

2009-2010 November through March Climate Summary

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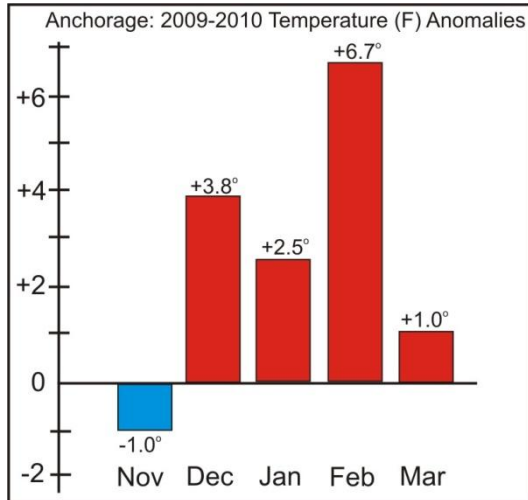
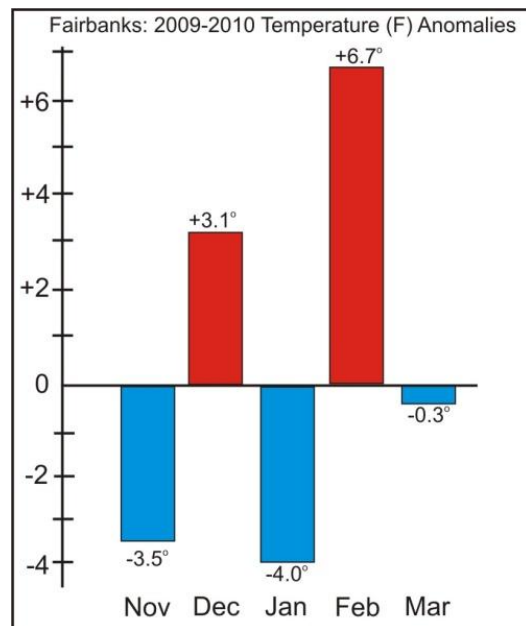


Figure 1 displays the monthly temperature anomalies (long-term average minus observed temperatures) for Anchorage International Airport. It is clear that it was a warm winter especially during the core months of Dec-Jan-Feb. This is not too surprising since this was an El Nino winter. In general the storm track shifted east from its climatological position just south of the central Aleutians which resulted in a higher number of storms moving into the Gulf of Alaska compared to 'normal'. Rain and snow (precipitation) amounts were highly variable from one locale to the next; Anchorage for example had 4.14" which is very close to a normal of 4.21" for those five

months. Snowfall totaled to 60.5" slightly above the 56.6" average. Kodiak City was warm and wet (131% of normal) while Valdez had some months with above normal precipitation and other months well below normal. The general lesson to be learned is that a warmer winter in the interior of Southcentral does not guarantee more snow and rain each month even though the general trend is for increased storminess. Along the coast there is a better chance that enhanced south flow will produce more rain and snow than normal.

Outside of Anchorage it was generally warmer than normal from the Alaska Range eastward with mixed anomalies from month-to-month in the Interior and west as seen by the chart of Fairbanks temperature anomalies. It was also very dry across the Interior as illustrated by Fairbanks airport which received 0.91" of precipitation which is only 35% of normal. With the eastward shift in the storm track the greater Bering Sea region was colder than normal (especially in March) as the area experienced an increase in air moving out of the Arctic. By late March record southward sea ice extent occurred from 170W to Bristol Bay. One of the most notable temperature anomalies (-13.9°) occurred on Saint Paul Island during March when the island was surrounded by sea ice. In addition, precipitation was 41% of normal as cold air from the north is considerably drier than air from the North Pacific. Lessons learned from this past and older El Nino's: the greater Gulf of Alaska region tends to be warmer



than normal while the central and western Bering is colder than normal. In the Interior and northwest part of the state the temperature signal is mixed from month-to-month. In terms of precipitation the Gulf of Alaska is often wetter than normal but there is considerable spatial variation as well. For the mainland south of the Alaska Range precipitation totals tend to be mixed, some well above or below normal. In general the Interior tends to be drier than normal while the Northwest is near normal.

Year	Anomaly
1997-1998	+3.3
2002-2003	+8.0
2004-2005	+4.8
2006-2007	-3.7
2009-2010	+2.8

As noted the shift in the storm track frequently occurs during El Nino winters; so how does this past winter matchup with the last several El Nino Winters? The previous El Nino occurred during the winter of 2006-2007 although by February the warmer than normal water temperatures in the eastern tropical Pacific had returned to normal indicating a conclusion of the event. In Anchorage the Nov-Mar average temperature anomaly was -3.7° , this was an outlier event for Southcentral which is clearly seen in Table 1. Older events however have typically above normal temperatures, in some cases as in 2002-2003 and 1976-1977 ($+8.7^{\circ}$) well above normal.

What does the historical record indicate occurs in the April-May-June time period after or during a weakening El Nino? If we use data from Anchorage Int. Airport from the past five El Nino's the temperature anomalies are: April: $+2.5^{\circ}$, May: $+1.0^{\circ}$, and June: $+0.7^{\circ}$. In other words there is a high probability that April will be warmer than normal in Southcentral but the impact of the warmer tropical waters in the Eastern Pacific and the associated changes in the atmosphere diminish as we move into summer. This assessment agrees with the Climate Prediction Center's forecast which they derive using various statistical and computer models, of above normal temperatures for this period.