THE
ATMOSPHERIC RESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

"An Extremely Mild Winter"

By Mark D. Schneider

North Dakota's recent trend of unprecedented, record-breaking weather continues as warm and dry conditions have taken residence here. On January 31st of last year, Williston had already received 75.0 inches of snow; this year only 8.0 inches had fallen. Of other significance is the 5.9 inches of snowfall in Bismarck, which ranks as the lowest "season-to-date" snowfall total going all the way back to 1886!

Snowfall in Inches

City	January 31, 2012	January 31, 2011	Normal (1981-2010)
Bismarck	5.9	52.8	29.4
Fargo	11.9	59.2	31.0
Grand Forks	13.7	41.7	28.4
Williston	8.0	75.0	28.4

Data courtesy of NWS Bismarck and Fargo-Grand Forks

The National Weather Service (NWS) offices in Bismarck and Fargo-Grand Forks have preliminary temperature and precipitation data compiled for September 1, 2011 through January 31, 2012. This data has been compared to previous station data from this period, with staggering results. The average daily high temperatures during this time period for five major reporting stations all rank in the top four when compared to their historical data. The average temperatures and rankings for Bismarck, Dickinson, Jamestown, Minot, and Williston are shown in the following table.

Highest Average Daily Temperature Ranking

City	Temperature (°F)	2011-12 Ranking
Bismarck	37.1	3rd
Dickinson	37.3	4th
Jamestown	36.5	2nd
Minot	37.7	1st
Williston	36.5	2nd

Data courtesy of NWS Bismarck

So what happened to the La Nina weather pattern that was supposed to bring an increased chance of above normal precipitation and below normal temperatures to North Dakota this season? A weak to moderate strength La Nina has been present, but other large-scale influences such as the Arctic Oscillation (AO) have played a role in keeping colder air and the overall storm track to the north of our state this season. The AO is an index that measures sea-level pressure variations between the mid-latitudes and the polar regions. Air moves from high to low pressure, so when the AO is positive (like it was this season), low pressure generally favors the polar regions. A west to east "zonal" flow of the jet stream results from this scenario, which keeps cold, arctic air well north of our state. A negative AO sets up high pressure in the polar regions and typically ushers cold air southeastward into North Dakota.

Without substantial snow cover in southern Canada this season, arctic air masses have been able to moderate (warm) as they move over bare ground. Snow cover prevents the sun's radiation from being absorbed at the earth's surface by reflecting it. The opposite is true this season, where arctic air has been repeatedly modified by a sun that was all but non-existent during last season's cloudy, snowy winter.

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