

Southwest Sunrise

Cloud Two Report

MCEN 4151 – Flow Visualization

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Introduction

For the second of two cloud assignments, I had the desire to take pictures of clouds which were different from the set I took during the first cloud assignment. My first cloud image was of altocumulus lenticularis which are typical of the Boulder area. As such, I knew I would have a very good chance of seeing different clouds on my trip to Chaco Canyon over Spring Break. My second intent was to take a beautiful image with the horizon included. Because I would be in a desert landscape, the inclusion of the horizon would not be so featured that it would be distracting, yet its inclusion had the potential to add something to the image. The southwest is known for its orange and red skies during sunrise and sunset, so I knew these would be the times to capture my image. Not only would I have a high chance of seeing different clouds than in Boulder, but Chaco Canyon would also provide an interesting horizon with beautiful colors to add to the cloud image. It was the perfect stage to capture my image seen below in Figure 1.



Figure 1: Final image portraying altostratus clouds at sunrise

The image was taken in Chaco Canyon, New Mexico on March 21st, 2011 at about 7:30am (see Figure 2). Chaco Canyon is in northwest New Mexico and is known for its beautiful desert landscape along with Native American petroglyphs and ruins. Chaco Canyon resides at an elevation of 6200 ft (U.S. National Park Service). The image was taken at sunrise on the spring equinox, so I was facing east at the time.



Figure 2: Image capture location (In Search of Atlán)

Altostratus Translucidus

The classification of the clouds presented in the above image was a bit more difficult than in the first assignment. It is obvious from the image that the clouds are highly layered bringing to mind some sort of stratus cloud. They are not nimbostratus because they did not come with any precipitation. In order to classify the stratus clouds I looked at the skew-t plot for the approximate time and location where the image was taken (see Figure 3). The plot shows a stable atmosphere with cloud formation somewhere between 6000 and 6500 meters in altitude. As such, the clouds portrayed in the image can be classified as altostratus. Further classification can be made on the species of altostratus. Because the sun was below the horizon at the time that the image was taken, it is difficult to determine if the sun would shine through the clouds or not. However, it would appear that they are not so thick that the sun would not. So, I would classify the clouds as altostratus translucidus.

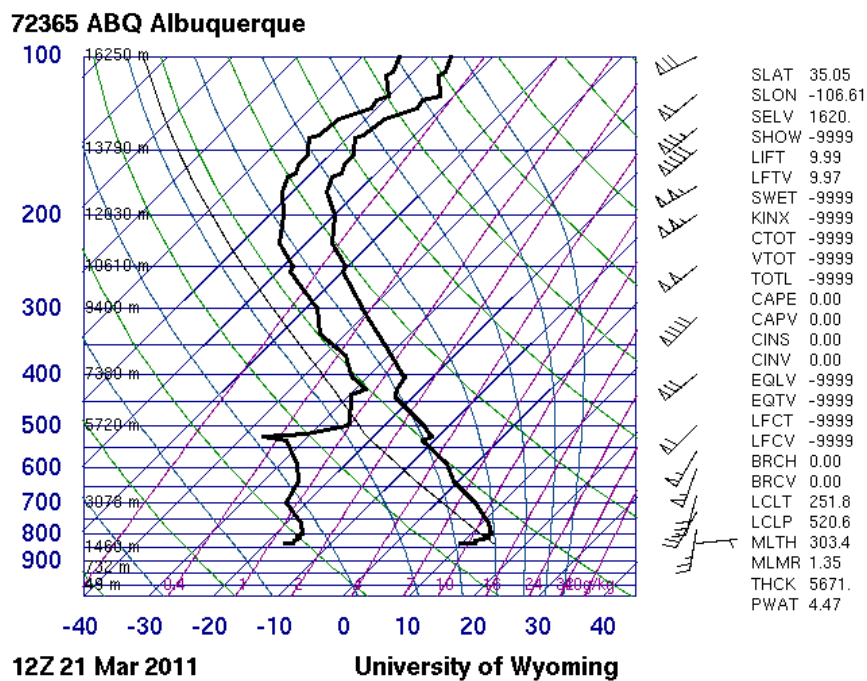


Figure 3: Skew-t plot from Denver on February 17th at 6pm

Altostratus clouds are generally layered in the form of gray or bluish uniform sheets (AMS). They can cover a very large area, even the entire sky. When not completely uniform, as seen in my image, the irregularities are not shaped and spaced evenly. In my image, it is apparent that the clouds are experiencing quite a bit of wind, as seen by the light wisps off the edges of the main formations. As in the atmosphere, it had been very windy that night and continued to be during the day. Altostratus clouds generally are formed during the approach of a weather front and can be a precursor to precipitation (AMS). Again, this was validated by slight rain in the afternoon on that day. The clouds are formed by rising air masses that condense into clouds.

Visualization Technique

This image was taken with a point-and-shoot camera on automatic settings. I played a little with the different modes allowed by the camera and ended up using the landscape mode for this image. The picture was also taken with autofocus which resulted in the horizon as the focal point. Because the horizon was sufficiently far away, the clouds are well within focus as well. It is difficult to determine the field of view; however, the horizon is likely about 1.5 miles long. Similarly, the distance to the horizon is difficult to determine, however it was likely about 1 mile away. Other specifications are listed below.

- Camera: Sony DSC-S780
- Lens focal length: 11.6mm
- Image dimensions: original – 2592x1944 pixels, final – 2592x1372 pixels
- Exposure specifications: 1/320 sec. shutter speed, f/4.5, 100 ISO
- Post-processing: image cropping, color contrast – curves
 - one original image shown in Appendix C

Conclusion

The image captured represents the typical southwest sunset seen frequently by the regions inhabitants. However, for those that are not able to see such vivid oranges and reds, they are uniquely beautiful. Not only was this intent met, but the image portrays clouds that are different from those taken by me in the first assignment, which was my first requirement for this assignment. I really like the image for its ascetics, although the cloud features are not all that interesting. However, they could be identified and their formation and movement explored, so I am pleased with the technical aspect of this assignment as well. Hopefully, in the future, I will be able to spend more time gazing at southwest sunsets.

References

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Appendix A: Original, un-edited image



Figure 4: Unedited image