

Cloud Report 1



Flow visualization

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Purpose:

This cloud image was taken for a project in my flow visualization class at the University of Colorado, Boulder. The objective of this assignment is to capture a visually pleasing image of a cloud and to describe the cloud type and atmosphere it is in with the help of a Skew-T chart. I took this photo off the second story balcony in my apartment. Sitting on our couch this semester, I noticed that during sunset the sun casts a beautiful reddish light on the clouds and brings out some of their interesting details. This image is what I attempted to capture in the image with the use of correct shutter speeds and different camera settings.

Location:

The photo was taken during a sunset at 7:28 PM on September 2nd, 2015. I took the photo on the second story balcony of my apartment. My apartment is located on the corner of Marine and Broadway Street in Boulder, Colorado. I was facing North towards the foothills. My camera was angled a few degrees upwards from the plane of the earth. The weather in Boulder the day of the photo was calm and about an average of 80 degrees F at 7:30 PM [2].

Cloud Type:

The cloud that I captured is called an Altocumulus. Altocumulus clouds are mid-level clouds, which usually form within 2,000 to 6,100 meters of the atmosphere. Altocumulus signifies convection. They are generally white or grey and often occur in sheets or patches with wavy, rounded masses or rolls [1].

The image of the clouds was taken during a small weather system, which brought little to no precipitation. The day before this was taken the temperature was higher, around 87 degrees F. The temperature drop is the sign of a warm front dissipating which indicates that a sheet of combined Altocumulus clouds will form [2]. The weather system can be seen in the Skew T diagram in figure 1 [3]. From the flags on the right of the graph we can see that the winds were blowing west to east but not very quickly. The CAPE value of 63.10 indicates that the atmosphere was unstable. This is typical during the formation of altocumulus clouds. From the diagram we can also see that at about 5,870 meters the dew point and the temperature lines are closest together. Since altocumulus clouds form between 2,000 to 6,100 meters we can conclude that they will be forming around that height.

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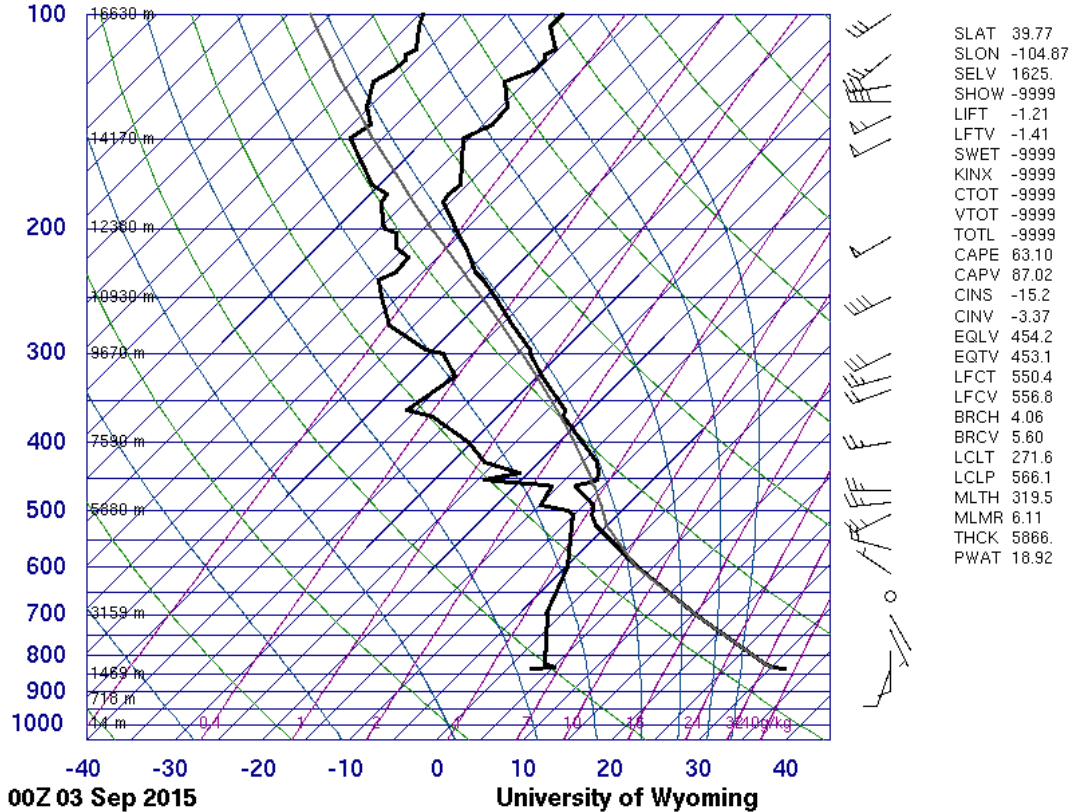


Figure 1: DIA Skew T diagram from September 2, 2015

Photographic Technique:

The camera I used to take this photo is a Nikon 3100D, a digital camera. The distance from lens to object was estimated by using the vertical distance of 5780 meters, which is where the clouds formed from the Skew T diagram. Then I estimated the degree the camera was at which was about 20 degrees. Then using a right triangle calculation I find the hypotenuse to be about 17,200 meters, which is the distance from lens to cloud. I then estimated the field of view by looking at the clouds in my image and determined that the height was about half the width so the width would be about 9,540 meters. The following camera settings were used when taking this photo:

- Exposure Time: 1/160 sec.
- Aperture: f/3.5
- Focal Length: 55 mm
- ISOS: 800
- Original image dimensions: 4608x3072 pixels
- Cropped image dimensions: 4092x2599 pixels

After the picture was taken I used Gimp to help develop my final image. The only parts I played with were the curves and lines of the image. First, I tried to make the landscape of my image darker in order to bring out the lighter colors in the sky. This

created a great contrast between the clouds and landscape. I noticed there were some reddish colors coming from the sunset that were shining on the clouds. I fiddled with the red colors in the image to make them colors more dominant and vibrant. Finally, I adjusted the blue colors in the image to make the sky appear bluer. You can see the differences between the original photo (figure 2) and the final image (figure 3).

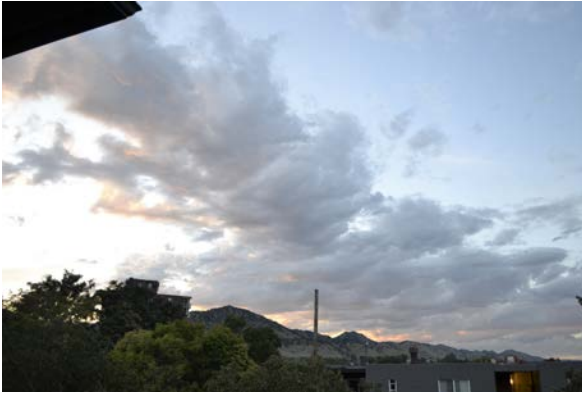


Figure 2: Original Image



Figure 3: Final Image

Conclusion:

The image reveals the physical beauty of clouds in nature. What I like about this photo is the different colors I captured that were not just blue and white like an average sky. The variation of colors added contrast throughout the image, making it visually pleasing and more interesting than an ordinary sky-scape. I believe I achieved my goal of capturing a beautiful image of a cloud, but there were steps in the process that I could have improved upon. One improvement would've been to capture a darker landscape in the image. The landscape I captured was not completely dark or black which would have contrasted well against the grayish white clouds in the image. Another option to improve on the landscape in the image would be to crop it out entirely. Doing this would also get rid of the random phone booth that is in the middle of the picture that unnecessarily attracts the eye when observing the image. I could solve these problems in post processing by making the dark colors even darker. I could also use a different shutter speed to help with the post processing.

References:

[1] World Meteorological Organization, ed. (1975).

http://library.wmo.int/pmb_ged/wmo_407_en-v1.pdf

[2] <https://weatherspark.com/averages/29728/9/1/Boulder-Colorado-United-States>

[3] [http://weather.uwyo.edu/cgi-](http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2015&MONTH=09&F)

[bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2015&MONTH=09&F](http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2015&MONTH=09&F)
[ROM=0300&TO=0300&STNM=72469](http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2015&MONTH=09&F)