UNIVERSITY OF COLORADO, BOULDER

Boulder Sunrise

Cloud Assignment 2

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MCEN 4151
Flow Visualization

The purpose of this image was to capture the beautiful hues of a Boulder sunrise. This was the second of two cloud assignments for the CU Boulder Flow Visualization course. The intent was to capture the contrast between the warm colors from the sun in the clouds and the cold colors of the sky above. In addition, it was intended to capture the combination and orientation of altostratus and altocumulus clouds. The edited image resulted in a striking blend of color, depth, and texture.

This image was taken on February 24, 2014 around 6:45 am in Boulder, CO. The camera was oriented east, facing the sunrise, and was angled along the horizontal axis approximately 25 feet from the ground. The clouds captured in this image can be classified as altostratus and altocumulus. Altostratus clouds can be seen toward the bottom of image, and extend a few miles east. The altocumulus clouds can be seen toward the top (and front) of the image. The surrounding sky was mostly calm and clear to the west with remnant clouds scattered to the east. Wind was low, which made for a beautiful morning to photograph the sky. The weather had been about the same on the previous day, but the day to follow brought lower temperatures and light snow. The skew-T plot below confirms that the atmosphere was stable (CAPE = 0) during the time the picture was taken.

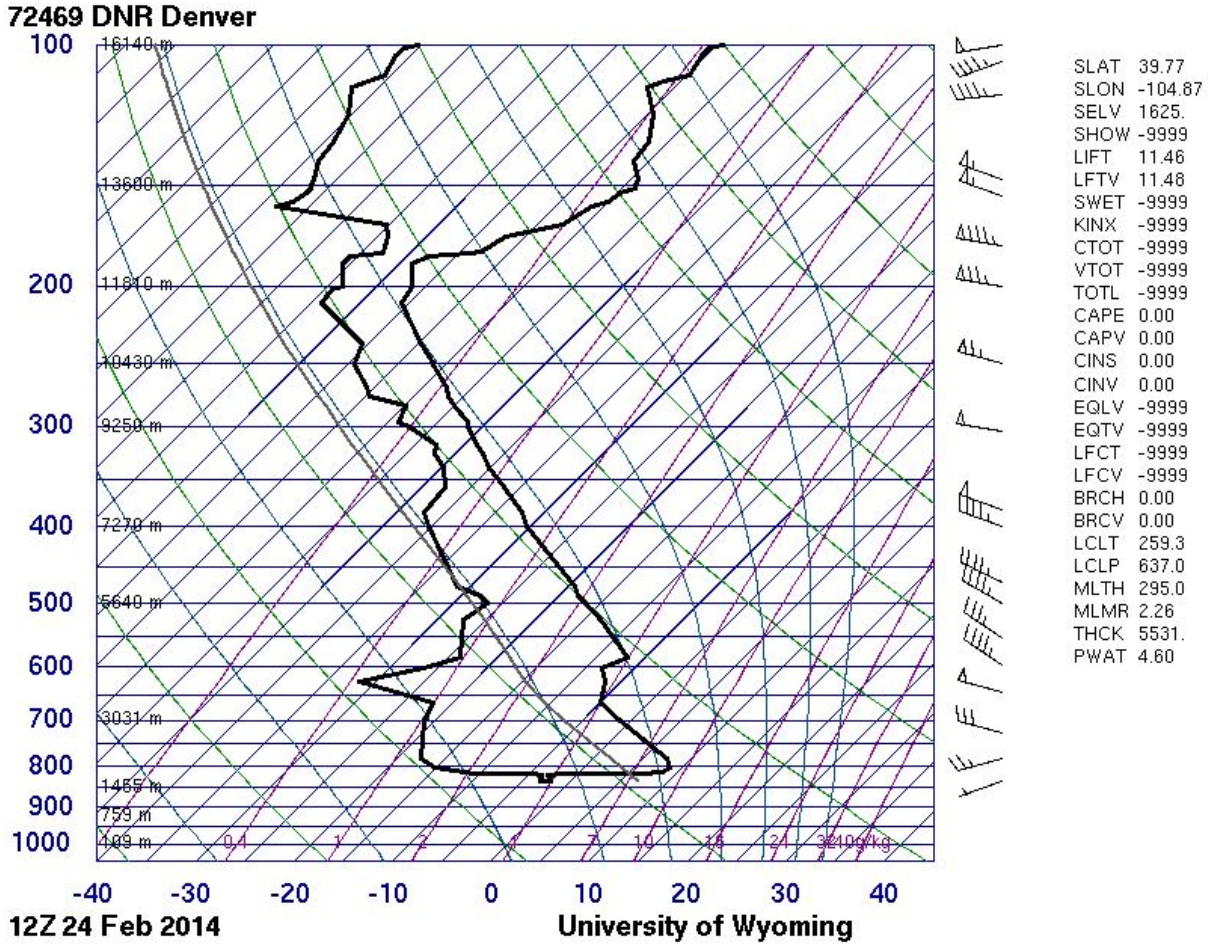

Figure 1: Skew-T Feb 19 00Z (Wyoming)

The skew-T diagram shows a pronounced low level inversion. An inversion is an area in which air temperature increases with an increase in altitude. The surface temperature on this skew-T is approximately -5^{o}C, and slightly above the surface, the temperature increases rapidly to approximately 12^{o}C. Inversions have the tendency to “trap” smog and dust below the inversion level, which makes the air near the surface appear hazy. At the top of the inversion, there is a distinct increase in visibility (since above the inversion smog and dust are no longer trapped in place). This phenomenon can be viewed in the bottom left of the image.

The image was captured using a Nikon D40X digital camera with a focal length of 40mm. I used the aperture-priority setting with an f-number of f/5, ISO of 200, and shutter speed of 1/100. I chose a slower shutter speed and a lower ISO so I could minimize the likelihood of noise, but still be able to capture the image using natural daylight.

Figure 2: Original Image (3872x2592 pixels)

Because of my position relative to the clouds, I captured several trees around the edges. I decided to crop the left of the image, but I left the trees on the right side because I loved the depth they added. I really liked how the sweeping silhouette of the trees added to the dimension and layers in the clouds. I used post-processing techniques to enhance the hues of the warm colors in the clouds at the bottom and the cool colors in the sky at the top of the image. The main edits I made were cropping the image and increasing the contrast using the curves function.

I was really pleased with the final image for this assignment. I struggled between two images when making my final decision; this one, which had more done in post-processing, and one that reflected the pastel palette of the original image. Ultimately, I liked the vibrant contrast between the blues and oranges and thought the combination of the two resulted in the most interesting and visually pleasing image. I think the image could be improved by having fewer trees, so the sun is more visible, but I do think that the solid silhouette of the trees makes them less distracting and more of a visual additive of depth and perspective.

Works Cited

Wyoming, University of. *72469 DNR Denver Sounding*. 24 February 2014.