Northern Exposure Fall 2009

National Weather Service
Grand Forks, ND

IN THIS ISSUE

The Funnels of September 11th	1-2
Warm September	3-4
The Return of El Niño	5

The Funnels of September 11th

by Adnan Akyuz and Greg Gust

Residents in the Fargo-Moorhead area experienced a very unique weather situation on the afternoon of Friday, September 11, 2009. Developing rain showers produced several weak and relatively short lived funnel clouds just north of the community which were quite visible to residents from West Fargo, across north Fargo, and even north Moorhead, mainly between the hours of 2:30 and 3:30 pm. Based on the proximity of these funnels, the emergency sirens were sounded in portions of Fargo and Moorhead which caused quite a stir within the community.

In some cases, sirens sounded just as school children were being dismissed, and children were already in their school busses. The situation seemed chaotic at first as some school children were called out of their busses and back into their school buildings where they sought shelter and safety. Parents also made calls to schools to assure themselves that their children were safe. Overall residents responded well to the sirens by checking the skies, seeking shelter, and checking with local media sources for more information.

But some question why the sirens sounded at all when there was apparently no Tornado Warning issued by the National Weather Service. First of all, it's important to note that the emergency management (EM) community's decision to activate the Fargo/Moorhead area's sirens was justified because funnel clouds were observed near town, and people should know to respond appropriately even without a corresponding warning from the NWS. It's also important that we educate ourselves to recognize that funnels are made in a variety of ways, and not all funnels become damaging tornadoes.

On that afternoon, meteorologists at the National Weather Service (NWS) Forecast Office in Grand Forks were monitoring what appeared to be benign rain showers when Fargo/Moorhead based SkyWarn Spotters began reporting what were described as short-lived funnels with little rotation. The NWS did issue a Significant Weather Advisory at 2:35 pm for the Fargo/Moorhead area to help explain the situation, and this advisory activated an Emergency Alert System (EAS) message

The funnel cloud viewed from I-94 a few miles north of Fargo.

which scrolled across community TV screens and was broadcast on several local radio stations including the NOAA Weather Radio system. However, the lack of what many believe are normal severe weather cues: hot and humid air, the lateness of the season, or the lack of any active severe weather Watch or Warning, led to many people's unawareness of the NWS's information and guidance. Awareness is half the battle when it comes to emergency preparedness and it's important that we remember to engage all our senses when the ominous cloud approaches, the flood waters start rising, or the sirens start to sound.

Remember, a funnel cloud is a rotating cloud formation near the base of a developing cumuliform cloud, often a cumulonimbus or thunderstorm cloud. A tornado is a funnel cloud which extends all the way to the ground and often produces extremely damaging winds. The funnels which formed on September 11th were the result of a particular weakly forced scenario that rarely results in tornadoes and is still quite difficult for the NWS to monitor.

On September 11th, a large-scale upper level low pressure center was moving across north central North Dakota. This type of upper level low pressure center is usually associated with cooler air aloft, overcast skies, and rain showers. Geographical locations near enough to the low pressure's center can sometimes experience what have been coined "cold-air funnels." Cold-air funnels are distinct from the funnels we usually associate with severe thunderstorms, and this type of funnel often happens with mere rain showers in the cool air behind a cold front.

Cold-air funnels have two main differences from the typical severe-weather type funnels. First their small rotation size within the parent cloud makes it very difficult for our conventional weather radar to "see" it. Meteorologists at the Grand Forks NWS were unable to get any clear indication of rotation using the Mayville based radar. Second cold-air funnels are in a typically more stable and near-surface weather environment thus they rarely become tornadoes, and if so rarely produce significant damage. While all funnels tend to be short lived, cold-air funnels are usually the most short lived due to the lack of low level atmospheric forcing.

One of the funnels on September 11th became particularly ominous as it appeared to descend very near to the surface (see picture) even though no touchdown was observed, and no damage was produced. Public safety is the number one priority when it comes to our emergency management and weather forecasting community. Local EM staff made the right decision to activate the sirens that day despite the lack of an official warning from the NWS, and many in the community made the right decision to stay out of harm's way.

"Listen! The wind is rising, and the air is wild with leaves,
We have had our summer evenings, now for October eves!"
~Humbert Wolfe (English Italian poet)

Warm September

by Geoffrey Grochocinski and Mark Ewens

The summer of 2009 was such a cool summer across the Northern Plains that many folks did not even consider it a summer. While late season warmth helped both the mood and some area crops, it simply did not make up for the unseasonal chill. Our cool summer was the result of higher than average atmospheric pressure near the North Pole. These higher pressures caused the cold summer air, normally located well north, to be displaced southward into the United States.

Not only do we look at the surface weather, but meteorologists look to the upper atmosphere to help diagnose and predict the weather. A common starting point is the "middle" of the stratosphere or about 18,500 feet above sea level. This is commonly referred to as the 500 millibar (500 mb) level. Typically when the atmospheric pressure is higher than normal to a great height above the ground, the weather below the high is dry and warm. However, the majority of 2009 summer was witness to lower than normal pressure in much of the atmosphere over the United States as a result of those higher pressures near the North Pole.

During most of September, the pattern dramatically reversed itself. Atmospheric pressure near the North Pole decreased, and the pressure near the Manitoba/Ontario border and much of North America rose significantly (Fig. 1). The result was the much warmer weather. Another layer lower in the atmosphere that meteorologists look at is 925 mb, which is much closer to sea level pressure. Lower atmospheric pressure is often associated with cooler wetter weather, while higher pressure often produces warmer weather. The average 925 mb pressure (Fig. 2) shows a trough of lower pressure near the eastern side of the Rocky Mountains; this resulted in a predominance of south to south-

southwest winds which usually produce warmer weather in our region.

It was so warm that the Grand Forks International Airport broke its September record with a monthly average temperature of 64.2 degrees which blew away the previous record of 62.6 degrees set in September 1948. September 2009 also became the second warmest September on record for Fargo at 65.1 degrees. Fargo's September record still stands at 65.6 degrees in 1897.

Grand Forks and Fargo had 14 and 13 days of 80 degrees or warmer in September, respectively. Grand Forks racked up more days of 80 degrees or warmer in September than any of its summer months (August (8), July (13), June (12)). Fargo's 13 80 degree days or warmer was more than it had in August (10) or June (10) but only slightly less than July (15).

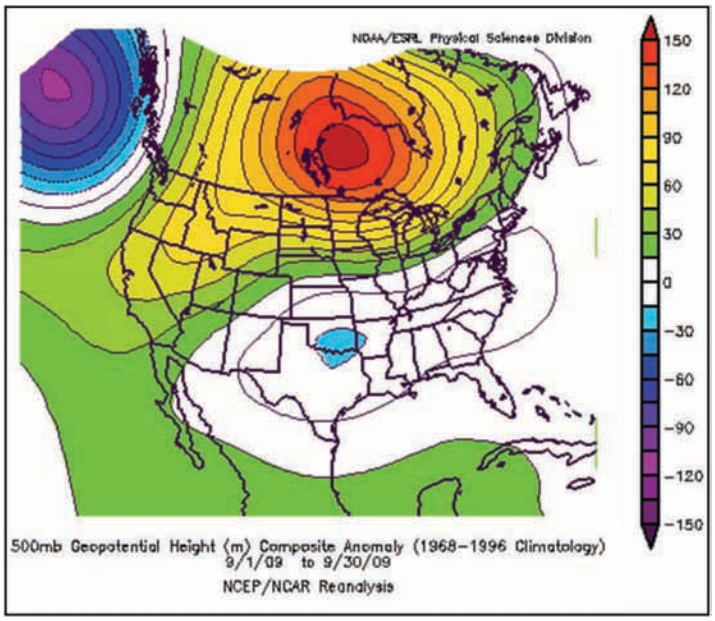


Fig. 1: A depiction of the mean 500 millibar (the middle atmosphere) height pattern over North America during September, 2009. Notice the higher height (and thus higher pressure) anomaly centered over Canada.

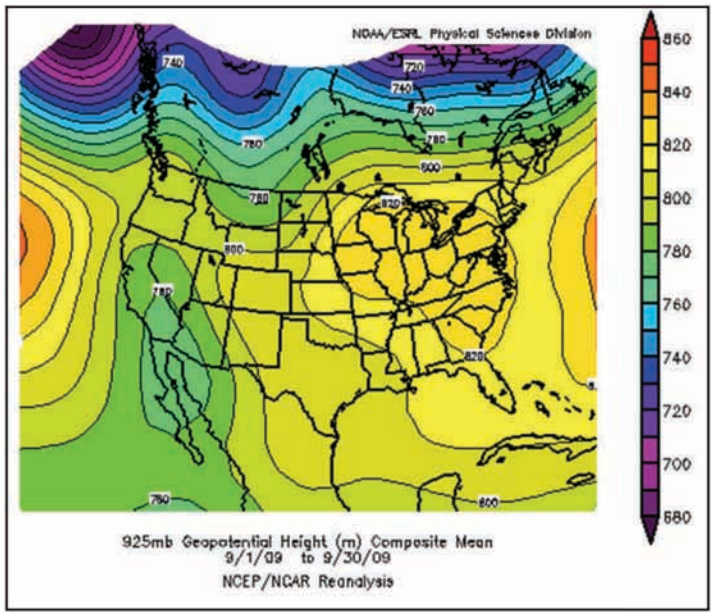


Fig. 2: A depiction of the mean 925 millibar (in the lower atmosphere) height pattern over North America during September of 2009. Notice the trough of low pressure along the eastern side of the northern Rocky Mountains, which implies September's predominance for warm southwesterly flow at the surface of the Northern Plains.

"I prefer winter and fall, when you feel the bone structure of the landscape—the loneliness of it, the dead feeling of winter. Something waits beneath it, the whole story doesn't show."
~Andrew Wyeth (American painter)

The Return of El Niño

by Lanae Preuss

The National Oceanic and Atmospheric Organization (NOAA) announced in July that El Niño had returned and is expected to stay around for the 2009/2010 winter. This name gets thrown around the news when it appears, so what is it exactly? El Niño is a warm sea surface temperature anomaly in the central Pacific Ocean around the equator, and it's direct opposite is the La Niña, which is a cold sea surface temperature anomaly in the same area. These two anomalies alternate back and forth, and the cycle lasts between 2-7 years. This whole cycle is called ENSO (El Niño/ Southern Oscillation), and it is always in effect. Periods can be marked by definite El Niño or La Niña conditions at various strengths and durations but are separated by periods of near neutral conditions with no clear leaning to one or the other. What NOAA detected in July is that the waters off the western coast of South America are anomalously warm. This indicates that the next several months, including this winter, will likely be marked by El Niño conditions.

As a consequence of this sea surface temperatures anomaly, weather is affected all over the world. So what does this usually mean for us? El Niño's are associated with warmer winters in the northern part of the United States. The jet stream tends to be orientated farther south and in a more west to east pattern (basically more flat). The opposite is associated during La Niña winters with the jet stream farther north and with greater swerving to the north and south, allowing the northern U.S. to be much colder.

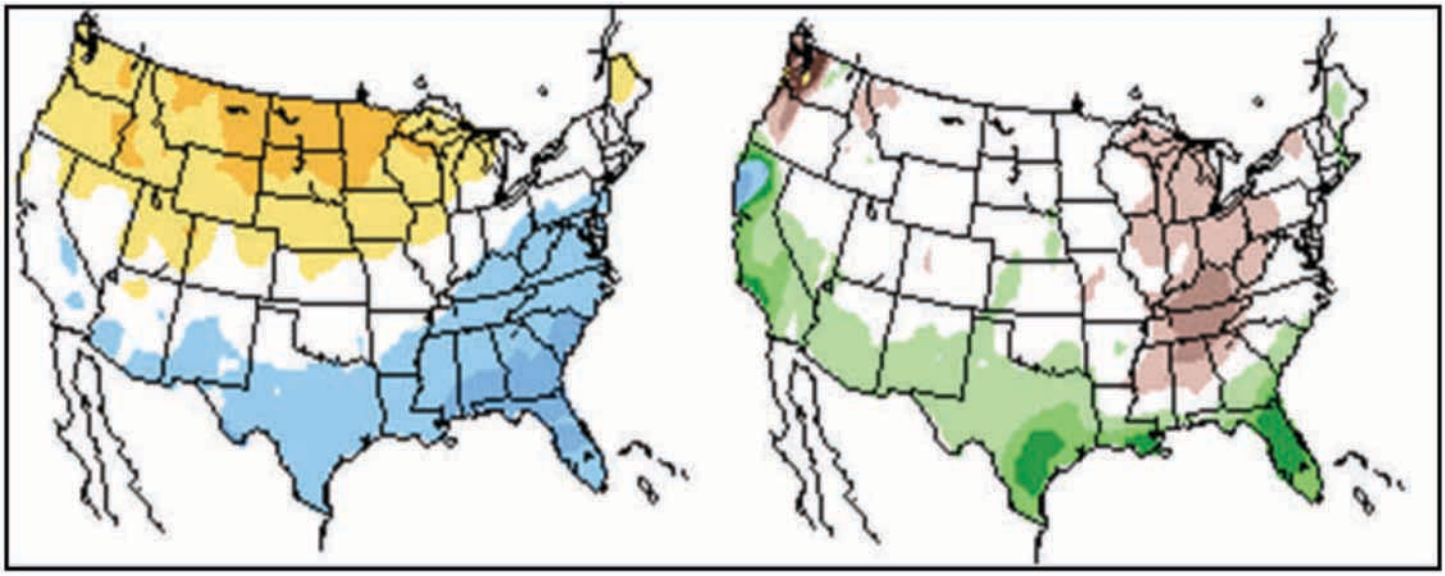


Fig. 1: Typical departure from normal temperature (left) and precipitation (right) during an El Niño winter. The southern United States is often colder and wetter, while the Northern Plains and Upper Midwest are often warmer and drier.

"Dull November brings the blast, then the leaves are blowing fast."
~Sara Coleridge (English author)

We need your weather stories and pictures!

Want a chance at sharing your weather story or picture in future newsletters?

If you are interested, then please send your weather story/picture(s) to Geoffrey Grochocinski at the Grand Forks, ND National Weather Service by email or mail:

Geoffrey.Grochocinski@noaa.gov

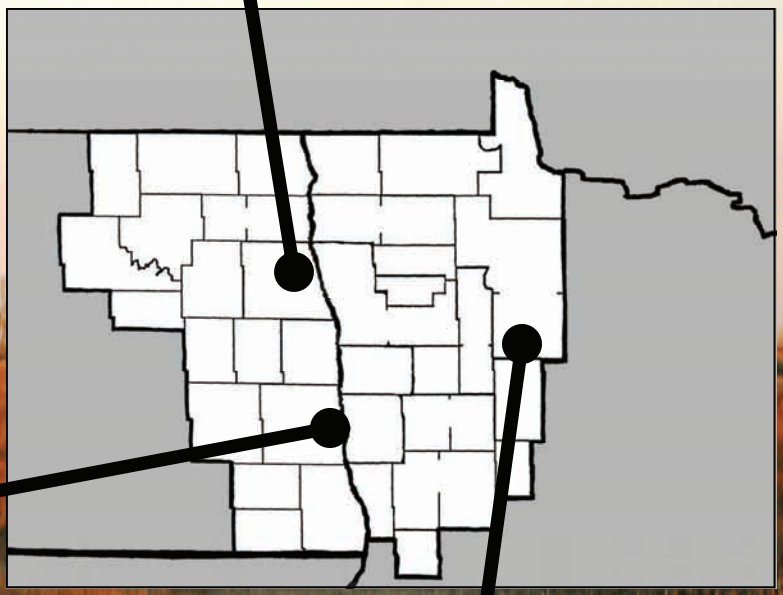
or

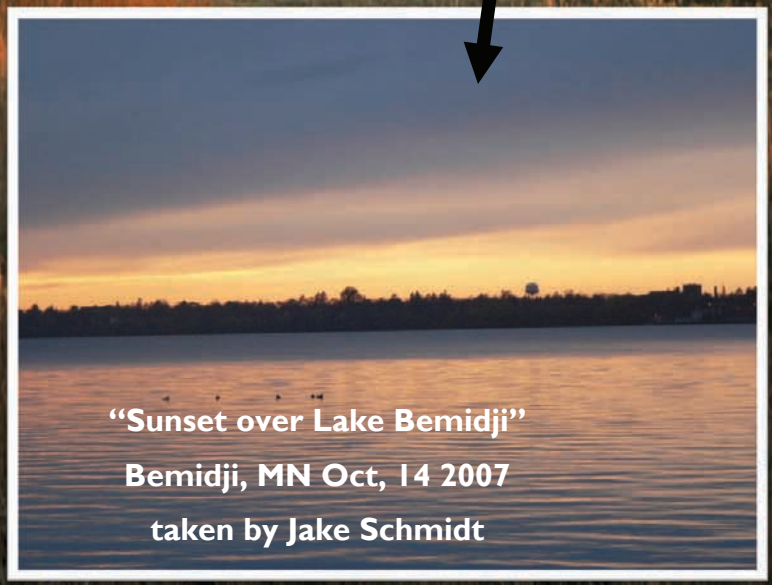
National Weather Service
4797 Technology Circle
Grand Forks, ND 58203

- **Greater preference will be given to story/photo(s) originating within our county warning area of eastern ND and the northwestern quarter of MN.**
- **Please be as detailed as possible (provide a title, the name of the author/photographer, where, when, and so forth).**
- **If your story or photo does not fit the theme of the next newsletter (Spring, for instance), do not despair! It will be saved for the next appropriately themed Northern Exposure.**

"Autumn Prairie Gloom"
Kelly Slough National Wildlife Refuge in North Dakota
Oct 9, 2005
taken by Crystal Ann

"Fargo Holiday Parade"
Fargo, ND Fall 2008
taken by Dean





"Sunset over Lake Bemidji"
Bemidji, MN Oct, 14 2007
taken by Jake Schmidt

The Grand Forks NWS Staff

MIC (Meteorologist in Charge)	Mark Frazier
SOO (Science Operations Officer)	Bradley Bramer
WCM (Warning Coordinator Meteorologist)	Greg Gust
ESA (Electronic Systems Analyst)	Michael Lukasz
DAPM (Data Acquisition Program Manager)	Mark Ewens
SH (Service Hydrologist)	Michael Lukes
ITO (Information Technology Officer)	Richard Hozak
ASA (Administrative Support Assistant)	Jeannette Ringuette
Lead Forecaster	Nancy Godon
Lead Forecaster	Dan Riddle
Lead Forecaster	Al Voelker
Lead Forecaster	David Kellenbenz
Lead Forecaster	Tommy Grafenauer
Forecaster	Vince Godon
Forecaster	John Hoppes
Forecaster	Peter Rogers
Forecaster	Peter Speicher
Intern Meteorologist	Geoffrey Grochocinski
Intern Meteorologist	Bradley Hopkins
Intern Meteorologist	Jim Kaiser
Hydrometeorological Technician	William Barrett
Electronic Technician	Ed Schulz
Electronic Technician	David Masterson
SCEP	Amanda Homann
SCEP	Vanessa Pearce

Feel free to make suggestions to Editor Geoffrey Grochocinski
Geoffrey.Grochocinski@noaa.gov

Lone Tree in the Middle of the Field
Near Larimore, ND October 29, 2008
taken by D. Bjorn

National Weather Service
4797 Technology Circle
Grand Forks, ND 58203
(701) 772-0720
http://www.crh.noaa.gov/fgf/