Jacob Haimes
Clouds Assignment 1 Report
ARTF 5200

Overview

This photo was taken at approximately 6:00 pm on October 11th, 2021. I was facing north-northwest, and was located approximately one block due east of the intersection between College Avenue and 28th Street Frontage Road in Boulder, Colorado. This time was partially chosen due to the fact that sounding data for Denver is recorded at 00Z (12:00 midnight GMT, and 6:00 pm MST) by the University of Wyoming [1]. The final image can be seen in Fig. (1).

Figure 1: Final image used for the first clouds assignment. We note the different cloud elevations, as well as the cloud shearing occurring. The difference in lighting of the lower and upper cloud groupings can be attributed to the setting sun.

Atmospheric State and the Skew-T Diagram

In order to understand what is occurring in the atmosphere, we can use the skew-T diagram, seen in Fig. (2) along with the final picture. This picture shows two distinct layers of clouds. The lower group, both in altitude and in the frame, appears to be occurring around 4 km above the ground, based on the skew-T diagram. Because these clouds are not particularly puffy, my guess is that they are stratus clouds. Above them, we see a second altitude grouping, which is occurring around 10 km, based on the skew-T diagram. There are, however, two types of clouds within this group. In the foreground we see wisp like streaks and relatively dispersed clouds. These also don't appear to be fluffy, so I think that they are alto stratus clouds. Further away, in the bottom left of the frame, we see a couple formations that look to be alto cumulus, due to their puffy nature. Returning to the center of the frame, we take note of the high wind speeds (the flags on the right of the skew-T diagram [2]) in the 10 km region. The change in wind speed that occurs from 8 km to 11 km is likely to be the cause of the shearing phenomena that we see here.

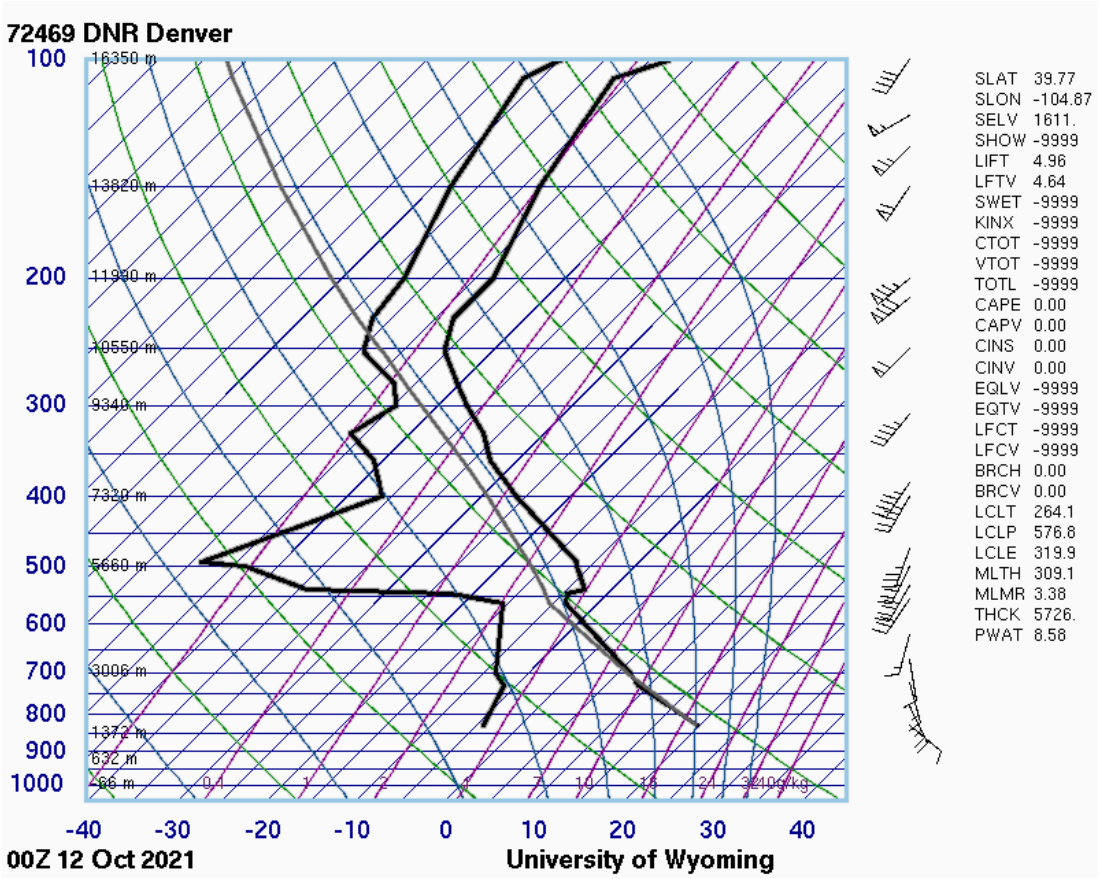

Figure 2: Skew-T diagram for 00Z, October 7$^{\text{th}}$, which is synonymous with 6:00 pm (MST) on October 11$^{\text{th}}$. The skew-T diagram was generated using the atmospheric soundings website of the University of Wyoming [1]. Some editing was conducted on the diagram in order to make the various lines more distinct.

Photographic Techniques

The pictures were taken with a Nikon D90 using a AF-S DX VR Zoom-Nikkor lens. An aperture of f/8.0, an exposure of 1/640, and an ISO of 320 were used. The image underwent post processing in darktable, which primarily utilized lens correction, adjusting white balance, bringing in the edges on the base curve, adjusting color zones, and increasing local contrast. The original images, in lower resolution, can be seen in Fig. (3) for context regarding initial image quality and field of view.

Figure 3: This was the original photo taken, unedited other than to reduce it's size for display purposes. The original image was 4310×2868 pixels.

Final Thoughts

Overall I am relatively pleased with the outcome of this photo. In particular, I feel that it does a good job visualizing the difference in wind speed at varying altitudes when paired with the skew-T plot. In the future, I am going to try to take even more photos of clouds, so that I have as many to choose from as possible. I will also try to obtain a view that is absent of any obstructions, as I don't like the non-cloud noise that this image contains at the bottom of the frame.

References

[1] L. Oolman, Ed., "Department of Atmospheric Science," Atmospheric soundings, 2021. [Online]. Available: http://weather.uwyo.edu/upperair/sounding.html.

[2] J. Haby, "Skew-T Basics," The Weather Prediction. [Online]. Available: http://www.theweatherprediction.com/thermo/skewt/.