MCEN 4151: Flow Visualization September 29, 2015 Kelsea Anderson



Flow Visualization 2nd Assignment: Clouds 1st

The purpose of this image was to capture a naturally occurring cloud during the time window from the beginning of the semester to the end of September. Clouds are a mass of condensed liquid vapor floating in the earth's atmosphere. Clouds can form at various layers in the earth's atmosphere. Different types of clouds form based off of the geographic location, season, and pressure variations Depending on the appearance and location of the cloud, these formations are given different names to help categorize them.

My image shows a collection of cumulus clouds. Cumulus clouds are formed when water vapor condenses into water droplets in a vertical formation. Cumulus clouds develop in the vertical direction, from their bases upwards. Cumulus clouds are classified by their fluffy, puffy appearance and are often associated with convection in the atmosphere due to their tendency to grow upwards. As a cumulus cloud builds it has the possibility to develop into a Cumulonimbus, more commonly know as a rain cloud.

This image was taken at 2:45pm, so an evening Skew-T diagram was used to analyze the atmospheric conditions near when the photograph was taken. The Skew-T data was from the Denver International Airport's weather surveying data. The Skew-T plot was found using the University of Wyoming's Department of Atmospheric Research page. This diagram can be seen in Figure 1 and attached to the end of this report.

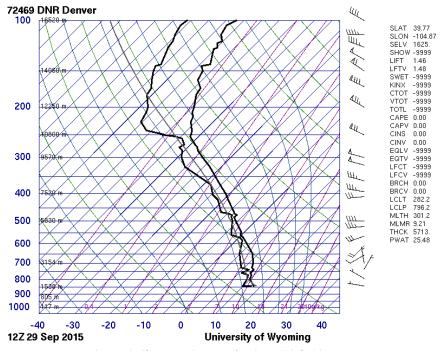


Figure 1: Skew-T Diagram for Sept. 29th 12z

As seen in the Skew-T diagram above (Figure 1), the CAPE value for the 29th of September was 0.00. This implies that the atmosphere is stable. My cloud most likely was formed at around 4500 m above the ground. This can be seen by the fact that the two lines on the Skew-T diagram begin to converge around this point. The converging lines on a Skew-T diagram shows that the dew point (represented by the curve on the left) and the local temperature (shown by the curve on the right) are coming closer and closer together. When the local temperature nears the dew point temperature water droplets begin to form and clouds are created.

My photograph was taken right after a late afternoon rainstorm and I was able to capture the moment right as the storm clouds began breaking up. The storm could have been caused by local instabilities in the atmosphere or it is possible that there was a much more unstable atmosphere during the afternoon then what the evening Skew-T diagram tells us.

This image was taken outside of the Benson Earth Science building on the University of Colorado Boulder campus. I was facing West when I took this image and I angled my camera about 34 degrees from the horizon to cut out part of Libby Hall which can be seen at the base of my image. The camera settings for my image can be seen in Table 1.

Table 1: Camera Settings

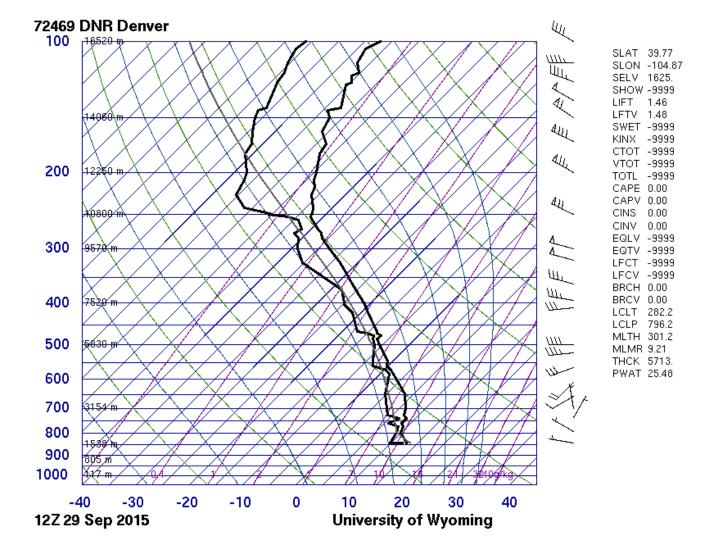
Focal Length	Exposure	f/	ISO
4.8 mm	1/3795 sec	2.2	40

Camera Model: Samsung Galaxy S5 Camera

Image Size: 3264 × 1836 Resolution: 72 Pixel Per Inch

The only post processing done on this image was to slightly tweak the color curves to add a little more contrast between the clouds and the sky. This image is very close to the original image taken.

I really like this image. I feel that it has some nice contrast between the sky and the clouds and I like how the lighting helped to darken the horizon of my image. I do wish that I could have found a higher spot to take this picture so that I could have kept the buildings out of this image, but I like the Flatirons. The shadowing on some of my clouds could be strengthened a little more, but I am not sure if I like how that change impacts the sky color. Other than those few changes I am very happy with my image. I really enjoyed running around with my camera trying to capture different types of cloud formations though out Boulder.



Works Cited

- "Atmospheric Soundings." *Atmospheric Soundings*. University of Wyoming, n.d. Web. 29 Sept. 2015. http://weather.uwyo.edu/upperair/sounding.html.
- "Cumulus Clouds." *Cumulus Clouds*. UCAR, n.d. Web. 1 Oct. 2015. https://eo.ucar.edu/webweather/cumulus.html>.
- "How to Read a Skew-T." *UNDERSTANDING A SOUNDING/SKEW-T*. Millersvill University of Pennsylvania, n.d. Web. 1 Oct. 2015.
 - $<\!http://www.atmos.millersville.edu/\sim\!lead/SkewT_HowTo.html>.$
- Warrilow, Chrissy. "Sky Watching: Cumulus Clouds." *The Weather Channel*. Weather.com, 21 Mar. 2013. Web. 1 Oct. 2015. http://www.weather.com/science/news/sky-watching-cumulus-20130320.