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Technical Attachment

EVALUATION OF WIND PROFILER DATA DURING THE JANUARY 18, 1992 WINTER STORM ACROSS NORTH MISSISSIPPI

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THE EVENT

A band of heavy snow fell across North Central Mississippi on Saturday, January 18, 1992, starting around 1100 UTC in the Greenville/Green wood area and spreading into the Tupelo area by 1600 UTC. The snow began tapering off early that evening. Snowfall amounts around 4 inches were common in a 20-mile wide band centered along U.S. Highway 82 (Fig. 1). The profiler sites at Okolona, MS (OKO); DeQueen, AR (DQU); and Winnfield, LA (WNF) provided timely and beneficial information during the winter storm. This paper will focus on the interpretation of the profiler data during this synoptic event.

SYNOPTIC SITUATION

The 500 mb analysis at 0000 UTC (Fig. 2) and 1200 UTC (Fig. 3) on the 18th depicted a shortwave trough moving into West Texas from the southern Rockies. This upper level feature helped to induce development of an 850 mb low over South Texas by 1200 UTC about midway between Corpus Christi and Del Rio (Fig. 4). From the low, a warm front extended northeastward across central Louisiana and southern Mississippi Oust south of Jackson and Meridian) into southern Alabama. At the same time, Southerly low level winds increased across the southern sections of Louisiana and Mississippi. At mid and Lipper levels, moderate west to southwest flow persisted across the Lower Mississippi Valley throughout the episode as the short-wave trough advanced slowly across North Texas and Oklahoma. The 1200 UTC sounding at Little Rock, AR, (Fig. 5) was indicative of snow; however, the soundings at Jackson, MS, (Fig. 6) and Centreville, AL, (Fig. 7) did not give obvious indications of the type of precipitation to expect.

By 0000 UTC Sunday, the 850 mb low had advanced to the central Louisiana coast (Fig. 8). The 12-hour movement of the 850 low from South Texas to the central coast of Louisiana backed the low level winds across Mississippi. This backing spread cooler drier air into the state. The arrival of the drier air ended the precipitation over the northern counties, while the colder air advecting into central Mississippi and northern Louisiana helped to change the rain to a sleet-snow mixture during the late afternoon and early evening hours.

PROFILER DATA

The boundary depicted on the 850 mb 1200 UTC analysis was south of all three profiler sites (WNF, DQU, OKO). They all displayed an easterly low level flow below 850 mb before 1200 UTC the 18th (Figs. 9, 10, 11). Around 1200 UTC, the profilers indicated increases in the easterly winds (generally

increasing from 10 knots to 20-25 knots). This provided evidence tat the low in the northwest Gulf of Mexico was strengthening. At this time, snowfall intensity increased at Greenwood, MS.

Around 1800 UTC, the 850 mb low had moved closer to the Louisiana coast. This movement accounted for a more northeasterly trajectory in the low level winds at DeQueen, Okolona, and Winnfield during the late morning and early afternoon hours. The northeast winds transported drier air into the northern tier of zones in Mississippi (Zones 1, 4, 5) decreasing chances of a significant snowfall. The dewpoint at Tupelo, MS, dropped 8 F^{o} during a three-hour period, increasing the dewpoint depression by 22'.

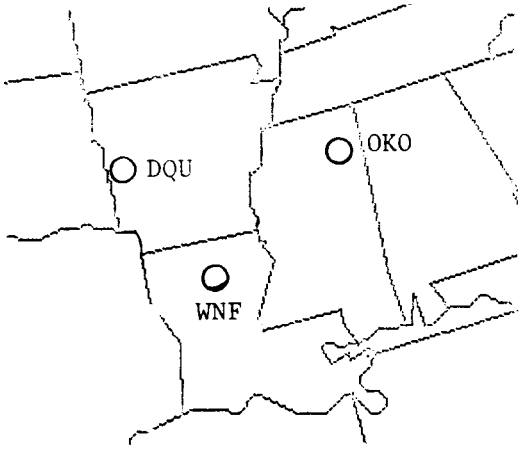
At the same time, arrival of colder air into northern Louisiana and central Mississippi allowed for the development of snow or wintery mix precipitation further south. Within two hours of the backing in the low level winds at Winnfield, both Shreveport and Monroe had rain change over to a wintery mix. By 2030 UTC, snow or a mixture of rain and snow was occurring at these locations.

CONCLUSION

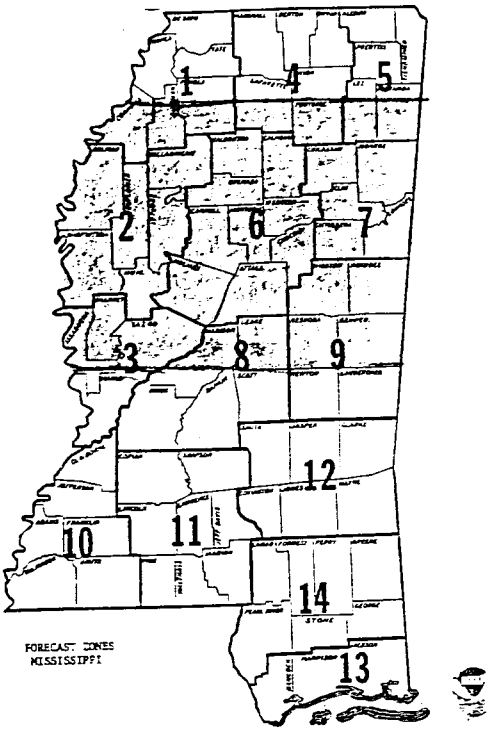
The profiler data from sites at Winnfield, LA; DeQueen, AR; and Okolona, MS, supplied beneficial and timely information during the winter storm on January 18, 1992. The 1200 UTC soundings at Jackson, MS, and Centreville, AL, indicated that a winter-type precipitation was probable, but type could not be determined. The hourly updates of the profiler data helped to define where (and where not) the wintery precipitation would occur. Backing of the low level winds from an easterly trajectory to a northeast component was a major clue used to determine when to expect the formation of snow or a wintery mixture.

ACKNOWLEDGEMENTS

Thanks to WSFO Jackson colleagues Wayne Gasson, Kevin Pence, Steve Rich, and Patsy Peden for their help and encouragement in preparing this study.



Location of profilers used in this study



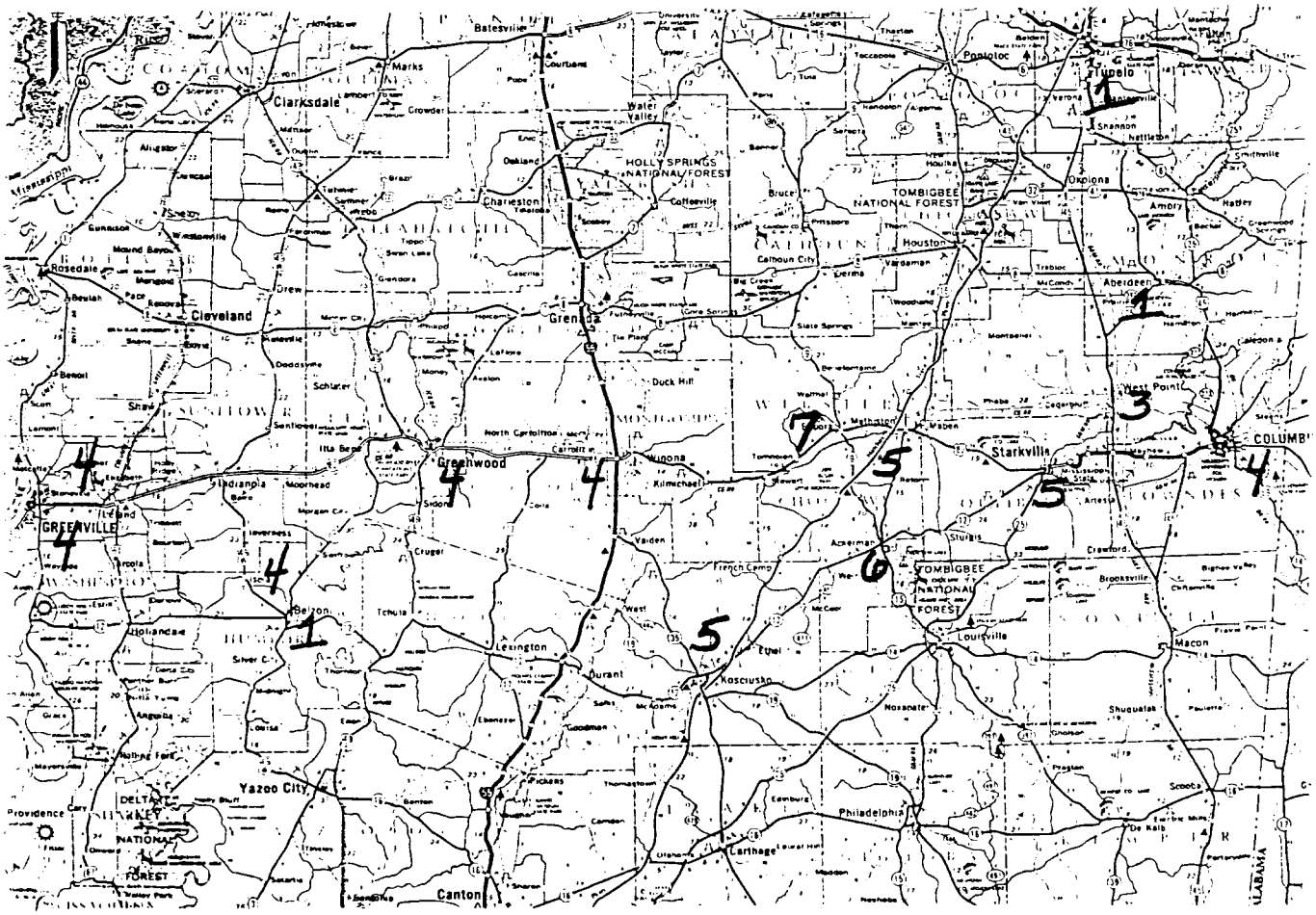


FIGURE 1. SNOW DEPTH (INCHES) ACROSS NORTH CENTRAL MISSISSIPPI 12Z JANUARY 19, 1992.

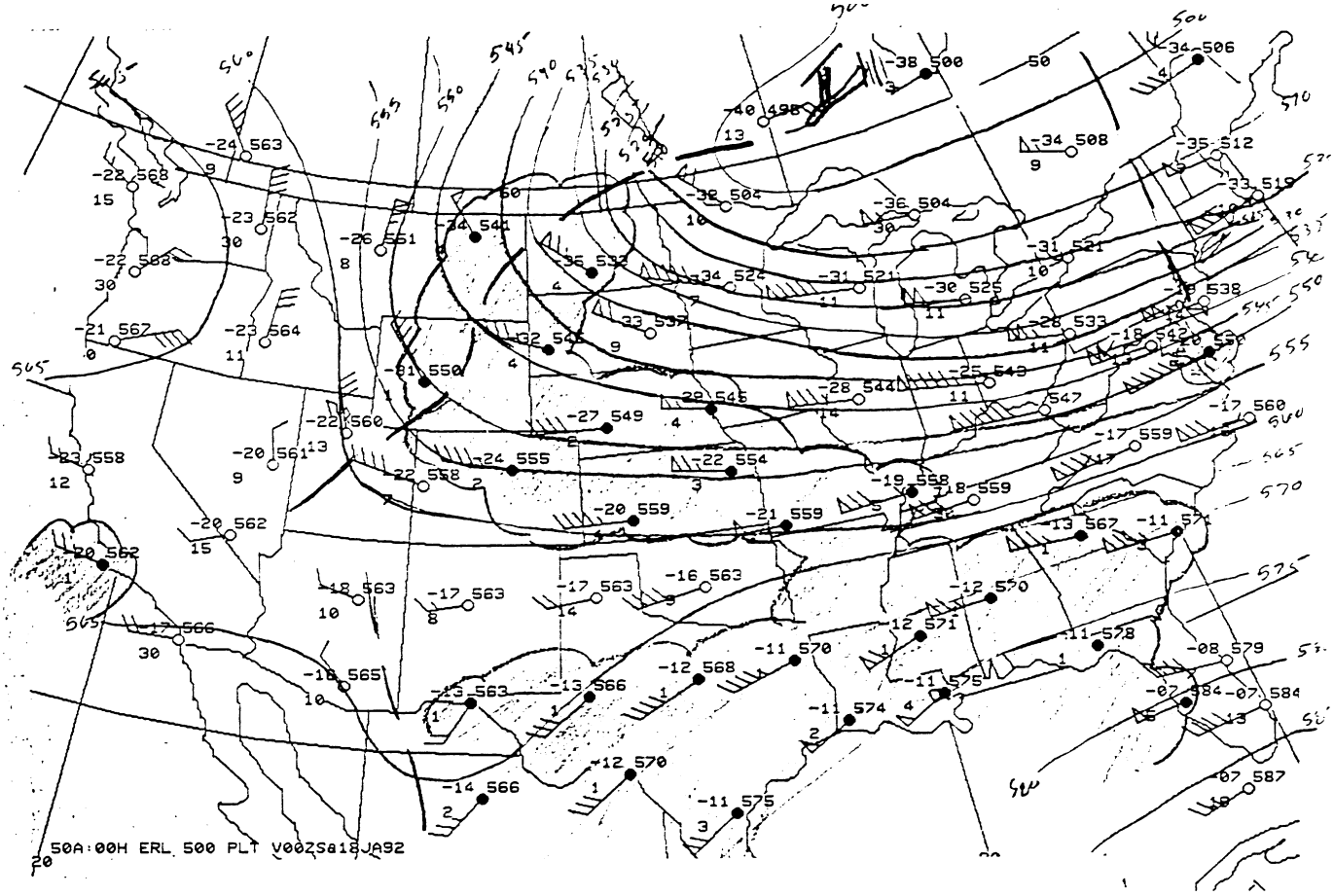


FIGURE 2. 500 Mb HEIGHTS AT 00Z 1/18/92.

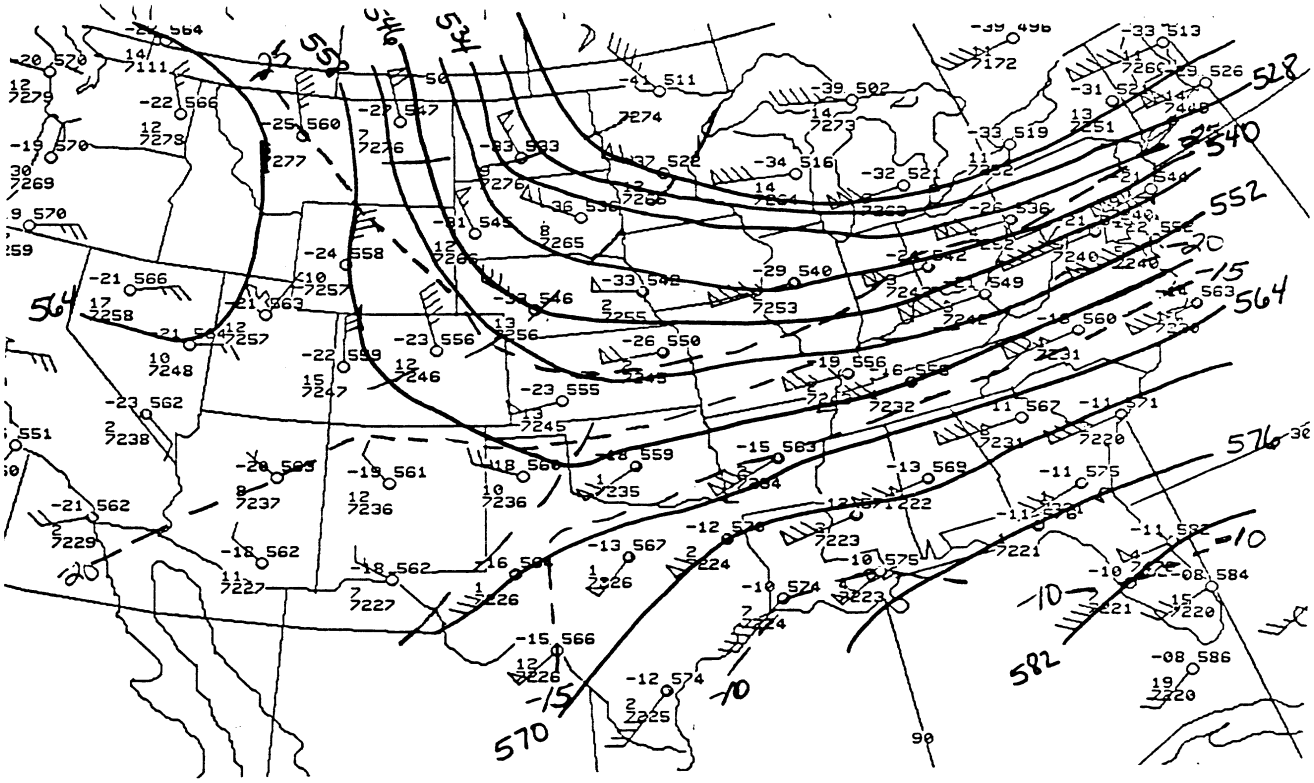


FIGURE 3. 500 Mb HEIGHTS/TEMPERATURES AT 12Z 1/18/92.

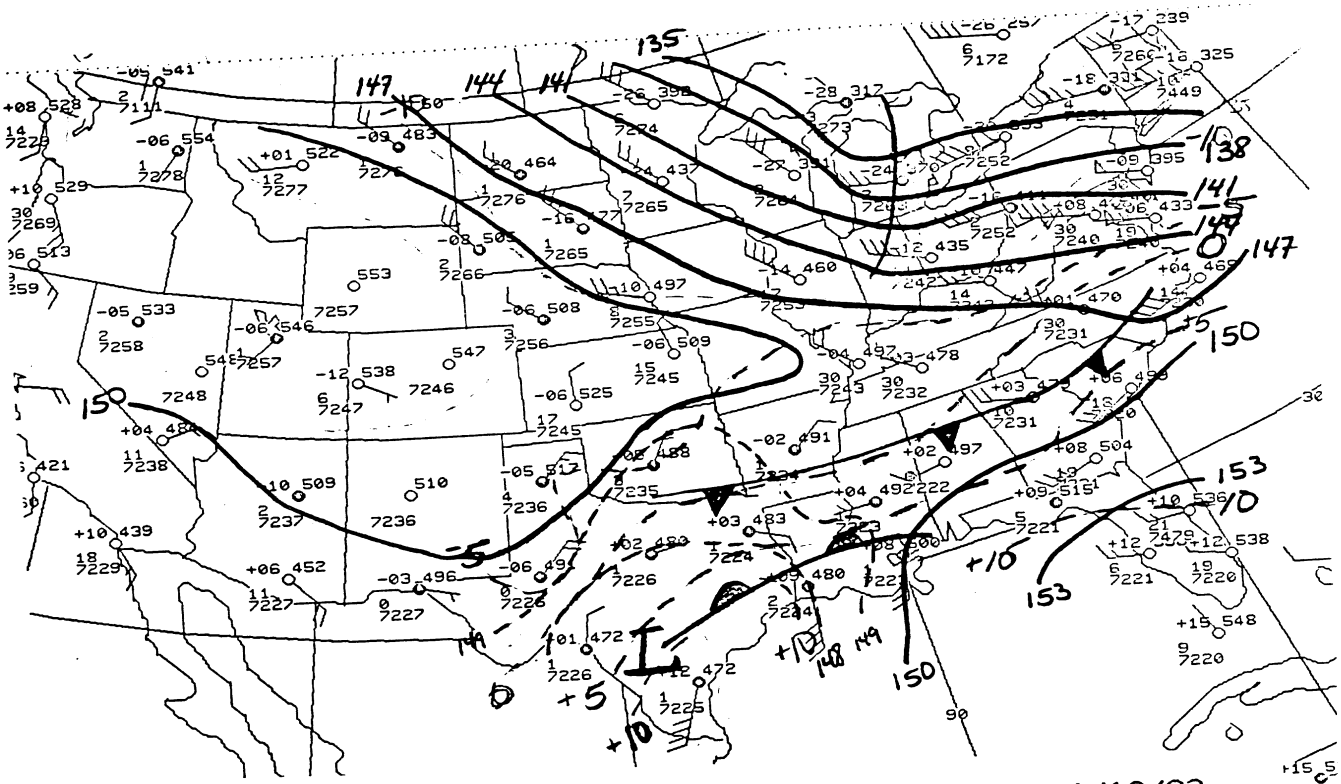


FIGURE 4. 850 Mb HEIGHTS/TEMPERATURES AT 12Z 1/18/92.

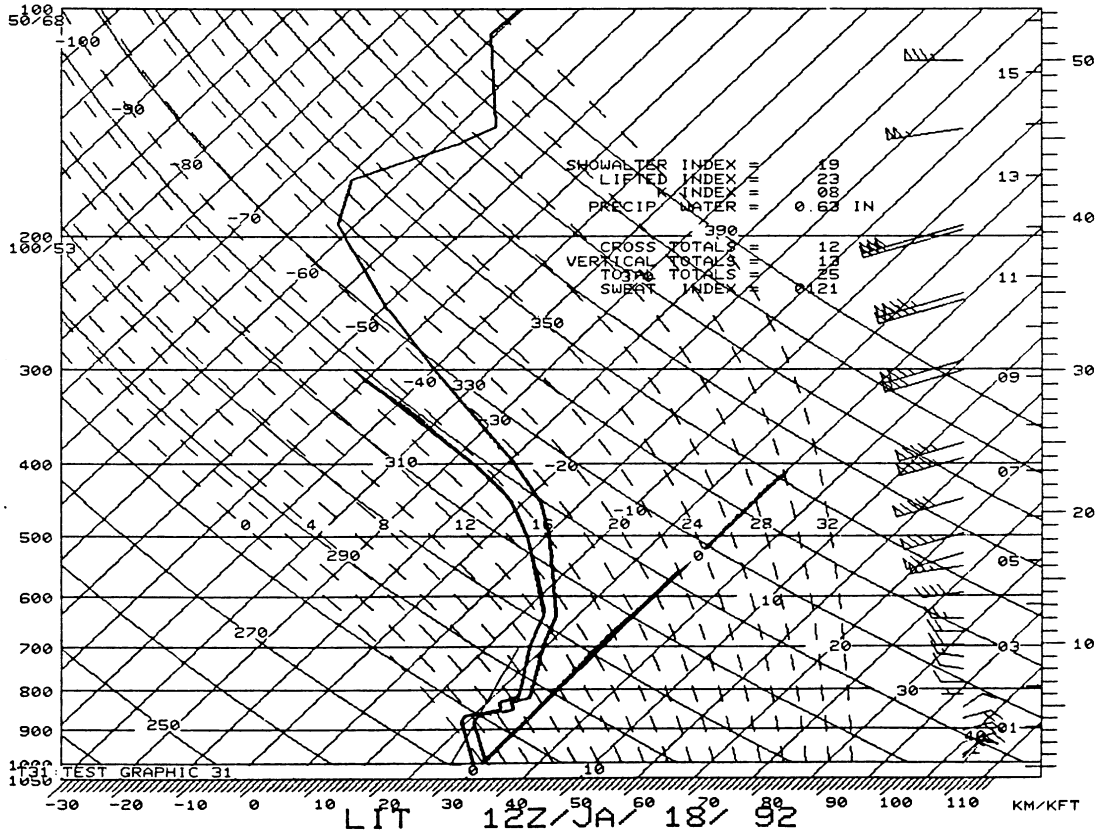


FIGURE 5. 12Z 1/18/92 SOUNDING AT LITTLE ROCK, AR.

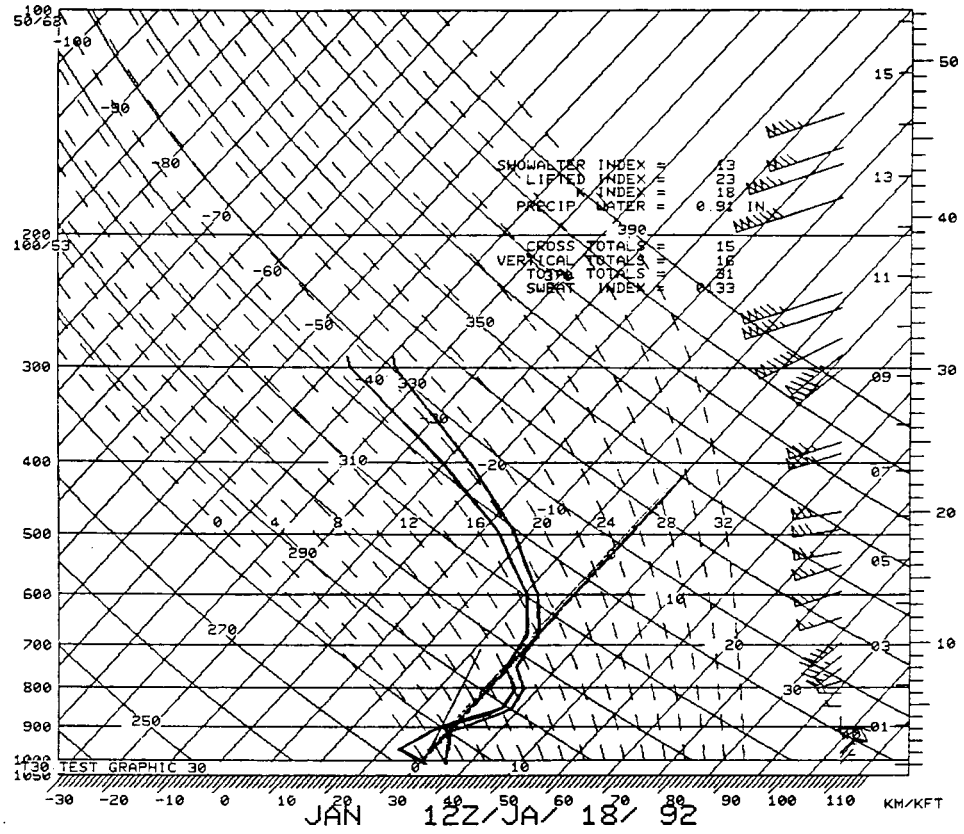


FIGURE 6. 12Z 1/18/92 SOUNDING AT JACKSON, MS.

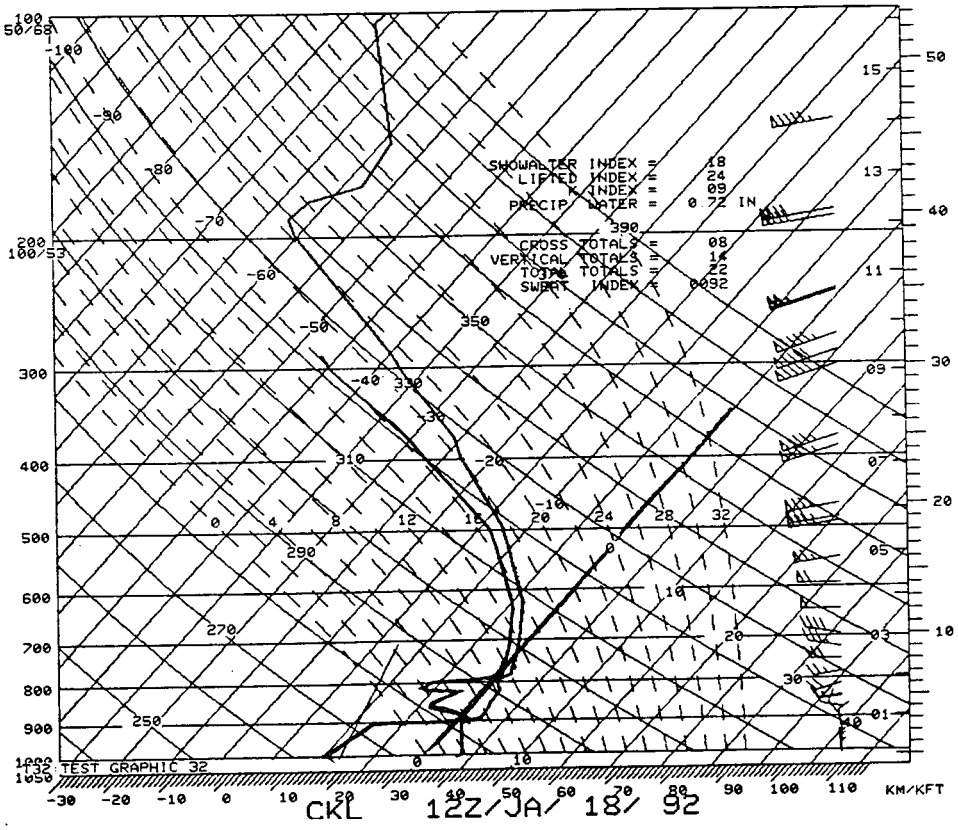


FIGURE 7. 12Z 1/18/92 SOUNDING AT CENTREVILLE, AL.

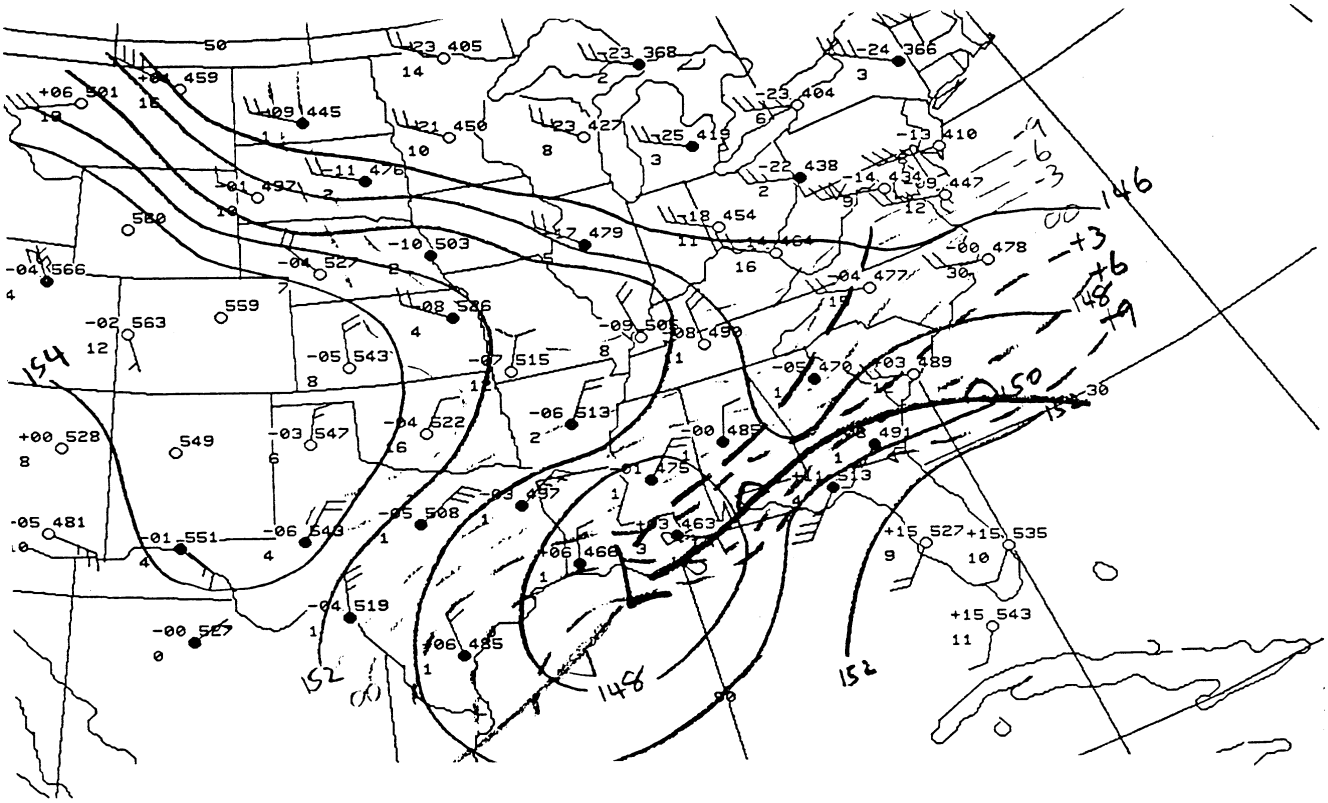


FIGURE 8. 850 Mb HEIGHTS/TEMPERATURES AT 00Z 1/19/92.

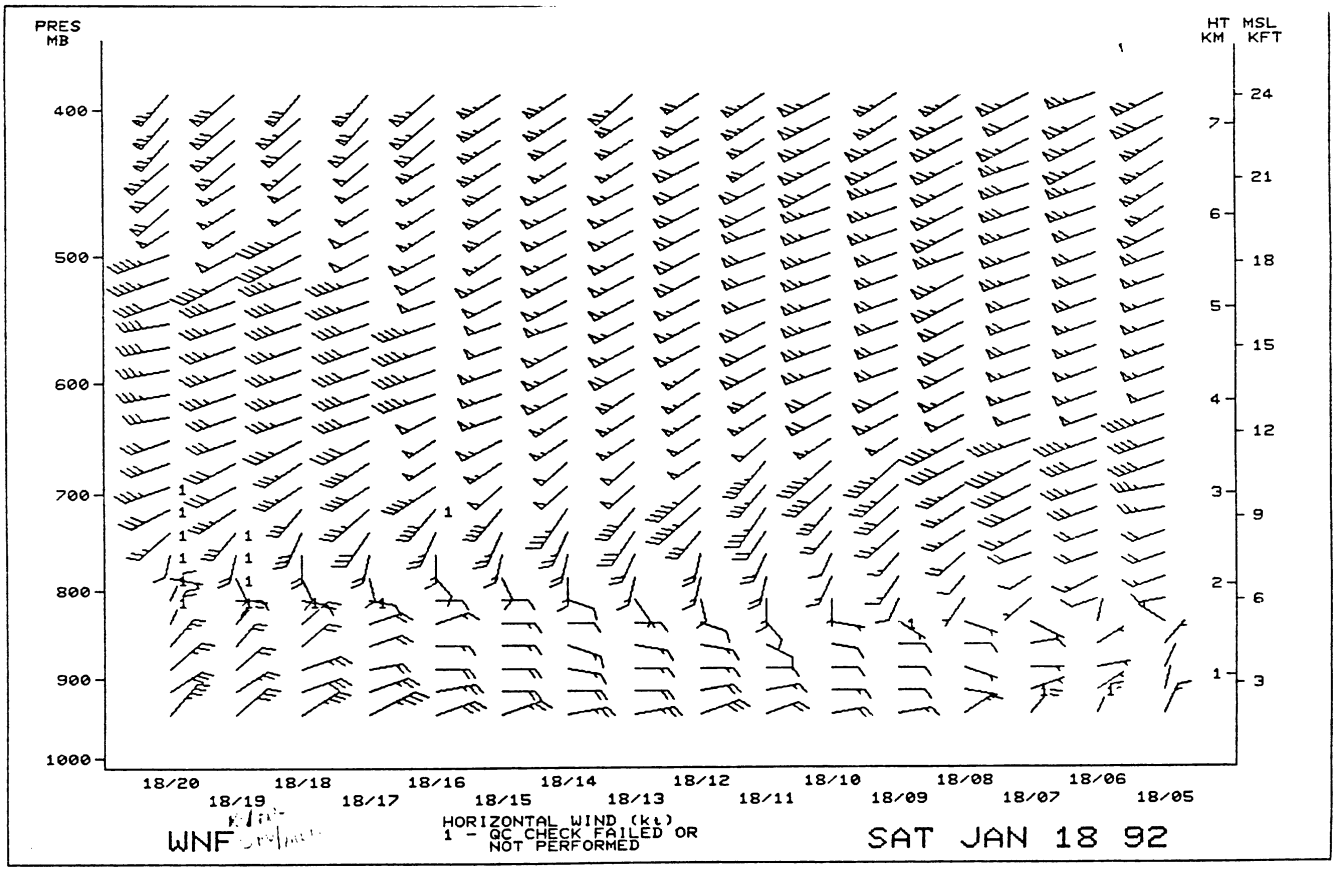


FIGURE 9. TIME SECTION PLOT OF WIND PROFILER AT WINNFIELD, LA.

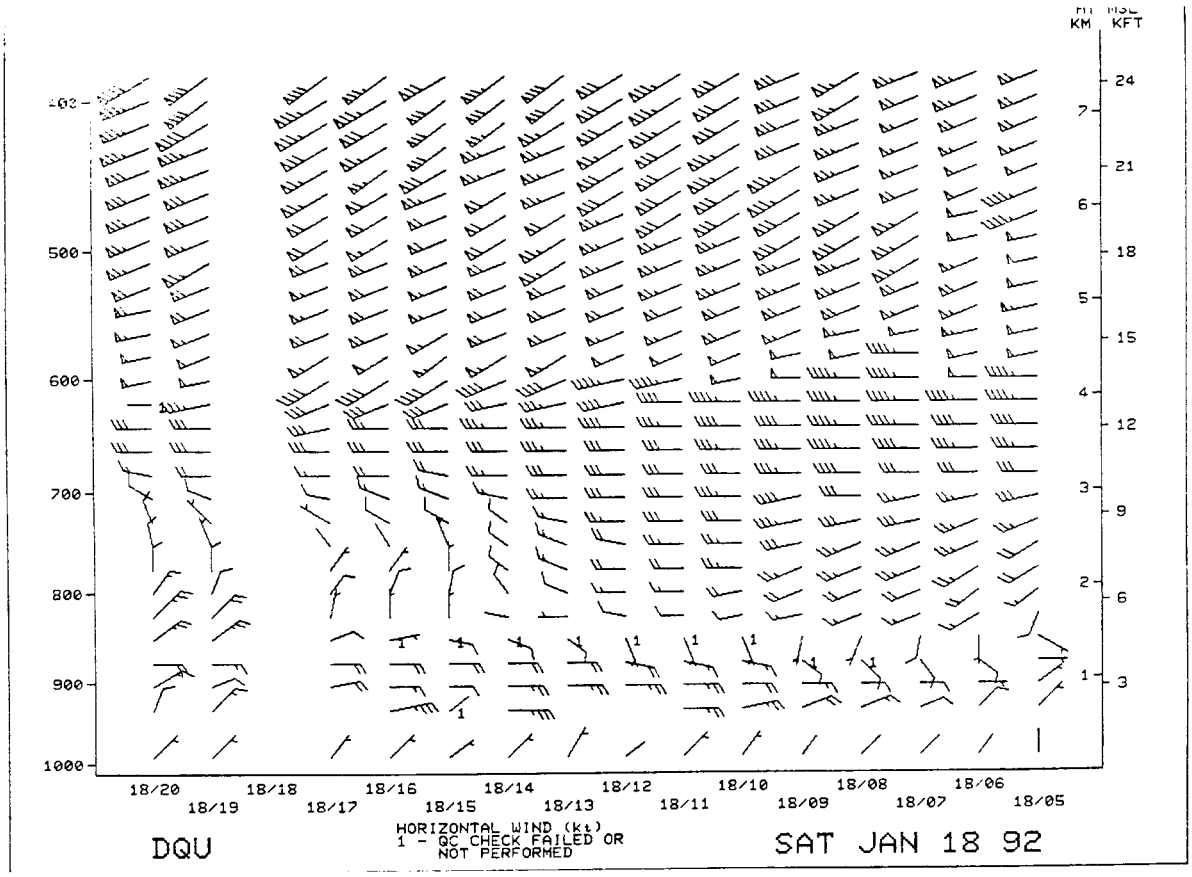


FIGURE 10. TIME SECTION PLOT OF WIND PROFILER AT DEQUEEN, AR.

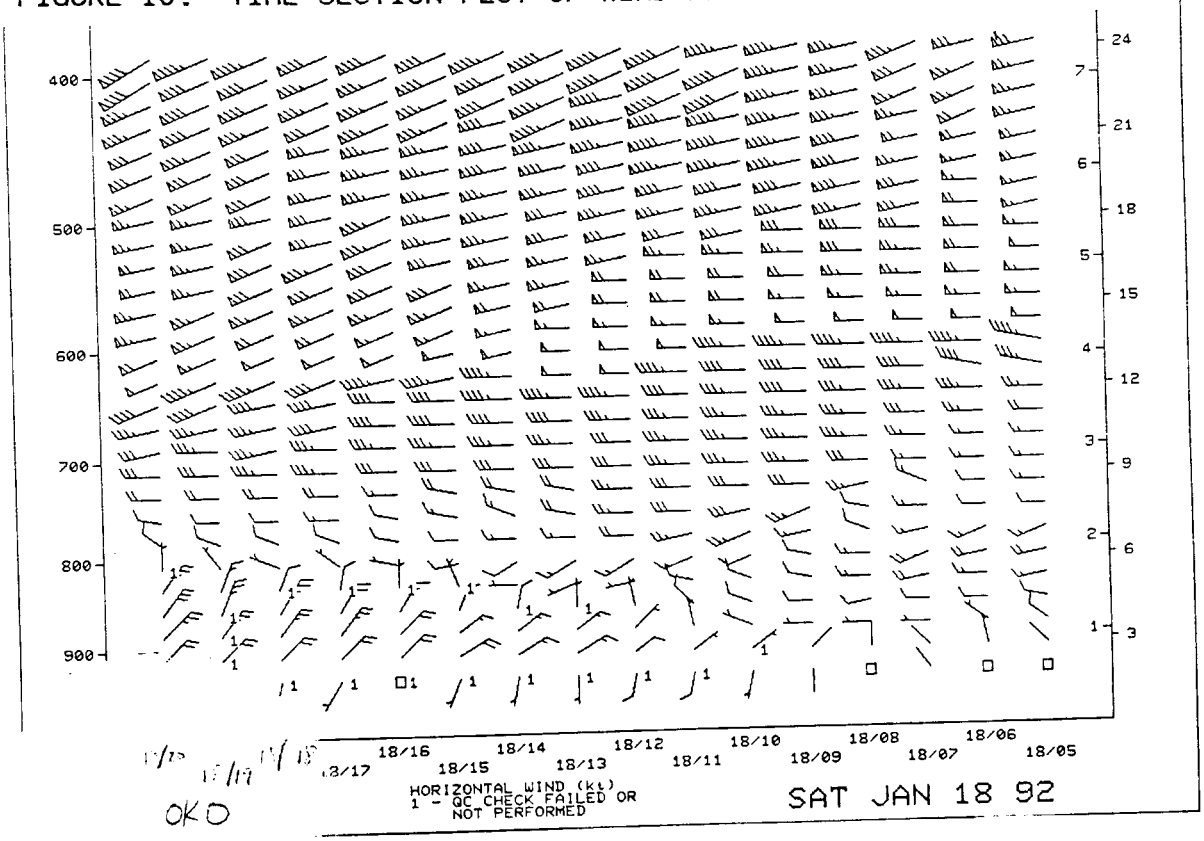


FIGURE 11. TIME SECTION PLOT OF WIND PROFILER AT OKOLONA, MS.