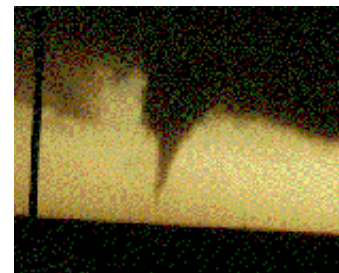




The West Texas

TWISTER



Winter 2001

NATIONAL WEATHER SERVICE FORECAST OFFICE LUBBOCK TEXAS

Winter Precipitation Type Forecasting

by Tim Tinsley, Senior Forecaster

There were two significant winter storms that affected the South Plains, the Southern Panhandle, and Rolling Plains during the winter of 2000-2001. The impact from each storm resulted from the amount of precipitation and the spectrum of wintry precipitation which occurred.

The first storm occurred around the Christmas holiday from December 25th to the 27th yielding some of the heaviest snowfall amounts over the region since 1983. The precipitation initially began as freezing rain on the 25th and changed to a mixture of freezing rain, sleet, and snow during the early morning hours of the 26th. This mixture changed over to all snow around daybreak of the 26th. With power lines and poles down due to the amount of snow (8 to 12 inches on average) and ice (one to three quarters of an inch thick), this winter storm produced around one million dollars in damage and crippled travel in the region.

The second storm occurred January 27th-28th, 2001. This storm produced more ice as heavy freezing rain occurred during the morning and afternoon of the



The photo above shows about 1/2 inch of ice accumulations on barbed wire outside the NWS office in Lubbock. Photo taken on January 29th.

27th. Ice accumulation of 1/2 to 1 inch was widespread across the region. The precipitation changed over to snow with 1 to 3 inches over most of the area except for near 8 inches in the southwest Panhandle. The property damage from this storm was estimated at one quarter of a million dollars. (continued on page 2)

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Winter Precipitation Type Forecasting

(continued from page 1)

The forecasts for each storm proved difficult in determining precipitation amounts and types. The amount of wintry precipitation and the type of precipitation involves several factors. The amount of precipitation is dictated by the size and movement of the precipitating clouds which determine the duration of precipitation. The area of precipitating clouds is dependant on the track of the upper level storm system and the amount of moisture transported into the system.

The determination of precipitation type involves knowledge of the temperature profile through the atmosphere and the properties involved in ice and snow formation within the clouds. With each of the storms discussed above, a shallow cold airmass invaded the region as the upper level storm system approached from the west. A layer of warm and moist air that was above freezing was drawn over the shallow cold airmass which was below freezing. Precipitation in the form of snow fell into the layer of air above freezing and changed to rain. The layer of below freezing air at the surface was not of sufficient depth or strength to change the rain back to ice or snow. The rain instantly froze as exposed surfaces were below freezing. Once the upper level storm system moved closer to the region and changed the temperature profile to below freezing through the depth of the cloud layer, the precipitation changed to snow.

There are occasions when freezing rain or drizzle occurs with temperatures in the teens while snow will occur with temperatures slightly above freezing. The temperature and moisture profiles through the depth of the atmosphere, not just at the surface, determine what the type of wintry precipitation will be.

New Wind Chill Index Formula Implemented

by Ed Calianese, WCM

The latest advances in science, technology, and computer modeling have resulted in the development of a significantly improved wind chill index formula. The wind chill index can be thought of as an *equivalent* temperature – it's the temperature that the combination of cold temperatures and wind would equivalently feel like on a colder but calm day. It is based on the fact that wind causes the body to cool more quickly because it takes heat away at a faster pace. For instance, a temperature of 5 degrees that occurs in combination with a 30 mph wind would result in a wind chill index of minus 19 and therefore would have the *equivalent* cooling effects on the body that a temperature of 19



Wind Chill Chart



		Temperature (°F)																	
		40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	Cal/m	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Times 30 minutes 10 minutes 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

(continued from page 2 - **New Wind Chill Index**)

below zero would have on a day with no wind. In comparison, those same conditions would produce a wind chill index of minus 40 degrees with the old formula!

The new wind chill index formula will include several significant differences as compared to the old. The new formula takes into account a wind speed that is at the average height of a human's face, which is about five feet above the ground. The old formula used a wind speed obtained from a standard weather observation, which includes a wind measurement at the 33-foot level. The new formula uses modern heat-transfer theory to account for the heat loss in the human body. This theory was clinically tested on the faces of several men and women in a chilled wind tunnel this past summer. In the experiment, researchers measured the chilling effects on the faces in varying combinations of cold and wind and this information was used to devise the new formula. The previous formula was based on experiments that took place in Antarctica in the 1940's. These experiments noted the change in temperature of containers filled with water in varying cold and wind conditions and used that information to approximate the cooling effects on the human body.

The National Weather Service implemented the new formula across the nation on November 1st and it will therefore be used for the first time this winter. As the previous example indicates, the new formula will produce wind chill indices that sound less drastic than they did in the past but the new indices will be more useful as they are more scientifically driven. The new formula also provides a specific danger level for frostbite that was not possible with the previous formula (see the wind chill table for critical frostbite times).



Road Conditions



- ◆ **Texas DOT** Phone 1 800 452-9292
<http://www.dot.state.tx.us/hcr/main.htm>
- ◆ **New Mexico DOT** Phone 1 800 432-4269
<http://www.nmshtd.state.nm.us/>
- ◆ **Oklahoma DOT** Phone 1 405 425-2385
<http://www.dps.state.ok.us/cgi-bin/weathermap.cgi>
- ◆ **Colorado DOT** Phone 1 303 639-1111
<http://www.cotrip.org>



NATIONAL WEATHER SERVICE

Lubbock, Texas

Forecasts



Telephone 806-745-4260

NOAA Weather Radio 162.40 MHz

Web Site www.srh.noaa.gov/lub

...Co-op News...

By Johnny S. Wallace, DAFM

Some changes have occurred in our Coop-Observers. In late July we were finally able to reopen the Coop Station at Muleshoe, Texas. We would like to take this opportunity to welcome the new observer for Muleshoe. The data for Muleshoe had been missing for some time and it is really good to have the data flowing from there again. Our long time observer in Guthrie has made it official and retired. With help from our retiring observer we were able to find a replacement observer for Guthrie. The station was relocated in one day without any loss of data. And with that said we would like to welcome the new Guthrie observer to our ranks. In contrast to the easy change in Guthrie, our observer in Paducah has had to give up the duties due to demands of jobs and family. We are still trying to find a new observer for the City of Paducah. The data from there is already being missed. Paducah experienced a severe thunderstorm on the 20th of September and if the observer hadn't still been gathering data it would have been difficult to even get a rainfall total in order to issue warnings for possible flash flooding. Another loss... Our rainfall observer at 10 miles south of Paducah has had to relocate for a new job and the data from there will also be missed. Our staff is working on a replacement observer for both of these areas.

Length of Service Awards were presented to our Coop-Observers at 15 miles south of Paducah and 15 miles west of Benjamin. Again, I would like to thank them for their continued service to their community, the National Weather Service, and their country. Other Length of Service Awards are due to be given out over the next few months.

Another Fiscal Year has ended. Our Coop-Weather Observer Program works on a fiscal year's worth of data. National Weather Service Southern Region Headquarters has issued the numbers on Coop-Station visits and repairs for the past year and I want to take this time to brag on my co-workers for another job well done. The Lubbock Weather Office completed another year well above the NATIONAL AVERAGE in visits, data flow, reports and repairs in our 24 county area. These numbers are only possible due to the dedication of our staff and some of the best Coop-Observers in the country. These are people that were pulling together before the tragic events of September 11th and I have no doubt will continue to do so, no matter what. Again, thanks from all of us for another job well done.



The NWS has initiated a new program to help communities prepare themselves to handle hazardous weather. The program is called **StormReady** and consists of a series of steps that will help the community respond to tornadoes, floods, winter storms, etc. Larger cities need to accomplish many steps to be StormReady. However, medium and smaller towns with fewer resources do not need to do quite as much to be given StormReady status.

Any community that earns StormReady certification will be part of a press briefing and media event to announce their accomplishment. Also, the NWS will supply two StormReady road signs that the community can use to proudly show off their accomplishments. If you are interested, please contact Ed Calianese at 806-745-3916 ext. 223 for more details.

Fast Fact

Most house fires occur during the winter. Christmas is a particularly dangerous time because of the use of many electrical decorations which quickly dry out Christmas trees. An increased use of transportable floor, space, or gas heaters also adds to the fire danger. Be sure to provide plenty of ventilation, especially when using indoor gas heaters, to avoid asphyxiation.

NWS Winter Weather Product Suite

Our office will likely issue a number of winter weather products this winter for the South Plains, extreme southern Texas Panhandle and the Low Rolling Plains. Here's a summary of the conditions that we expect when we issue each of these products:

Winter Weather Outlook - significant winter weather is possible in the next 36 to 72 hours. The timing, precise track, and forecast intensity of the storm may be uncertain and thus specific details may still be undetermined. There is a high enough likelihood of adverse winter weather to highlight the potential event.

Winter Storm Watch - significant and potentially dangerous winter weather is possible in the next 12 to 36 hours. Heavy snow of 4 inches or more; or ice accumulations of 1/4 of an inch or more; or sleet accumulations of 1/2 of an inch or more expected.

Winter Storm Warning - significant and potentially dangerous winter weather is expected in the next 24 hours. Conditions could lead to injuries or loss of life. Snow, ice and sleet accumulations are the same as those for the winter storm watch. If only one element is expected then the warning may be issued as an event specific warning such as "Ice Storm Warning" or "Heavy Snow Warning".

Blizzard Warning - the combination of heavy snow and strong wind will result in blindingly low visibilities and dangerously low wind chills during the next 24 hours.

Winter Weather Advisory - a combination of snow amounts of 3 inches or less and light accumulations of ice or sleet will result in hazardous conditions in the next 24 hours. The event is more of an inconvenience than a danger if precautions are taken.

Snow Advisory - snowfall amounts of 1 to 3 inches will occur in the next 24 hours.

Wind Chill Advisory - wind chill values generally colder than minus 15 degrees F are expected (this criterion will likely be modified sometime this winter to accommodate the new wind chill index formula).



A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. People can become trapped at home, without utilities or other services.

Home	Weather Data	Climate Data	Aviation	Weather Safety
Our Office	Skywarn	Fire Weather	Weather Radio	



National Weather Service

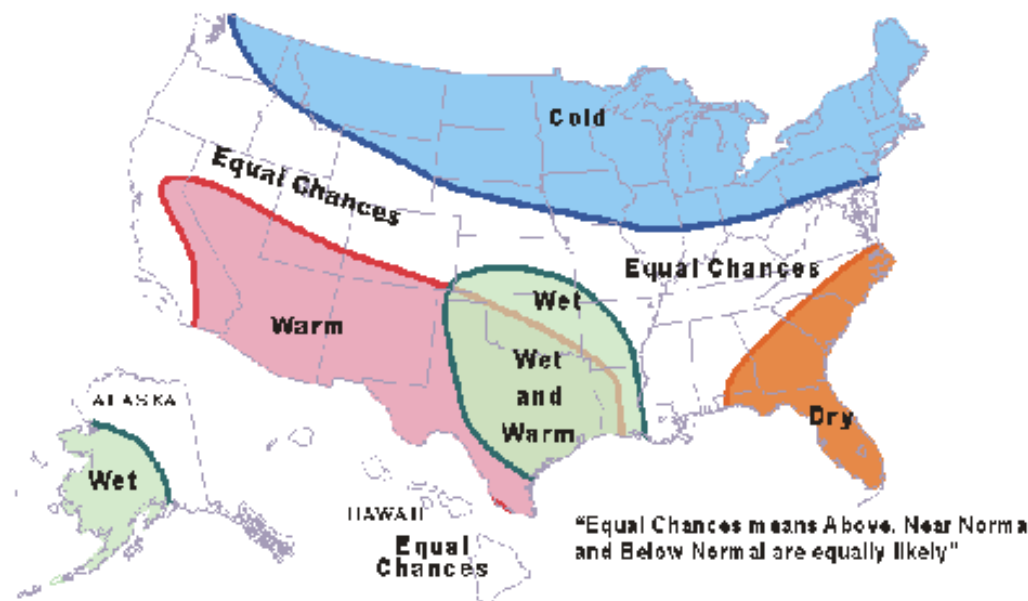


In This Issue...

Winter Precipitation Type Forecasting, New Wind Chill Formula and Chart, Winter Weather Outlook, Coop News, Road Condition Phone Numbers and Web Sites and more...



WINTER OUTLOOK
Temperature and Precipitation
Compared to 1971-2000 Normals



National Weather Service

Ph. (806) 745-4260

Editor
Anthony Cavallucci

Contributing Authors
Ed Calianese
Johnny Wallace
Tim Tinsley

Sea surface temperatures in the eastern tropical Pacific continue near normal and should remain so through the upcoming winter. These conditions are similar to what occurred last winter, which indicates that the long-term weather this winter will again be dominated by neither an El Nino (warmer than normal Pacific ocean waters) nor a La Nina (cooler than normal Pacific ocean waters). These conditions are technically called ENSO neutral conditions. Without the dominating and typically moderating effects of El Nino or La Nina, the door is open for a highly variable winter season again this year. For the South Plains area, the odds of experiencing an overall warmer and wetter than normal winter are better than those of experiencing a cooler and drier than normal winter.