

Clouds 2



Figure 1: Final Photograph.

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Clouds Second Assignment
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Introduction

The final image seen in Figure 1 was taken for the second cloud assignment for Flow Visualization. This assignment was designed to visualize and capture various cloud formations and how they relate to various weather patterns. For my image, I wanted to focus in on a few layers with specific types of clouds. This is different to my previous picture which captures the entire sky from a far distance.

Photo Location

This photo was taken on the evening of April 7, 2018 at 7:15pm. This was captured in southern part of Boulder, CO. The exact location was $39^{\circ} 59' 15''\text{N } 105^{\circ} 14' 20''\text{W}$, this location is detailed as the pinned location on the map in Figure 2. The elevation at this point is approximately 5380 feet. The picture was taken facing directly westward with an angle of approximately 60 degrees to the horizontal.



Figure 2: Exact location where the photograph was taken [1].

Type of Clouds

Based on the appearance of the clouds in the photograph and the weather throughout the day, it looks as if the clouds in the lower right are stratocumulus and the others in the upper left are a mix of altostratus and cirrostratus. The weather throughout the day of April 7th was relatively stable, as is seen on the SkewT Diagram in Figure 3. The weather throughout the day fluctuated between 23F and 59F with a mean temperature throughout the day of 41F. There was some slight precipitation around 12:30am, however the atmosphere had mostly stabilized by the time the picture was taken. There were very calm winds throughout the day with a max wind speed only getting to about 8mph.

Looking at the clouds, the darker clouds in the lower right of the picture are clumpy in appearance and formed at a low elevation in the sky. This makes me believe they are stratocumulus. Looking at Figure 3, the first clouds will form between 1400 – 3000m, this is a very similar height to where stratocumulus clouds normally form.

The rest of the clouds in the sky are a little harder to identify since there isn't very much detail or defining features to them. Visually they are probably a mixture of altostratus and cirrostratus clouds. Looking at Figure 3, the SkewT comes very close together between 4000 – 8000m, which is the correct height range for altostratus and cirrostratus formation. Additionally, there are some wispy looking clouds mixed in, these could be cirrus clouds. These are typically found at a higher height (10,000+ m), but looking at Figure 3 it is still possible for their formation throughout that day.

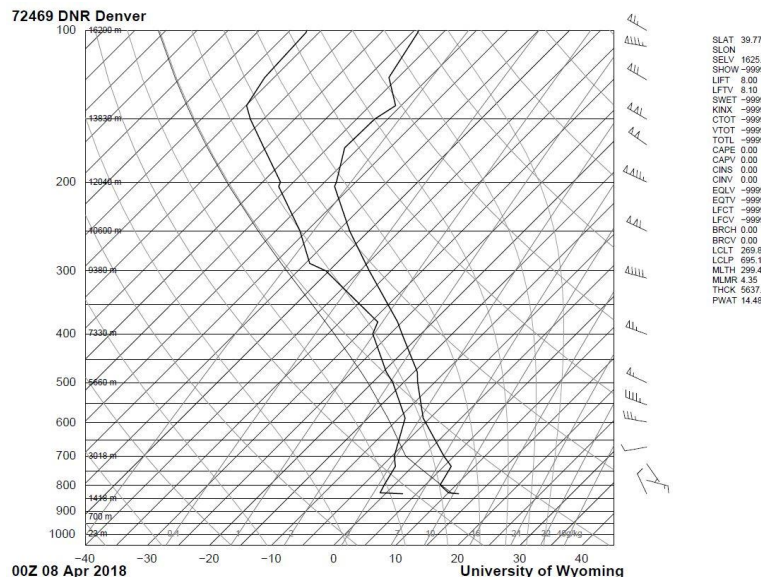


Figure 3: SkewT Diagram for 6pm on April 7, 2018.

Photographic Techniques

Since this image was taken using the camera on a smartphone, there wasn't much control over the settings used. Instead I focused on the subject of the image and making sure it was as clear as possible. For clarity, the image was taken during sunset so that just the clouds are illuminated and show as much detail as possible. With this, the original image was easily post processed to bring out the important details overall.

The picture was shot with a Nexus 5X smartphone camera with the following settings: ISO 60, shutter speed – 1/568 sec, and aperture- f/2. Such a small aperture allowed for a large depth of field where almost all the clouds throughout the span of the image is in focus. From different perspectives of the clouds throughout that evening, it was noticed that these clouds were very close to the mountains. From the location the picture was taken, that is approximately 2.5 miles. The focal length of the digital lens of the camera is 4.67mm.

The original photo can be seen in Figure 4 below. There wasn't any drastic post processing done, the original picture highlighted the clouds already. However, I did crop the picture so that top of the house was removed so the focus was solely on the clouds. Then the contrast was changed to darken the trees slightly and bring out the blue of the sky. The original size of the image was 4032x3024 pixels and the edited version is 4032x2421 pixels.



Figure 4: Original Photograph.

Conclusion

Overall, this photograph was able to achieve the visualization of a few different clouds with a more zoomed in and focused look. I really like how the image overall came out in the end. The way the sunlight highlights the features of the clouds is really great making me realize sunset is a great time to photograph clouds. It would be interesting for next time to zoom in even further so the image is only focused on a single cloud. This could be interesting to be able to achieve a high level of detail for one cloud, since that is difficult when photographing the entire sky.

References

- [1] Google. (n.d.). [Boulder, CO Map]. Retrieved March 18, 2018, from <https://www.google.com/maps/place/39%C2%B059'15.0%22N+105%C2%B014'20.0%22W/@39.9875041,-105.2410776,17z/data=!3m1!4b1!4m5!3m4!1s0x0:0x0!8m2!3d39.9875!4d-105.2388889>.
- [2] Weather History for KBDU - April, 2018. (n.d.). Retrieved April 15, 2018, from https://www.wunderground.com/history/airport/KBDU/2018/4/7/DailyHistory.html?req_city=Boulder&req_state=CO&req_statename=&reqdb.zip=80301&reqdb.magic=1&reqdb.wmo=99999.
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