



## NOAA, NATIONAL WEATHER SERVICE, WEATHER FORECAST OFFICE

Miami, Florida 33165

---

## Chilly February Caps Coldest Winter in Three Decades over South Florida

A colder-than-normal February wrapped up the coldest winter since the early 1980s over south Florida. Almost all main weather reporting sites recorded the coldest December-February average temperature since 1981, except for Miami International Airport which recorded its coldest average winter temperature since 1986. December to February temperatures ended up about 2 to 3 degrees below normal, which is remarkable considering that December was 2 to 3 degrees **above** normal. These values resulted in the following all-time recorded rankings: Miami Beach recorded its 2<sup>nd</sup> coldest winter on record; Naples recorded its 6<sup>th</sup> coldest winter on record; Moore Haven its 8<sup>th</sup> coldest and West Palm Beach its 10<sup>th</sup> coldest winter on record.

The extended periods of cold temperatures in January and February resulted in average temperatures during that two-month period of 4 to 5 degrees below normal. This resulted in all four main climate stations recording among the top 10 coldest January-February temperatures on record. Miami Beach set a record for its all-time coldest January-February on record (previous record set in 1958). In West Palm Beach, it was the 2<sup>nd</sup> coldest January-February on record; Naples recorded its 3<sup>rd</sup> coldest January-February, Moore Haven its 3<sup>rd</sup> coldest, Fort Lauderdale its 8<sup>th</sup> coldest and Miami its 10<sup>th</sup> coldest January-February average temperature on record. Only in the winters of 1940, 1958, 1977 and 1981 did January-February average temperatures come close to what was observed in 2010. The coldest period observed this winter was between January 2<sup>nd</sup> and January 13<sup>th</sup> when south Florida experienced one of its coldest 12-day periods on record ([read more about this exceptional cold episode here](#)).

Why was it so cool this winter compared to normal? The main contributing factor was a rather persistent low pressure area in the middle and upper levels of the atmosphere centered over eastern Canada and the northeast United States. A trough associated with this low extended down across much of the southeastern U.S., including Florida. This pattern was most noticeable in January and February (Figure 1). The result of this upper level pattern was a number of strong cold fronts moving south from the upper Midwest all the way through Florida. Air masses of Canadian and Arctic origin followed these fronts, plunging temperatures to much below normal levels for rather extended periods of time.

What about El Niño and its expected role in the cool and wet winter? El Niño indeed has made its presence felt, primarily in the way of several low pressure systems, or “storms”, moving across Florida from the Gulf of Mexico. This provided most of south Florida with higher than normal winter rainfall, along with a few episodes of very heavy rain and strong thunderstorms. During most moderate to strong El Niño episodes, intense cold outbreaks are not common due to the prevailing influence of the Pacific subtropical jet stream which keeps Canadian and Arctic air masses from penetrating too far south. However, an atmospheric circulation known as the North Atlantic Oscillation (NAO) was the dominant feature during large portions of the winter. During the negative phase of the NAO which predominated this winter, the polar jet stream, which generally determines the primary winter storm track, dipped farther south than normal into the central and eastern United States. This more southern storm track brought increased precipitation and snowfall to areas not typically accustomed to seeing a lot of snow, as well as driving cold air masses from the northern latitudes farther south into Florida and the subtropics.

Here are average December 2009-February 2010 temperatures, departures from normal and ranking for select locations:

<b>Location (beginning of period of historical record)</b>	<b>Dec 2009–Feb 2010 Avg Temp</b>	<b>Departure From Normal</b>	<b>Rank</b>
Miami (1895)	67.21	-2.8	34 <sup>th</sup> coldest
Fort Lauderdale (1912)	66.47	-1.9	15 <sup>th</sup> coldest
West Palm Beach (1888)	64.1	-3.2	10 <sup>th</sup> coldest
Naples (1942)	63.08	-2.2	6 <sup>th</sup> coldest
Miami Beach (1927)	65.17	-5.6	2 <sup>nd</sup> coldest (tied)
Moore Haven (1918)	60.38	-3.3	8 <sup>th</sup> coldest

## Precipitation

Winter precipitation was above average over most south Florida locations. Most areas received about 2 to 4 inches above normal rainfall for the December to February period, with isolated areas in southeast Florida receiving in excess of 6 inches above normal (Figure 2). The above normal winter rainfall is typical of moderate to strong El Niño episodes in which south Florida is impacted by more storminess and moisture-laden frontal systems. Two rain events punctuated this pattern; the December 17<sup>th</sup> floods in southeast Broward and northeast Miami-Dade counties in which 8 to 14 inches of rain were observed; and the February 1<sup>st</sup> event when 6 to 8 inches of rain fell over metro southwestern Broward County including Cooper City, Pembroke Pines, Southwest Ranches and Weston. Both of these rain events were caused by warm fronts moving north across the area and ahead of mid to upper atmospheric low pressure systems.

Following are December 2009-February 2010 rainfall totals, departure from normal in inches and ranking for selected locations:

<b>Location (beginning of period of historical record)</b>	<b>Dec 2009-Feb 2010 Rainfall</b>	<b>Departure From Normal</b>	<b>Rank</b>
Miami (1855)	8.59	+2.46	21 <sup>st</sup> wettest
Fort Lauderdale (1912)	15.32	+7.03	6 <sup>th</sup> wettest
West Palm Beach (1888)	13.80	+4.36	12 <sup>th</sup> wettest
Naples (1942)	6.66	+0.95	22 <sup>nd</sup> wettest
Miami Beach (1927)	13.53	+6.97	3rd wettest
Moore Haven (1918)	6.12	+0.39	27 <sup>th</sup> wettest
The Redland (1942)	12.74	+6.80	
Clewiston (1948)	5.88	-0.03	
Hollywood (1963)	26.95	+18.82	

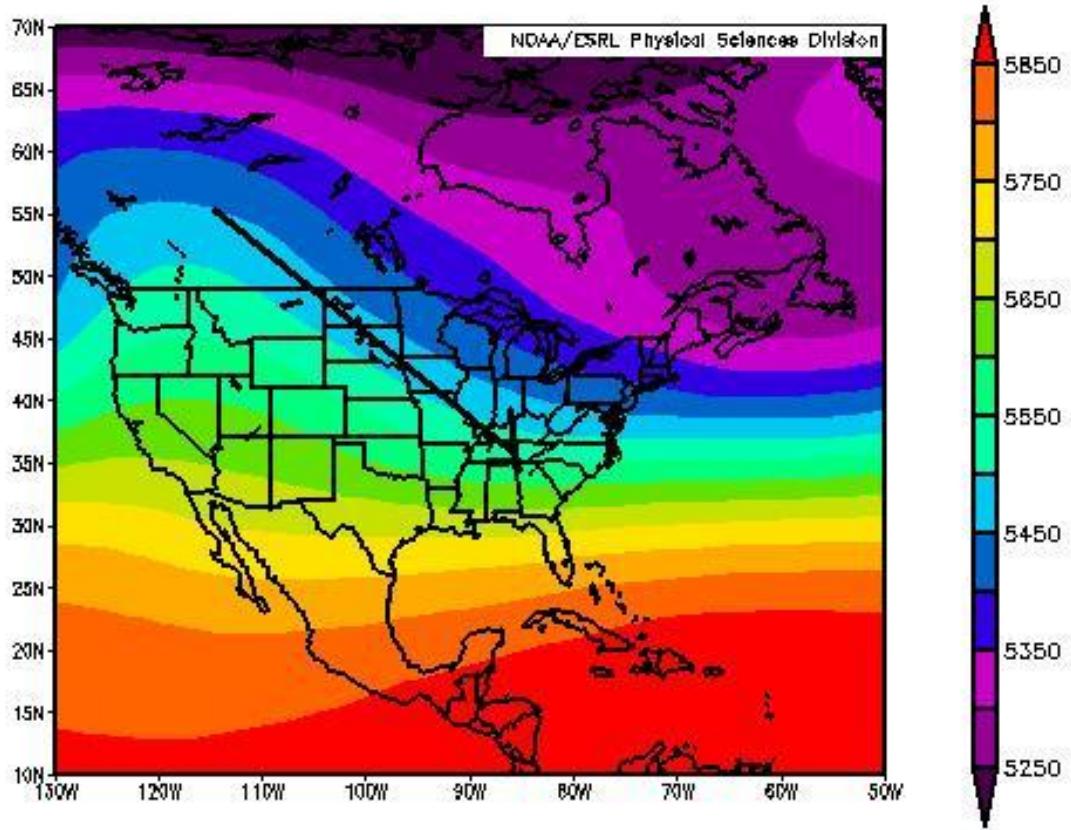
## **Outlook for March-May**

The [Climate Prediction Center's outlook](#) for March through May calls for a continuation of cooler and wetter than normal conditions as El Niño continues to influence weather patterns across the Western Hemisphere. March in particular looks to be cooler than normal due to the expected persistence of this winter's pattern of northwest flow over the eastern United States described earlier and noted in Figure 1 below.

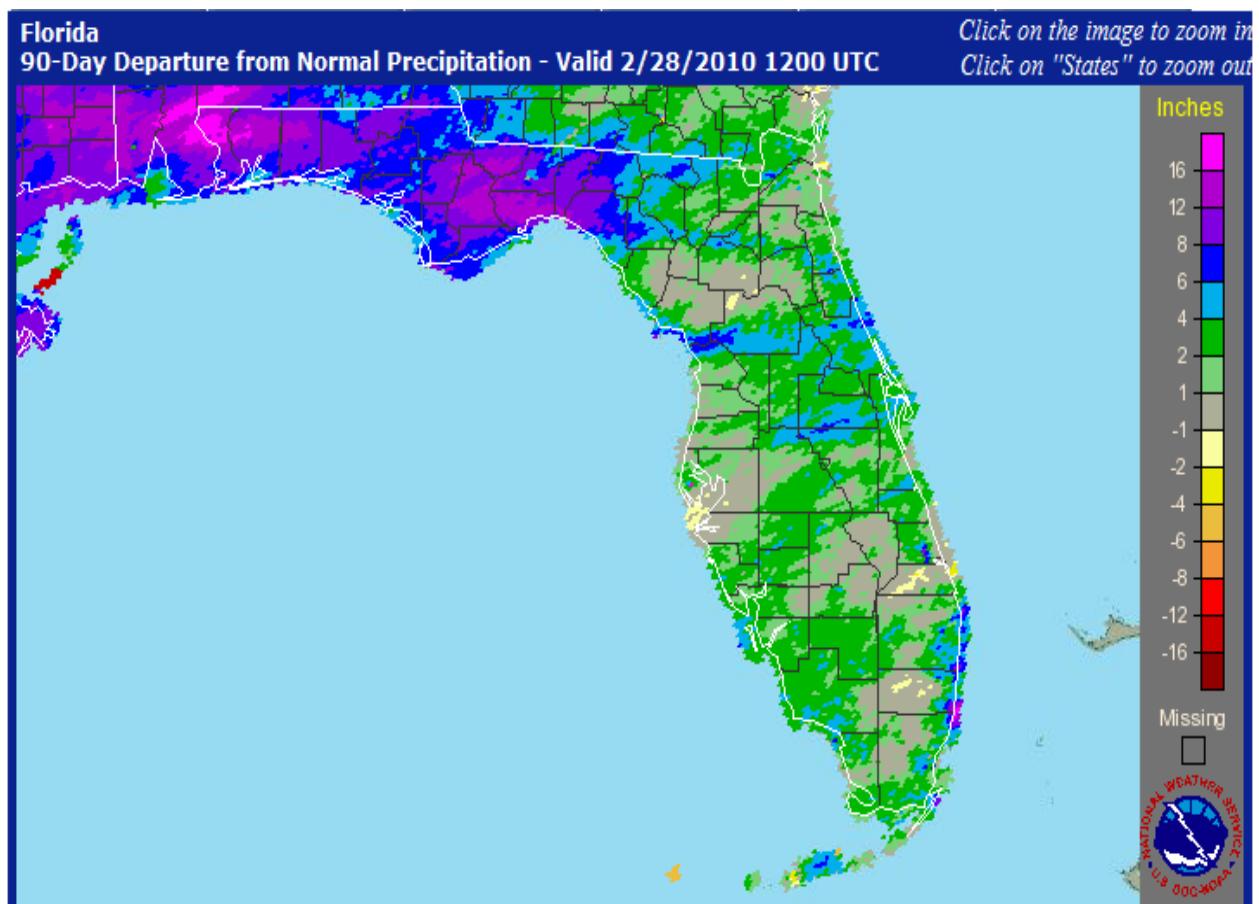
Additional Gulf of Mexico storm systems could impact Florida during this period, primarily during March and April, with the potential to produce severe weather, including tornadoes, as was the case during the El Niño episodes of 1998 and 2003.

Long-range models suggest that the current El Niño will weaken significantly by May and dissipate to neutral conditions this summer.

For the latest south Florida weather information, including the latest watches, advisories and warnings, please visit the National Weather Service Miami Forecast Office's web site at [weather.gov/southflorida](http://weather.gov/southflorida).



**Figure 1:** Mean 500 mb (mid atmospheric) pattern during January and February 2010. Ridge over western U.S. and trough over eastern Canada and central and eastern United States produced mean northwest flow over much of the eastern half of the country (black arrow) This pattern favors cold air intrusions deep into the southern U.S., including Florida.



**Figure 2:** Rainfall departure from normal from Dec 2009 to Feb 2010. Green and light blue denotes areas of 2 to 8 inches above normal. Gray denotes areas of near normal rainfall.