THE WILD WINTER OF 2013-14. COULD IT REPEAT?

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The Winter of 2013-14 was wild over North America. Most forecasters and the public including NOAA's, CPC were caught by surprise.

We all have a high regard for the work of the National Weather Service in providing local forecasts and warning services. The Climate Prediction Center has done some great research and provides some very excellent tools for longer-range forecasts and they do a commendable job with medium range forecasts.

The government forecasters do a have a blind spot, however, with seasonal forecasts. Part of the reason, a former director once told me, was due to pressure from academia only to use tools that have sufficiently proven skill or statistically significant correlations with temperature and precipitation. This basically restricts them to using ENSO. They are also incorporating warming trends that have been non-existent for almost two decades.

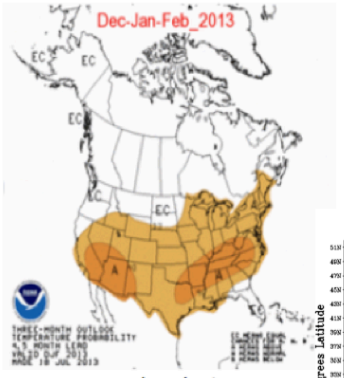
When it comes to El Niños, they have not bought into the idea that there are two flavors of ENSO, depending on strength and location of the warmest water in the Pacific. Both flavors are linked to the large scale Pacific Multidecadal Oscillation (PDO).

I was invited to make a presentation at the Climate Prediction Center in the fall of 2002 predicting that the winter would be very cold in the East. They were convinced, however, that it was a slam-dunk warm winter forecast. You may recall that Boston had 6 straight months below normal that year. The October to March period was the coldest since 1940-41 in Boston and the 11th coldest since 1900.

Month	*Departure from Normal*
October 2002	**-1.8° F**
November 2002	**-2.0° F**
December 2002	**-1.7° F**
January 2003	**-5.2° F**
February 2003	**-5.1° F**
March 2003	**-1.5° F**

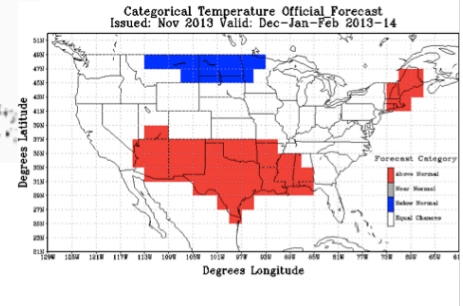
The government forecasts were better in 2009-10, but they did not see the extreme cold and snow in the Mid-Atlantic.

Last year, ENSO was neutral. In their July forecast, CPC was thinking there would be widespread warmth and limited the cold in their late November forecast to the far northern plains.

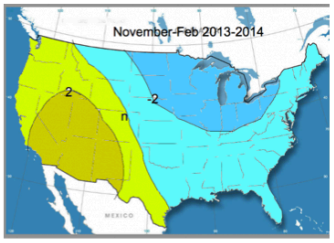


Dec/Jan/Feb

CPC forecasts for the
Winter of 2013/14 made
In July and November

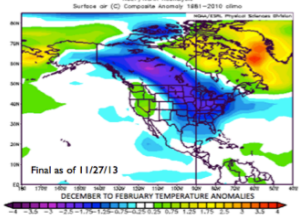


At WeatherBell, we were warning clients of the possibility of a historic winter in July and went full bore cold by Thanksgiving.

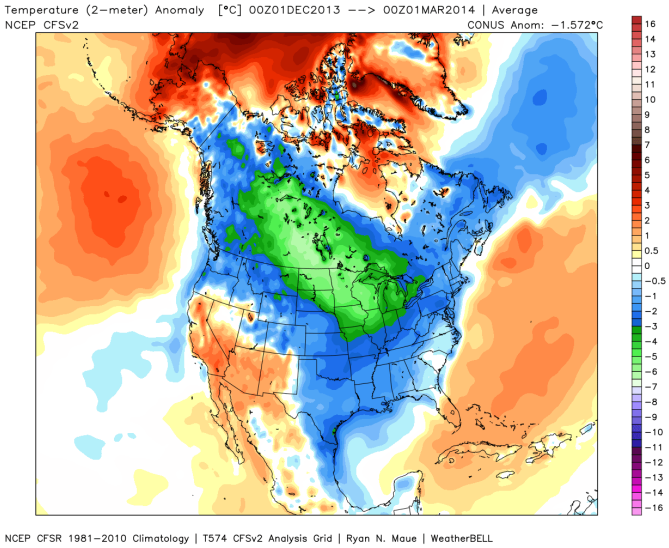


WeatherBell forecasts for the
Winter of 2013/14 made
In July and November

WeatherBell Winter Forecast

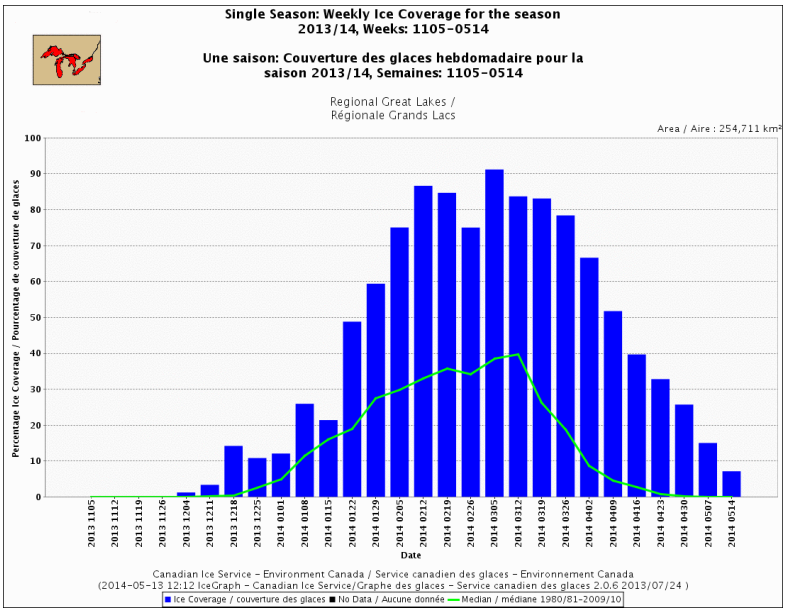


The actual December to February temperature anomalies were very much in line with our analog forecast.

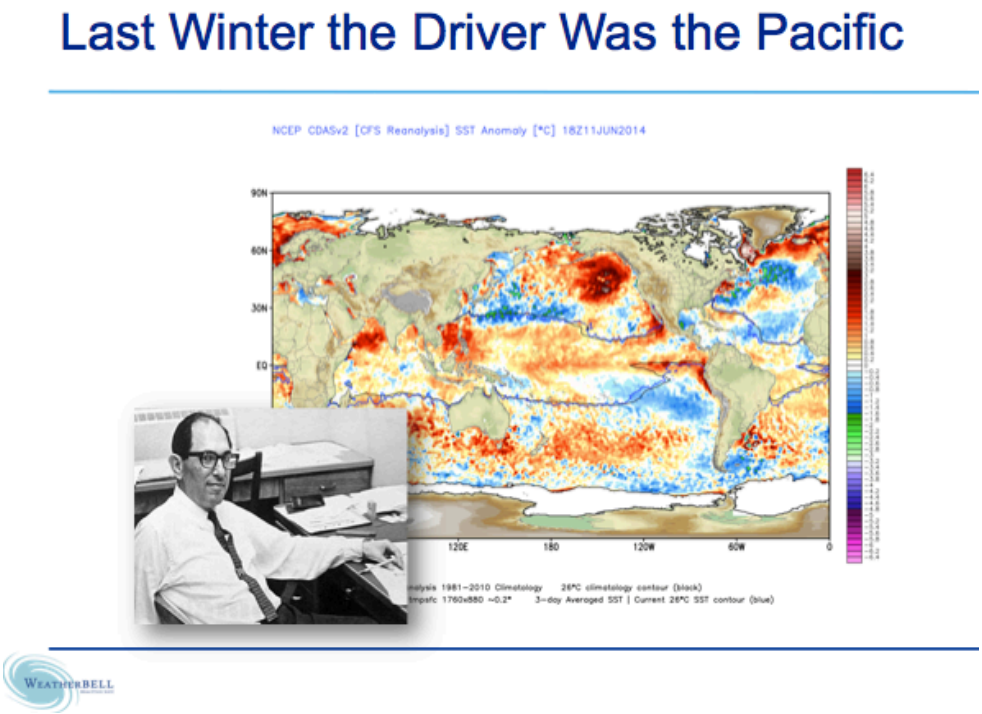


Chicago had its coldest December to March on record (since 1872), Detroit its snowiest on record (since 1880). It was third snowiest in Chicago behind only 1977-78 and 1978-79. It was the second snowiest in Philadelphia.

Ice on the Great Lakes was the greatest on record, peaking at 92.2% and above normal in every week. Ice flows were seen on Lake Superior in early June.



It stayed cold into the spring, with the coldest weather shifting eastward. Vermont had its coldest March on record, with a statewide temperature of 18.3°F (8.9°F below average). The previous coldest March in Vermont occurred in 1916 when the monthly average temperature was 18.6°F. Maine and New Hampshire each had their second coldest March on record. Massachusetts had its eighth coldest March, Connecticut its ninth coldest, and Pennsylvania its 10th coldest.



Weatherbell has a different approach from CPC in seasonal forecasting. As I noted they have climate models but tend to focus more on statistical approaches focusing heavily on ENSO and trends. We do analog forecasts based on ENSO (by region) and the many other major oceanic oscillations. We also use the QBO, which even CPC had found modulated the effects with ENSO and measures of solar activity.

Last year the AMO (warm) and PDO (cold) became confused and ENSO was neutral. The real drivers were the QBO westerly phase and a record warm pool in the Gulf of Alaska (both favoring a +PNA - western ridge, central and eastern trough). The Polar Vortex made its way into the news. Of course the polar vortex is not new and in fact it is there in some for or another in all seasons. It is stronger in some parts of the hemisphere and its amplitude varies. This year it was stuck in central North America and it was particularly deep.

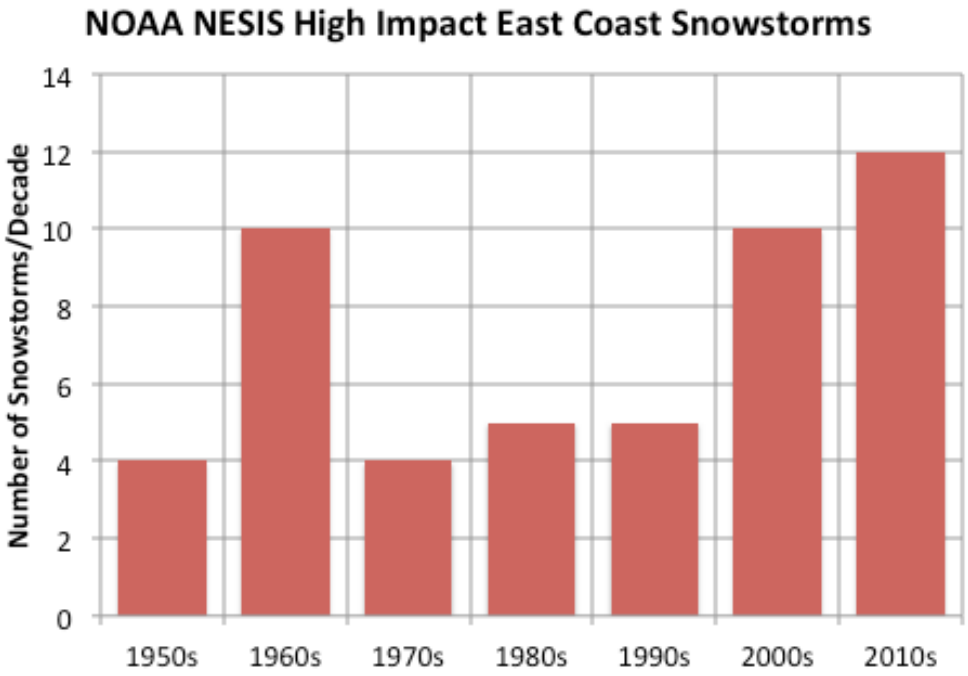
The man sitting next to the sea surface temperature map (above) is Jerome Namias, the first Director of the Long Range Forecasting branch of what was then called the US Weather Bureau (Long range then was 5 days!). Later his research convinced him that cold and warm water pools outside the tropics had an effect by anchoring the mean long wave troughs and ridges. He used them in his seasonal forecasts at Scripps. He wrote a paper and explained to me at a conference how the warm water that developed during the strong string of La Niñas in the early to mid 1970s led to a western US trough and a warm southeast. Once the currents carried it to the Gulf of Alaska in 1976, the pattern flipped with three incredibly cold winters.

Joe Bastardi and I noted the same thing happened between 1916-1918, with two record setting winters. That is what made us so bullish on last winter (and next winter).

If it feels like winters are getting colder and snowier to you, your perception is correct. NOAA has reported, www.ncdc.noaa.gov/cag/, that meteorological winter (December - February) temperatures in the contiguous United States have trended downward at a rate of 0.36°F per decade over the last 25 winters, 1.13°F per decade over the last 20 winters, and 2.26 °F per decade over the last 10 winters.

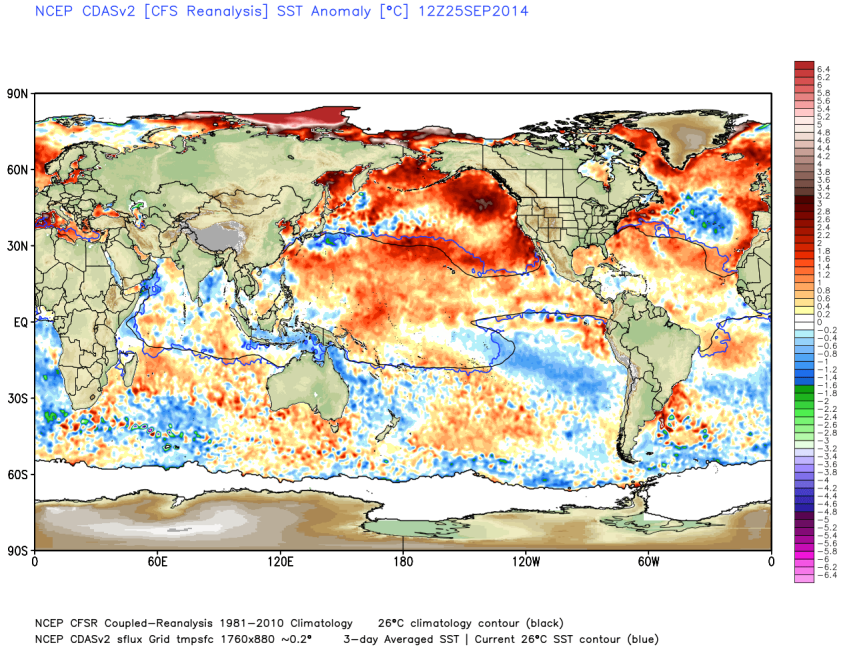
For the past 20 years, every one of the 9 climate regions has shown a downward trend in winter temperatures.

As for snowfall, just 4 years into this decade, we have had more high impact east coast snowstorms than any decade since the 1950s.

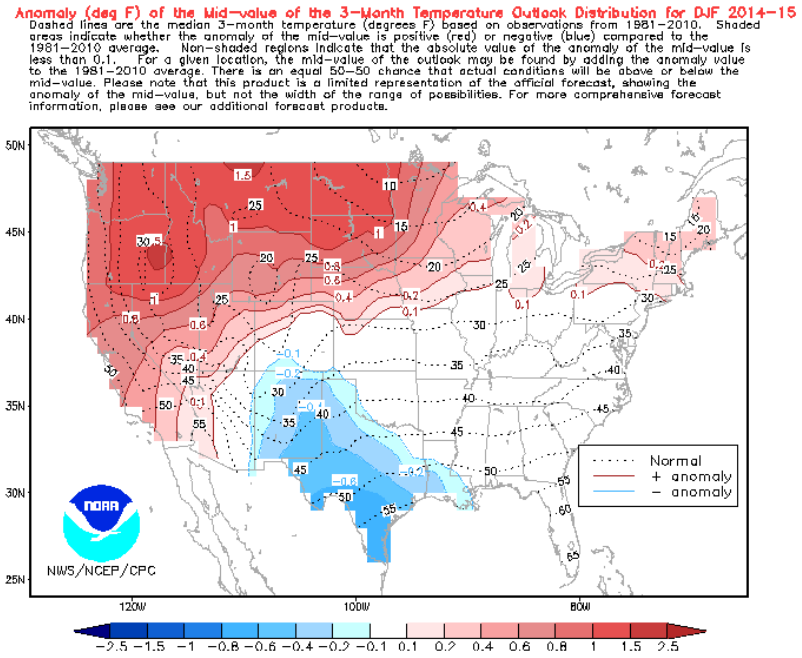


For the hemisphere, 4 of the top 5 snowiest years have occurred since 2007-08.

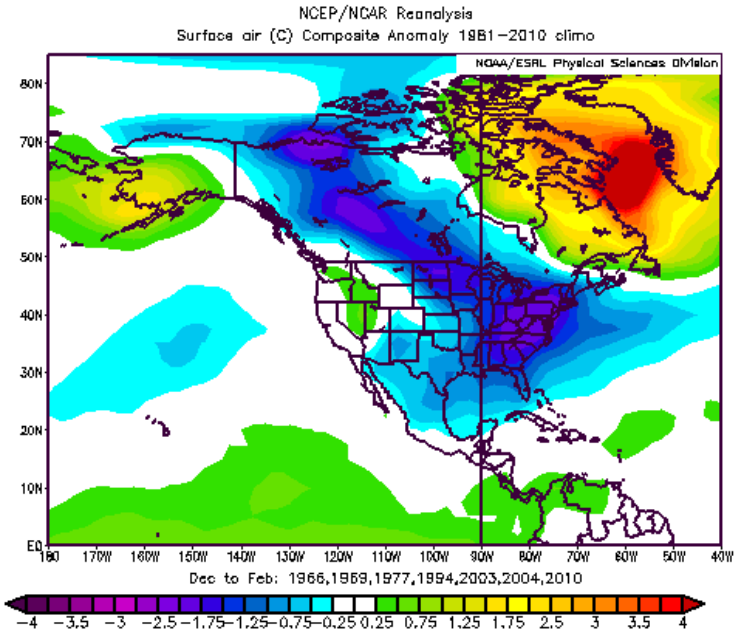
You can see the warm pool is still in the Gulf of Alaska. El Niño is trying to come on and will likely do so but be biased toward the central Pacific. The QBO has flipped easterly, which favors a broader cold over the lower 48 states.



NWS, though, is going with the canonical El Niño relationship, with lots of warmth and cold limited to the southern Rockies and southern Plains.



Our analogs favor a repeat “fickle finger of fate” or polar vortex but with the coldest air biased farther to the east and south. We have warmth limited to the far northwest. There should be plenty of snow, especially from southern New England towards the south and southwest.



Stop by the WeatherBell booth at the NWS Winter Media conference this October and come join us at Weatherbell.com to get the daily details in blogs and videos by myself, Joe Bastardi, Tom Downs, and Dr. Ryan Maue, along with the most complete

weather, teleconnection tracking, model sets and highest resolution European model output available.