Cloud First Fall 2019



Altocumulus Clouds by the ITLL Taken August 29 at 5:14 pm

MCEN 4151-001: Flow Visualization Date: 10/28/2019

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INTRODUCTION

In this assignment, we had to specifically capture some type of cloud pictures. The mission to explore and learn more about the various cloud types and the physics behind them, as well as get to know the various possible photographic techniques that is best used to capture breath-taking cloud pictures. Throughout the duration of this assignment, I came to photograph and learn about the beauty of clouds that I did not appreciate enough in the past. My album in this assignment had 27 photos of clouds formed from August 29 all the way to September 27, and in various times of the day. In this end, I decided to go with one of earliest first pictures I took because I liked the simplicity of it and feeling it gave. That cloud was an altocumulus cloud which is mostly known for having multiple layers.

IMAGE CIRCUMSTANCES

This image was captured August 29 at 5:14 pm near the ITLL building as I was heading home. The camera (my iPhone X's in this case) was held at an approximate 45° angle with an elevation of about 170 cm.

CLOUD IDENTIFICATION

From a simple look at the clouds, one can deduce that it is either altocumulus or stratocumulus. Both of these two types are mainly characterized by having multiple dark layers as seen in the picture. The main difference between them is the altitude as which they form. Altocumulus is known to occur at an altitude of about 4 miles, whereas stratocumulus is at a lower height of about 1.5 mile^[1]. It is worth mentioning that the higher the altitude of the cloud, the larger it usually is. Furthermore, altocumulus clouds mostly form in unstable atmosphere conditions while stratocumulus is the opposite of that. This means that in order to accurately define the type of the captured cloud, accurate data of the weather condition must be obtained. A photo showing the appearance of the sky earlier that day is in Fig. 1. As we can see from both

photos, the weather that day was fair with no major rain or storms. This was similar the day before. However, there was some small showers in the vicinity the following day, August 30.



Figure 1. Weather conditions at 2:44 pm.





Figure 2. Ceilometer data for August 29.

To accurately check the height of the clouds, I used the Skywatch Observatory website ^[2] to obtain some ceilometer data for the day in question. At the time of the picture clouds start forming from 2 km all the way to km, which is roughly 5 miles. To find more information about the stability of the atmosphere, pressures, temperatures, and wind conditions of the system a Skew-T diagram is required. From the University of Wyoming's site ^[3], I obtained the following closest Skew-T diagram of my captured cloud as show in Fig. 3.



Figure 3. Closest Skew-T plot.

From this plot, we can confirm that there were at least two or three layers of clouds. The lowest layer has an altitude of about 6000 m which further confirm that the captured image shows an altocumulus cloud. This was determined by comparing where the dark black lines are closest. The right line shows the atmospheric temperature, while line on the left half shows the dew point. As these temperatures are closes to one another, it is more and more likely that a cloud will form. Following the temperature lines, we can notice how cold it was around those regions as the lowest layer is at about $-20^{\circ}C$ with a continuous decrease in temperature as the altitude increases. The CAPE number, which is shown to be 389 indicated an unstable atmosphere since it is bigger than zero. This is yet another characteristic of altocumulus clouds over stratocumulus clouds. However, the number is not significantly large, so it is a low unstable atmosphere. Pressures were ranging from 500 to 250 millibars. Finally, from the small lines in the right side of the figure, we can deduce that the wind was coming from the north-west.

PHOTOGRAPHIC TECHNIQUE

I did not do any post-processing for this assignment, save for a small cropping at one of the corners to focus more on the cloud. I learned from this assignment how beautiful nature can be in its simplicity, and I thought I did a good job capturing that without having to do tweaking to the original picture. The photo in the title page is exactly how it came out from my phone. The meta-data for the picture are as following: Model: iPhone X, Lens:Apple; iPhone X back dual camera

4mm f/1.8. Focal length: 4.00 mm (in 35mm: 51mm), Exposure: 1/12000 sec; f/1.8; ISO 25, image size is 4032 x 3024 pixels with a resolution of 72.00 pixel per inch. The lightning and all other conditions were natural.

CONCLUSION

I really enjoyed this assignment. By forcing me to take the time and look at clouds to study and capture them, I learned a lot and gained a lot of further appreciation for nature. Other students loved the ray of lights this image show and I have to agree with them, it give some kind of celestial feeling to it. I'm hoping to use the second cloud assignment to capture a different kind of cloud conditions to gain some more insights on this topic.

REFERENCES

- [1] https://www.weather.gov/media/lmk/soo/cloudchart.pdf
- [2] https://skywatch.colorado.edu/
- [3] http://weather.uwyo.edu/upperair/sounding.html