Cloud Second

Fall 2019

Cirrostratus Clouds by Adams Circle
Taken November 2 at 6:12 pm

MCEN 4151-001: Flow Visualization
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INTRODUCTION

This assignment is the second of two assignments in the Flow Visualization class that are specifically dedicated to capturing different types of clouds and studying their flow characteristics. This time, I wanted to capture something pretty different that the cloud I got for the first assignment, which was altocumulus. Also, since the first picture was taken before sunset I wanted to focus mainly on sunsets and night-time clouds here, which why I photographed at only those times. The cloud that I decided to go with in the end was cirrostratus which is a stable kind of clouds which doesn't have a well-defined shape. There were some pretty good candidates that I will include in the end.

IMAGE CIRCUMSTANCES

I took this image November 2 at 6:16 pm right outside my apartment door by Adams Circle as I couldn't miss the great opportunity that I saw through the window. I used my iPhone X to capture this picture. I held the phone at an angle of approximately 45 degrees with my arms extended all the way.

CLOUD IDENTIFICATION

One main characteristic that we see displayed in the image in the lack of a well-defined shape for the clouds. Instead, we have these wave-like structures that appear inter-connected and merged with the sky -like we see in the right side of the image-.These are common features of cirrostratus clouds. To further confirm this, I have obtained the skew-T diagram[1] for the corresponding day and time that the picture was taken. The diagram is shown in Fig. 1.

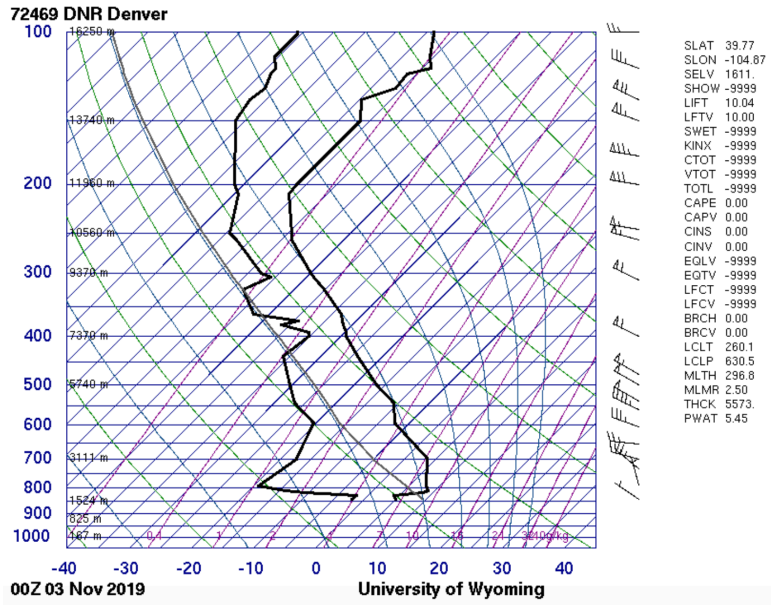

Figure 1. Closest Skew-T plot.

The key information that are presented in this diagram are as follow: The thick black lines are used to determine the altitude where the probability of a cloud forming the highest. The line on the left-side shows the dew point temperature, whereas the right-side line defines the actual atmospheric temperature. The closest these temperatures to each others, the more likely that a

cloud is present in the corresponding altitude. By inspecting the diagram, the lines are closest at a height of approximately 7370 m which is about 4.6 miles. Furthermore, the CAPE number in the right-side of the diagram indicates stability of the atmosphere. Since that value is shown to be zero here, it means that the weather was stable at the day this picture was taken. From Dr. Hertzberg's notes [2], we can confirm that the type of stable clouds that forms at an altitude of around 5 miles is indeed cirrostratus. From the blue temperature lines, we can know how cold it was around the cloud in question. Following the line downward, we can see that the temperature was around - $30°C$, with a continuous decrease in temperature as the altitude increases more and more. The small lines in the right-side reveal information about the wind direction and speed. From the figure, we can deduce that the wind was coming from the north-west. Finally, the pressure can be found by looking at the left-side numbers, which is approximately 400 millibars. A picture taken 3 minutes later while heading to the ITLL building is shown in Fig. 2.

Figure 2. Different angle of the cloud, taken 3 minutes after the submitted picture.

Viewing the cloud from a different angle further illustrate the effect of cirrostratus clouds "merging" with the sky. I also included this picture because of the fantastic colors and angle. I think this should have been the main image, I don't remember why I choose that one over this.

PHOTOGRAPHIC TECHNIQUE

No kind of post-processing was done to the original picture. I was aiming to capture a natural sunset at it is and I found the original colors of the image to be fantastic. The only thing that was done was a small amount of cropping near the edges. However, from the critiques that I got from my classmates I now see that I should have tried to erase some of the trees shown in the bottom. And since the visible building is not really well-designed or appealing, I think darkening it with a black layer might have also added more to the picture. The picture was taken using my iPhone X at 6:12 pm, November 2, 2019. Meta data: Focal length: 4 mm. F number: f/1.8. Exposure time: 1/30. Pixels: 4032 x 3024.

OTHER CANDIDATES

Figure 3. Alternative option showing sunset taken October 15.

CONCLUSION

This assignment further increased my knowledge and interest of clouds and their types. Since I was aiming to capture clouds at specific time of the day, I was more focused on analyzing and enjoying sunsets which gained me some appreciation for them. Now that I have looked back at the pictures that I took, I believe I made the wrong decision as I might have been in a hurry and didn't really pay attention to the details in the other two pictures I included in this report. I believe both of them are superior than the one I went with, both in colors and overall artistic value.

REFERENCES

[1] http://weather.uwyo.edu/upperair/sounding.html
[2] http://www.flowvis.org/wp-content/uploads/2019/10/12.Clouds1.pdf
[3] https://www.weather.gov/media/lmk/soo/cloudchart.pdf