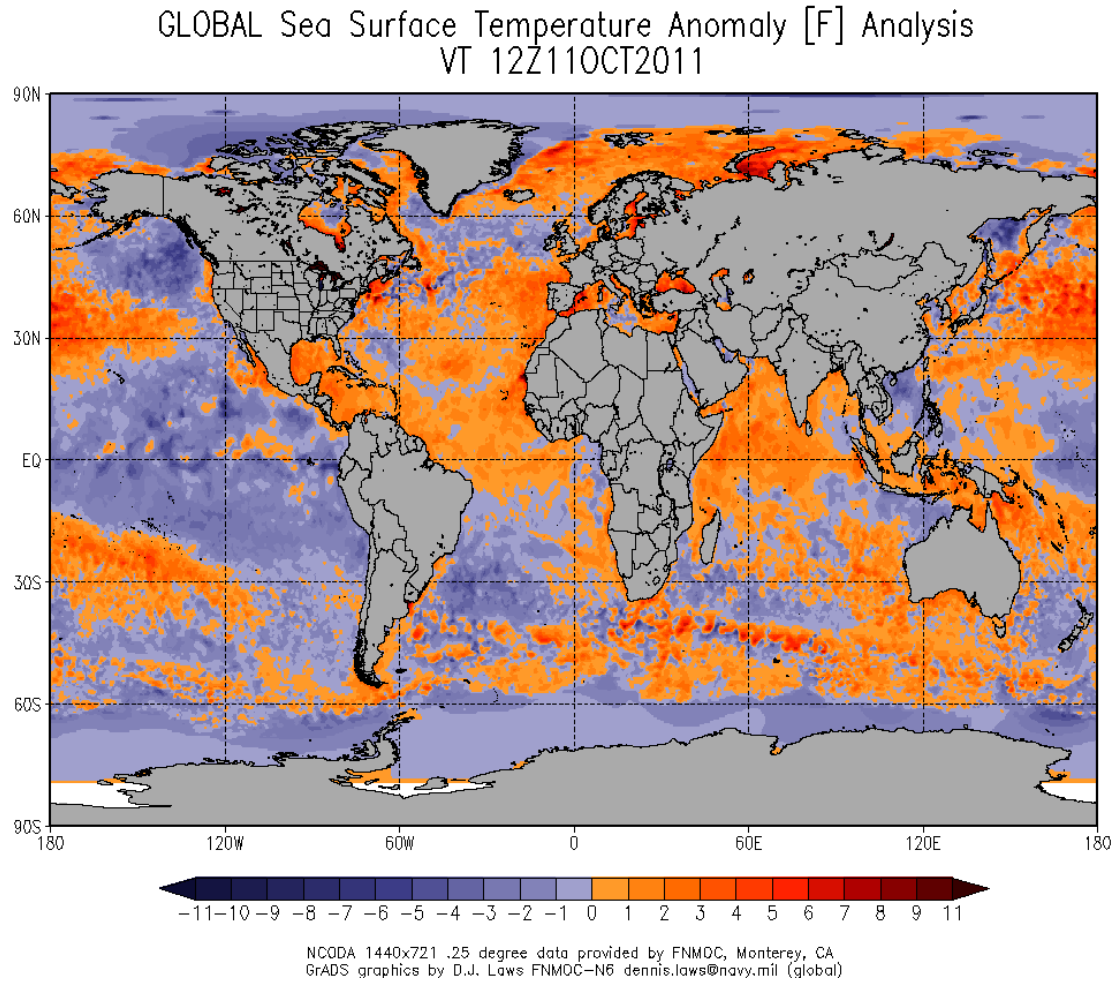
### Model Predictions of ENSO from Sep 2011



2. Sea Surface Temperatures... This is becoming a more useful tool in seasonal forecasting and not just in the tropical Pacific with respect to ENSO. The sea surface profile is very similar in the tropical Pacific from this time last year. This of course is due to the return of La Niña. Notice we also have the same

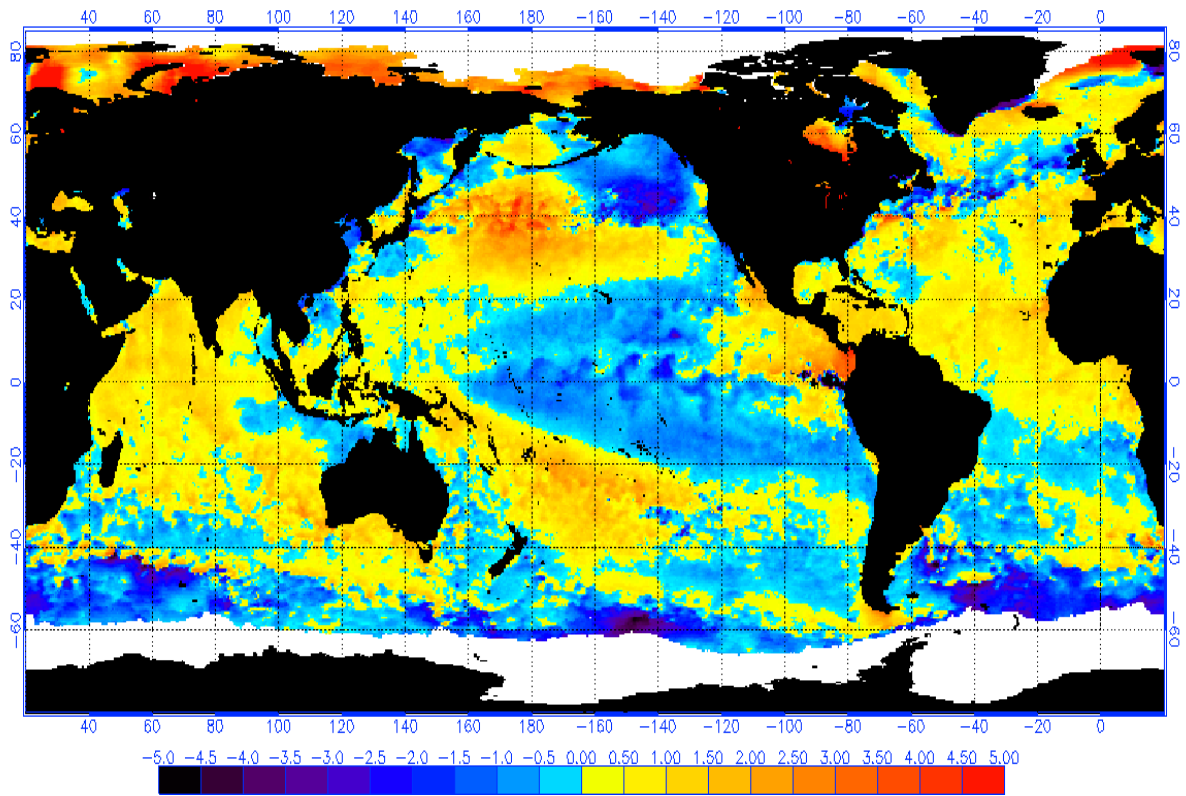
cold pool in the NE Pacific south of the Aleutian Islands. If that cold pool remains, it will keep a trough in place, promoting ridges downstream over the western US and NW Canada. It would be another winter of frequent arctic air masses in Canada, with a mechanism (eastern trough) to transport them south. In addition, while not quite as warm as last year it is warmer than normal in the North Atlantic near Greenland. Now if that continues, then it can promote negative phases of the NAO/AO which are cooler signals in the east.

Here is a recent snapshot detailing SST anomalies.



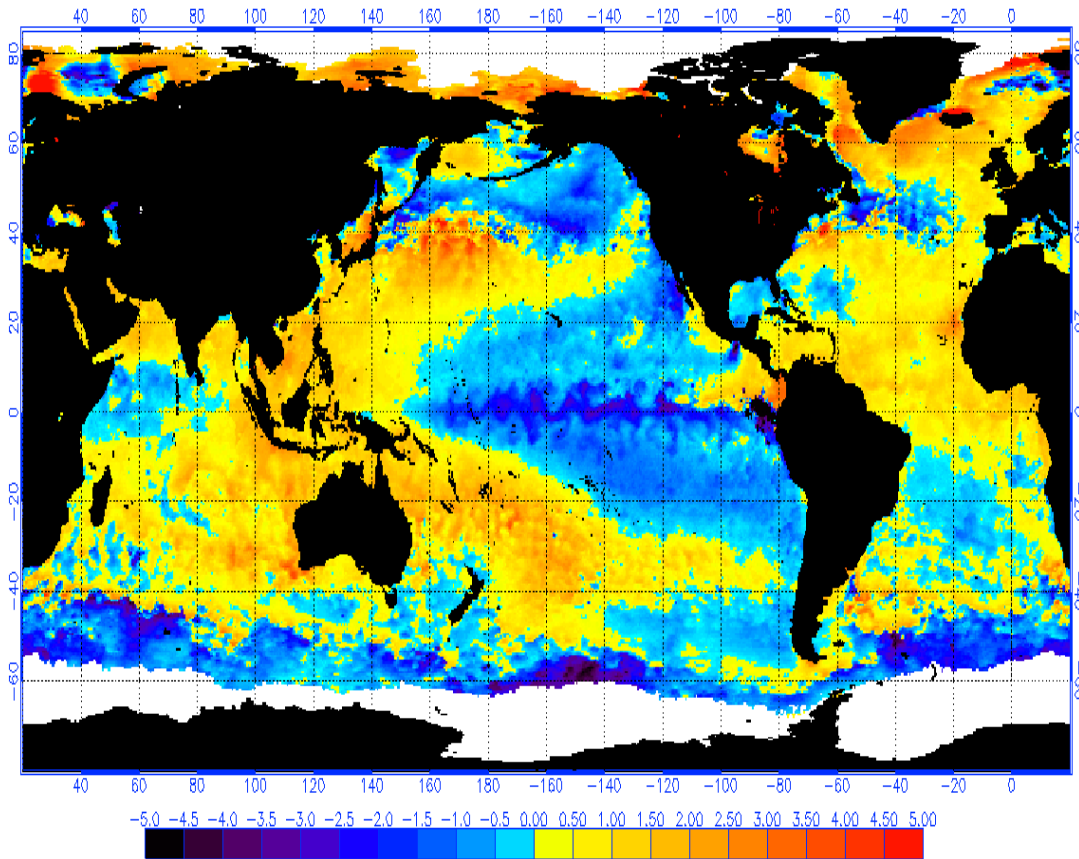
Below from another source is a comparison between this year and last.

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 10/10/2011  
(white regions indicate sea-ice)



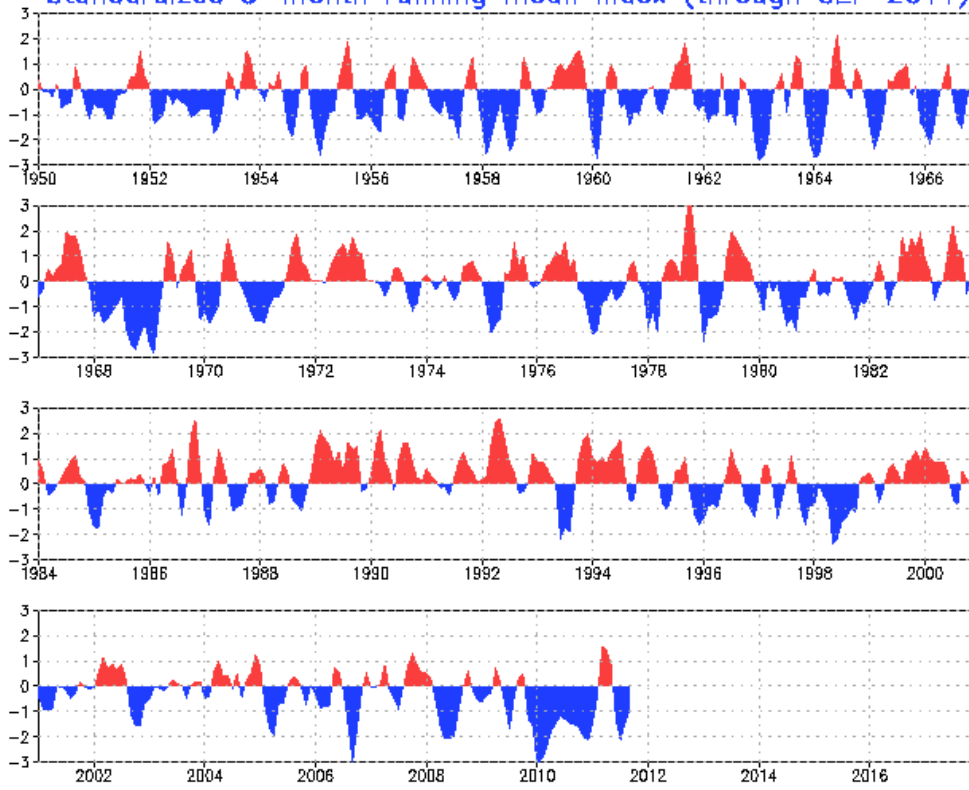
NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 10/11/2010

(white regions indicate sea-ice)

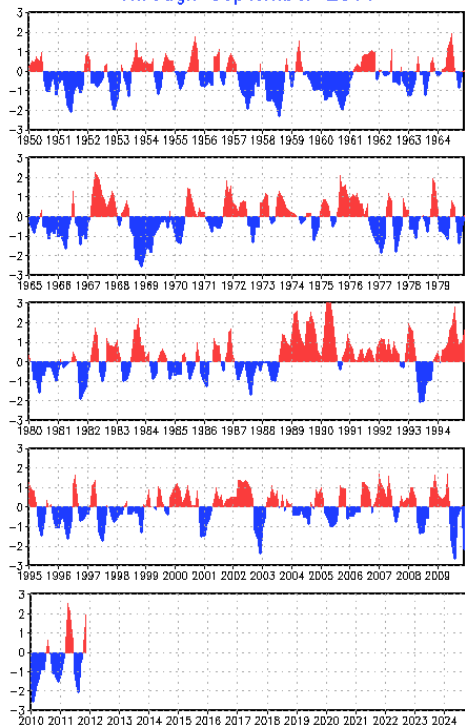


4. NAO/AO/ ... The NAO/AO indices are discussed frequently in the winter season. When they are in the negative (blue) state they are associated with cold air outbreaks over the central and eastern US states. These can only be predicted over small time scales, a week or two so a prediction is not much use in a seasonal forecast. But, I think it is worth showing where they have been. The following charts show the tendency of the NAO and AO in the last 60 years. I am focusing on the more consistent negatives we have seen the past 3 winters. This could be construed as a colder signal for parts of the north and east which is consistent with a La Niña as well. As it turns out the past 3 winters have been a little colder than the previous several.

North Atlantic Oscillation  
Standardized 3-month running mean Index (through SEP 2011)



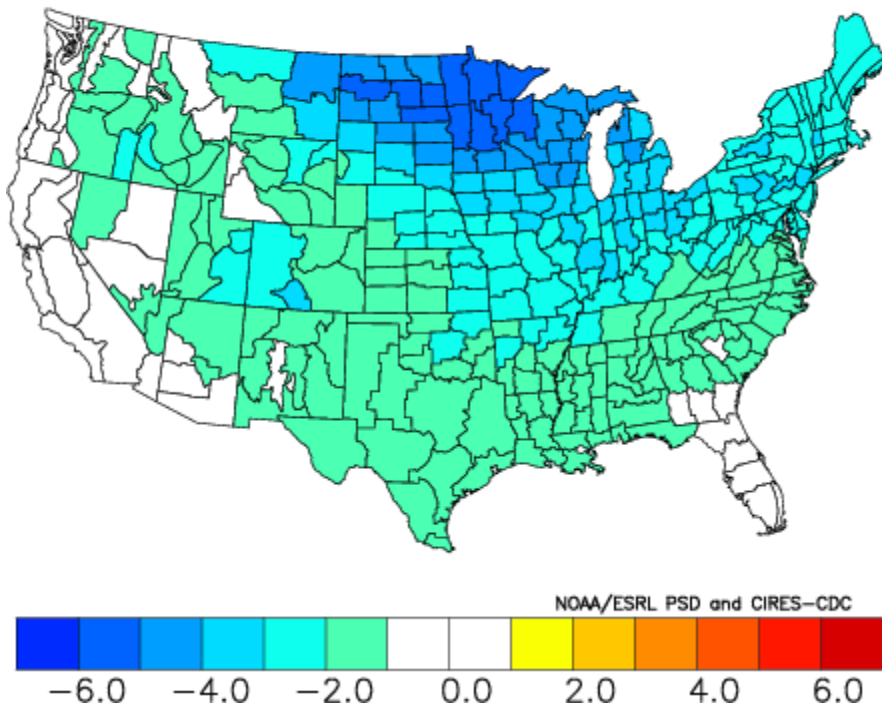
Standardized 3-Month Running Mean AO Index  
Through September 2011



5. Analogging This technique is becoming widely used, but I think it is the most misunderstood. The theory is to take a snapshot of the atmosphere and compare its look to similar years then see what the next winter brought. This year I am going to present two different methodologies.

The first one is known as the Quasi Biennial Oscillation (QBO). This is a measurement of wind direction in the Tropical Pacific. These winds are currently from the east representing a very weak negative phase. There is a chart of these measurements located at <http://www.cdc.noaa.gov/Correlation/qbo.data> From there I determined the closest matches were 1993, 1988, 1983, 1976 and 1964. These were years that started out strongly positive and flipped to negative by autumn. Please keep in mind that any analog method used only assumes that piece of data as a factor. It is why they do not play a big role in my forecast preparation unless I think it is a main driver. Even so, here is what those winters look like.

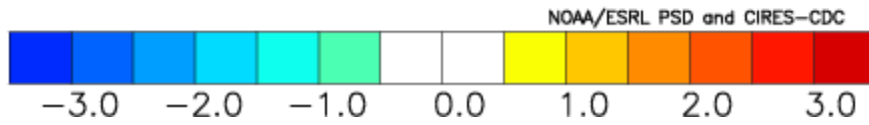
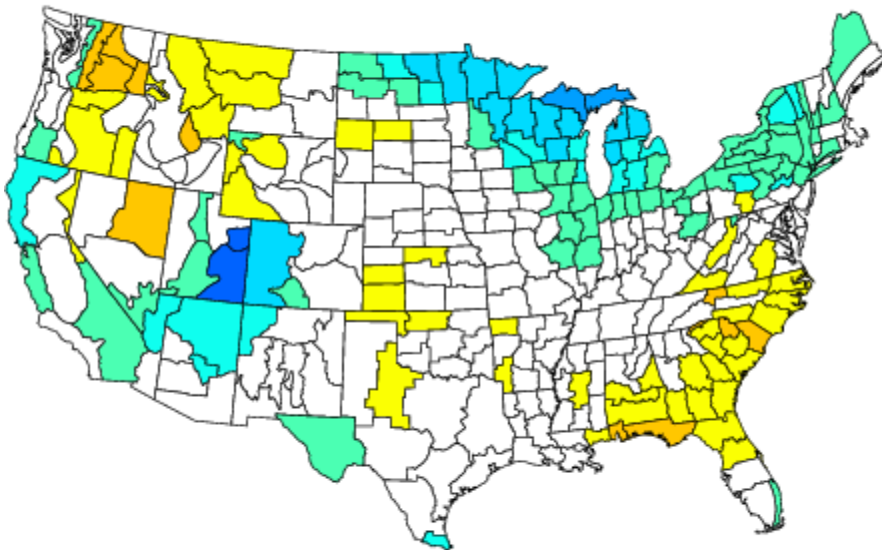
Composite Temperature Anomalies (F)  
Dec to Feb 1993-94, 1988-89, 1983-84, 1976-77, 1964-65  
Versus 1981-2010 Longterm Average



This appears very different (colder) to what many of the climate models are predicting

The second analog is called the Pacific Decadal Oscillation (PDO). This is a Northern Pacific Sea surface measurement. It has similarities to the El Niño/La Niña phenomenon but on a longer time scale. Most observations indicate long term we are in a decade of negative phase indicative of colder temperatures. The index has been weakly negative for all of 2011. I looked for years with similar trends and came up with the following.

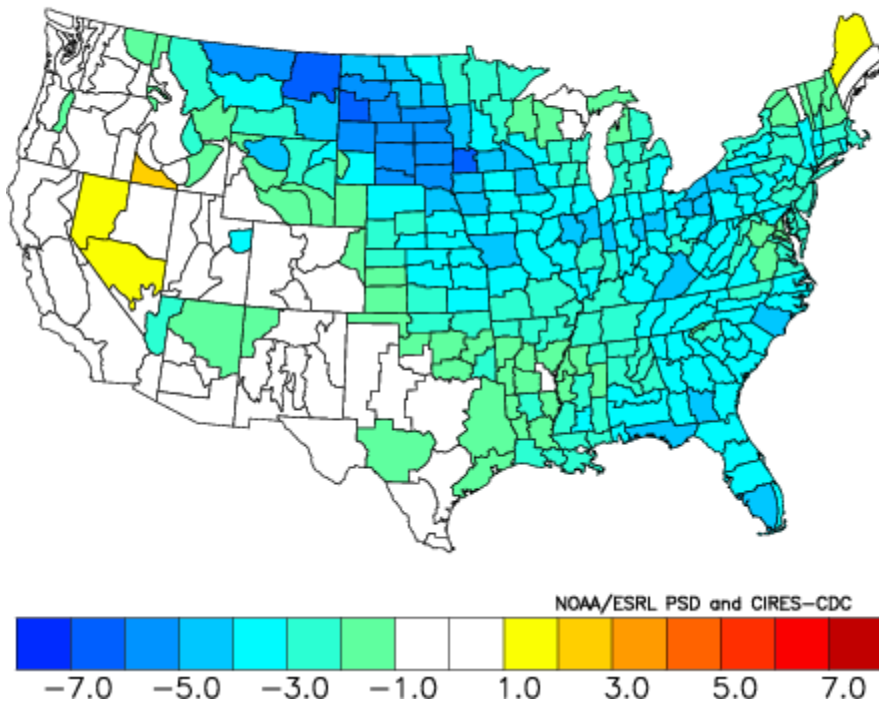
Composite Temperature Anomalies (F)  
Dec to Feb 1998-99, 1990-91, 1975-76, 1973-74, 1967-68, 1962-63  
Versus 1981-2010 Longterm Average



This one is not as cold, but still has cooler trends in the north.

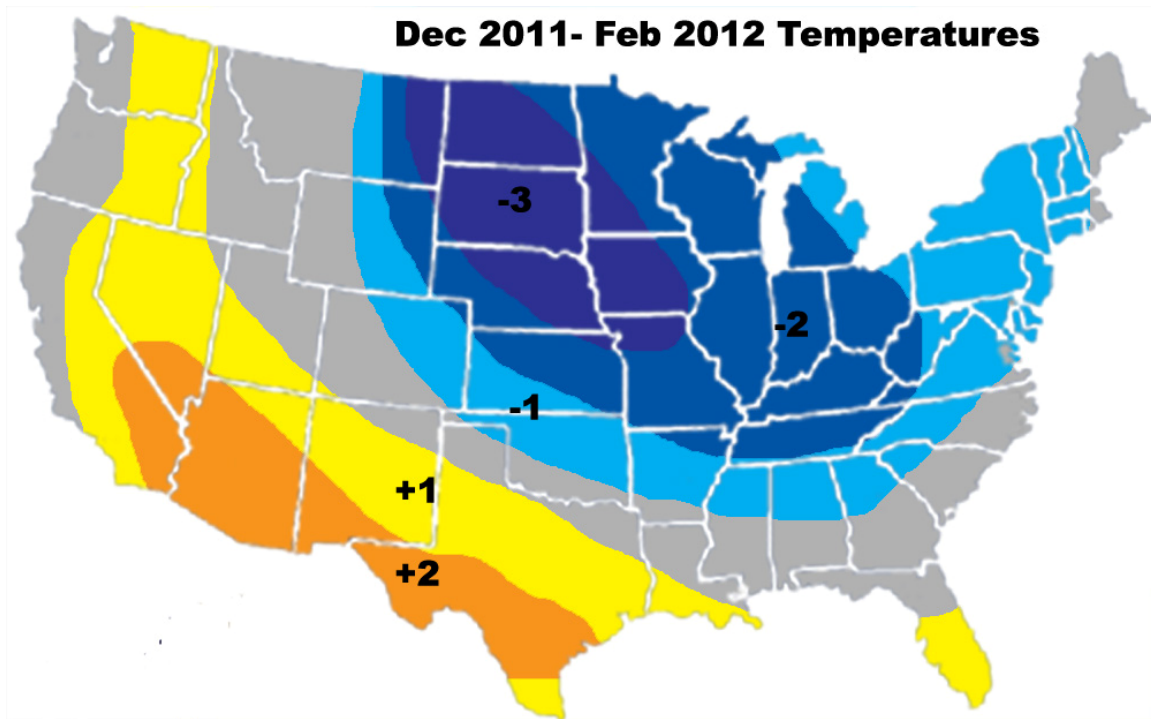
Finally for reasons I will explain below I show last years' winter map which was colder than normal for a large part of the country.

Temperature Anomalies (F)  
Dec to Feb 2010–11  
Versus 1981–2010 Longterm Average



6... Time to draw some conclusions:

It is a fascinating choice to make this year. If one only uses the predictive models the signs are overwhelming for the north and west to be colder than normal and the south and east to run warm. Yet almost every other variable suggests strong potential for the north and east to be cold. A weak La Nina, the sea surface temperature profile, tendency for more negative NAO/AO signatures and the analogs all support this. I keep coming back to last winter and find many of the current variables are very similar to last year. Most of what I just mentioned above are similar as well as the evolution of this hurricane season with high numbers but low U.S. landfalls with most storms curving out to sea. One other issue is with using the 1981-2010 normal; it will be easier to get below normal than in the past 10 years since these numbers are warmer to begin with. To me, it makes more sense to use the variables rather than the models to predict this winter. I feel the most confident in going below normal in the north. Behind that, my confidence level is high in a small warm bias in the far south as well as much of the west. The east is my least confident area but feel a small cold bias is the way to go.



## • Specific City Anomalies

• City	Dec - Feb forecast
• Boston	-0.5
• New York	-1.50
• Toronto	-1.00
• Atlanta	-0.50
• Chicago	-2.00
• Kansas City	-2.50
• Dallas	+1.50
• Denver	-1.00
• Tucson	+2.00
• Los Angeles	+1.00
• Seattle	+0.50

Precipitation: La Nina years are typically wet ones over the hydro NW. Last year was an exception and given the sea surface similarities this could be as well especially if the La Nina is weaker than last year. I am going with about 90% of normal precipitation in the hydro NW. much of the north and east may see at least slightly above normal snowfall this winter and as in the past several years at least a couple of noteworthy east coast events are likely. The south is expected to run a little drier than normal.