THE COLD FACTS- JANUARY 2012 IN ALASKA

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All data is provisional as it still needs to be quality controlled.

Alaska is no stranger to cold weather, although it has been some time since a large part of the state has experienced near record to record cold for an extended period of time. January 2012 will be noted as one of the colder months in recent decades, as a number of records were set. The coldest air temperatures were in the Interior, as seen in Figure 1. A number of stations: Bethel, Nome, Kotzebue, Bettles, and McGrath as well as St Paul and Kodiak City set new record lows for January. In addition, new all-time monthly lows were set in Bethel, McGrath, and Bettles. There were numerous sub minus 60 values throughout the month at various Interior stations, especially during the last 5 days of the month. The only part of the state which was not well below normal was the Panhandle, where temperatures were on the order of 2 to 4 degrees below normal.

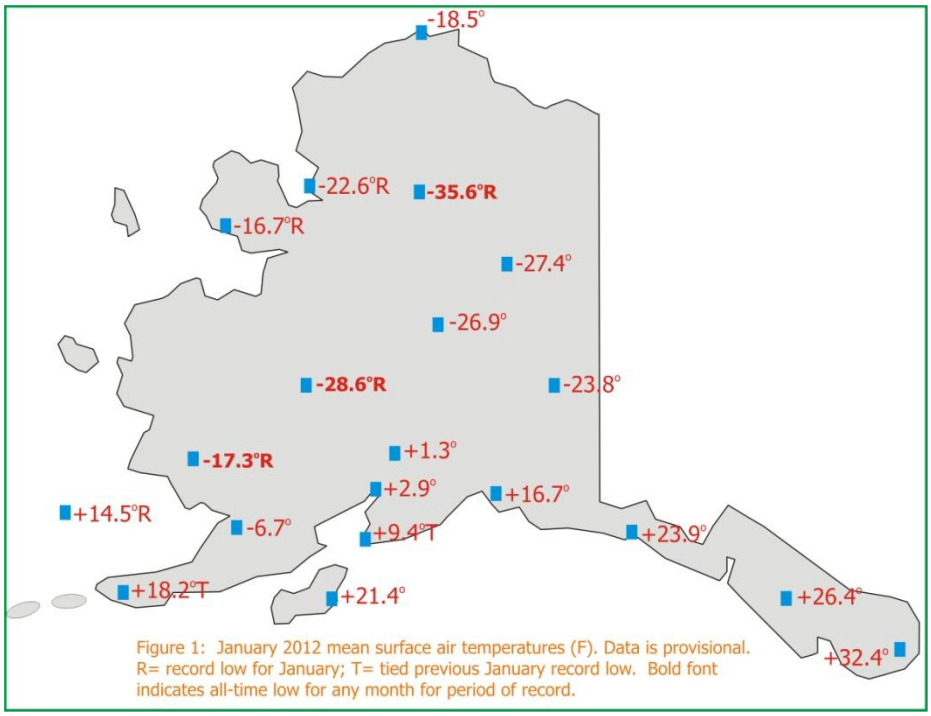


Figure 1: January 2012 mean surface air temperatures (F). Data is provisional. R= record low for January; T= tied previous January record low. Bold font indicates all-time low for any month for period of record.

Let's digress for a minute to discuss how 'mean' air temperatures are calculated. Daily mean (average) air temperatures are calculated by taking the daily maximum temperature (by way of example 12^{o}) and averaging with the daily minimum temperature (2^{o}): $12^{o}+2^{o}=14^{o}$ which is then divided by 2; leaving $14^{o}/2= 7^{o}$ as the daily mean. The monthly mean is the mean of all the daily means; that is we sum up all of the daily means and divide by the number of days in that month. A temperature anomaly is the deviation, or difference, from a 30 year 'normal' value (we are now using the 1981-2010 normals) which is in effect a long-term mean. For example, the 30 year monthly normal for January at the Bethel airport is 6.6^{o}. However within that 30 year period, observed January monthly values ranged from a high of 21^{o} to a low of **-13^{o}**, which is a broad range. Mean monthly air temperatures essentially give us a rough estimate of what the middle value is within a longer data set although the observed temperatures may be well above or below that value.

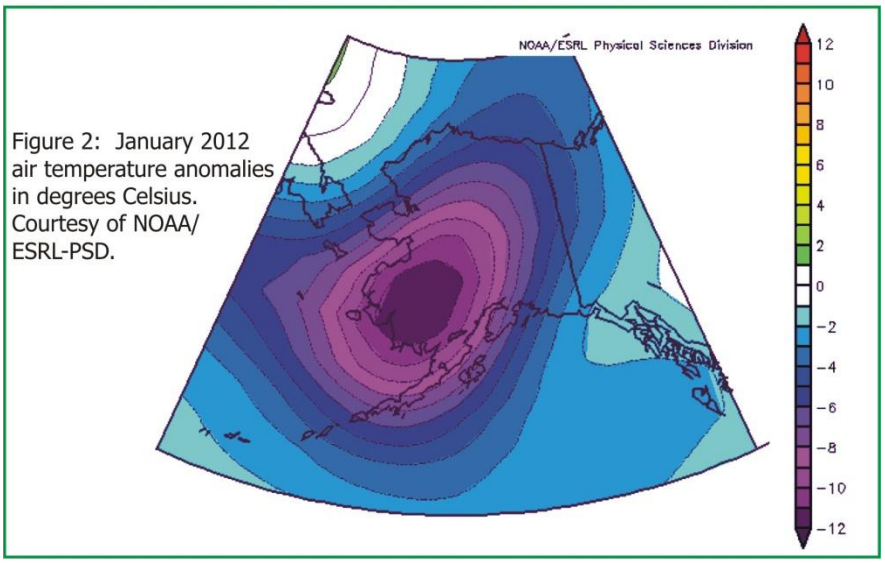


Figure 2: January 2012 air temperature anomalies in degrees Celsius. Courtesy of NOAA/ ESRL-PSD.

The largest temperature anomalies, as seen in Figure 2, were centered in the southwest but stretched to the southern tip of the Alaska Peninsula and to the central Interior and Seward Peninsula.

This January's cold temperatures are similar to January 1989 when temperatures were especially cold in the western half of the state. Some additional noteworthy cold Januarys occurred in 1973 and 1971 (the late 60's and early 70's were an extended cold period in general) during which a number of records were set. January 1973 had a very similar temperature anomaly pattern as this past January, while January 1971 differed in that the anomaly was centered in the eastern Interior, although the magnitude of the anomalies were all similar.

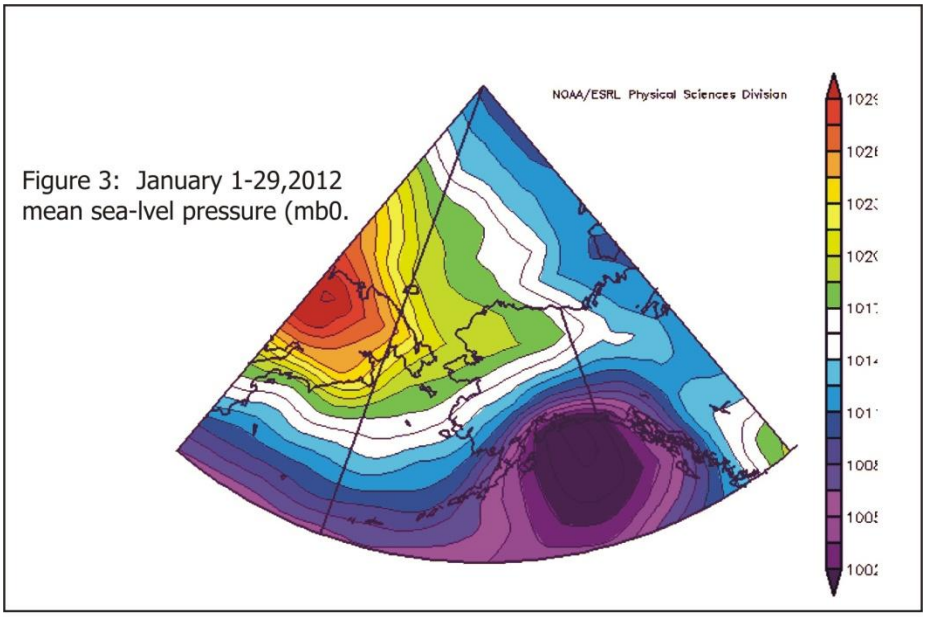
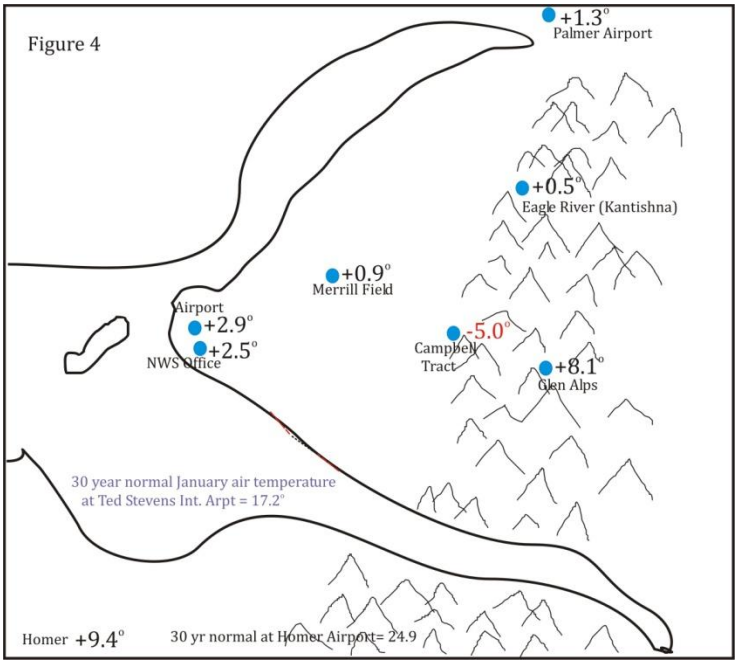


Figure 3: January 1-29,2012 mean sea-lvel pressure (mb0.

A review of this past January's weather shows that there was no one dominant weather pattern throughout the month. For the first 11 days a series of low pressure centers moved through the Chukchi Sea-Bering Strait region and allowed cold air to move from the Arctic into the southern Bering region and western Alaska. In the eastern Gulf of Alaska a number of storms moved into Prince William Sound, generating copious snow along the north gulf coast. From the 12th through the 23rd high pressure persisted over the Bering Sea and Far East Siberia (Figure 3).

This ridge of high pressure moved to the west during the last week of the month but the general flow pattern remained unchanged. The net result of these various patterns was the transport of cold air from the Arctic into the state via the northwest.



Southcentral had its share of cold weather; Figure 4 shows the monthly mean temperatures around Anchorage. A modest windstorm on the 11th generated the warmest temperatures around Cook Inlet; Anchorage reached 39°, Palmer 42°, and Kenai 33°. The coldest temperatures in the greater Anchorage area were **-31°** at North Fork Trail in Eagle River, **-15°** at the airport and **-25°** at Campbell Creek Science Center- all on the morning of the 28th. It is also apparent that the temperatures vary considerably across the region: locations near Cook Inlet tend to be warmer than those a few miles inland. Monthly precipitation in Anchorage was slightly above normal (1.31”), with 25” of snowfall at the NWS office. Figure 5 shows this past January’s mean temperature in comparison with select Januarys. Due to the significant variation of air temperatures across Anchorage, it is important to note that prior to 1954 the senor was located at various locations in the downtown area, at Merrill Field, and initially in Ship Creek. These areas are generally colder than at the current airport site, hence a historical analysis prior to 1954 is difficult. Nevertheless, this January ranks high on the list of cold months. We are in the midst of a La Nina winter; is there any connection between cold air temperatures and La Nina conditions? It is not surprising that

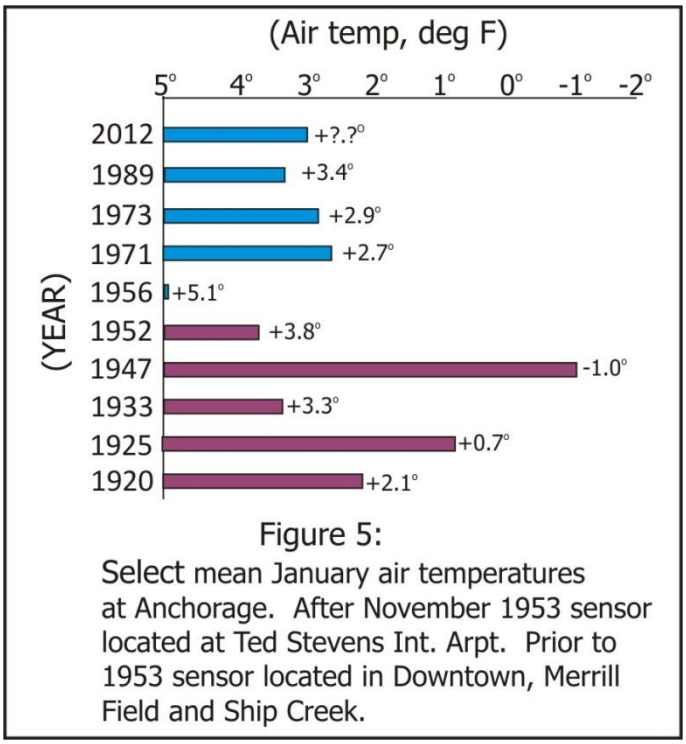


Figure 5:
Select mean January air temperatures at Anchorage. After November 1953 sensor located at Ted Stevens Int. Arpt. Prior to 1953 sensor located in Downtown, Merrill Field and Ship Creek.

this recent cold period occurred during a La Nina as the historical data from around the state indicates that there is some connection- however the presence of a La Nina does not guarantee colder winters in Alaska due to other weather/climate drivers. Last winter was also a La Nina winter and air temperatures around the state were on the cool side but the magnitude was nowhere like the current cold period. Those of us in the climate business still have a considerable amount to learn about climate in the Great Land.

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