LATE NOVEMBER 2001 WINTER PRECIPITATION EVENT OVER SOUTH CENTRAL TEXAS

On November 28 to 29, 2001, an early season snow and winter precipitation event evolved over South Central Texas.

On the night of Nov 27 to predawn of Nov 28, 2001 snow was falling in sub freezing conditions north of Val Verde County: at Midland, Ft. Stockton, and San Angelo. At 1200 UTC Nov 28, 850 hPa Temperatures were -9 degrees Celsius at Midland and -5 degrees Celsius at Del Rio. From 00 to 12 UTC Nov. 28, an increasing amplitude 700 to 300 hPa trough formed from the Southwest U.S. to North Central Mexico. A sub freezing layer of cold air from the surface to 850 hPa, was advected over Val Verde, Edwards, Real, Bandera, Kerr, Gillespie, Llano, Burnet, Blanco and Kendall Counties, from sub freezing areas at Ft Stockton, Midland and San Angelo. The funneling affects of the Pecos River Valley, running North to South, enhanced arrival of the sub freezing conditions over Val Verde County in the morning of Nov. 28. Efficient lift and high humidity to 500 hPa was present, with temperature and dew point differences 0 to 2 degrees through 700 hPa and 3 to 5 degrees at 500 hPa. Favorable upper level dynamics and a sub freezing, saturated surface to 850 hPa layer was a good recipe for snow. Snow began falling across parts of Val Verde County, in the early morning Nov. 28th and spread across the rest of Val Verde County through the early afternoon. Sleet and freezing rain were reported in Val Verde County around 1230 UTC Nov. 28, with some of the bridges and overpasses beginning to ice over. Further east 12.5 mm of snow was reported near Hunt over west Kerr County in the morning. The mix of winter precipitation caused icy roads in Val Verde County and further east over Edwards, Real, and Western Kerr Counties between 2000 and 2100 UTC Nov. 28. Snow amounts in Val Verde County were as follows: 127 mm of snow 17.71 km northeast of Pandale; 101.6 mm at Hudspeth; 63.5 mm 1.61 km north of Pandale; 50.8 mm 20.93 km west of Langtry, 25.76 km east southeast of Langtry, 14.49 km southwest of Juno, and 9.66 km north northeast of Loma Alta. By late afternoon, about 50 to 80 mm of snow accumulated in and near Comstock, near 48 km northwest of Del Rio. Around 11 km west of Comstock, near 152.4 mm of snow was observed, with reports of drifts up to near 250.4 mm. Snow began falling in the vicinity of Del Rio area in the morning and continued intermittently into the afternoon. Light snow amounts were observed in the Del Rio area. At the Del Rio International Airport snow began around 1900 UTC November 28th. A trace of snow was measured 1.61 km north of the Airport, where snow flurries lingered until 6 PM. The temperature at the Del Rio International Airport fell to 0 degrees Celsius in the afternoon, and a report of the temperature at -1.67 degrees Celsius was observed north of Del Rio.

Further east in Edwards County, a Trace of Snow was observed at Rocksprings; 2.54 mm at Utopia in northeast Uvalde County; a Trace of Snow at Camp Wood in Real County; and 20.3 mm of snow at Ingram in Kerr County.

Around and after 00 UTC Nov. 29, 2001, the precipitation type began to change. After 00 UTC Nov. 29, and further east, the depth of sub freezing cold air became shallower and warmed from the effects of down sloping subsidence winds; greater distance from the initial sub freezing regions to the northwest; and latent heat feedback from precipitation processes. This created conditions more favorable for freezing rain, sleet and isolated snow flurries from 00 UTC to 12 UTC November 29, across parts of Kinney, Maverick, Uvalde, Medina, Bexar, Comal, Hays, Travis, Williamson, Caldwell, Bastrop, Lee, and Fayette Counties.

By 00 UTC Nov. 29, the strong dynamics of the 700 to 300 hPa trough began to create widespread precipitation from Del Rio to Eagle Pass to west of Laredo. Between 00 and 02 UTC Nov. 29, precipitation development was efficient west and southwest of San Antonio to the Rio Grande River. As the precipitation moved east, it changed to freezing rain, sleet, and very isolated snow flurries. The 0 degree Celsius line at 850 hPa moved near a San Antonio to Austin Line around 00 UTC Nov. 29, and ran into resistance evolving East, because of the high amplitude 500 to 300 hPa trough from west of Amarillo to east of Chihuahua, Mexico. Early evening surface temperatures fell to near and below freezing, helped by the early November sunset and evaporative cooling, as rain fell into much drier air. As the area of precipitation developed eastward from around 02 to 06 UTC on Nov. 29, strong dynamics caused just enough latent heat release to help transform the event to more of a freezing rain, mixed with sleet and isolated snow flurry event. The mixed winter precipitation event occurred in sub freezing areas north and west of Eagle Pass to San Antonio to New Braunfels to Austin. Light rain mixed with sleet was observed at Eagle Pass at 0100 UTC. From near and after 02 to 04 UTC the wintry mix of precipitation, mostly freezing rain and some sleet moved to the Hondo and San Antonio Areas. Temperatures fell to 0 Degrees Celsius by 02 UTC in the Hondo and San Antonio, helped by cold advection, early November sunsets, and later evaporative cooling from precipitation. The Freezing rain and sleet from Hondo to San Antonio Areas spread to New Braunfels, San Marcos, and Austin from 04 to 06 UTC.

Between 06 to 08z UTC freezing rain, mixed with sleet and some snow flurries showed up from Austin to near La Grange. After 08 UTC on Nov. 29, drying and subsidence from the west rapidly began to decrease the precipitation area. Clouds began to decrease from the west around 09 UTC Nov. 29th from San Antonio to Del Rio. A brief round of winter precipitation, associated with strong lift occurred from the Austin Area to eastern parts of South Central Texas from around 09 UTC to shortly after 12 UTC Nov. 29. The event ended after 12 UTC Nov. 29, as dry air came across the area from the west at low levels, and subsidence increased at Mid and Upper Levels in wake of the 700 to 300 hPa Trough.

NUMERICAL WEATHER FORECASTS

The Meso Scale ETA Model showed excellent precipitation forecasts of the event from the Nov. 28 1200 UTC Cycle. The Meso Scale ETA Model was running on a Hewlett Packard 3000 Workstation at 8 kilometer grid, using the Kain-Fritch Parameterization Scheme, and running Non Hydrostatic.

Minimum temperature 24 and 36 hour forecasts from the Nov. 28 1200 UTC cycle were good also, for 1200 UTC Nov. 29, the end of the winter precipitation event. The errors at 24 hours varied from 3 degrees at Del Rio to 0 degrees at Austin Mabry. The average error of the 4 places listed below is 1.5 degrees Fahrenheit. All Temperature Data is in degrees Fahrenheit.

24 Hour Forecasts for 1200 UTC Nov. 29
From 12z UTC Nov. 28 Meso Eta

Location	Forecast	Observed
Del Rio - DRT	35	32
San Antonio - SAT	32	30
Austin Bergstrom - AUS	30	31
Austin Mabry - ATT	30	30

The errors at 36 hours varied from 3 degrees at Del Rio to 0 degrees at Austin Mabry. The average error of the 4 places listed below is 1.25 degrees Fahrenheit.

36 Hour Forecasts for 1200 UTC Nov. 29
From 12 UTC Nov. 28 Meso Eta

Location	Forecast	Observed
Del Rio - DRT	35	32
San Antonio - SAT	31	30
Austin Bergstrom - AUS	30	31
Austin Mabry - ATT	30	30

SUMMARY

A late November snow event over Val Verde, parts of Edwards, parts of Real, northern Uvalde, and Parts of Kerr Counties, was supported by unstable, sub freezing conditions. The event changed 9 to 12 hours later further East to mostly freezing rain, sleet and isolated snow flurries. Latent heat precipitation processes and warming synoptic scale subsidence from the west, modified the precipitation type further East. The event ended after 12 UTC Nov. 29, about 24 hours after it began. The Meso Eta Workstation, with 8 km grid spacing, running Non Hydrostatic, and using the Kain-Fritch Parameterization Scheme, showed good forecasts of the precipitation and temperature.

WEB ADDRESS FOR EXPANDED VERSION

An expanded version of this paper can be found at:

http://www.srh.noaa.gov/ewx/wx/nov282001/nov28.htm

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