HW2 Write Up Roz Roberts IV

1. List of lowest inversions:

The 12 UTC measurement is in the morning, and thus the lowest inversion is co-located with the surface. I expect this to be caused by diurnal cooling of the surface. The first lifted inversion is at a lower level than 00 UTC, indicating that the stable layer of air is now closer to the surface.

| Time | 18 UTC | 00 UTC | 12 UTC |
| --- | --- | --- | --- |
| Pressure [hPa] | 883.00 | 728.00 | 1007.00 / 878.10 |

1. Compute CAPE and CIN for the soundings:

| Time | 18 UTC | 00 UTC | 12 UTC |
| --- | --- | --- | --- |
| CAPE [J/kg] | 3567.92 | 4144.41 | 0.00 |
| CIN [J/kg] | 18.88 | -18.69 | 0.00 |

1. What is the wind profile of 00 and 12 UTC?

18 UTC - Greatly Veering Profile (WAA), thus we can expect a large amount of wind shear, indicating severe weather in the region is likely.

00 UTC - Decent Veering Profile (WAA), thus we can expect a decent amount of wind shear, indicating severe weather is probable

12 UTC - Greatly Backing Profile (CAA), we can expect to see little wind shear and the chance for severe weather to be less probable

1. Estimate 1 km wind shear for 00 UTC, and 12 UTC.

Since the shear is decreasing with time. It is going from a fairly large speed to a smaller speed even though the direction hasn’t really changed, thus we can infer that the air is becoming more stable. This is also backed by the CAPE and CIN (mentioned above).

| Time | 18 UTC | 00 UTC | 12 UTC |
| --- | --- | --- | --- |
| Shear Dir [deg] | 52.32 | 6.77 | 359.07 |
| Shear Spd [kts] | 41.71 | 30.35 | 19.56 |

1. Surface Pressure over time

The surface pressure over time is increasing, which indicates we are becoming a more stable atmosphere. This increase is caused by descending air, like from a high pressure system moving into the region.

| Time | 18 UTC | 00 UTC | 12 UTC |
| --- | --- | --- | --- |
| Pressure [hPa] | 991.00 | 992.00 | 1007 |

1. Will the severe weather continue after 12 UTC?

From what we have found above, I do not think that Severe Weather is likely to continue after 12 UTC as the atmospheric conditions are getting more stable rather than unstable.

UTC to JAN Time Conversion:

| 04/27/2011 18 UTC | 04/28/2011 00 UTC | 04/28/2011 12 UTC |
| --- | --- | --- |
| 04/27/2011 13:00 | 04/27/2011 19:00 | 04/28/2011 07:00 |

A note on the Hypsometric Equation used in this script. The Non-Isothermal Hypsometric Equation was collected from Wallace and Hobbs 1977 on pages 60-61. To find this equation I had to go to the Weaver Science and Engineering Library and find the original, version 1, of the book. This was in an effort to understand the associated MetPy function of “height\_to\_pressure\_std” which was originally used to calculate the pressure for the Lifting Condensation Level in my code. I have since coded the LCL pressure by hand using the equation from Wallace and Hobss instead of relying solely on MetPy.

(This totally didn’t take about three hours to track down… But at least it works now!)