

# MCEN 5151: Flow Visualization

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*Figure 1: Clouds over the Flat Irons*

## Flow Visualization Clouds 1

I took this photograph on September 27<sup>th</sup> 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.

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 meters<sup>2</sup>. 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 air<sup>3</sup>, 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/>.