IC7.4: Optional Job Sheet Answer Key

Diagnosing Unexpected Precipitation Areas

Question 1. Examine the 00 UTC February 14 analysis through 00 UTC February 15. Where is the strongest QG upward vertical forcing located over the next 24 hours (through 00 UTC on the 15th)?

North Texas and just north of the Red River in southern Oklahoma has strong Q-vector convergence at 00 UTC on February 14th. The convergence shifts fairly quickly east into northern Louisiana and southern Arkansas by 00 UTC on the 15th.

Question 2. Does the location and intensity of the precip agree with what you saw in the 12 hr forecast from the NAM 80 in the previous step?

Location is essentially the same as the previous 12 hr forecast valid at this time, but it does look for intense and is hanging around in the western part of the CWA whereas the model progged the short wave trough to move faster east such that there shouldn't be any snow in that area at 12 UTC, as there clearly is on radar..

Question 3. Are these snowfall totals consistent with the snow advisory currently in effect?

Certainly not. As the radar alluded to, snowfall amounts are much heavier across the advisory areas, even exceeding warning criteria in a few spots. Location of the advisory is good though.

Question 4. Given current trends in radar, which counties will likely see additional snowfall exceed (or likely already has exceeded) warning levels?

Given current trends in satellite and radar, we feel the following counties will likely exceed warning criteria very soon:

In Texas: Wilbarger, Hardeman, Wichita, Clay

In Oklahoma: Tillman, Jackson, Cotton, Stephens, Jefferson, Carter, Love, Marshall, Murray, Bryan, Johnston.

Question 5. Where is strong QG forcing coupled with frontogenesis, and is it stronger and/or positioned differently than previous model runs?

The latest model run (12 UTC on 14th) has WG forcing much further west that previous model runs, consistent with radar/satellite/metar trends. Q-vector convergence is also much stronger this run that previous runs, and perfectly coupled with 700 mb frontogenesis across north central Texas. Evidently, the model runs were too weak and fast with this short wave trough. There doesn't appear to be much if any significant instability along the Red River, this event looks to be synoptic forcing coupled with frontogenesis.

Question 6. What do you notice about the location of the rising motion vs. area of frontogenesis?

The maximum rising motion (-8 μb/sec) is located 100 mb above the maximum frontogenesis.

Question 7. Is this cross section favorable for efficient snowgrowth in the dendritic growth zone? Where are these conditions most favorable?

Yes--maximum rising motion is centered roughtly on the -20 C isothem.

Question 8. Is there any instability, and if so, is it favorably coupled with frontogenesis? Where is the instability greatest?

Very little instability on this cross section. There is some MPVg in central Oklahoma well north of the maximum in frontogenesis. There doesn't appear to be any CSI or CI after examining the equivalent potential temperature and Mg countours.

Question 9. Snow likely to continue through ~00 UTC

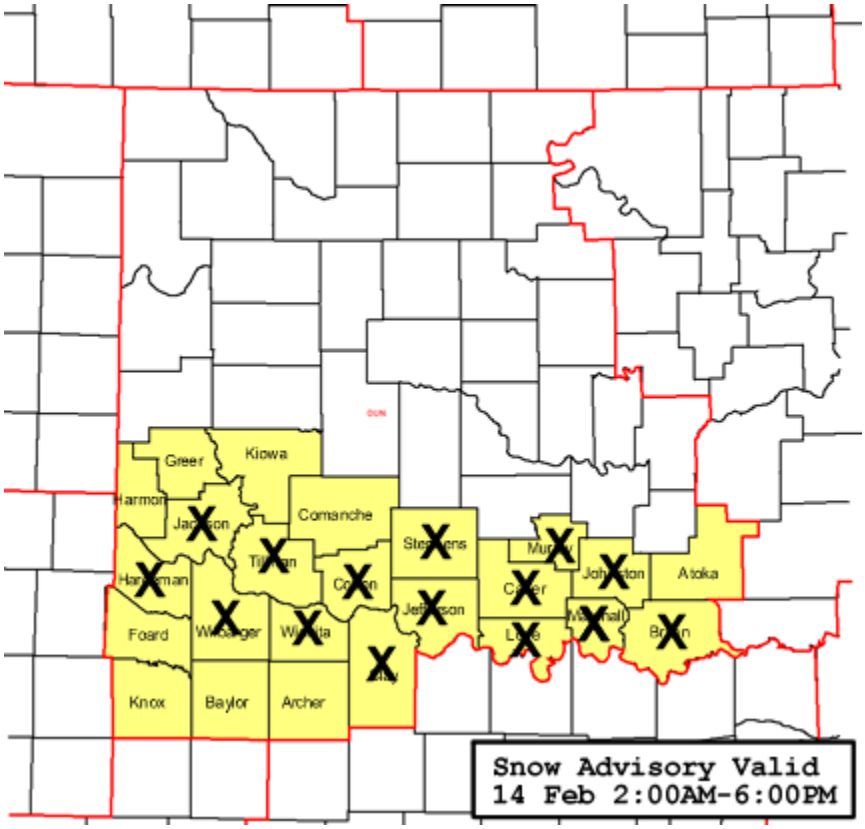

Figure 1. Upgraded heavy snow warning with counties receiving the upgrade shown with an "X" in them. This now expires at 8 PM CST on 14 February as discussed in the text.

Question 10.HSW Expires at: 8 PM CST (tacked on a couple of hours to account for snow ending across SE couties in the CWA

VERIFICATION (from OUN Storm Data): Advisory conditions met for the following
OK counties: Harmon - Greer - Kiowa - Comanche - Stephens - Murray
TX counties: Knox, Baylor, Archer

Heavy snow warning conditions met for these OK counties: Jackson - Tillman - Coal - Cotton - Jefferson - Carter - Johnston - Atoka - Love - Marshall - BryanHarmon - Greer - Kiowa - Comanche - Stephens - Murray
TX counties: Hardeman - Foard - Wilbarger - Wichita - Clay