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Clouds First Image/Video
MCEN 5151: Flow Visualization
Stratocumulus Cloud. Boulder, CO.
September 27, 2019. 1:23pm.

I. Introduction

This assignment was the first clouds assignment of the semester. For this picture, we were supposed to photograph any cloud formation between the first day of the semester and the due date (August 26 through October 13). I decided to take as many pictures as possible on multiple different days in order to capture the widest variety of cloud formations. After looking over the numerous pictures I had taken, I decided to go with a stratocumulus cloud picture I had taken towards the middle of the assignment period.

II. Circumstances

My cloud picture was taken at 1:23pm, on Friday, September 27, 2019. The picture was taken on the third floor of the Bear Creek Apartments Building B, in Boulder, CO, where I live. I was facing South/Southwest, and the angle that the picture was taken was roughly 60 degrees from the horizon line. I had to use such a steep angle due to the fact that I had to angle my phone against the windows of the building. Below is a figure depicting the photographic setup used in order to capture the cloud formation. The figure is not to scale.
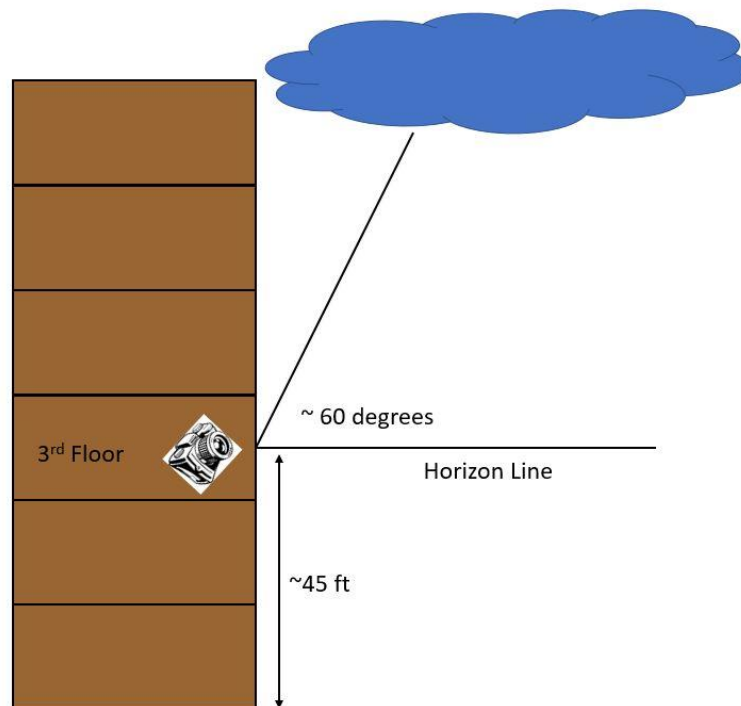

Figure 1: Diagram of Photographic Setup

III. Cloud Data

The cloud I captured is a stratocumulus cloud. I determined this using multiple methods and research avenues. The first being the Skew-T diagram. The Skew-T diagram measures different environmental factors at a multitude of altitudes to help predict cloud formation and weather. Skew-T measurements are done twice a day, at 6am and 6pm. Since my picture was taken after 12pm, I decided to use the Skew-T diagram from 6pm on September 27, measured at the Denver location. Note this correlates to 00Z on September 28, which is why the date on the diagram does not immediately match the date of the picture. In my Skew-T diagram, it can be seen that the two thick black lines converge between 3500 meters and 5700 meters. Although this is a higher elevation than normal for a stratocumulus cloud, which forms at around 2000 meters [1], I feel this is an accurate description due to the weather patters happening throughout the day, and the characteristic shapes that match the stratocumulus cloud more so than other cloud formations.

According to weather history, Boulder had a rain storm on the evening of September of 27 [2]. This would mean that the clouds during the evening would be cumulonimbus clouds. The stratocumulus clouds in the afternoon would most likely be gaining altitude as the storm started gathering. The characteristics of stratocumulus clouds are described on the Clouds-A-Day app as "a patch of cloud that has a well-defined, clumpy base", has "tones from white to dark grey", and has "sun-blocking tendencies" [3]. The app also lists that "High Stratocumulus…can be confused with the mid-level cloud Altocumulus" [3]. With all of these characteristics put together, it can clearly be seen that this cloud formation is correctly categorized as high-level stratocumulus.
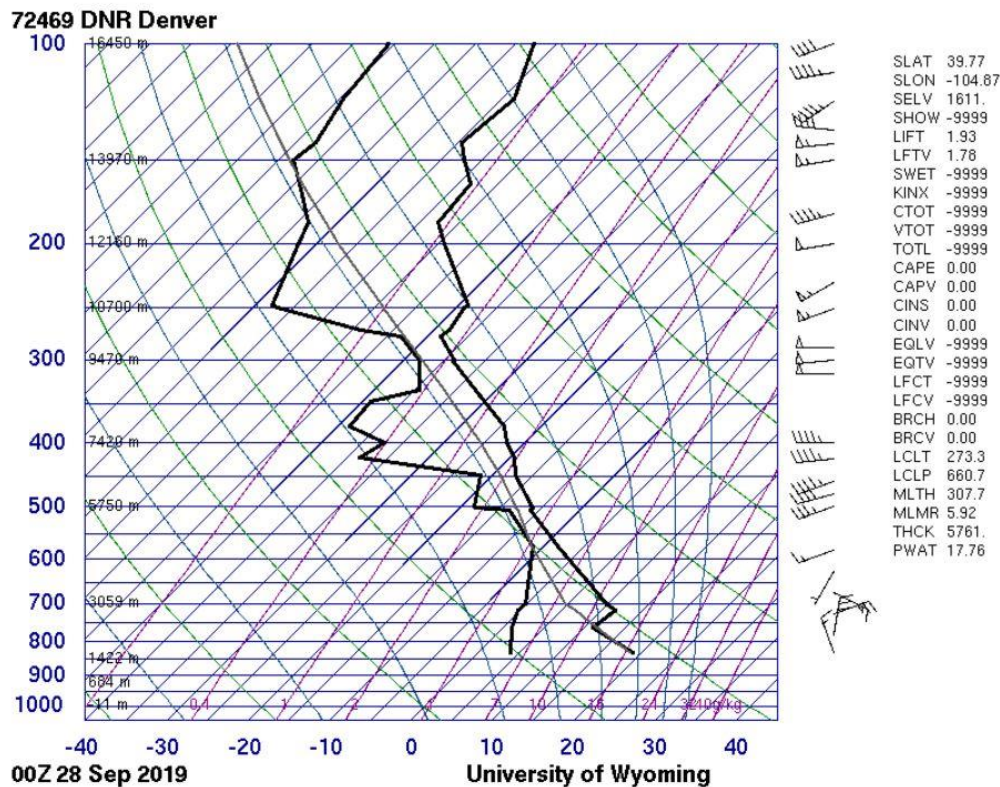

Figure 2: Skew-T Diagram [4]

IV. Photographic Technique

I took this picture using my Google Pixel 3 phone camera. The aperture was f/1.8, the shutter speed was 1/23,256 of a second, the focal length was 4.44mm, and the ISO was 82. These were the automatic settings that the camera used, no manual settings were used for this picture. In post processing, I wanted to try to stay as close to the original picture as possible, but did increase the contrast a little to make the blue stand out more vibrantly against the clouds. This also allowed the lighter and darker parts of the clouds to stand out as well, instead of looking so washed out and grey.

Figure 3: Unedited Photograph

Figure 4: Edited Photograph

V. Results

The cloud formation I was able to capture shows the beauty of nature and weather. The way that the sun is forced to break through the clouds in different areas due to their placement is intriguing, and causes a dichotomy between the light portions on the left and the dark portions on the right. Overall, I am incredibly pleased with the outcome of this picture, and my subsequent research into the different kinds of clouds has helped me understand them more than I thought possible. If I were to change anything about my picture, I think I would like to find an angle that included some of the environmental elements that were left out, such as the mountains. I think that this could enhance the understanding of the field of view, as well as increase the artistic beauty of the clouds by comparing them to something so solid.

VI. References

[1] https://en.wikipedia.org/wiki/Stratocumulus_cloud

[2] https://www.timeanddate.com/weather/usa/boulder/historic?month=9&year=2019

[3] Cloud Appreciation Society, *Clouds-A-Day*, Version 2.1.0

[4] http://weather.uwyo.edu/upperair/sounding.html