Clouds 1 Image Report

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This is the first cloud assignment for the Flow Visualization course where the class was tasked to take an image of an interesting or visually appealing cloud phenomenon. I chose to take this image on a day when I noticed the skies were a particularly bright shade of blue which starkly contrasted the white cumulus

clouds I noticed flying high in the sky. The cloud phenomena I photographed allowed me to make estimations of the stability of the atmosphere as well as winds that may be present on that particular day. From this image assignment I learned that clouds are an incredible tool that can provide one with great observations on the weather and atmosphere of that day.

I happened to be in Centennial (a suburb south of Denver) on this particular day and that allowed me to get an image of not only the cumulus clouds but also the cap cloud covering the divide. I drove to the top level of a parking garage where I was able to take photos of the cumulus clouds without distractions of trees or buildings in the foreground. I figured that an image of the clouds with a backdrop of the mountains would be very impactful and demonstrative of the atmosphere that day. At the top of the parking garage I positioned my camera (Nikon D40) to be facing west at a parallel to the horizon. I took multiple photos on Sunday, February 16th from 3:00-4:30 pm and the final image I chose to submit was taken at about 3:45 pm. The clouds seen in the center of the image are classified as altocumulus lenticularis. I distinguished these as such due to their high, vertical nature and distinct edges. There were clouds in all directions I turned that day. Stratus clouds when I was facing southeast and more cumulus clouds when I was facing northeast. On that Sunday it happened to be extremely windy which explains the presence of the other cloud over the divide. This can be classified as a cap cloud[1], which only occurs on extremely windy days. The skew-T plot (Figure 1) shows that the atmosphere is stable that day because the CAPE number does not have a value[2]. Assuming that the mountains in the image are at about 13,500 feet, it can be estimated that the cumulus clouds are at about the same height. This corresponds to about 4000 meters, which makes sense on the Skew-T diagram because the temperatures

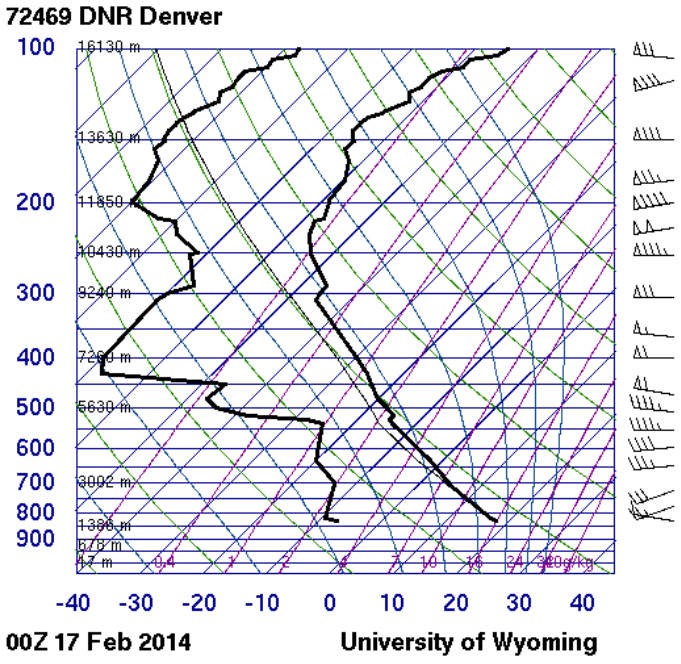

Figure 1 Skew-T Diagram of Denver on February 16, 2014

[1] Hertzberg, Jean. "Cloud Physics; Orographic and Synoptic Uplift." MCEN 4151: Flow Visualization Lectures. Fleming Law Building, Boulder, CO. 18 Feb. 2014. Lecture.

[2] Oolman, Larry. "Atmospheric Soundings." Atmospheric Soundings. University of Wyoming, Web. 19 Feb. 2014.

begin to decrease above that height. I assume that the cap clouds are covering the divide at about 14,000-15,500 feet of elevation.

Using a Nikon D40 SDLR camera, I took the image using the automatic settings and manual focus. The focal length is 18mm with a max aperture of f3.5, shutter speed of 1/500 and ISO speed of 200. Although it is difficult, I estimate the field of view to be about 40 miles wide since I know that the distance from my location to the start of the Rocky Mountains is about 25 miles and the image seems to double that length. The photo was post-processed using the iPhoto application for Mac. I increased the definition and highlights and also I used the shadows setting to remove some shadows and make the image sharper. The original unedited image (below) is 3008x2000 pixels and the edited image is 2830x1873 pixels.

Overall, I enjoyed taking the clouds image much more than expected. Clouds are fascinating in the way that they can give off so much information on the atmosphere and the weather of the day. The one aspect that I do not like about the image is that the front of the cumulus clouds appear dark, which makes is seem shadow-y and it obscures the true color of the clouds that day. It was difficult to capture the bright white clouds contrasting the blue sky on my camera, especially when the sun was behind the clouds. However, I love how the sun is hiding behind the clouds and creates a nice "glow" behind them. I also enjoy how the clouds are so tall and the cap cloud is also very interesting to me because it tells so much about the weather of that day. To develop this idea further, I would have liked to set-up a time-lapse so that I could have captured the movement of the clouds over a long period of time. Although in the end, the beauty of Colorado and the clouds over the Rocky Mountains is what makes the image so magnificent and I love it for what it is.

Figure 2 Original, unedited image of cumulus and cap clouds