MCEN 5151: Flow Visualization October 25, 2021 Robert Sasse



Figure 1: Clouds over the Flat Irons

Flow Visualization Clouds 1

Introduction

I took this photograph on September 27th at 3:30 pm in Boulder, just north of east campus. The goal of this assignment was to take a photograph of an interesting cloud formation and to complete some analysis of the atmospheric flow conditions at the time of the photograph. I chose this photograph because I liked the way sunlight from the south hits the edges of the clouds. It creates an interesting effect. I also think it's interesting that the center of the clouds appears to have a similar color to the sky.

Cloud Analysis

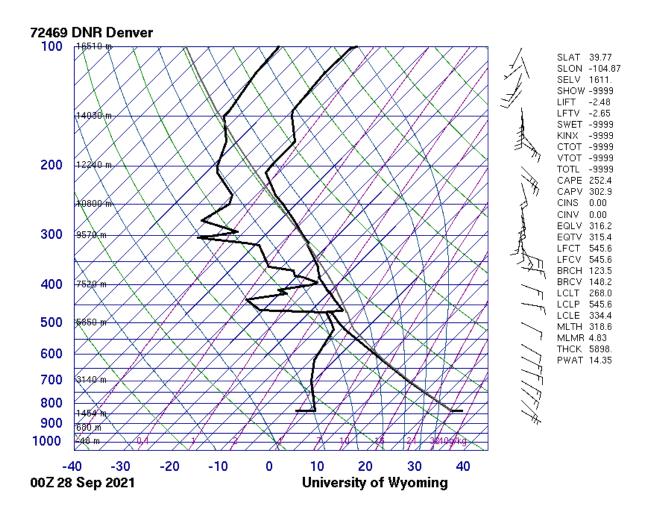


Figure 2: Skew-T Diagram¹

The clouds photographed for this assignment are cumulous. In the image these clouds are roughly flat at the bottom and fluffier looking at the top. This is a characteristic of cumulous clouds. These clouds appear to be in the lower atmosphere which is consistent with cumulous clouds as well. Based on the Skew T diagram about it seems

likes these clouds could be at altitude between 2000-3000 meters. For reference boulder sits at altitude of about 1655 meters². This could place the cloud at a few hundred meters above earths surface. For this Skew T diagram, the information was taken from the Denver station at 6 pm the same day. The convective available potential energy (CAPE) is given as 252.4 – this isn't a large value but indicates that the parcel of air for the cloud is slightly warmer than the surrounding air³, which, with a larger temperature difference could potentially indicate the possibility of thunder. In this case there is a slight instability in the atmosphere around Denver for this time. It is noteworthy that Boulder and Denver don't always have the same weather – in fact, weather around the foothills can vary drastically, so the Skew T diagram while helpful may not always be an accurate reflection of atmospheric conditions for location where a photo is taken.

Imaging Technique:

Camera: Nikon D3300

Image Size: 6000 x 2834

Focal Length	Exposure	f/	ISO
55 mm	1/2000	10	100

To take the picture I held the camera by hand. Since the shutter speed was relatively fast this mean I could get a decently clear image. I wanted to make sure there were some trees and mountains in the picture to give some reference for the size and height of the clouds. I also didn't want to over edit the photo. I used the editing software dark table and altered the hues slightly hoping to create a bluer sky with more contrast between the clouds and the sky. The original photo can be seen below with the comparison of the final version.





Figure 3: Original Image on top, final edited image below.

Results of Final Image and Revelations:

I was happy with the results of this image. I like the way the light hits the different parts of the cloud. Although I would have lighted to make the sky a little bit bluer. I think I was able to capture and image that represents a good example of cumulous clouds.

References

- 1. University of Wyoming. Atmospheric Sounding. http://weather.uwyo.edu/upperair/sounding.html
- 2. University of Colorado Boulder. https://www.colorado.edu/orientation/prearrival/life-boulder
- 3. Skew-T: A Look at Cape. The Weather Prediction, http://www.theweatherprediction.com/habyhints/305/.