

## RECORD SETTING AO AND SOI COMBO CREATES A WILD WINTER

In [April 2009](#), we talked about Mt Redoubt's eruption (and later Russia's Sarychev) and the effect it might have on high latitude blocking and cooling summer and winter.

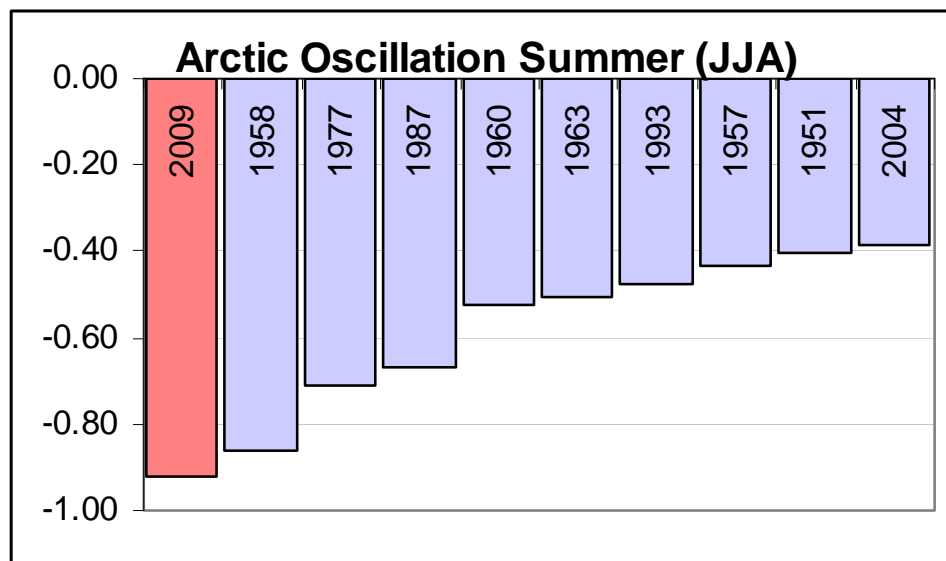
Climatologists may disagree on how much the recent global warming is natural or manmade but there is general agreement that volcanism constitutes a wildcard in climate, producing significant global scale cooling for at least a few years following a major eruption. However, there are some interesting seasonal and regional variations of the effects.

[Oman et al](#) (2005) and others have shown that though major volcanic eruptions seem to have their greatest cooling effect in the summer months, the location of the volcano determines whether the winters are colder or warmer over large parts of North America and Eurasia. According to their modeling, tropical region volcanoes like El Chichon and Pinatubo actually produce a warming in winter due to a tendency for a more positive North Atlantic Oscillation (NAO) and Arctic Oscillation (AO). In the positive phase of these large scale pressure oscillations, low pressure and cold air is trapped in high latitudes and the resulting more westerly jet stream winds drives milder maritime air into the continents.

## *Mt Redoubt Volcano*

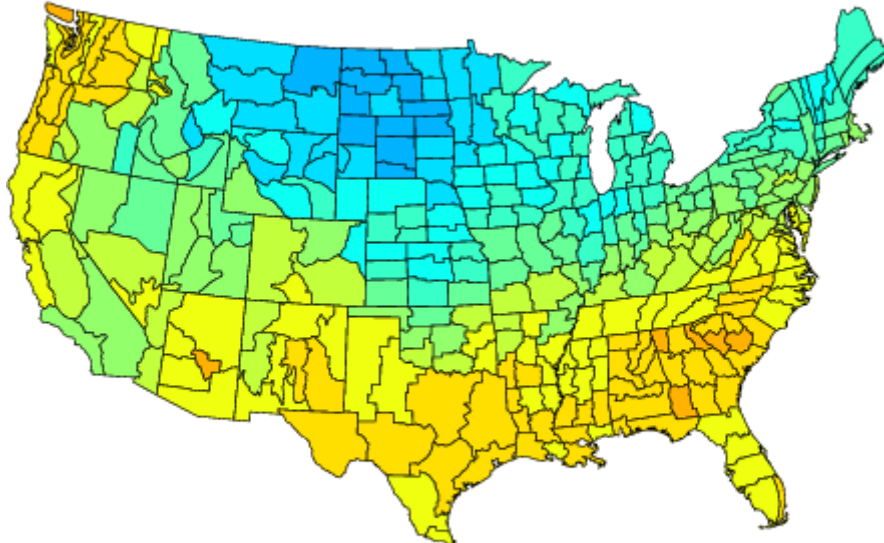


The summer of 2009 had the most negative AO since 1950. Which explains the cold summer (especially July).

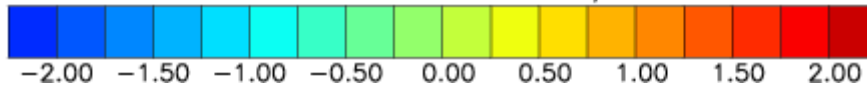


Summers with a very negative AO above have a cold anomaly centered in the nation's midsection.

Composite Temperature Anomalies (F)  
Jun to Aug 1958,1977,1987,1963,1993,1960,1957,1951,2004  
Versus 1950–1995 Longterm Average

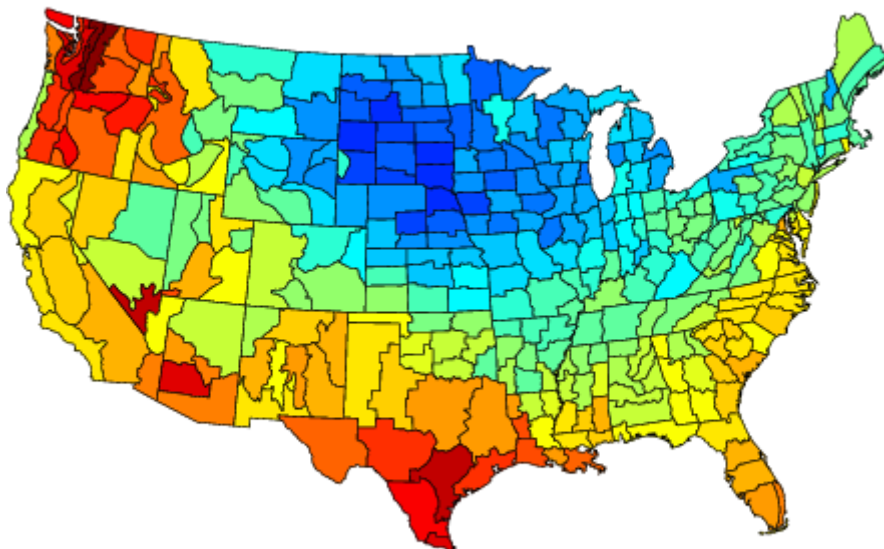


NOAA/ESRL PSD and CIRES-CDC

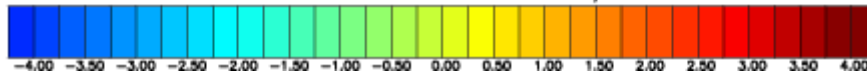


Last summer saw that pattern.

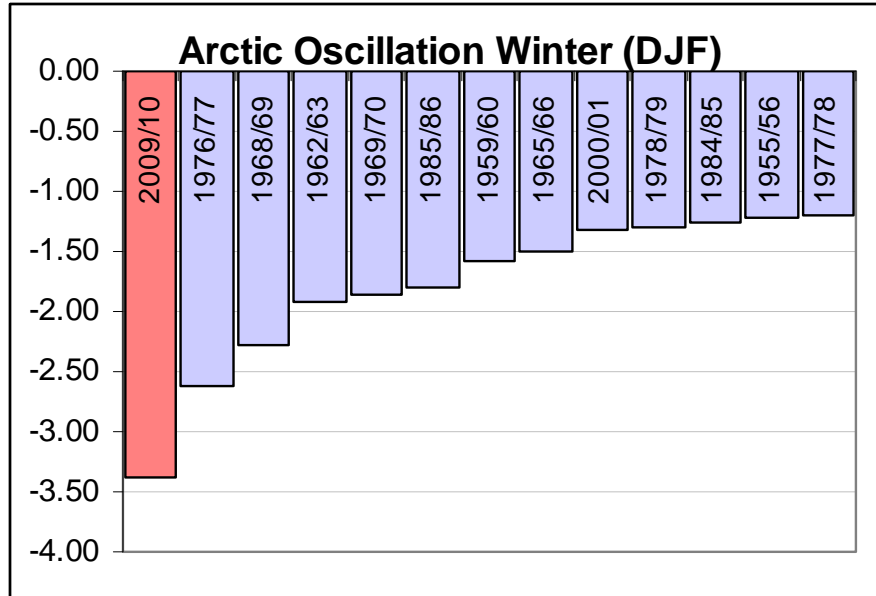
Temperature Anomalies (F)  
Jun to Aug 2009  
Versus 1950–1995 Longterm Average



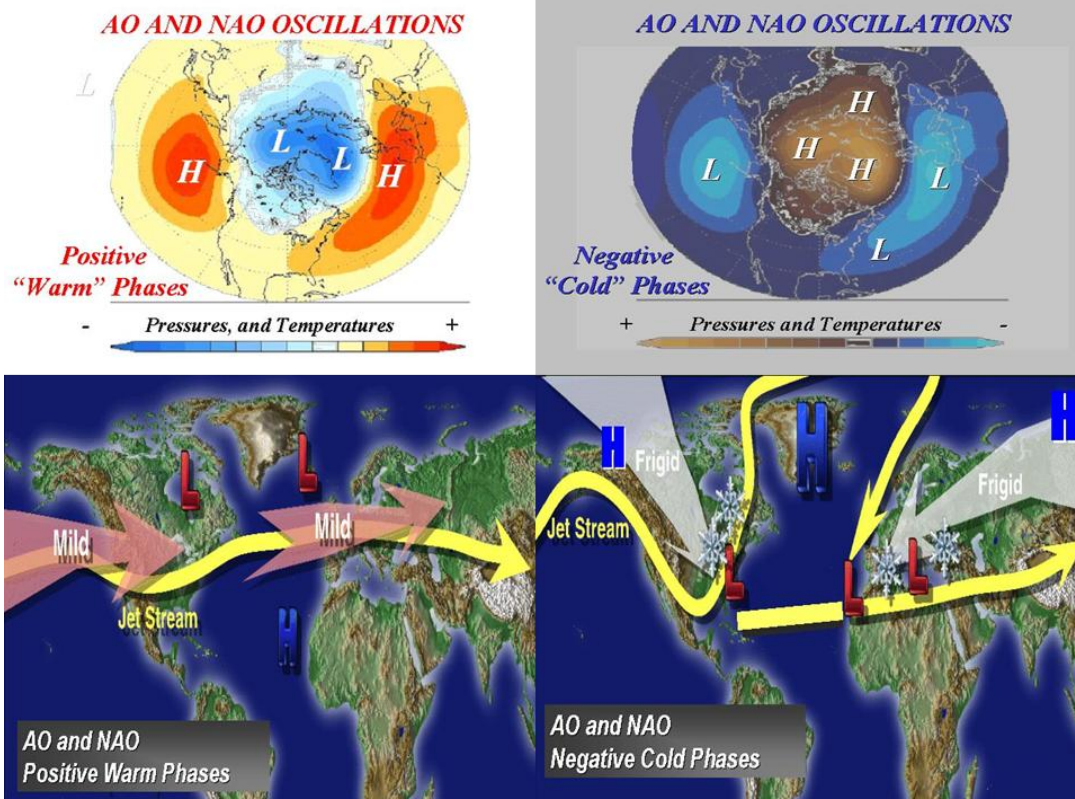
NOAA/ESRL PSD and CIRES-CDC



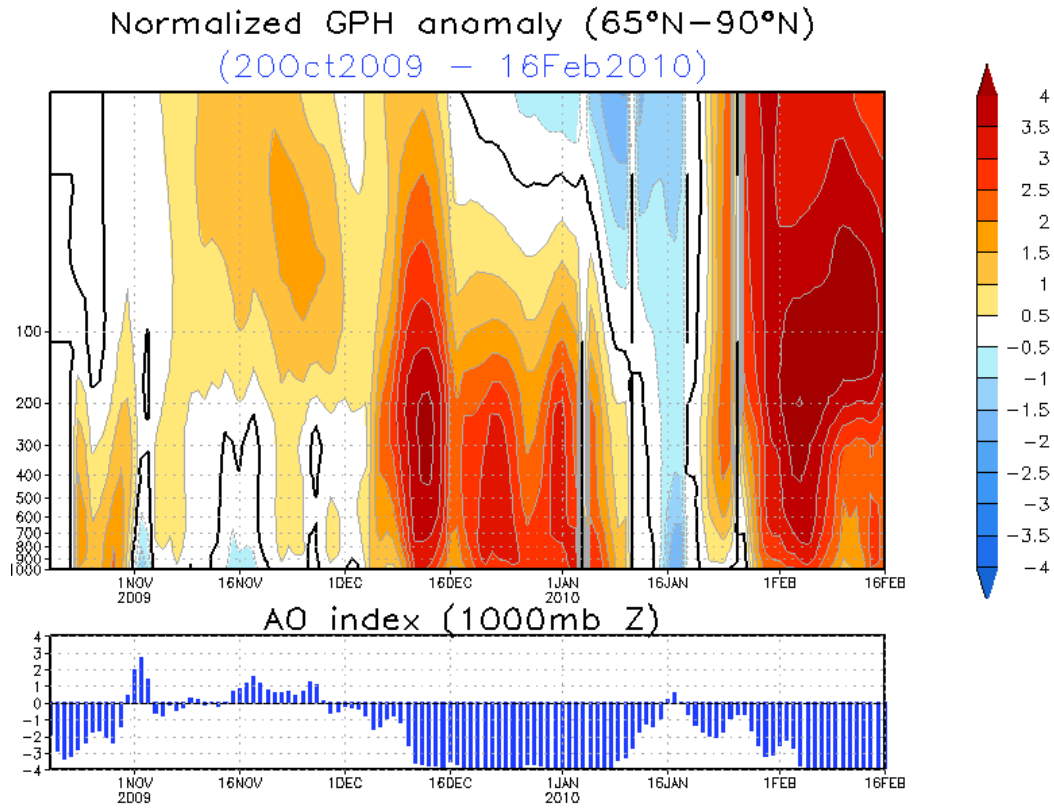
The AO has stayed very negative this winter. In fact again the most negative of any winter since 2009/10. It has averaged almost 3.5 standard deviations negative. In both December and February, it has reached more than 5 STD.



Negative AO/NAO winters are cold and often snowy in the US and Europe.



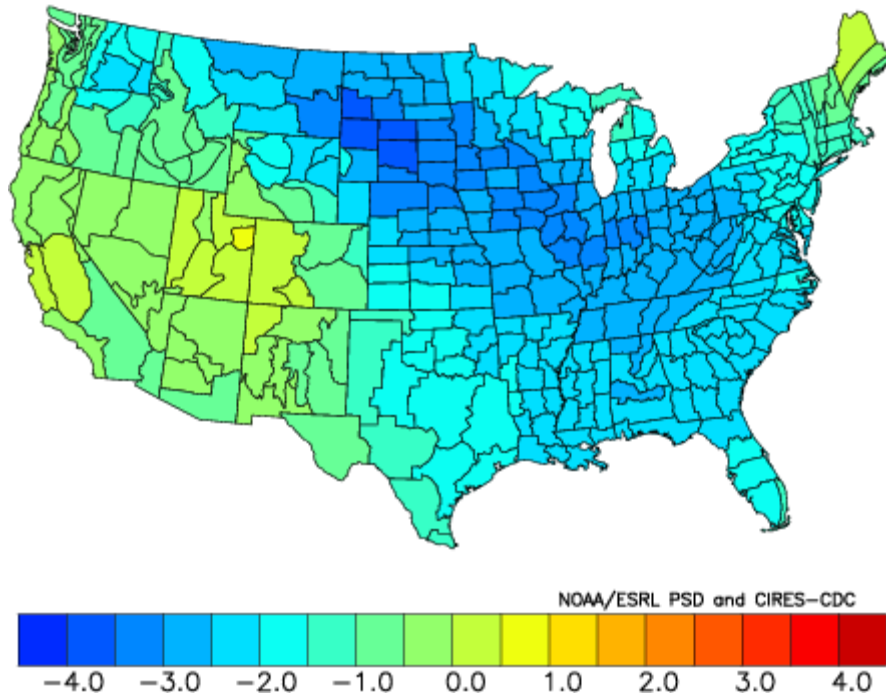
The strongest blocking years have a warm polar stratosphere and mid troposphere. Certainly that has been the case this year.



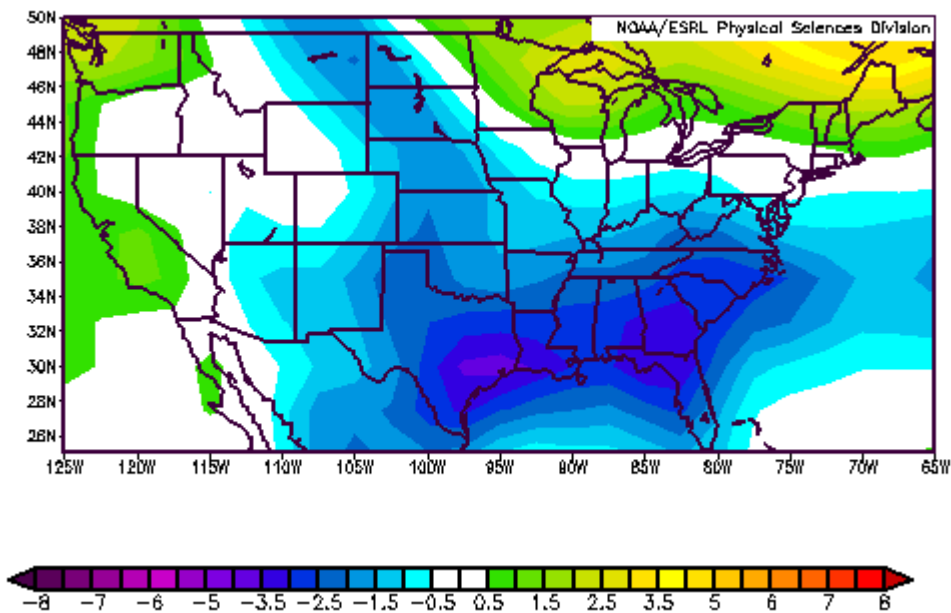
The most negative years when composited show the widespread cold.

### Composite Temperature Anomalies (F) Versus 1950–1995 Longterm Average

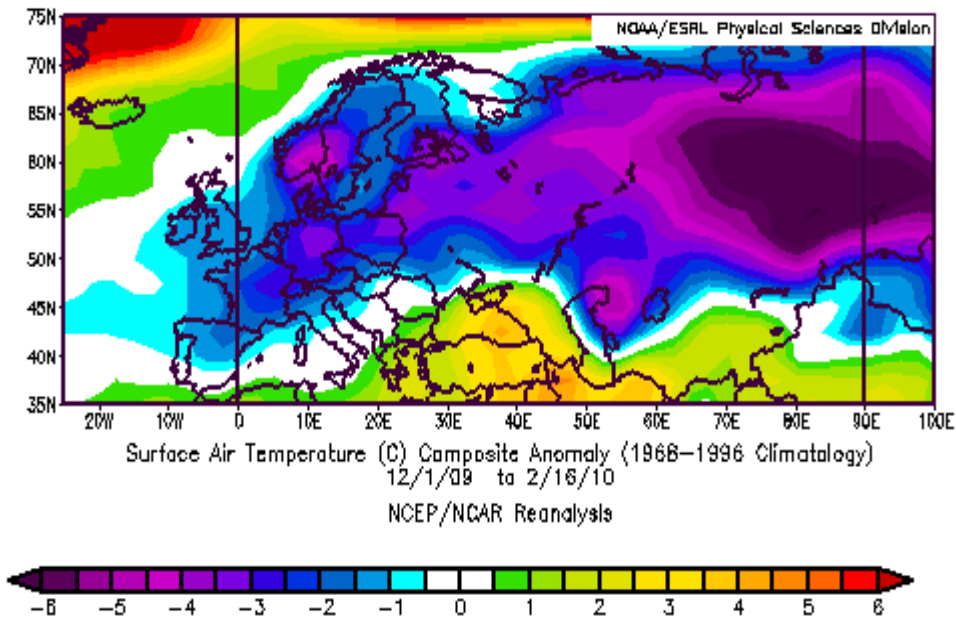
Dec to Feb 1976–77, 1977–78, 1978–79, 1968–69, 1969–70, 1962–63, 1984–85, 1985–86,  
1955–56, 1959–60, 2000–01, 1965–66,



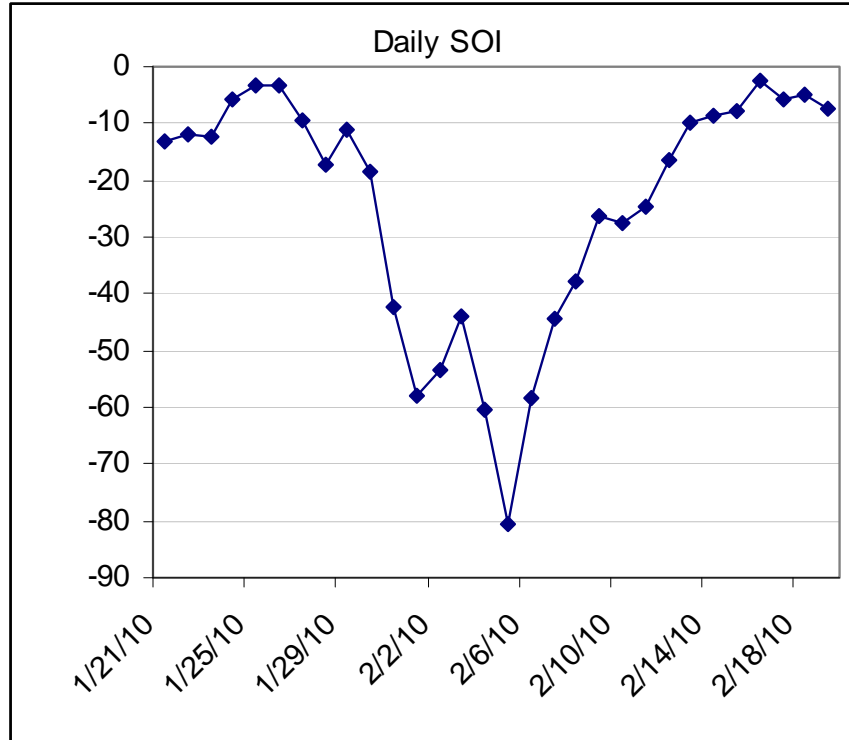
This winter has been cold especially in the southeast through February 16th.

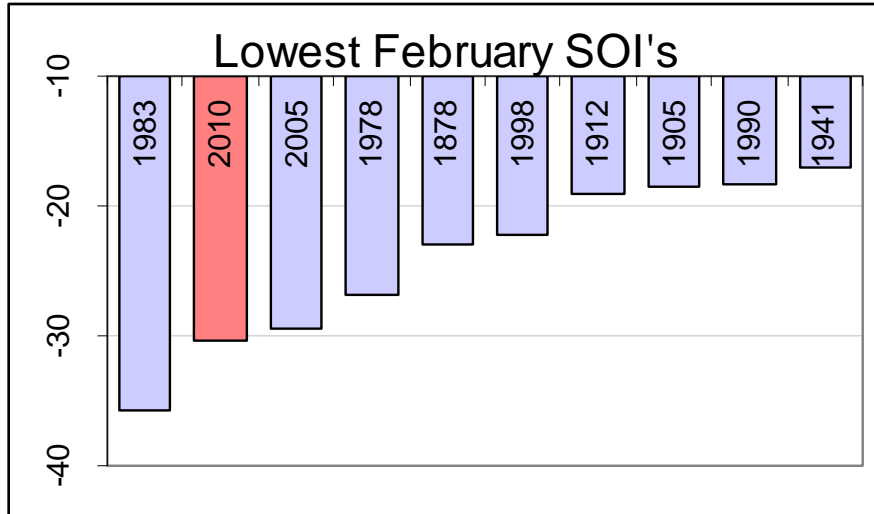


And certainly also all across Asia into Europe.

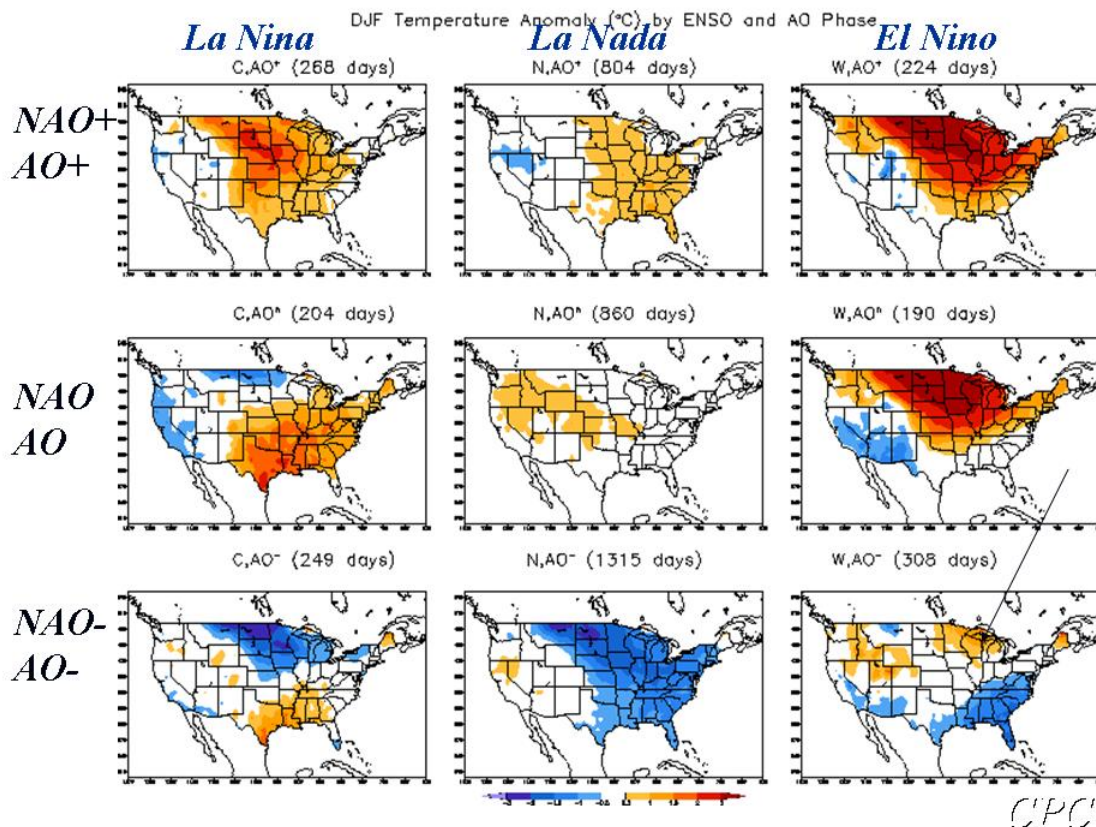


It also has been an El Nino year, the case in about half the top ten most negative AO years. The Southern Oscillation Index has dropped on a daily basis to an amazing 8 STD negative in early February. For the first 19 days, it has been most negative February since 1870.





This fits the combination of a negative AO El Nino very well (bottom right).



We covered the wild and crazy weather across the nation three winters in a row, La Nina and El Nino. IPCC and CCSP talks about retreat north of the cold. You can't get further south in the CONUS than Key West Florida.



## KEY WEST, FLORIDA

...January ties as 5th coldest January in Key West since 1873...

### **...January 7 through 13 ties coldest week on record for Key West...**

Average monthly temperatures for January were 64.2 degrees fahrenheit at the Key West International Airport and 63.6 degrees at the Florida Keys Marathon Airport. Normal January temperatures average 70.3 and 69.0 degrees...for Key West and Marathon, respectively.

This average for Key West ranks as the 5th coldest January since 1873. There were two previous occurrences of a 64.2-degree monthly Average...1886 and 1978. In the past 30 years this ranks as the 3<sup>rd</sup> coldest January on record...behind 2003 and 1981. The coldest month on record was 1981...with an average temperature of 61.3 degrees. These below-normal averages were primarily the result of an extended blast of cold arctic air that spanned much of the central and eastern United States. The coldest temperatures were experienced throughout the keys on the mornings of the 10th and 11th in the wake of an additional cold front that swept through the area.

Throughout the Keys...the lowest temperatures reported during this cold spell ranged between 35 degrees in Key Largo...37 degrees in parts of marathon...40 degrees at Big Pine Key and Ramrod Key...and 42 degrees in Key West. The low of 42 degrees in Key West on the 11th shattered the daily record of 48...and is now ranked as the second coldest temperature ever recorded in Key West. Still retaining the title of coldest temperature in Key West is the 41 degrees measured first on January 12th 1886 and then again on January 13th 1981.

Low temperatures broke six different daily records in January. These cold days and nights also allowed for January 7th through 13th 2010 to tie with December 1st through 6th 1876 for the coldest week in Key West...since recordkeeping began in the summer of 1872. Records are not yet tracked for marathon due to the shorter period of observations.

We will recap the entire winter worldwide in a few weeks. Winter may continue however into March even April