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MCEN 4151 - 001
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Cloud First Report

This image was part of the Clouds First Assignment. It was my first attempt at capturing the well-known phenomena that we all see every day. Originally, I took an image of a layer of fog that had settled at the base of the Flatirons right at the end of a long snow storm. However, my camera's SD card became corrupted and I had to find a new source for the image. The actual image focuses on more common cloud compositions as can be seen on the title page.

This picture was taken in the Flemming parking lot facing Southeast looking above Wolf Law. I was standing at ground level and the camera was aimed at the sky at an angle of about 30º. It was taken at 6:00 P.M. (00Z) on October 16. 2018 figure 1 below shows the location and direction of the camera shot.

Figure 1: Map of CU campus, showing my orientation when taking the photograph.

As a relatively inexperienced cloud enthusiast, I had a lot to learn; not just about how to effectively photograph them but also the physics on how clouds are constructed and how those factors affect how clouds are classified. Before this image was taken there was a week-long storm where it snowed constantly with the sun hidden for the entirety of the storm. There was about an eight-hour gap between that front and a second wave of the same heavy clouds and snowfall. The wind was relatively calm between these fronts. Using the knowledge from lectures and analyzing a skew-T chart, I assume these clouds are stratocumulus. These clouds are formed in stable atmospheres which makes sense as the atmosphere had a CAPE of zero that day. Figure 2 below shows the nearest skew-T plot to the Boulder area and gives a good indication of atmospheric potential that day. The boldened line on the right indicates the actual temperature of the atmosphere at a given altitude. The boldened line on the left indicates the dew point of the atmosphere at that altitude. When these two lines are close together, chance of cloud formation is statistically high. Analyzing the skew-T graph we can see these lines are close together from about 4,500 ft. to 9,000 ft. above sea level. Boulder's elevation is around 5,300 feet above sea level which means these clouds should have formed below 3,700 feet relative to Boulder. This matches the characteristics of stratocumulus clouds as they are low level clouds typically less than 6,600 ft

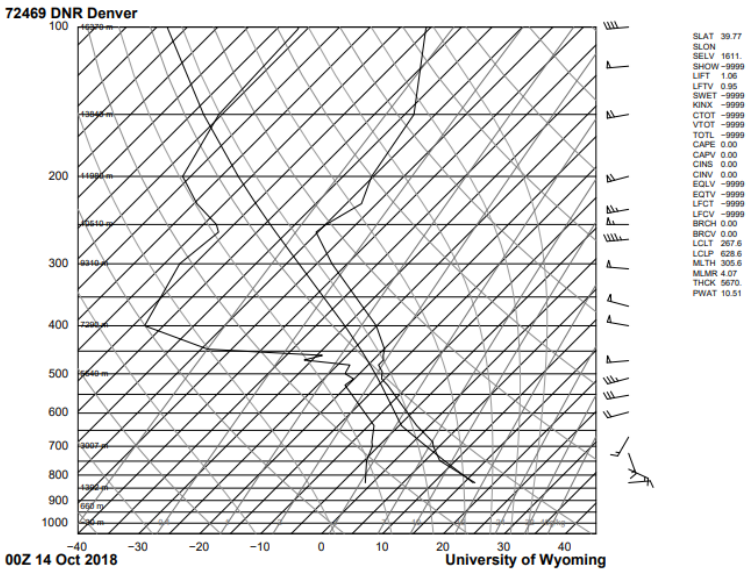

Figure 2: Skew-T chart from Denver, Colorado during the time of the photograph.[1]

It's hard to give an exact estimate on the size of the field of view, but from the image, you can get a reference using the building. I estimate that the length of the building in view is about 100 feet. I was standing about 250 feet from the building which can be shown in figure 1. The lens had a focal length of 48mm and an F-stop of f/5.6. The ISO was set to 4000 with a shutter speed of 1/800 seconds. The exposer bias was also set to +3 step. I found out a week after the image was taken that I had my white balance set to an unknown offset. I reset the camera settings to fix this, but unfortunately, I do not know the exact specifications of the white-balance settings for this photograph. This photo was taken using a Nikon D5100 DSLR camera. The original photo was 3696 x 2448 pixels and the final image was 1300 x 861 pixels. The only post editing was the curve shown in figure 3 which helped black out the building and trees, thus focusing attention on the clouds in the background.

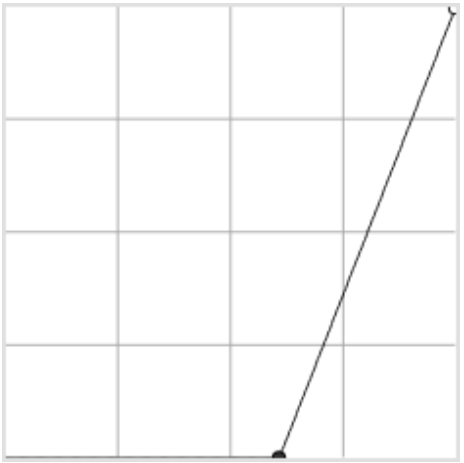

Figure 3: RGB curve edit used in post-processing.

While the image does not exactly stand up to my artistic standards, I was able to find a drastic mistake in my camera thanks to the help of a classmate during a review of my photograph. Using this information, the camera was reset back to correct specifications and photos from here on out will be absolutely astonishing compared to my initial images. I really like how I framed the photo and how the clouds were presenting themselves on that day. I'm excited to see what my second cloud photo can become now that I have my camera back to its full potential.

REFERENCES

[1] Department of Atmospheric Science, U. (n.d.). Retrieved from http://weather.uwyo.edu/cgibin/sounding?region=naconf&TYPE=PDF%3ASKEWT&YEAR=2018&MONTH=10&FROM=1600&TO=1700&STNM=72469