

## **MID OCTOBER 1998 HEAVY RAIN EVENT OVER CENTRAL AND SOUTH CENTRAL TEXAS**

### **Summary...**

A series of upper air disturbances moving in from the west and southwest...plus an excellent moisture tap from the Pacific Ocean and Gulf of Mexico...helped to develop a very heavy rain event over South Central Texas and the Texas Hill Country...on Saturday October 17, 1998. As a cool front moved into the area late Saturday night and Sunday morning... October 18th...more rain developed ahead of and along the cool front.

On Sunday the 18th...the cool front drifted near the coast and stalled. In the wake of the front...on Sunday the 18th and also Monday the 19th...clouds...rain and showers lingered. Winds aloft continued out of the southwest... bringing a series of weak upper air disturbances...that helped trigger periods of occasional rain. Just above the shallow cool air at the surface...southerly winds pumped plenty of gulf moisture over the area...while at higher levels...southwest winds brought plenty of moisture from the Tropical Pacific. On the 20th and 21st of October...cloudy skies and occasional light to moderate rain was observed over the area.

The wettest month of climate record for San Antonio...since 1871... was October 1998. The heavy rains caused many rivers in the area to reach near or exceed record stage heights...causing widespread flooding in the flood plains of streams...creeks and rivers. According to the Texas Department of Public Safety, 31 people drowned during the floods, and the total property damage was estimated to be about 750 Million Dollars.

### **...History...**

This heavy rain event was similar not only to the October 1994 rain event that affected South and Southeast Texas...also other heavy rain events that have cause floods and flash floods over South Central Texas and the Texas Hill Country. The heavy rain events in October of 1994 over South and Southeast Texas was similar to the 1998 pattern for South Central Texas. During the October of 1994 rain events...winds aloft carried the rain making systems faster through South Central Texas on October 7th and 8th... producing 5 to 10 inches of rain. Later in October of 1994 over Southeast Texas, the rain making

systems moved slower...producing a large flood event over Southeast Texas, with rain amounts between 10 and 30.50 inches over parts of Southeast Texas. In the October 16 to 19, 1994 Southeast Texas rain event, the remnants of Eastern Pacific Hurricane Rosa came over Texas, with a plume of deep tropical moisture streaming northward in wake of Rosa. Over Southeast Texas most of the rain came Monday the 17th to Tuesday the 18th. General 10 to 20 inch rain amounts were observed. The maximum rain was 30.50 inches at Liberty.

Like the Southeast Texas heavy rain event in October 1994... winds aloft in the 1998 South Central Texas and parts of Central Texas heavy rain event did not carry the rain making system away...helping to bring the large rain amounts of near 10 to near 30 inches of rain. See map and end of document for October 1998 Rain Event. The largest documented rain was in southern Hays County just south of San Marcos, where near 30 inches of rain fell. According to the U.S. Geological Survey, about 2,300 square miles in 12 counties got at least 12 inches of rain and about 5,000 square miles in 19 counties got at least 8 inches of rain.

In some years floods in fall and winter do occur. When fall and winter floods come...rainfall can be just as heavy as other times of the year. Thinner vegetation and lower evaporation in the cool season can add to the flooding. From 1856 to 1998 out of the 10 wettest months for the Austin City location...2 occurred in the fall and winter, excluding September. If the transition month of September was added...4 out of the 10 wettest came in fall and winter. For Austin/Bergstrom since October 1942...6 out of the 10 wettest months occurred in the fall and winter, excluding September. With September included there is no change. For Del Rio, 1905 to 1998, and San Antonio, 1871 to 1998, out of the 10 wettest months of record...2 occurred in the fall and winter, excluding September. If the transition month of September was added the figures rise to 6 out of 10 for Del Rio and 5 out of 10 for San Antonio. September, on average one of the wettest months, takes into account late summer, tropical storm, and very early fall events... therefore it is not a true in the fall rain month all the time.

Some of the heavy fall/winter precipitation events in the past nearly 30 years include January of 1968, September of 1973, January of 1985, December of 1986, January of 1991, December of 1991, January to March of 1992, October of 1994 and October of 1998 over Central and South Central Texas. The December 1991 event came around Christmas, when widespread flooding affected not only South Central Texas, also parts of Central Texas and Southeast Texas. The heavy snow event over South Central Texas in January 1985, associated with an arctic airmass, could have been a heavy rain event if

temperatures had been much warmer. In this event 13.5 inches of snow fell in San Antonio, 8.6 inches at Del Rio and 7.5 inches at Austin.

**...For San Antonio...**

**Rainfall records established for the Alamo City in October 1998 follow.**

The most rain recorded on any calendar day occurred Saturday, Oct. 17th, 1998...when 11.26 inches of rain fell at the San Antonio International Airport. The previous record was 6.83 inches on September 9...1921. The 11.26 inches of rain on October 17th...1998 even shattered the greatest 24 hour amount of 7.28 inches...recorded on September 26 to 27...1973. It also easily exceeded the record for October 17th...2.13 inches October 17...1948.

The most rainfall in a 24 hour period of 13.35 inches occurred from the 17th to the 18th. Previous record was 7.28 inches from Sep. 26th to 27th, 1973.

A new 30 day rainfall record for the Alamo City of 19.09 inches from October 2...1998 to November 1...1998 has been established. The previous record was 18.45 inches...from May 13 to June 12...1987.

Wettest Month and October of record...with 18.07 inches of rain. Previous record wettest month 15.78 inches in Sep. 1946, and previous wettest October of 9.74 inches in 1994.

**For San Antonio - 10 wettest Octobers...**

*1.	1998	-	18.07	inches	6.	1981	-	8.61	inches
2.	1994	-	9.74	"	7.	1976	-	8.48	"
3.	1942	-	9.56	"	8.	1960	-	7.84	"
4.	1913	-	8.86	"	9.	1949	-	7.58	"
5.	1919	-	8.66	"	10.	1871	-	6.65	"

**For San Antonio - 10 wettest months...**

*1.	18.07	inches	-	October	1998
2.	15.78	"	-	September	1946
3.	14.07	"	-	May	1935
4.	13.96	"	-	December	1991

5. 13.09 " - September 1973
6. 12.85 " - May 1987
7. 12.47 " - May 1993
8. 11.95 " - June 1986
9. 11.71 " - September 1874
10. 11.64 " - April 1915

The 10 greatest calendar day rainfall totals for San Antonio are:

- \*1. 11.26 inches - October 17 1998
2. 6.83 " - September 9 1921
3. 6.82 " - May 31 1937
4. 6.78 " - April 18 1915
5. 6.54 " - September 26 1973
6. 6.26 " - May 5 1993
7. 6.18 " - June 3 1951
8. 5.97 " - December 19 1991
9. 5.96 " - October 1 1913
10. 5.84 " - May 9 1935

### ...For Austin...

For October 1998 Austin received 12.39 inches of rain making October 1998 the 3rd wettest October and 15th wettest month for the Austin City climate location since the mid 19th century...when climate records began. On October 17...6.24 inches of rain fell at the Robert Mueller Airport in Austin. This is a new daily record for October 17. The old record for October 17th was 2.48 inches set back in 1937. Rainfall records for the Austin City location date back to 1856. Austin/Bergstrom Airport received 6.89 inches of rain on Saturday October 17 1998. For the Austin/Bergstrom location...the 12.73 inches in October 1998 was the 2nd wettest October and 5th wettest month since October 1942.

The 10 wettest Octobers for the Austin/City Location are...

- |                        |                        |
|------------------------|------------------------|
| 1. 1925 - 12.63 inches | 6. 1919 - 10.92 inches |
| 2. 1870 - 12.54 "      | 7. 1984 - 10.34 "      |

*3. 1998 - 12.39	"	8. 1923 - 9.25	"
4. 1960 - 12.30	"	9. 1913 - 8.92	"
5. 1973 - 11.11	"	10. 1957 - 8.79	"

The 10 wettest Octobers for Austin/Bergstrom are...

1. 1960 - 13.08 inches	6. 1957 - 9.00 inches
*2. 1998 - 12.73 "	7. 1994 - 7.79 "
3. 1973 - 10.40 "	8. 1976 - 6.99 "
4. 1984 - 9.30 "	9. 1959 - 6.94 "
5. 1986 - 9.11 "	10. 1981 - 6.39 "

The 10 wettest months for Austin/Bergstrom are...

1. June 1981 - 15.59 inches	6. November 1974 - 12.49 inches
2. May 1965 - 13.69 "	7. April 1957 - 12.18 "
3. October 1960 - 13.08 "	8. January 1991 - 10.53 "
4. December 1991 - 12.88 "	9. May 1974 - 10.48 "
*5. October 1998 - 12.73 "	10. October 1973 - 10.40 "

The 10 wettest months for the Austin/City Location are...

1. September 1921 - 20.78 inches	6. May 1895 - 14.10 inches
2. April 1915 - 19.82 "	7. July 1919 - 12.80 "
3. December 1913 - 16.14 "	8. September 1874 - 12.78 "
4. June 1981 - 14.96 "	9. May 1929 - 12.75 "
5. December 1991 - 14.16 "	10. July 1903 - 12.65 "

October 1998 was the 15th wettest overall month of record for the Austin/City Location.

The 6.24 inches of rain on October 17 1998 is the 8th greatest calendar day precipitation total ever for the Austin City climate location. The 6.85 inches at Austin/Bergstrom was the 3rd wettest day of record.

For Austin/City - 10 greatest calendar day precipitation totals...

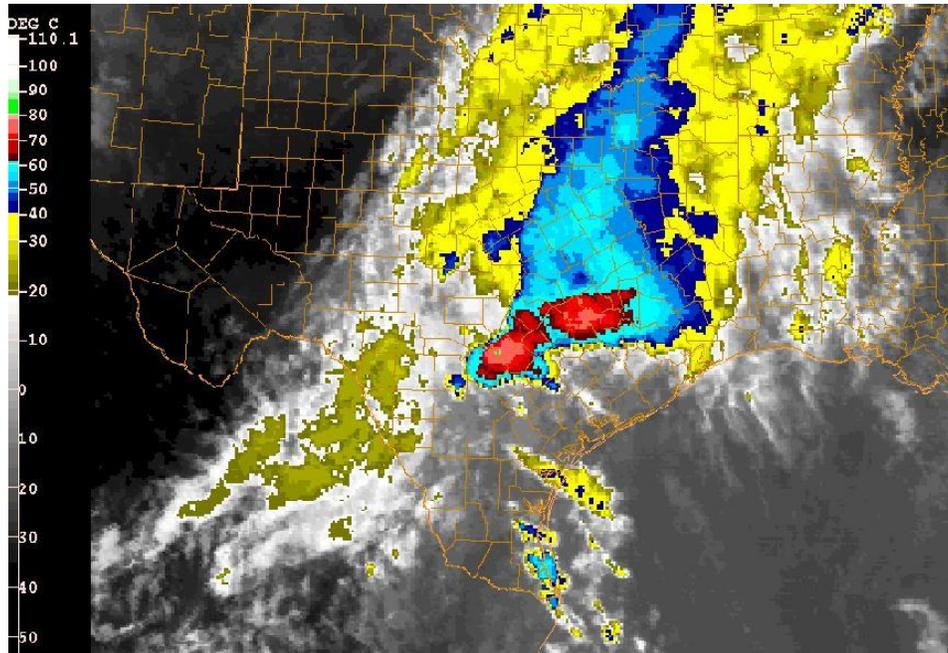
1. 15.00 inches - September 9 1921
2. 10.00 " - April 23 1915
3. 8.56 " - July 21 1919
4. 7.39 " - October 14 1923
5. 6.95 " - October 13 1925
6. 6.50 " - April 6 1900
7. 6.34 " - December 3 1913
- \*8. 6.24 " - October 17 1998
9. 6.16 " - May 28 1929
10. 6.00 " - December 11 1891

For Austin/Bergstrom - 10 greatest calendar day precipitation totals...

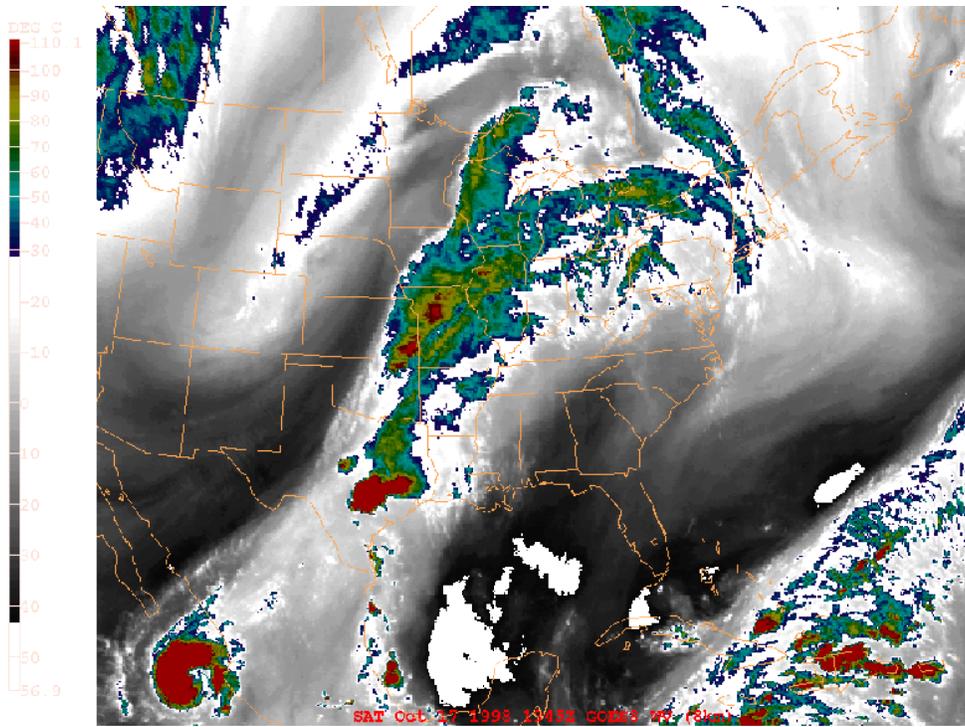
1. 8.70 inches - November 23 1974
2. 8.53 " - May 9 1974
- \*3. 6.85 " - October 17 1998
4. 5.97 " - September 6 1986
5. 5.93 " - August 3 1966
6. 5.73 " - June 11 1981
7. 5.04 " - May 30 1995
8. 5.01 " - January 9 1991
9. 5.00 " - August 9 1994
10. 4.95 " - June 3 1951

Rainfall amounts from northern Bexar county to southeast Kendall county...parts of Comal county...including the New Braunfels metro area...and parts of Hays county on October 17 and 18th...were near 15 to near 30 inches.

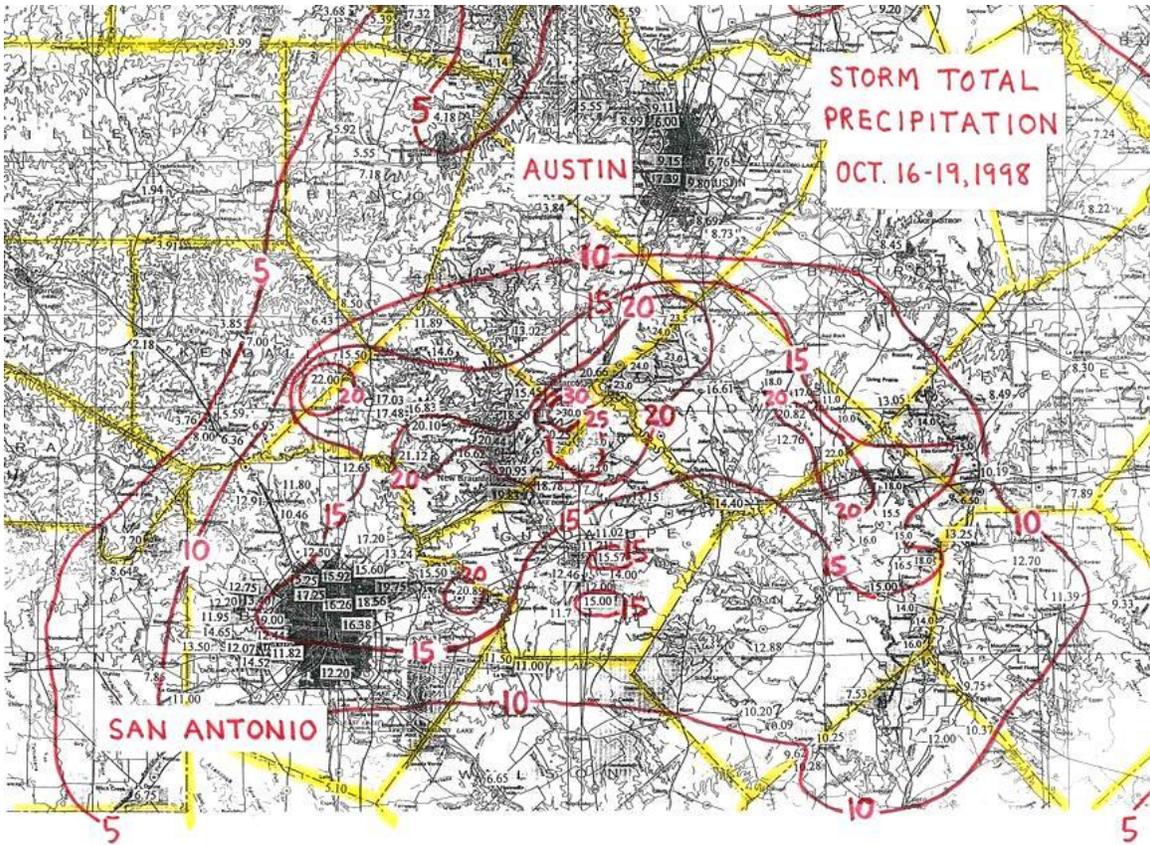
Del Rio was west of the heaviest rains. From October 16th to 1 pm October 21st Del Rio has had 0.41 inches of rain. For October 1998 Del Rio had 1.46 inches of rain. The wettest October of record for Del Rio was 11.69 inches in October of 1930.



[146 pm cdt Satellite picture of the rain event on Saturday, October 17, 1998.](#)



245 pm cdt Satellite picture of the rain event on Saturday, October 17, 1998.



**Maximum rain was near and just over 30 inches (762 mm) between San Antonio and Austin, near San Marcos. Total rain shown fell from Friday night October 16 to Monday, October 19.**