

# 2014 Calendar

A photograph of a snowy landscape. In the foreground, a barbed wire fence runs across the frame, supported by wooden posts. The ground is covered in a thick layer of snow, with long shadows cast across it. In the background, there are several bare trees and a clear blue sky. The overall scene is peaceful and wintry.

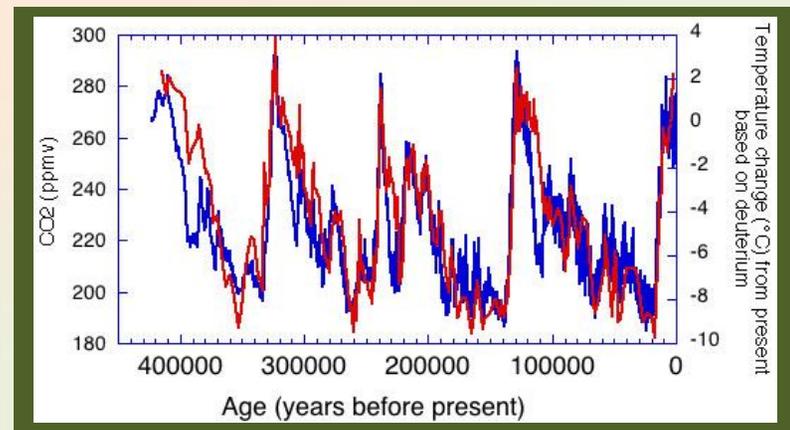
Near Tulia, Texas  
February 25, 2013

*The National Weather Service in Lubbock, Texas*

Photo courtesy of  
Kristina Alexander

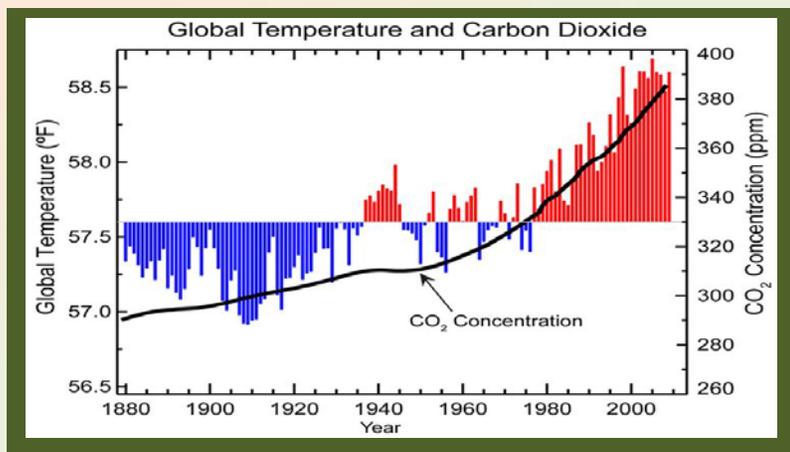
# A perspective on a warming planet

## Temperature and carbon dioxide change



CO2 levels in red – global temperature in blue. Note the strong correlation during past interglacial periods.

“The atmospheric concentrations of carbon dioxide (CO<sub>2</sub>), methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. CO<sub>2</sub> concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification.” Intergovernmental Panel on Climate Change, Fifth Assessment Report, Summary for Policy makers, September 2013



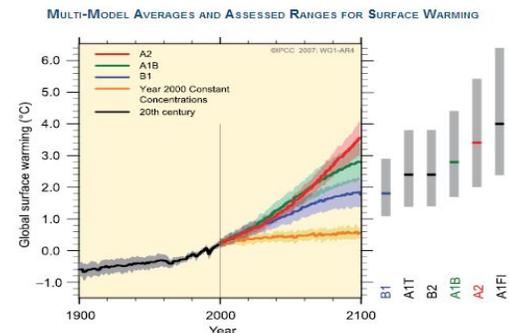
CO2 trend line in black, compared with the mid-20th century average global temperature around 57.6 degrees. Blue bars show cooler than average years - red bars warmer than average.

One of the more remarkable aspects of past climate records is the correlation between global temperatures and carbon dioxide (CO<sub>2</sub>) levels through interglacial periods of the past several hundred thousand years. When CO<sub>2</sub> levels have increased, temperatures warmed. And as CO<sub>2</sub> levels dropped, temperatures cooled. This has been shown through the study of ice cores extracted from the ice sheets. Charting CO<sub>2</sub> with temperature since 1880, however, indicates less precise correlation in year-to-year or even decade-to-decade time periods. There is great variability in short-term climate.



In addition to CO<sub>2</sub>, other important greenhouse gases also include water vapor, methane, and nitrous oxide. Greenhouse gases act to trap heat in the lower atmosphere, keeping the Earth warm and habitable. However, in May 2013, atmospheric CO<sub>2</sub> measurements at the Mauna Loa Recording Station reached 400 parts per million (ppm) for the first time. The highest CO<sub>2</sub> levels from ancient ice cores have been near 300 ppm. The precipitous CO<sub>2</sub> rise has prompted the Intergovernmental Panel on Climate Change (IPCC) to state it is extremely likely human influence is the dominant cause of the warming trend since the mid-20<sup>th</sup> century.

Where are CO<sub>2</sub> levels and temperatures heading in our future climate? Projecting CO<sub>2</sub> has proven very difficult as it greatly depends on worldwide human activities. Thus far, CO<sub>2</sub> has increased **above** the highest expected levels with no diminishing trend indicated. The IPCC has projected warming several degrees above current levels by 2100, based on a scenario of modest CO<sub>2</sub> increases. Each IPCC scenario indicates warming through 2100, including the scenario that holds year 2000 CO<sub>2</sub> concentrations constant.



The IPCC scenarios projecting warmer global temperatures through 2100.

More evidence of the warming, its consequences, and the greenhouse effect, are topics for later.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
 Follow us on twitter at: <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/NWSLubbock</a>		 Follow us on facebook at: <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/US.NationalWeatherService.Lubbock.gov</a>	<b>1</b> Normals: 53/26 0.02 76-1997/-2-1919 Lubbock Records sr 752 am - sunrise ss 551 pm - sunset New Year's Day  New Moon	<b>2</b> 53/26 0.02 77-2009/-2-1979 sr 752 am ss 551 pm Quadrantids Meteor Shower (Jan 2-3)	<b>3</b> 53/26 0.01 83-2006/-2-1947 sr 752 am ss 552 pm	<b>4</b> 53/26 0.02 76-1918/-9-1947 sr 752 am ss 553 pm  Last Quarter
<b>5</b> 53/26 0.02 82-1927/-4-1971 sr 752 am ss 554 pm	<b>6</b> 53/26 0.02 79-1927/0-1971 sr 753 am ss 555 pm	<b>7</b> 53/26 0.02 80-2006/6-1968 sr 753 am ss 555 pm  First Quarter	<b>8</b> 53/26 0.02 82-1969/3-1967 sr 753 am ss 556 pm	<b>9</b> 53/26 0.02 79-2002/2-1920 sr 753 am ss 557 pm	<b>10</b> 53/26 0.01 76-1928/-10-1930 sr 752 am ss 558 pm	<b>11</b> 54/26 0.02 76-1911/-7-1918 sr 752 am ss 559 pm
<b>12</b> 54/26 0.02 77-1953/-10-1918 sr 752 am ss 600 pm	<b>13</b> 54/26 0.02 79-1957/-16-1963 sr 752 am ss 601 pm	<b>14</b> 54/26 0.01 82-1928/3-1963 sr 752 am ss 602 pm	<b>15</b> 54/26 0.02 80-1911/4-1963 sr 752 am ss 602 pm  Full Moon	<b>16</b> 54/26 0.02 80-1974/6-1930 sr 751am ss 603 pm	<b>17</b> 54/26 0.02 87-1914/-2-1930 sr 751 am ss 604 pm	<b>18</b> 54/26 0.03 79-1914/-5-1930 sr 751 am ss 605 pm
<b>19</b> 54/26 0.02 80-2000/0-1963 sr 751 am ss 606 pm	<b>20</b> 54/27 0.02 78-1986/7-1940 sr 750 am ss 607 pm Martin Luther King Jr. Day (Observed)	<b>21</b> 55/27 0.02 81-1950/-4-1918 sr 750 am ss 608 pm	<b>22</b> 55/27 0.02 79-2009/-6-1918 sr 749 am ss 609 pm	<b>23</b> 55/27 0.03 83-1972/3-1983 sr 749 am ss 610 pm	<b>24</b> 55/27 0.02 83-1970/-1-1915 sr 748 am ss 611 pm  Last Quarter	<b>25</b> 55/27 0.03 79-1952/7-1940 sr 748 am ss 612 pm
<b>26</b> 55/27 0.02 78-1975/7-1966 sr 747 am ss 613 pm	<b>27</b> 55/27 0.03 78-1970/5-1925 sr 747 am ss 614 pm	<b>28</b> 55/27 0.02 80-2003/8-1948 sr 746 am ss 615 pm	<b>29</b> 56/27 0.03 80-1911/1-1948 sr 746 am ss 616 pm	<b>30</b> 56/27 0.02 80-1967/6-1951 sr 745 am ss 617 pm  New Moon	<b>31</b> 56/28 0.03 84-1911/2-1985 sr 744 am ss 618 pm	NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES: Lubbock 162.400 Dimmitt 162.500 Plainview 162.450 Childress 162.525 Dickens 162.500

# Aviation Services

The NWS in Lubbock issues aviation forecasts for Lubbock Preston Smith International and Childress Municipal Airports. These forecasts are created at least four times per day and are specifically tailored to the needs of aviation users.

While Lubbock typically enjoys visual flying weather 90%-95% of the time, it is that remaining 5%-10% which is especially critical for aviation. From fuel planning to the requirement to file an alternate destination, our forecasts support the safety of private and commercial aviation in West Texas.

In addition to issuing aviation forecasts, like the one seen below, the NWS in Lubbock also maintains the Automated Surface Observation Station (ASOS) equipment at the Lubbock and Childress airports. ASOS provides continuous monitoring of near-surface weather conditions.

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KLBB 161129Z 1612/1712 21015KT P6SM FEW070 BKN150  
FMI61600 24030G40KT 4SM BLDU SKC  
FMI70000 24015KT P6SM SKC
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KCDS 161129Z 1612/1712 18014KT P6SM FEW080 BKN150  
FMI61700 24026G36KT P6SM SKC  
FMI70000 22013KT P6SM SKC
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Final approach into Lubbock



We strive to help prevent this!



Automated Surface Observation System

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
 <p>Follow us on facebook at: <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/US.NationalWeatherService.Lubbock.gov</a></p>				<p>NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:</p> <p>Lubbock 162.400 Dimmitt 162.500 Plainview 162.450 Childress 162.525 Dickens 162.500</p>		<p><b>1</b> Normals: <b>56/28 0.03</b> 83-1963 / -7-1951 Lubbock Records sr 744 am - sunrise ss 619 pm - sunset</p>
<p><b>2</b> <b>56/28 0.02</b> 80-2003 / -4-1951</p> <p>sr 743 am ss 620 pm</p> <p>Groundhog Day</p>	<p><b>3</b> <b>56/28 0.03</b> 80-1934 / 4-1972</p> <p>sr 742 am ss 621 pm</p>	<p><b>4</b> <b>57/28 0.02</b> 82-1925 / 3-1989</p> <p>sr 741 am ss 622 pm</p>	<p><b>5</b> <b>57/28 0.03</b> 81-1937 / 3-1982</p> <p>sr 741 am ss 623 pm</p>	<p><b>6</b> <b>57/28 0.02</b> 80-2009 / 4-1956</p> <p>sr 740 am ss 624 pm</p>  <p>First Quarter</p>	<p><b>7</b> <b>57/29 0.03</b> 84-1918 / -3-1933</p> <p>sr 739 am ss 625 pm</p>	<p><b>8</b> <b>57/29 0.03</b> 83-1951 / -17-1933 (all-time)</p> <p>sr 738 am ss 626 pm</p>
<p><b>9</b> <b>58/29 0.03</b> 83-1976 / 0-1933</p> <p>sr 737 am ss 627 pm</p>	<p><b>10</b> <b>58/29 0.03</b> 84-1962 / 1-1929</p> <p>sr 736 am ss 627 pm</p>	<p><b>11</b> <b>58/29 0.03</b> 85-1962 / 6-1981</p> <p>sr 735 am ss 628 pm</p>	<p><b>12</b> <b>58/29 0.02</b> 86-1962 / 9-1958</p> <p>sr 734 am ss 629 pm</p>	<p><b>13</b> <b>59/30 0.03</b> 81-1979 / 7-1963</p> <p>sr 734 am ss 630 pm</p>	<p><b>14</b> <b>59/30 0.03</b> 87-1979 / 12-2004</p> <p>sr 733 am ss 631 pm</p> <p>Valentine's Day</p>  <p>Full Moon</p>	<p><b>15</b> <b>59/30 0.02</b> 83-1945 / 8-1951</p> <p>sr 732 am ss 632 pm</p>
<p><b>16</b> <b>59/30 0.03</b> 85-2011 / 13-1979</p> <p>sr 730 am ss 633 pm</p>	<p><b>17</b> <b>59/31 0.03</b> 85-1970 / 0-1978</p> <p>sr 729 am ss 634 pm</p> <p>Presidents' Day</p>	<p><b>18</b> <b>60/31 0.02</b> 83-1996 / -2-1978</p> <p>sr 728 am ss 635 pm</p>	<p><b>19</b> <b>60/31 0.03</b> 83-1986 / 2-1978</p> <p>sr 727 am ss 636 pm</p>	<p><b>20</b> <b>60/31 0.03</b> 82-1996 / 4-1918</p> <p>sr 726 am ss 637 pm</p>	<p><b>21</b> <b>60/31 0.02</b> 84-1996 / 6-1964</p> <p>sr 725 am ss 637 pm</p>	<p><b>22</b> <b>61/32 0.03</b> 87-1996 / 12-1911</p> <p>sr 724 am ss 638 pm</p>  <p>Last Quarter</p>
<p><b>23</b> <b>61/32 0.02</b> 85-2009 / 9-1914</p> <p>sr 723 am ss 639 pm</p>	<p><b>24</b> <b>61/32 0.03</b> 89-1918 / 1-1960</p> <p>sr 722 am ss 640 pm</p>	<p><b>25</b> <b>61/32 0.02</b> 86-1989 / -8-1960</p> <p>sr 721 am ss 641 pm</p>	<p><b>26</b> <b>62/33 0.03</b> 85-1918 / 8-1935</p> <p>sr 719 am ss 642 pm</p>	<p><b>27</b> <b>62/33 0.03</b> 81-2006 / 10-1934</p> <p>sr 718 am ss 643 pm</p>	<p><b>28</b> <b>62/33 0.03</b> 89-2006 / 7-1962</p> <p>sr 717 am ss 643 pm</p>	 <p>Follow us on twitter at: <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/NWSLubbock</a></p>

3. Persistent cloud cover often prevents strong winds from mixing down to the surface, and can significantly reduce the extent of blowing dust.

2. Strong cold fronts may also result in blowing dust, especially along their leading edge.

5. Land use plays a large role in the availability of source dust. Here in northwest Texas, agriculture on the South Plains makes this region more favorable for blowing dust than the Rolling Plains.

6. The color of blowing dust will vary depending on the source. Occasionally, dust from White Sands National Monument can be seen on the South Plains.

4. A "Haboob" is a very specific kind of dust storm, which results from thunderstorm winds. Haboobs can occur very quickly – often reducing visibilities to near zero in a matter of seconds.

1. Strong southwest winds (30+ mph) in the springtime are very common, which is a big reason why early spring is the "prime time" for blowing dust in western Texas.

3  
New Mexico

2

5

6

1

4

Texas

# Anatomy of a Dust Storm

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Image Landsat

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SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
 Follow us on facebook at: <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/US.NationalWeatherService.Lubbock.gov</a>		 Follow us on twitter at: <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/NWSLubbock</a>		NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:  <b>Lubbock</b> 162.400 <b>Dimmitt</b> 162.500 <b>Plainview</b> 162.450 <b>Childress</b> 162.525 <b>Dickens</b> 162.500		Normals: 63/33 0.03 89-2006/5-1922 Lubbock Records sr 716 am - sunrise ss 644 pm - sunset   New Moon
<b>2</b> 63/34 0.03 86-1974/-2-1922  sr 715 am ss 645 pm	<b>3</b> 63/34 0.03 88-2009/7-1943  sr 713 am ss 646 pm	<b>4</b> 63/34 0.03 89-2009/-1-1917  sr 712 am ss 647 pm	<b>5</b> 64/34 0.04 90-1916/11-1989  sr 711 am ss 648 pm Ash Wednesday	<b>6</b> 64/35 0.03 87-1934/10-1943  sr 710 am ss 648 pm	<b>7</b> 64/35 0.03 88-2006/11-1996  sr 708 am ss 649 pm	<b>8</b> 64/35 0.03 87-1918/12-1967  sr 707 am ss 650 pm First Quarter
<b>Severe Weather Awareness Week</b>						
<b>9</b> 65/35 0.04 88-1911/13-1969  sr 806 am ss 751 pm  Daylight Saving Time begins	<b>10</b> 65/36 0.03 88-1911/4-1948  sr 804 am ss 752 pm	<b>11</b> 65/36 0.03 95-1989/2-1948  sr 803 am ss 752 pm	<b>12</b> 66/36 0.04 94-1989/10-1948  sr 802 am ss 753 pm	<b>13</b> 66/36 0.03 91-1916/12-1950  sr 800 am ss 754 pm	<b>14</b> 66/37 0.04 86-1972/13-1954  sr 759 am ss 755 pm	<b>15</b> 66/37 0.03 88-2013/17-1947  sr 758 am ss 755 pm
<b>16</b> 67/37 0.04 87-1966/16-1923  sr 756 am ss 756 pm Full Moon	<b>17</b> 67/37 0.03 90-2011/18-1970  sr 755 am ss 757 pm St. Patrick's Day	<b>18</b> 67/37 0.04 88-1916/11-1923  sr 754 am ss 758 pm	<b>19</b> 68/38 0.04 87-1995/11-1923  sr 752 am ss 758 pm	<b>20</b> 68/38 0.03 90-1916/8-1965  sr 751 am ss 759 pm Spring Equinox (11:57 am)	<b>21</b> 68/38 0.04 93-1997/17-1983  sr 750 am ss 800 pm	<b>22</b> 68/38 0.04 86-1935/18-1952  sr 748 am ss 801 pm
<b>Flood Safety Awareness Week</b>						
<b>23</b> 69/39 0.04 84-2009/13-1952  sr 747 am ss 801 pm Last Quarter	<b>24</b> 69/39 0.04 88-1929/22-1965  sr 746 am ss 802 pm	<b>25</b> 69/39 0.04 90-1998/19-2013  sr 744 am ss 803 pm	<b>26</b> 70/40 0.04 88-1956/16-1965  sr 743 am ss 804 pm	<b>27</b> 70/40 0.04 94-1971/12-1931  sr 742 am ss 804 pm	<b>28</b> 70/40 0.04 90-1963/16-1931  sr 740 am ss 805 pm	<b>29</b> 70/40 0.04 91-2012/18-1944  sr 739 am ss 806 pm
<b>30</b> 71/41 0.03 91-2010/16-1987  sr 738 am ss 807 pm New Moon	<b>31</b> 71/41 0.04 95-1946/19-1931  sr 736 am ss 807 pm					

# NWS Cooperative Observer Program (COOP)



Lubbock NWS COOP observer Travis Smith (center) received the 50-year Edward H. Stoll Award for weather observing. Presenting the award are Lubbock Meteorologist in Charge (MIC) Justin Weaver (left) and Lubbock Senior Service Hydrologist John Lipe (right).

The National Weather Service (NWS) Cooperative Observer Program (COOP) is truly the nation's weather and climate observing network of, by, and for the people. The COOP was formally created in 1890 under the Organic Act. More than 11,000 volunteers take observations on farms, in urban and suburban areas, in National Parks, on seashores, and on mountain tops. The data are representative of the places people live, work, and play.

The NWS Lubbock COOP program has about 40 observers that collect valuable meteorological data every day, with dozens more that send in information when it rains, sleet or snows. These data are widely used by surrounding NWS offices, River Forecast Centers at Tulsa, OK, and Fort Worth, TX, and the National Climatic Data Center (NCDC).



Lubbock NWS COOP observer Emil Macha (right) received the 35-year Length of Service Award from Lubbock MIC Justin Weaver. Sadly, Mr. Macha passed away in late 2013.



**NWS Lubbock staff would like to express our genuine appreciation to the many COOP observers who provide these important services. Thank You!**



Lubbock NWS COOP observer Rex Harrison (right) received the 35-year Length of Service Award from Lubbock MIC Justin Weaver.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
 Follow us on facebook at:  <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/US.NationalWeatherService.Lubbock.gov</a>		<b>1</b> Normals: 71/41 0.04 96-1946/22-1948 Lubbock Records sr 735 am - sunrise ss 808 pm - sunset  April Fool's Day	<b>2</b> 72/41 0.04 92-2011/20-1936 sr 734 am ss 809 pm	<b>3</b> 72/42 0.04 94-2011/26-1975 sr 732 am ss 810 pm	<b>4</b> 72/42 0.04 92-1928/18-1920 sr 731 am ss 810 pm	<b>5</b> 72/42 0.04 92-2006/21-1917 sr 730 am ss 811 pm
<b>6</b> 73/43 0.04 96-1972/21-1936 sr 728 am ss 812 pm	<b>7</b> 73/43 0.04 93-1930/21-1936 sr 727 am ss 812 pm  	<b>8</b> 73/43 0.05 91-1930/23-1938 sr 726 am ss 813 pm	<b>9</b> 74/44 0.04 94-1939/23-1973 sr 725 am ss 814 pm	<b>10</b> 74/44 0.04 93-1972/22-2013 sr 723 am ss 815 pm	<b>11</b> 74/44 0.04 94-1972/25-1932 sr 722 am ss 815 pm	<b>12</b> 74/44 0.04 96-1972/22-1997 sr 721 am ss 816 pm
<b>13</b> 75/45 0.05 91-2006/26-1957 sr 719 am ss 817 pm	<b>14</b> 75/45 0.04 93-2006/27-1933 sr 718 am ss 818 pm	<b>15</b> 75/45 0.04 92-2006/25-1928 sr 717 am ss 818 pm   Full Moon Total Lunar Eclipse	<b>16</b> 76/46 0.05 100-1925/31-1947 sr 716 am ss 819 pm	<b>17</b> 76/46 0.05 94-2006/23-1921 sr 715 am ss 820 pm	<b>18</b> 76/47 0.04 96-1987/29-1953 sr 713 am ss 821 pm	<b>19</b> 76/47 0.05 92-2001/25-2013 sr 712 am ss 821 pm
<b>20</b> 77/47 0.05 93-1925/30-1933 sr 711 am sr 822 pm  Easter Sunday	<b>21</b> 77/48 0.04 98-1989/28-1918 sr 710 am ss 823 pm	<b>22</b> 77/48 0.06 100-1989/29-1927 sr 709 am ss 824 pm Earth Day   Last Quarter	<b>23</b> 78/48 0.05 97-1989/30-1928 sr 708 am ss 824 pm  Lynids Meteor Shower (Apr 22-23)	<b>24</b> 78/49 0.05 95-1996/25-2013 sr 706 am ss 825 pm	<b>25</b> 78/49 0.06 104-2012/35-1927 sr 705 am ss 826 pm	<b>26</b> 78/49 0.05 96-1943/29-1947 sr 704 am ss 827 pm
<b>27</b> 79/50 0.06 97-1996/27-1920 sr 703 am ss 828 pm	<b>28</b> 79/50 0.06 94-1992/35-1994 sr 702 am ss 828 pm	<b>29</b> 79/50 0.06 97-2011/31-1968 sr 701 am ss 829 pm   New Moon	<b>30</b> 80/51 0.06 94-2013/33-1918 sr 700 am ss 830 pm	NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:  Lubbock 162.400 Dimmitt 162.500 Plainview 162.450 Childress 162.525 Dickens 162.500		 Follow us on twitter at:  <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/NWSLubbock</a>

## Number of "observed" tornadoes - 1950 to 2013

<u>Parmer</u>	<u>Castro</u>	<u>Swisher</u>	<u>Briscoe</u>	<u>Hall</u>	<u>Childress</u>
Total 48 F3+ 3	Total 57 F3+ 1	Total 66 F3+ 5	Total 44 F3+ 3	Total 46 F3+ 2	Total 25 F3+ 0
<u>Bailey</u>	<u>Lamb</u>	<u>Hale</u>	<u>Floyd</u>	<u>Motley</u>	<u>Cottle</u>
Total 50 F3+ 2	Total 82 F3+ 7	Total 126 F3+ 3	Total 56 F3+ 3	Total 21 F3+ 2	Total 31 F3+ 1
<u>Cochran</u>	<u>Hockley</u>	<u>Lubbock</u>	<u>Crosby</u>	<u>Dickens</u>	<u>King</u>
Total 28 F3+ 1	Total 58 F3+ 6	Total 94 F3+ 3 F5 1	Total 52 F3+ 2	Total 32 F3+ 1	Total 19 F3+ 0
<u>Yoakum</u>	<u>Terry</u>	<u>Lynn</u>	<u>Garza</u>	<u>Kent</u>	<u>Stonewall</u>
Total 25 F3+ 0	Total 31 F3+ 0	Total 42 F3+ 1	Total 19 F3+ 0	Total 22 F3+ 0	Total 24 F3+ 0

## South Plains Tornado Trivia

### Longest Tracked Tornado:

- ▽ From NE of Muleshoe to NE of Pampa on April 17, 1970 = 130 miles
- ▽ Entire track in Lubbock NWS area: From NW of Levelland to NE of Muleshoe on June 17, 1980 = 45 miles

### Largest Tornado:

- ▽ May 28, 1980 – Tornado that tracked west of Tulia was estimated to be 2330 yards wide (1.3 miles wide)

### Strongest Tornado:

- ▽ May 11, 1970 - F5 tornado tracked through Lubbock and produced \$250 million in damage, killed 26 people, and injured 1500

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 Follow us on facebook at:  <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/US.NationalWeatherService.Lubbock.gov</a>		NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:  <b>Lubbock</b> 162.400 <b>Dimmitt</b> 162.500 <b>Plainview</b> 162.450 <b>Childress</b> 162.525 <b>Dickens</b> 162.500	 Follow us on twitter at:  <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/NWSLubbock</a>	<b>1</b> Normals: 80 / 51 0.05 96-2012 / 32-1970 Lubbock Records sr 659 am - sunrise ss 831 pm - sunset	<b>2</b> 80 / 51 0.06 97-2012 / 30-1967 sr 658 am ss 831 pm	<b>3</b> 80 / 52 0.05 98-2012 / 27-2013 sr 657 am ss 832 pm
<b>4</b> 81 / 52 0.06 104-1947 / 35-1935 sr 656 am ss 833 pm	<b>5</b> 81 / 52 0.05 99-2012 / 34-1953 sr 655 am ss 834 pm  Cinco De Mayo	<b>6</b> 81 / 53 0.06 99-2000 / 32-1917 sr 654 am ss 834 pm  	<b>7</b> 81 / 53 0.05 100-2009 / 29-1917 sr 653 am ss 835 pm	<b>8</b> 82 / 53 0.06 102-1989 / 31-1938 sr 652 am ss 836 pm	<b>9</b> 82 / 54 0.06 97-2011 / 38-1961 sr 652 am ss 837 pm	<b>10</b> 82 / 54 0.06 99-2000 / 33-1918 sr 651 am ss 837 pm
<b>11</b> 83 / 54 0.07 101-2000 / 37-1930 sr 650 am ss 838 pm  Mother's Day	<b>12</b> 83 / 55 0.06 98-1962 / 35-1960 sr 649 am ss 839 pm	<b>13</b> 83 / 55 0.08 100-2006 / 37-1971 sr 648 am ss 840 pm	<b>14</b> 83 / 55 0.07 100-1996 / 35-1953 sr 648 am ss 840 pm  	<b>15</b> 84 / 56 0.06 103-1996 / 34-1967 sr 647 am ss 841 pm	<b>16</b> 84 / 56 0.07 102-1996 / 37-1945 sr 646 am ss 842 pm	<b>17</b> 84 / 56 0.08 101-1996 / 41-1986 sr 646 am ss 843 pm
<b>18</b> 84 / 57 0.08 103-2003 / 42-1916 sr 645 am ss 843 pm	<b>19</b> 85 / 57 0.08 105-1996 / 42-1971 sr 644 am ss 844 pm	<b>20</b> 85 / 57 0.08 102-2006 / 40-1931 sr 644 am ss 845 pm	<b>21</b> 85 / 58 0.09 101-1989 / 39-1967 sr 643 am ss 845 pm  	<b>22</b> 85 / 58 0.09 105-1996 / 40-1931 sr 643 am ss 846 pm	<b>23</b> 86 / 58 0.09 105-2000 / 45-1917 sr 642 am ss 847 pm	<b>24</b> 86 / 58 0.09 109-2000 / 40-1930 sr 642 am ss 848 pm
<b>25</b> 86 / 59 0.09 102-2012 / 44-1924 sr 641 am ss 848 pm	<b>26</b> 86 / 59 0.09 101-1945 / 43-1950 sr 641 am ss 849 pm  Memorial Day	<b>27</b> 86 / 59 0.08 103-1984 / 48-1961 sr 640 am ss 850 pm	<b>28</b> 87 / 60 0.10 104-2011 / 43-1917 sr 640 am ss 850 pm  	<b>29</b> 87 / 60 0.10 104-2011 / 38-1947 sr 639 am ss 851 pm	<b>30</b> 87 / 60 0.09 103-1998 / 45-1983 sr 639 am ss 851 pm	<b>31</b> 87 / 61 0.10 102-1916 / 43-1983 sr 639 am ss 852 pm

# Flash Flooding



Road damage and debris after a flash flood in Caprock Canyons State Park on September 26, 2012.

30-yr national average weather-related deaths annually:

- Flooding: 99 deaths
- Lightning: 62 deaths
- Tornadoes: 54 deaths
- Hurricanes: 49 deaths



Except for heat-related fatalities, more deaths occur from flooding than any other weather hazard. Why? Most people fail to realize the power of water. Six inches of fast-moving flood water can knock you off your feet, and two feet can carry most cars, trucks, and SUVs away. When approaching a flooded roadway: **Turn Around, Don't Drown!**

Living on the semi-arid high plains of West Texas, flooding is not often something that comes to mind. However, periodic torrential rains do visit the region and can occasionally result in flash flooding. Significant terrain, like what's found at the edge of the Caprock, is most prone to flash flooding. This was the case at Caprock Canyons State Park in fall of 2012 (right) and again in June of 2013 (above) when brief but very heavy rainfall brought a flood surge down the drainages there, flooding and damaging the park road. During the latter event, rainfall rates briefly exceeded 12 inches per hour and totals approached 4 inches. Up on the Caprock, localized flash flooding, often human engineered, can occur. More commonly occurring is inundation flooding as playa lakes swell. Floods are not all bad; they help fill reservoirs and are often required to bust droughts.



Flash flooding in Caprock Canyons State Park on June 19, 2013. Photo by Donald Beard.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<b>1</b> Normals: 88/61 0.11 107-1998/45-1964 Lubbock Records sr 638 am - sunrise ss 853 pm - sunset	<b>2</b> 88/61 0.10 107-1998/39-1917 sr 638 am ss 853 pm	<b>3</b> 88/61 0.11 104-1998/43-1919 sr 638 am ss 854 pm	<b>4</b> 89/62 0.12 106-2013/47-1970 sr 638 am ss 854 pm	<b>5</b> 89/62 0.11 106-1990/45-1928 sr 637 am ss 855 pm  First Quarter	<b>6</b> 89/62 0.12 107-1990/45-1917 sr 637 am ss 855 pm	<b>7</b> 89/62 0.11 103-1994/45-1915 sr 637 am ss 856 pm
<b>8</b> 89/63 0.11 106-1981/43-1915 sr 637 am ss 856 pm	<b>9</b> 90/63 0.12 107-1981/50-1955 sr 637 am ss 857 pm	<b>10</b> 90/63 0.10 105-1917/47-1955 sr 637 am ss 857 pm	<b>11</b> 90/63 0.11 105-2008/50-1955 sr 637 am ss 858 pm	<b>12</b> 90/64 0.10 105-2001/53-1951 sr 637 am ss 858 pm	<b>13</b> 90/64 0.11 105-2011/52-1945 sr 637 am ss 858 pm  Full Moon	<b>14</b> 91/64 0.11 106-1939/44-1947 sr 637 am ss 859 pm Flag Day
<b>15</b> 91/64 0.10 109-1939/49-1927 sr 637 am ss 859 pm Father's Day	<b>16</b> 91/65 0.10 108-2011/49-1981 sr 637 am ss 859 pm	<b>17</b> 91/65 0.10 107-1924/53-1999 sr 637 am ss 900 pm	<b>18</b> 91/65 0.10 107-1924/47-1945 sr 637 am ss 900 pm	<b>19</b> 91/65 0.10 107-2011/52-1945 sr 637 am ss 900 pm  Last Quarter	<b>20</b> 92/65 0.09 108-1935/49-1973 sr 638 am ss 901 pm	<b>21</b> 92/66 0.10 107-1981/54-1973 sr 638 am ss 901 pm Summer Solstice (5:51 am)
<b>22</b> 92/66 0.10 106-1978/50-1927 sr 638 am ss 901 pm	<b>23</b> 92/66 0.09 107-1980/56-1964 sr 638 am ss 901 pm	<b>24</b> 92/66 0.09 110-1990/56-1957 sr 639 am ss 901 pm	<b>25</b> 92/66 0.10 110-2011/54-1940 sr 639 am ss 901 pm	<b>26</b> 92/66 0.08 112-2011/53-1958 sr 639 am ss 901 pm	<b>27</b> 92/67 0.09 114-1994/56-1958 (all-time) sr 640 am ss 902 pm New Moon	<b>28</b> 92/67 0.08 108-1980/56-1946 sr 640 am ss 902 pm
<h2>Lightning Safety Awareness Week</h2>						
<b>29</b> 92/67 0.09 107-1957/57-1948 sr 640 am ss 902 pm	<b>30</b> 93/67 0.09 106-1957/57-1940 sr 641 am ss 902 pm		NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES: Lubbock 162.400 Dimmitt 162.500 Plainview 162.450 Childress 162.525 Dickens 162.500	 Follow us on facebook at: www.facebook.com/ US.NationalWeather Service.Lubbock.gov		 Follow us on twitter at: www.twitter.com/ NWSLubbock

# The North American Monsoon

- The North American Monsoon can impact the weather in Arizona, New Mexico, Utah, Colorado and Texas
- Monsoon season typically runs from late June through September
- For some areas, monsoon rainfall provides over 50% of their annual precipitation
- Monsoon storms can cause flooding, severe downburst winds and haboobs (dust storms which are caused by thunderstorm downbursts)

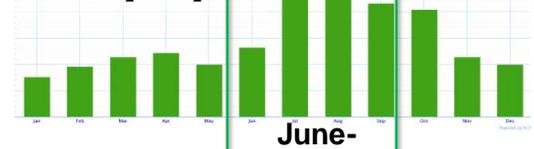
*A monsoon is a seasonal reversal in the prevailing wind direction associated with large continents. Winds blowing offshore bring drier weather, while winds blowing onshore bring more precipitation. The monsoon season typically refers to the onshore (rainy) phase of the pattern.*

## Average Monthly Precipitation

### 1. Phoenix



### 2. Albuquerque



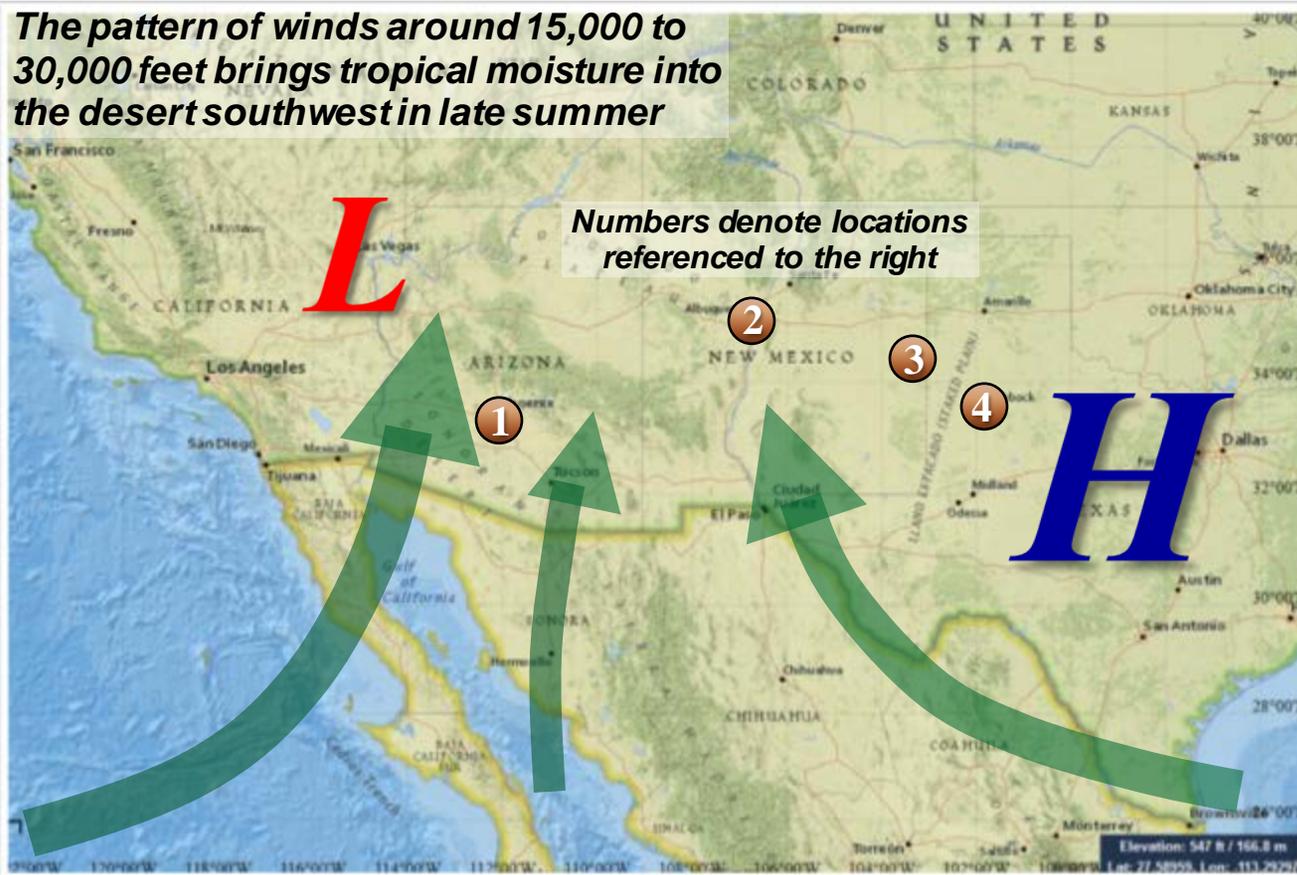
### 3. Clovis



### 4. Lubbock



*The pattern of winds around 15,000 to 30,000 feet brings tropical moisture into the desert southwest in late summer*



*A haboob moving across Phoenix on 11 July, 2011.  
Photo by Mike Chandler*



SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY										
 Follow us on facebook at:  <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/US.NationalWeatherService.Lubbock.gov</a>		<b>1</b> Normals: 93/67 0.08 105-1994/56-1924 Lubbock Records sr 641 am - sunrise ss 902 pm - sunset	<b>2</b> 93/67 0.08 106-1989/56-1944 sr 642 am ss 902 pm	<b>3</b> 93/67 0.08 108-1983/54-1929 sr 642 am ss 901 pm	<b>4</b> 93/67 0.07 105-1987/56-1924 sr 642 am ss 901 pm  Independence Day	<b>5</b> 93/67 0.07 104-1971/49-1915 sr 643 am ss 901 pm   First Quarter										
<b>6</b> 93/67 0.07 105-1994/53-1946 sr 643 am ss 901 pm	<b>7</b> 93/68 0.07 103-1998/51-1952 sr 644 am ss 901 pm	<b>8</b> 93/68 0.06 106-2009/51-1952 sr 644 am ss 901 pm	<b>9</b> 93/68 0.07 107-2009/56-1952 sr 645 am ss 900 pm	<b>10</b> 93/68 0.06 109-1940/58-1968 sr 646 am ss 900 pm	<b>11</b> 93/68 0.07 104-1970/57-1999 sr 646 am ss 900 pm	<b>12</b> 93/68 0.06 105-1933/57-1999 sr 647 am ss 859 pm   Full Moon										
<b>13</b> 93/68 0.06 107-1933/54-1953 sr 647 am ss 859 pm	<b>14</b> 93/68 0.07 108-1933/55-1990 sr 648 am ss 859 pm	<b>15</b> 93/68 0.06 105-2001/58-1926 sr 648 am ss 858 pm	<b>16</b> 93/68 0.06 105-2001/58-1935 sr 649 am ss 858 pm	<b>17</b> 93/68 0.06 105-1989/59-1930 sr 650 am ss 857 pm	<b>18</b> 93/68 0.05 103-1978/60-1935 sr 650 am ss 857 pm   Last Quarter	<b>19</b> 93/68 0.06 108-1936/55-1947 sr 651 am ss 856 pm										
<b>20</b> 93/68 0.05 105-1936/59-1971 sr 652 am ss 856 pm	<b>21</b> 93/68 0.06 102-1966/57-1988 sr 652 am ss 855 pm	<b>22</b> 93/68 0.05 104-2003/55-1915 sr 653 am ss 855 pm	<b>23</b> 93/68 0.06 104-2001/54-1915 sr 654 am ss 854 pm	<b>24</b> 93/68 0.05 104-1958/57-1915 sr 654 am ss 853 pm	<b>25</b> 93/68 0.05 104-1940/59-1956 sr 655 am ss 853 pm	<b>26</b> 93/68 0.06 105-1995/58-1959 sr 656 am ss 852 pm   New Moon										
<b>27</b> 93/68 0.05 106-1995/57-1933 sr 656 am ss 851 pm	<b>28</b> 93/68 0.06 105-1995/54-2005 sr 657 am ss 851 pm  Delta Aquarids Meteor Shower (July 28-29)	<b>29</b> 93/68 0.05 102-1948/60-2004 sr 658 am ss 850 pm	<b>30</b> 93/68 0.05 104-1946/60-2000 sr 658 am ss 849 pm	<b>31</b> 93/68 0.06 104-1934/56-1971 sr 659 am ss 848 pm	NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:  <table> <tr> <td>Lubbock</td> <td>162.400</td> </tr> <tr> <td>Dimmitt</td> <td>162.500</td> </tr> <tr> <td>Plainview</td> <td>162.450</td> </tr> <tr> <td>Childress</td> <td>162.525</td> </tr> <tr> <td>Dickens</td> <td>162.500</td> </tr> </table>		Lubbock	162.400	Dimmitt	162.500	Plainview	162.450	Childress	162.525	Dickens	162.500
Lubbock	162.400															
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Plainview	162.450															
Childress	162.525															
Dickens	162.500															
						 Follow us on twitter at:  <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/NWSLubbock</a>										

# Landspout Tornadoes

## Dust Whirl/Tube Landspout



- Begins as an intensely rotating column of dust
- Attached to a developing towering cumulus cloud
- Requires ample wind shear (change in speed and direction w/height)
- Short-lived (seconds to minutes)
- Minor if any damage (winds  $\leq$  60 mph)
- Dry and dusty appearance (sometimes hollow or soda-straw like)
- Impossible to detect with radar

## Moist/Tropical Landspout



- Moist conditions with light winds allow funnel clouds to develop
- Sometimes these funnel clouds reach the ground, producing a landspout
- Short-lived
- Minor if any damage (winds  $\leq$  60 mph)
- May have smooth and laminar appearance
- Difficult to detect with radar

A tornado is defined as a violently rotating column of air, in contact with the ground, either pendant from a cumuliform cloud or underneath a cumuliform cloud, and often (but not always) visible as a funnel cloud. There are two basic types of tornadoes, one that forms aloft and descends from a rotating supercell thunderstorm and those that form from rotating air near the ground being stretched upward. The latter is a **landspout** type tornado, while the former produces the strongest, longest-lived and most damaging tornadoes.

Since landspout-type tornadoes develop near ground level, they usually need some type of wind shift boundary (with slowly rotating air) to be present. If a storm develops above this boundary and conditions are right, the rapidly rising air can stretch the slowly rotating air. This causes the rotation to narrow and speed up, forming a landspout tornado. This is an example of the principle of conservation of angular momentum at work and is similar to a spinning ice skater that speeds up as they pull their arms in. Unfortunately, landspout tornadoes are difficult to impossible to detect with radar, but thankfully they are relatively short-lived, weak, and typically produce little to no damage.

# August 2014

Lubbock National Weather Service

WWW.WEATHER.GOV/LUBBOCK

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
 <p>Follow us on facebook at: www.facebook.com/ US.NationalWeather Service.Lubbock.gov</p>			<p>NO AA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:</p> <p>Lubbock 162.400 Dimmitt 162.500 Plainview 162.450 Childress 162.525 Dickens 162.500</p>	 <p>Follow us on twitter at: www.twitter.com/ NWSLubbock</p>	<p>Normals: 93/68 0.05 106-1966/55-1925 Lubbock Records 1 sr 700 am - sunrise ss 847 pm - sunset</p>	<p>93/68 0.06 2 105-2012/54-1936 sr 701 am ss 846 pm</p>
<p>93/68 0.07 3 107-1944/56-1921 sr 701 am ss 846 pm</p>  <p>First Quarter</p>	<p>93/68 0.06 4 105-2003/57-1915 sr 702 am ss 845 pm</p>	<p>92/68 0.07 5 102-2011/57-1915 sr 703 am ss 844 pm</p>	<p>92/68 0.06 6 105-2013/57-1990 sr 703 am ss 843 pm</p>	<p>92/68 0.06 7 104-2003/58-1971 sr 704 am ss 842 pm</p>	<p>92/68 0.06 8 105-2003/58-1990 sr 705 am ss 841 pm</p>	<p>92/68 0.07 9 103-2011/51-1946 sr 706 am ss 840 pm</p>
<p>92/68 0.06 10 104-2011/55-1915 sr 706 am ss 839 pm</p>  <p>Full Moon</p>	<p>92/67 0.06 11 103-1936/56-1931 sr 707 am ss 838 pm</p>	<p>92/67 0.05 12 107-1936/54-1979 sr 708 am ss 837 pm</p> <p>Perseids Meteor Shower (Aug 12-13)</p>	<p>92/67 0.06 13 107-1936/54-1920 sr 708 am ss 836 pm</p>	<p>92/67 0.06 14 103-1946/53-1920 sr 709 am ss 835 pm</p>	<p>92/67 0.06 15 103-1982/56-1920 sr 710 am ss 834 pm</p>	<p>92/67 0.06 16 104-1943/55-1931 sr 710 am ss 832 pm</p>
<p>92/67 0.06 17 103-1978/56-1931 sr 711 am ss 831 pm</p>  <p>Last Quarter</p>	<p>91/67 0.06 18 103-1994/55-1943 sr 712 am ss 830 pm</p>	<p>91/67 0.05 19 103-1994/58-1950 sr 713 am ss 829 pm</p>	<p>91/66 0.06 20 103-1943/54-1915 sr 713 am ss 828 pm</p>	<p>91/66 0.07 21 103-1930/52-1956 sr 714 am ss 827 pm</p>	<p>91/66 0.06 22 100-1999/58-1967 sr 715 am ss 825 pm</p>	<p>91/66 0.06 23 101-1985/54-1923 sr 715 am ss 824 pm</p>
<p>91/66 0.06 24 101-1936/51-1916 sr 716 am ss 823 pm</p> <p>89/64 0.07 31 100-1930/43-1915 sr 721 am ss 814 pm</p>	<p>90/66 0.07 25 105-1936/54-1962 sr 717 am ss 822 pm</p>  <p>New Moon</p>	<p>90/65 0.06 26 102-1922/51-2010 sr 717 am ss 820 pm</p>	<p>90/65 0.06 27 100-1931/53-1926 sr 718 am ss 819 pm</p>	<p>90/65 0.06 28 103-2011/54-1916 sr 719 am ss 818 pm</p>	<p>90/65 0.07 29 99-1943/51-1917 sr 719 am ss 817 pm</p>	<p>89/64 0.07 30 104-2011/44-1915 sr 720 am ss 815 pm</p>

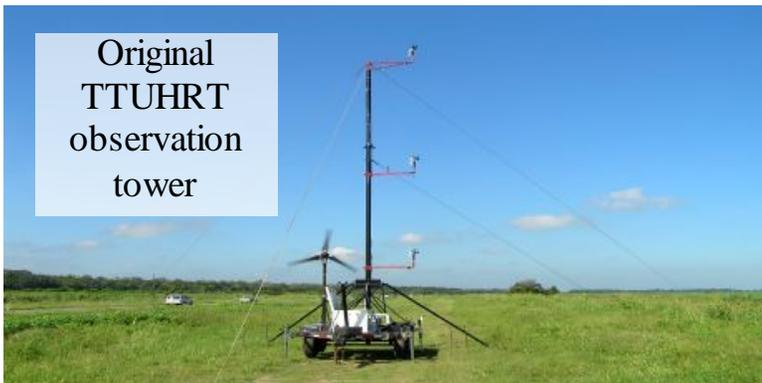
# The Tropics



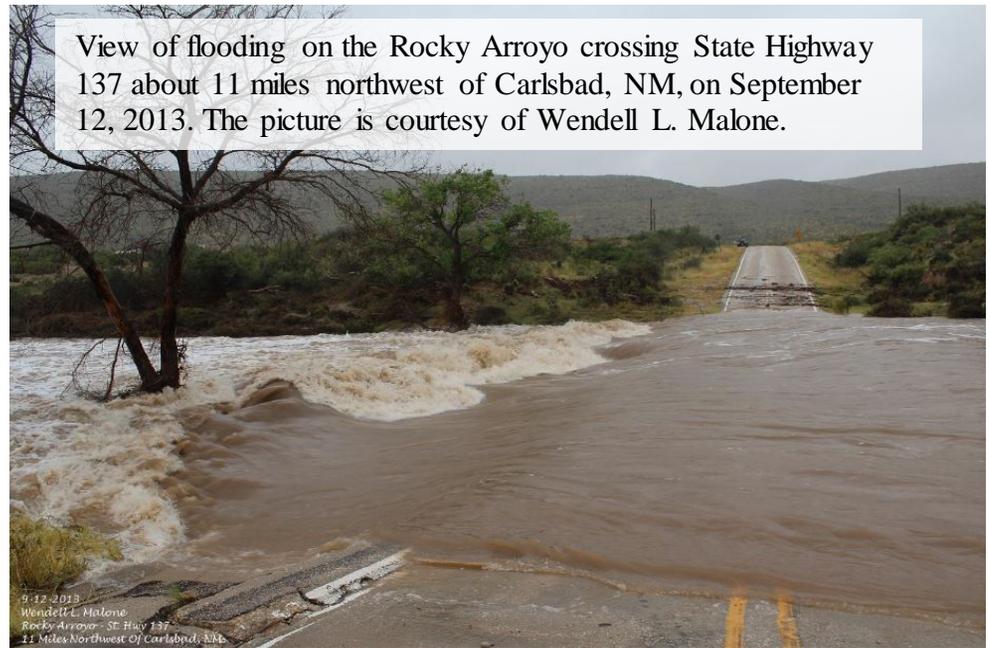
Deployed Stick-Net tower collecting data

**Texas Tech University Hurricane Research Team (TTUHRT)** <http://www.atmo.ttu.edu/TTUHRT/>

Even though Lubbock is by no means a coastal town, it does claim home to one of the premier hurricane research teams, the TTUHRT. The TTUHRT was established in 1998 and has the goal of developing a mobile, ruggedized meteorological observing station that could be deployed in the path of landfalling U.S. tropical cyclones. The observation platforms have changed and grown with the program since then, and now boasts an array of 24 rapid deployment Stick-Net platforms and several mobile weather radars. TTUHRT has deployed to the Gulf and Atlantic Coast on 25 tropical cyclones, collecting valuable weather data.



Original TTUHRT observation tower



View of flooding on the Rocky Arroyo crossing State Highway 137 about 11 miles northwest of Carlsbad, NM, on September 12, 2013. The picture is courtesy of Wendell L. Malone.

## 2013 Regional Tropical Impacts

The 2013 Atlantic hurricane season was relatively quiet, producing 13 tropical storms, 2 hurricanes, and no major hurricane. Texas escaped without any direct landfalls. However, the tropical moisture from the remnants of Hurricane Ingrid and eastern Pacific Hurricane Manuel combined with an upper level storm system and cold front to bring widespread rainfall, including pockets of flooding, to the Lone Star State in mid-September. Much of Texas received 1-4 inches between September 19<sup>th</sup> and 21<sup>st</sup>, with locally 6-8+ inches over parts of Central and East Texas. Even more impressive, a week earlier a strong monsoon coupled with a feed of tropical moisture and a western storm system to produce torrential rains from parts of northern Mexico through the Guadalupe Mountains and the Front Range of Colorado. Boulder endured historic flooding, recording nearly a year's worth of rainfall in less than a week. Further south, the West Texas Mesonet site in Guadalupe Mountains National Park captured 15.76 inches of rain in a 5-day period, including 13.62 inches from the 11<sup>th</sup>-12<sup>th</sup>. This resulted in flash flooding throughout the park and adjacent plains. The flood waters damaged many roads and trails. The above image shows flooding that resulted from the excessive rain near Carlsbad, NM.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	<b>1</b> Normals: 89/64 0.08 99-2013/43-1915 Lubbock Records sr 722 am - sunrise ss 813 pm - sunset  Labor Day	<b>2</b> 89/64 0.07 101-1947/50-1955 sr 722 am ss 811 pm  	<b>3</b> 88/63 0.09 101-2000/48-1974 sr 723 am ss 810 pm	<b>4</b> 88/63 0.08 101-2000/46-1915 sr 724 am ss 809 pm	<b>5</b> 88/63 0.09 102-2000/46-1961 sr 724 am ss 807 pm	<b>6</b> 87/62 0.09 103-1948/51-1918 sr 725 am ss 806 pm
<b>7</b> 87/62 0.09 99-2012/45-1918 sr 726 am ss 805 pm	<b>8</b> 87/62 0.09 97-1985/47-2004 sr 726 am ss 803 pm  Full Moon	<b>9</b> 87/61 0.09 99-1984/47-1956 sr 727 am ss 802 pm	<b>10</b> 86/61 0.09 100-2000/47-1962 sr 728 am ss 801 pm	<b>11</b> 86/61 0.09 103-2000/47-1959 sr 728 am ss 759 pm	<b>12</b> 86/60 0.08 100-1930/44-1959 sr 729 am ss 758 pm	<b>13</b> 85/60 0.09 101-1930/43-1959 sr 730 am ss 757 pm
<b>14</b> 85/60 0.09 100-1965/42-1945 sr 730 am ss 755 pm	<b>15</b> 85/59 0.08 99-1965/42-1993 sr 731 am ss 754 pm  	<b>16</b> 84/59 0.09 100-1965/42-1951 sr 732 am ss 752 pm	<b>17</b> 84/58 0.09 98-2005/42-1951 sr 732 am ss 751 pm	<b>18</b> 84/58 0.08 98-1997/43-1971 sr 733 am ss 750 pm	<b>19</b> 83/58 0.09 105-1930/42-1991 sr 734 am ss 748 pm	<b>20</b> 83/57 0.08 98-1977/41-1991 sr 734 am ss 747 pm
<b>21</b> 83/57 0.08 98-1998/33-1983 sr 735 am ss 745 pm	<b>22</b> 83/56 0.09 98-1977/40-1995 sr 736 am ss 744 pm  Autumnal Equinox (9:29 pm)	<b>23</b> 82/56 0.08 98-1926/41-2009 sr 736 am ss 743 pm	<b>24</b> 82/56 0.09 97-1953/38-1989 sr 737 am ss 741 pm  	<b>25</b> 82/55 0.08 100-2005/36-2000 sr 738 am ss 740 pm	<b>26</b> 81/55 0.08 99-1997/36-1926 sr 738 am ss 739 pm	<b>27</b> 81/55 0.08 100-1953/39-1942 sr 739 am ss 737 pm
<b>28</b> 81/54 0.07 98-1994/36-1918 sr 740 am ss 736 pm	<b>29</b> 80/54 0.07 97-2011/33-1916 sr 740 am ss 734 pm	<b>30</b> 80/53 0.07 99-1977/35-1985 sr 741 am ss 733 pm	 Follow us on facebook at:  <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/                      US.NationalWeather                      Service.Lubbock.gov</a>	NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:  Lubbock 162.400 Dimmitt 162.500 Plainview 162.450 Childress 162.525 Dickens 162.500		 Follow us on twitter at:  <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/                      NWSLubbock</a>



West TX solar eclipse from May 2012.

# Celestial Sights this October

*Weather permitting, residents of the South Plains can see two eclipses this month.*

This October will offer sky gazers in West Texas an opportunity to see both types of eclipses, solar and lunar. Provided weather conditions cooperate, a total lunar eclipse will be visible before dawn on Wednesday, October 8th, followed by a partial solar eclipse late in the afternoon on Thursday, October 23rd.

A total lunar eclipse occurs when the Moon passes precisely through the shadow of the Earth cast by the Sun. Partial lunar eclipses occur a few times each year, but total lunar eclipses such as the one this October 8th are less common.

Total lunar eclipses can be very photogenic as the Moon assumes an eerie shade of red. This color is the result of all sunlight except red wavelengths being filtered by the Earth's atmosphere.

## Future West TX Solar Eclipses

- \* October 23, 2014 (partial eclipse)
- \* August 21, 2017 (partial eclipse)
- \* October 14, 2023 (near total eclipse)

Solar eclipses on the other hand are even more rare, and occur when the Moon passes in between the Sun and the Earth. Some West Texas residents may

recall our last solar eclipse from May 20, 2012, when clouds interfered with the view from time-to-time. Although this year's solar eclipse on October 23rd will only be a partial eclipse, you may want to catch this event as the next event won't occur here until 2017!

**Solar Eclipse:**  
Sun, Moon, and Earth line up with the Moon in the middle.

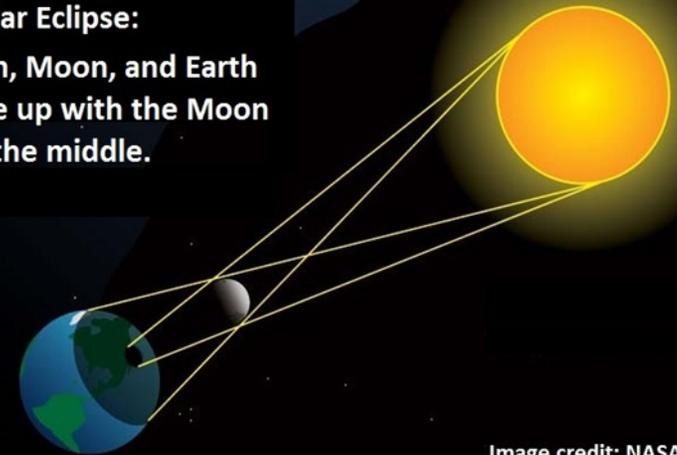


Image credit: NASA

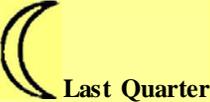
## How this month's eclipses should appear to viewers on the Texas South Plains



Total lunar eclipse Oct 8 at 5:27 AM CDT

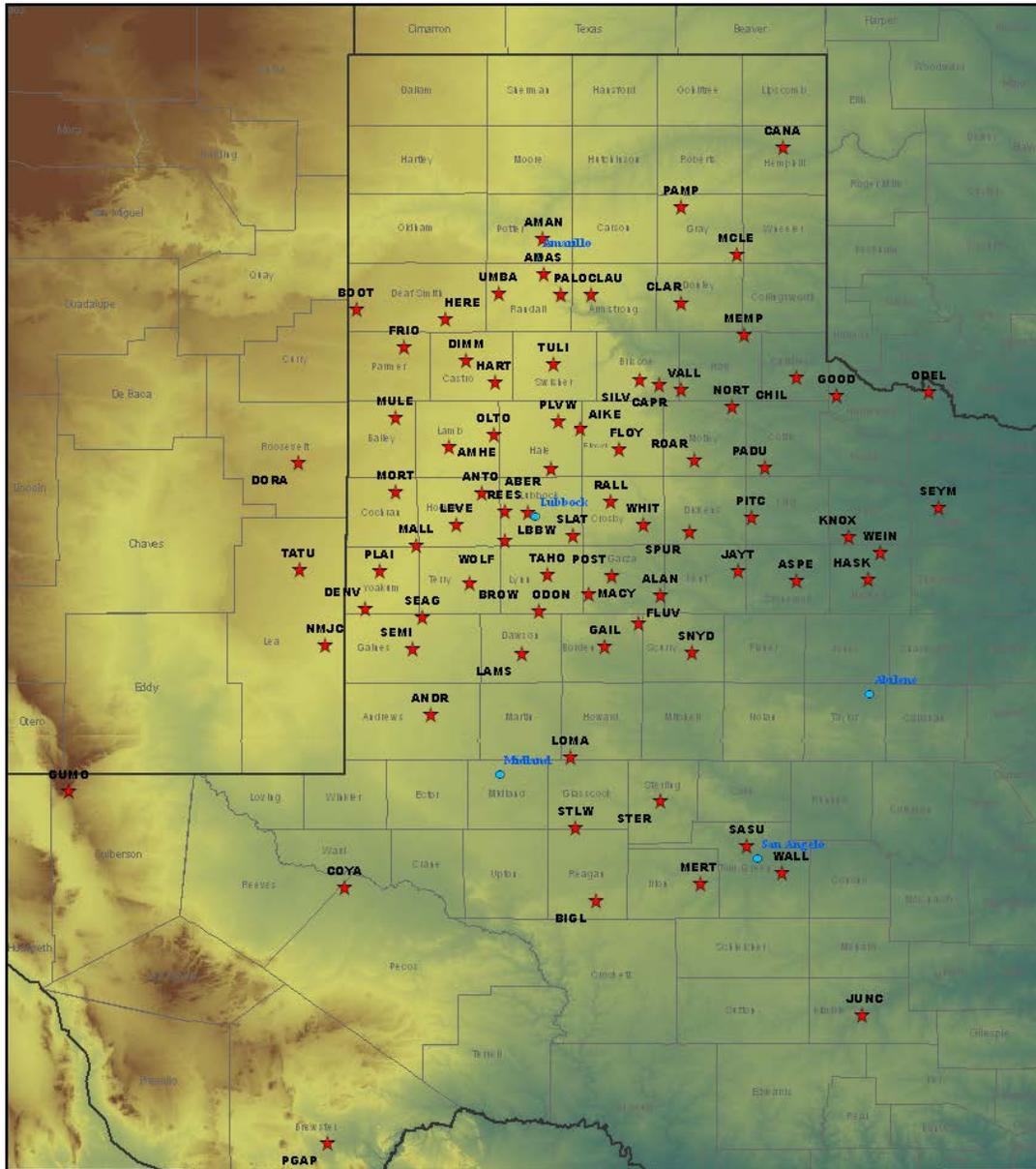


Partial solar eclipse Oct 23 at 5:49 PM CDT

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
 Follow us on facebook at: <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/US.NationalWeatherService.Lubbock.gov</a>		 Follow us on twitter at: <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/NWSLubbock</a>	<b>1</b> Normals: 80/53 0.07 98-2000/39-1985 Lubbock Records sr 742 am - sunrise ss 732 pm - sunset  First Quarter	<b>2</b> 79/53 0.07 99-2000/40-2009 sr 743 am ss 730 pm	<b>3</b> 79/52 0.06 100-2000/35-1961 sr 743 am ss 729 pm	<b>4</b> 79/52 0.06 96-2000/41-1961 sr 744 am ss 728 pm
<b>5</b> 79/52 0.07 97-1934/33-1932 sr 745 am ss 726 pm	<b>6</b> 78/51 0.07 94-1939/34-2001 sr 745 am ss 725 pm	<b>7</b> 78/51 0.07 98-1979/31-1952 sr 746 am ss 724 pm	<b>8</b> 78/51 0.07 98-1979/31-1976 sr 747 am ss 723 pm  Full Moon Total Lunar Eclipse	<b>9</b> 77/50 0.07 93-1965/29-1970 sr 748 am ss 721 pm	<b>10</b> 77/50 0.07 93-1965/37-2009 sr 748 am ss 720 pm	<b>11</b> 77/50 0.08 93-1979/34-2009 sr 749 am ss 719 pm
<b>12</b> 77/49 0.07 92-1989/33-1969 sr 750 am ss 717 pm	<b>13</b> 76/49 0.06 92-1992/28-1969 sr 751 am ss 716 pm Columbus Day	<b>14</b> 76/49 0.07 93-2009/31-1969 sr 751 am ss 715 pm	<b>15</b> 76/48 0.07 92-1965/31-1966 sr 752 am ss 714 pm  Last Quarter	<b>16</b> 75/48 0.07 92-2003/30-2001 sr 753 am ss 712 pm	<b>17</b> 75/48 0.06 93-1988/32-1999 sr 754 am ss 711 pm	<b>18</b> 75/47 0.07 90-2001/32-1968 sr 755 am ss 710 pm
<b>19</b> 74/47 0.06 92-1940/24-1917 sr 755 am ss 709 pm	<b>20</b> 74/47 0.06 93-2012/25-1916 sr 756 am ss 708 pm	<b>21</b> 74/46 0.07 90-2003/26-1917 sr 757 am ss 707 pm Orionids Meteor Shower (Peaks Oct 21-22)	<b>22</b> 74/46 0.06 89-1961/28-1945 sr 758 am ss 706 pm	<b>23</b> 73/46 0.06 91-2003/22-1917 sr 759 am ss 704 pm  New Moon Partial Solar Eclipse	<b>24</b> 73/45 0.05 91-1933/26-1929 sr 800 am ss 703 pm	<b>25</b> 72/45 0.05 91-1959/30-1955 sr 800 am ss 702 pm
<b>26</b> 72/44 0.05 88-1979/26-1913 sr 801 am ss 701 pm	<b>27</b> 72/44 0.05 87-1922/26-2012 sr 802 am ss 700 pm	<b>28</b> 71/44 0.05 91-1943/25-1970 sr 803 am ss 659 pm	<b>29</b> 71/43 0.05 90-2003/20-1917 sr 804 am ss 658 pm	<b>30</b> 71/43 0.04 90-2010/18-1993 sr 805 am ss 657 pm  First Quarter	<b>31</b> 70/43 0.05 88-1934/20-1991 sr 806 am ss 656 pm Halloween	NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES: Lubbock 162.400 Dimmitt 162.500 Plainview 162.450 Childress 162.525 Dickens 162.500

# West Texas Mesonet

(<http://www.mesonet.ttu.edu/>)



The West Texas Mesonet project began in 1999 to provide **free, real-time** weather and agricultural information for residents of the South Plains of West Texas. Over the years the project has grown well beyond the South Plains to include three observation towers in eastern New Mexico, sites in Guadalupe Mountains and Big Bend National Parks, and towers at Palo Duro and Caprock Canyons State Parks. To the left is a map of the West Texas domain which includes 79 mesonet stations (red stars) as of late 2013. Each observation station collects temperature, moisture, wind, pressure, solar radiation, and precipitation data, with most sites also sensing soil temperature and moisture at several depths.

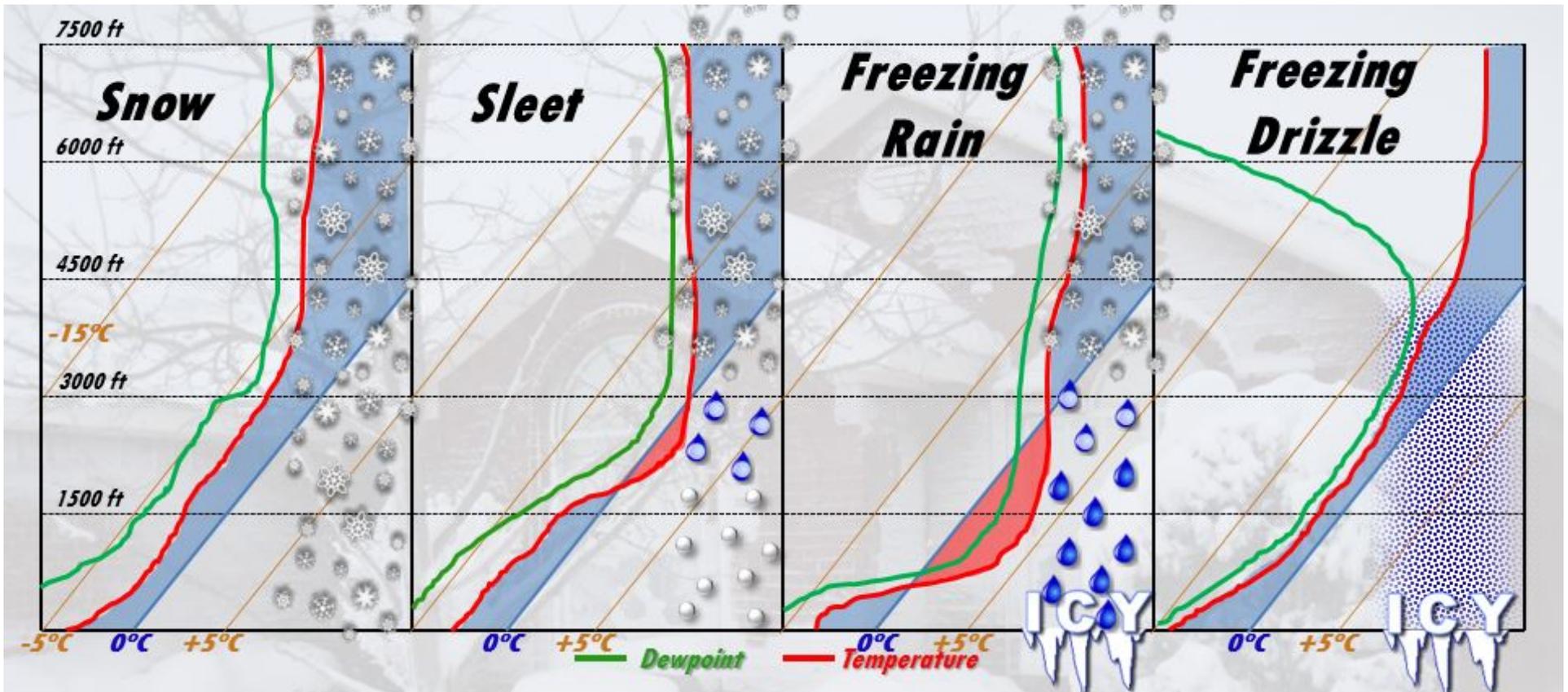


# November 2014

Lubbock National Weather Service

WWW.WEATHER.GOV/LUBBOCK

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	 Follow us on facebook at:  <a href="http://www.facebook.com/US.NationalWeatherService.Lubbock.gov">www.facebook.com/US.NationalWeatherService.Lubbock.gov</a>		NOAA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:  <b>Lubbock</b> 162.400 <b>Dimmitt</b> 162.500 <b>Plainview</b> 162.450 <b>Childress</b> 162.525 <b>Dickens</b> 162.500	 Follow us on twitter at:  <a href="http://www.twitter.com/NWSLubbock">www.twitter.com/NWSLubbock</a>		Normals: 70 / 42 0.04 85-1994 / 23-1951 Lubbock Records sr 806 am - sunrise ss 655 pm - sunset
<b>2</b> 69 / 42 0.04 85-2012 / 19-1991  sr 707 am ss 554 pm  Daylight Saving Time Ends	<b>3</b> 69 / 41 0.04 88-2005 / 7-1991  sr 708 am ss 554 pm	<b>4</b> 69 / 41 0.04 86-1916 / 20-1950  sr 709 am ss 553 pm  Election Day	<b>5</b> 68 / 40 0.03 86-1924 / 22-1959  sr 710 am ss 552 pm	<b>6</b> 68 / 40 0.03 85-1975 / 16-1959  sr 711 am ss 551 pm   Full Moon	<b>7</b> 67 / 40 0.03 89-1916 / 19-1947  sr 712 am ss 550 pm	<b>8</b> 67 / 39 0.03 88--2005 / 20-1943  sr 713 am ss 549 pm
<b>9</b> 67 / 39 0.02 90-2006 / 21-1943  sr 714 am ss 549 pm	<b>10</b> 66 / 38 0.03 85-1927 / 19-1950  sr 715 am ss 548 pm	<b>11</b> 66 / 38 0.03 82-1956 / 16-1950  sr 715 am ss 547 pm  Veteran's Day	<b>12</b> 65 / 37 0.03 85-1995 / 19-1919  sr 716 am ss 547 pm	<b>13</b> 65 / 37 0.02 82-1973 / 14-1976  sr 717 am ss 546 pm	<b>14</b> 64 / 37 0.03 85-1933 / 4-1976  sr 718 am ss 545 pm   Last Quarter	<b>15</b> 64 / 36 0.03 85-1965 / 10-1916  sr 719 am ss 545 pm
<b>16</b> 63 / 36 0.02 83-1966 / 11-1916  sr 720 am ss 544 pm	<b>17</b> 63 / 35 0.03 85-1966 / 10-1959  sr 721 am ss 544 pm  Leonids Meteor Shower (peaks Nov 17-18)	<b>18</b> 62 / 35 0.02 82-1999 / 16-1951  sr 722 am ss 543 pm	<b>19</b> 62 / 34 0.03 85-1996 / 14-1937  sr 723 am ss 543 pm	<b>20</b> 62 / 34 0.02 88-1996 / 17-1937  sr 724 am ss 542 pm	<b>21</b> 61 / 33 0.03 84-1927 / 18-1956  sr 725 am ss 542 pm	<b>22</b> 61 / 33 0.02 82-2006 / 6-1957  sr 726 am ss 541 pm   New Moon
<b>23</b> 60 / 33 0.03 84-1965 / -1-1957  sr 727 am ss 541 pm	<b>24</b> 60 / 32 0.02 82-1915 / 7-1938  sr 728 am ss 541 pm	<b>25</b> 59 / 32 0.03 86-1965 / 15-1993  sr 728 am ss 540 pm	<b>26</b> 59 / 32 0.03 82-1970 / 8-1980  sr 729 am ss 540 pm	<b>27</b> 59 / 31 0.02 81-1949 / 12-1976  sr 730 am ss 540 pm  Thanksgiving Day	<b>28</b> 58 / 31 0.03 83-1949 / 5-1976  sr 731 am ss 540 pm	<b>29</b> 58 / 30 0.03 78-2012 / 1-1976  sr 732 am ss 540 pm   First Quarter
<b>30</b> 58 / 30 0.02 81-2012 / 10-1918  sr 733 am ss 539 pm  End of the Atlantic Hurr. Season						



While winter in West Texas doesn't quite compare to many northern climates when it comes to bone chilling temperatures and feet of snow, our little slice of the high plains certainly sees its fair share of wintry weather in most years. One of the most frequent challenges when forecasting winter weather in this part of the country is precipitation type, which can change very rapidly with only very slight changes in environmental temperatures. Weather balloons launched from Midland and Amarillo are very helpful tools for determining expected precipitation type, as the data from these instruments give forecasters one of the few available direct measurements of the atmosphere above the surface, where varying temperatures are so important to the processes that determine precipitation type. The graphs of vertical temperature and dewpoint above will help explain how different types of winter precipitation form, and why this is such a significant challenge for forecasters here on the South and Rolling Plains of Texas.

Snow is the most likely precipitation type if the entire atmosphere is below freezing.

In addition, high moisture values at high altitudes and temperatures below -10°C (14°F) increase snow probabilities.

Sleet forms when a relatively thin layer of above-freezing air partially melts snow as it falls.

This partially melted snow then refreezes into pellets as it falls through a layer of cold air at the surface.

If the layer of warm air aloft is deep, and the layer of cold air is shallow, falling snow melts completely.

These rain drops fall as liquid, and if surface temperatures are below 0°C (32°F), they will freeze on contact.

Freezing drizzle soundings look much like snow in that temperatures throughout the atmosphere are below freezing.

However, dry air aloft prevents snowflakes from forming, resulting in small water droplets remaining in liquid form.

SUNDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

 <p>Follow us on facebook at:  www.facebook.com/ US.NationalWeather Service.Lubbock.gov</p>	<p><b>1</b> Normals: 57 / 30 0.02 79-2012 / 12-1918 Lubbock Records sr 734 am - sunrise ss 539 pm - sunset</p>	<p><b>2</b> 57 / 30 0.03 81-1995 / 13-1985 sr 735 am ss 539 pm</p>	<p><b>3</b> 57 / 29 0.02 82-2010 / 15-1967 sr 735 am ss 539 pm</p>	<p><b>4</b> 56 / 29 0.02 81-1958 / 15-1921 sr 736 am ss 539 pm</p>	<p><b>5</b> 56 / 29 0.03 79-1939 / 10-1950 sr 737 am ss 539 pm</p>	<p><b>6</b> 56 / 28 0.02 83-1939 / 1-1950   Full Moon</p>										
<p><b>7</b> 55 / 28 0.03 79-2007 / 8-2005 sr 739 am ss 539 pm</p>	<p><b>8</b> 55 / 28 0.03 78-1970 / 3-1917 sr 739 am ss 539 pm</p>	<p><b>9</b> 55 / 28 0.02 80-1939 / 5-1978 sr 740 am ss 539 pm</p>	<p><b>10</b> 55 / 28 0.03 81-1933 / 5-1917 sr 741 am ss 540 pm</p>	<p><b>11</b> 54 / 27 0.03 80-1939 / 6-1917 sr 742 am ss 540 pm</p>	<p><b>12</b> 54 / 27 0.02 82-1937 / 6-1961 sr 742 am ss 540 pm</p>	<p><b>13</b> 54 / 27 0.03 79-1921 / 5-1917 sr 743 am ss 540 pm  Geminids Meteor Shower (Dec 13-14)</p>										
<p><b>14</b> 54 / 27 0.03 82-2010 / 8-1987 sr 744 am ss 541 pm   Last Quarter</p>	<p><b>15</b> 54 / 27 0.02 80-2010 / 2-1987 sr 744 am ss 541 pm</p>	<p><b>16</b> 54 / 27 0.03 77-2006 / 3-1987 sr 745 am ss 541 pm</p>	<p><b>17</b> 53 / 27 0.03 78-1980 / 5-1932 sr 746 am ss 542 pm</p>	<p><b>18</b> 53 / 27 0.02 77-1980 / 6-1996 sr 746 am ss 542 pm</p>	<p><b>19</b> 53 / 26 0.03 76-1921 / 0-1924 sr 747 am ss 543 pm</p>	<p><b>20</b> 53 / 26 0.02 80-1921 / 3-1924 sr 747 am ss 543 pm</p>										
<p><b>21</b> 53 / 26 0.03 78-1981 / 2-1983 sr 748 am ss 543 pm Winter Solstice (5:03 pm)   New Moon</p>	<p><b>22</b> 53 / 26 0.02 79-1969 / -2-1989 sr 748 am ss 544 pm</p>	<p><b>23</b> 53 / 26 0.03 80-1964 / -1-1989 sr 749 am ss 545 pm</p>	<p><b>24</b> 53 / 26 0.02 80-1955 / 0-1983 sr 749 am ss 545 pm</p>	<p><b>25</b> 53 / 26 0.02 76-1955 / -1-1924 sr 750 am ss 546 pm  Christmas</p>	<p><b>26</b> 53 / 26 0.02 77-2005 / 0-1918 sr 750 am ss 546 pm</p>	<p><b>27</b> 53 / 26 0.03 76-2006 / 3-1918 sr 750 am ss 547 pm</p>										
<p><b>28</b> 53 / 26 0.02 81-1928 / -2-1924 sr 751 am ss 548 pm   First Quarter</p>	<p><b>29</b> 53 / 26 0.02 77-1920 / -1-1939 sr 751 am ss 548 pm</p>	<p><b>30</b> 53 / 26 0.02 80-2008 / 7-2000 sr 751 am ss 549 pm</p>	<p><b>31</b> 53 / 26 0.02 76-2011 / 8-1923 sr 752 am ss 550 pm  New Year's Eve</p>	<p>NO AA WEATHER RADIO CAN BE FOUND AT THE FOLLOWING FREQUENCIES:</p> <table border="0"> <tr><td>Lubbock</td><td>162.400</td></tr> <tr><td>Dimmitt</td><td>162.500</td></tr> <tr><td>Plainview</td><td>162.450</td></tr> <tr><td>Childress</td><td>162.525</td></tr> <tr><td>Dickens</td><td>162.500</td></tr> </table>	Lubbock	162.400	Dimmitt	162.500	Plainview	162.450	Childress	162.525	Dickens	162.500		 <p>Follow us on twitter at:  www.twitter.com/ NWSLubbock</p>
Lubbock	162.400															
Dimmitt	162.500															
Plainview	162.450															
Childress	162.525															
Dickens	162.500															

# Severe Weather Safety Tips

## Prepare a Home Severe Weather Plan—

- Pick a place where family members could gather if a tornado is headed your way. It could be your basement or, if there is no basement, a center hallway, bathroom, or closet on the lowest floor. Keep this place uncluttered.
- If you are in a high-rise building, you may not have enough time to go to the lowest floor. Pick a place in a hallway in the center of the building.

## Assemble a Disaster Supplies Kit containing—

- First aid kit and essential medications.
- Canned food and can opener.
- At least three gallons of water per person.
- Protective clothing, bedding, or sleeping bags.
- Battery-powered radio, flashlight, and extra batteries.
- Special items for infant, elderly, or disabled family members.

## When a Severe Thunderstorm or Tornado WATCH is issued—

- Listen to NOAA Weather Radio, local radio and TV stations for further updates.
- Be alert to changing weather conditions.

## When a Severe Thunderstorm or Tornado WARNING is issued—

- If you are inside, go to the safe place you picked to protect yourself from glass and other flying objects.
- If you are outside, hurry to the basement of a nearby sturdy building or lie flat in a ditch or low-lying area.
- If you are in a car or mobile home, get out immediately and head for safety (as above).

## After the Severe Thunderstorm or Tornado passes—

- Watch out for fallen power lines and stay out of the damaged area.
- Listen to the radio for information and instructions.
- Use a flashlight to inspect your home for damage.

## Conduct periodic Severe Weather drills so everyone remembers what to do. Stay tuned for warnings—

- Listen to your local radio and TV stations for updated storm information.
- Be especially alert to the weather when Severe Thunderstorm and Tornado WATCHES are in effect and take action when WARNINGS are issued.
- Know what a Severe Thunderstorm or Tornado WATCH and WARNING means:
  - A Tornado/Severe Thunderstorm WATCH means a Tornado/Severe Thunderstorm is possible in your area.
  - A Tornado/Severe Thunderstorm WARNING means a Tornado/Severe Thunderstorm has been detected and may be headed for your area. Go to a safe location immediately.