

Weather Whys

I started weather forecasting in the 1970s for CBS in New York City for local radio, TV and the network show Energy and then as a college professor at Lyndon State College in Vermont where I taught weather and climate analysis and forecasting, and with my students started telephone, radio and ski area forecasting.

We had tools that were very primitive relative to today. Weather forecasters then depended on pattern recognition and empirical rules developed over the years. We looked globally and at all levels of the atmosphere. Computer models were in their infancy extending out with surface forecasts just 2 days. There were no 7 or even 5 day forecasts on television. The third day was considered an outlook.

I left the college in 1980 to join John Coleman in Chicago where we produced Good Morning America weather and plan for the Weather Channel (TWC), which we started with the helps of many of my former students in 1982. The early 80s saw a technology revolution to computerized weather data and graphics and real time local radars. TWC started right at that transition and pioneered new ways of doing both forecasting and TV weather.

The science greatly advanced the next two decades with the explosion of satellite delivery of information and graphics and then the internet and availability of data and global computer modeling going out to 16 days into the future in detail. These models are now run multiple times a day and multiple times in every run (called ensembles) to give forecasters an idea of the range of possibilities and degree of confidence in their outlooks. Model skill has increased in the first 7 to 8 days enough so now the TV meteorologists routinely do a 7-day forecast.

Even though the tools have improved, the best forecasters are the ones like my students and the old timers that understand the basics and can better determine which computers to believe and why and how to interpret what it means for the local area. In my company, Weatherbell.com, we cover the whole world for our clients, extending the challenge. We have to worry about unusual cold and snow in southern Brazil, frigid air in Europe, a slow monsoon onset in India, a heat wave in China, not enough rain in West Africa as well as a snowstorm in New England.

To do so, we at Weatherbell.com developed our own statistical models that combine factors like El Nino and La Nina, the longer term states of the oceans (Multidecadal Oscillations in the Pacific and Atlantic), all the solar variables that affect our weather, the winds in the tropical and temperatures in the polar high atmospheres, the magnitude and location of any volcanism, and patterns of soil moisture and snow cover patterns.

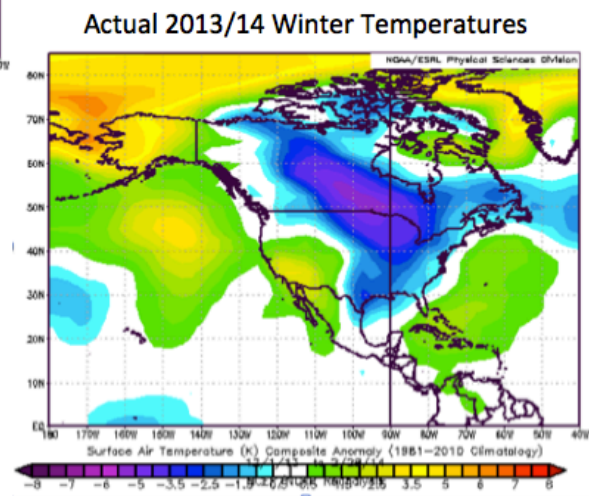
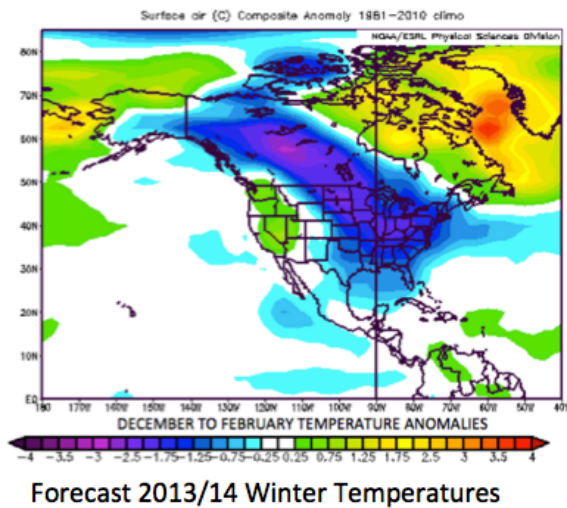
Sometimes like this past winter, other strong localized anomalies show up that override all other factors. A very warm water pool that developed after the super La

Nina of 2010/11 in the Pacific northwest of Hawaii grew as it drifted to the Gulf of Alaska last summer and fall. After record Alaska snow and cold in the prior two winters, this warm pool deflected the jet stream north into Alaska making last winter warmer there. The jet stream then turned south into Canada and the central United States forming the 'polar vortex', driving arctic and at times Siberian air south in a steady stream from November into the spring.

In the end we have found, the warm and cold pools in the ocean really drive the dominant weather regimes- where it will be cold or warm, and where storms track and thus where it will be wet or dry, and in winter, snows will tend to fall. And we see strong evidence that the sun drives these ocean patterns.

This extreme cold scenario like this past winter happened in the 1976-79, 1916-1918 periods in both cases, a few years after strong La Ninas and quiet sun periods like this past winter.

Seeing that evolution, Weatherbell told our clients last summer that a very cold winter was coming despite the official government climate center forecast of a warm winter.

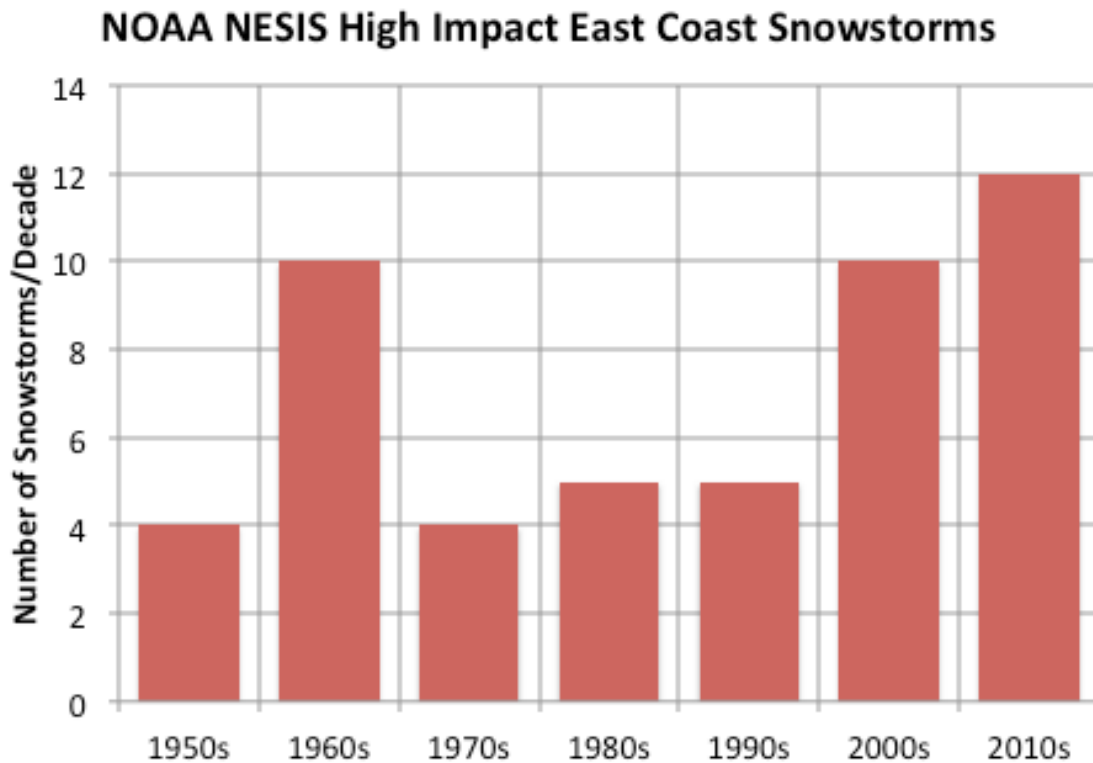


Indeed 2013/14 brought the coldest December to March ever in Chicago since records began in 1872. It was the 3rd snowiest there, snowiest ever in Detroit and

other spots, and second snowiest in Philadelphia. The amount of ice on the Great Lakes set an all time record, well above normal in every week, peaking at 92% coverage in March and not disappearing entirely until June 10.

That ocean warm pool will persist at least into next winter and the El Nino that is coming on will settle near the dateline (called a Modoki El Nino) as it did in 2002/03, 2009/10.

These two factors argue for the cold last year over the central to shift further east – over us. The El Nino southern storm track will have California and Texas farmers dancing in the rain. You can expect another snowy winter on the east coast where we already have had 12 major impact snowstorms this decade just 4 years in, beating out the old record of 10 in the 1960s and the 2000s.



<http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>

Climate forecasters whose business success depends on getting it right will tell you these same natural factors that determine our seasonal weather patterns can also explain all the past climate cycles and extremes very nicely.