

Clouds 2: A Grand Sunset



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Purpose

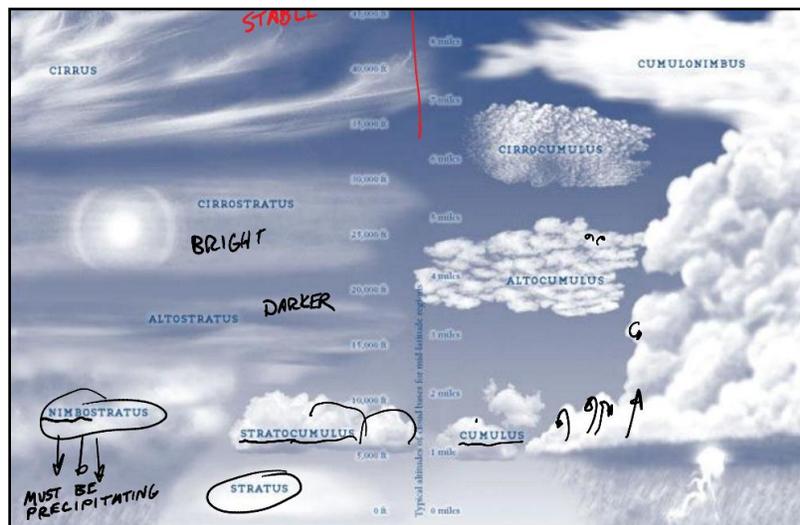
Some moments are better appreciated without a camera so that they can be inhaled and committed to memory. Yet, other moments make one yearn to grab a camera and just *try* to capture their beauty. In this assignment, Clouds 2, the challenge of capturing an image of clouds is examined. The primary intent of this assignment is to create an image of (subjectively) interesting clouds, while the secondary intent of this assignment is to analyze the climate conditions under which the captured fluid flow of clouds occurs. The final chosen image is meant to depict clouds during a sunset at the Grand Canyon. The subsequent report will further describe the circumstance and conditions of the image.

Circumstance

This image was taken on Tuesday, March 26th, at 6:55p.m. During Spring Break, I was fortunate to adventure on a road trip with friends; during our stop at the Grand Canyon, we experienced a gorgeous sunset through extremely windy conditions. This image was taken hastily, grabbing a friend's camera due to forgetting my own and in time so that the last light of the sunset was not missed. In terms of elevation, the Grand Canyon's South Rim – where this picture was taken – sits at 6,800ft. The orientation of the camera at the time of the image was about 15° - 20° horizontal to the surface. Because the view offered a wide expanse of sky to be seen, the camera did not need to be tilted. The clouds in this image seemed distant – almost receding to the horizon – and were much higher up from the elevation of the South Rim.

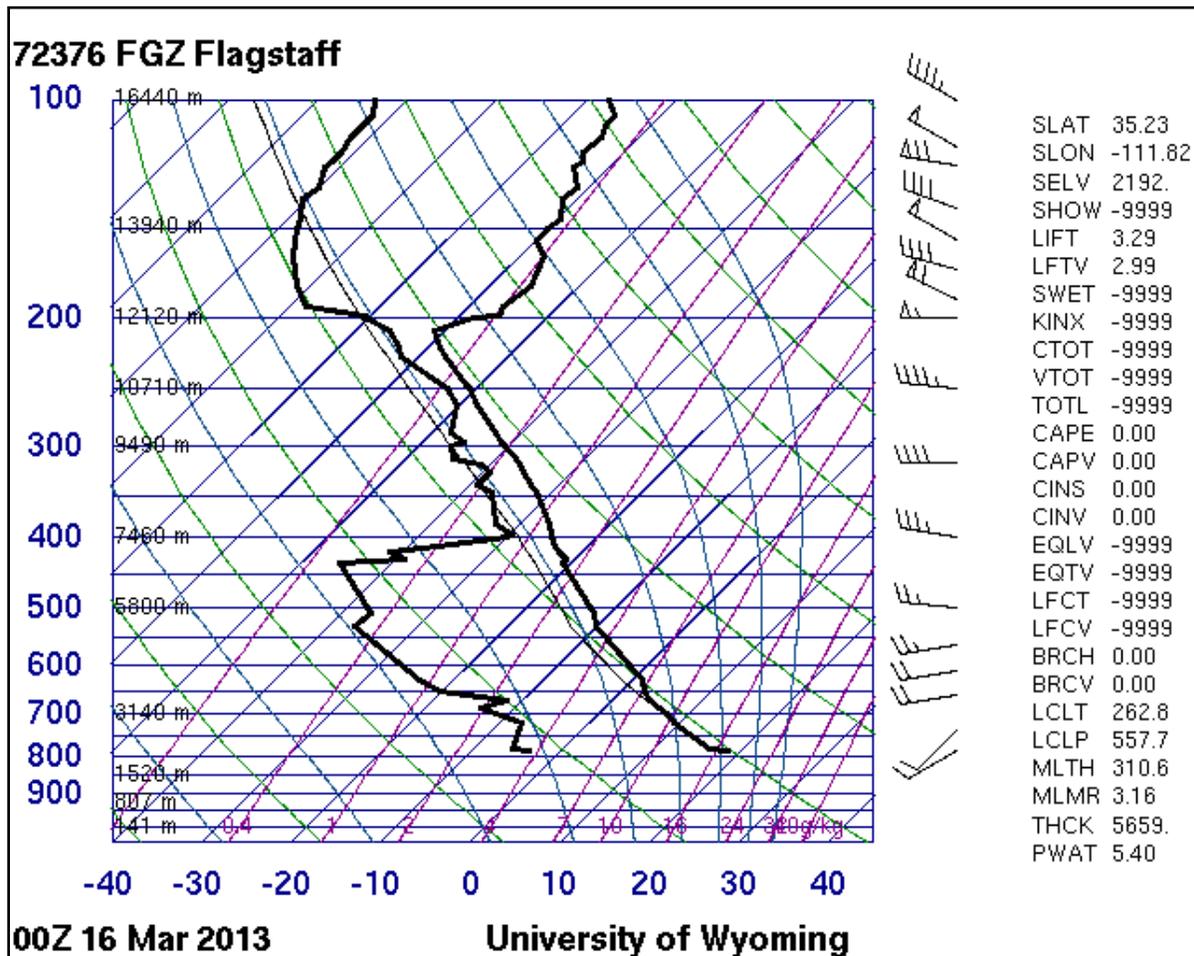
Conditions

From the image, it seems that the clouds are altostratus clouds. This is visually confirmed based on the cloud diagrams shown in the lecture notes for Flow Visualization from Lecture 8. In this diagram, the altostratus cloud is not only high in elevation (~15,000ft), but it is also shown to have a flat bottom surface similar to a stratocumulus while its sides and top surface retain the wispy quality of an altostratus cloud. This diagram can be seen below.



To better understand the stability of the environment at the time of this image, the weather is also important to analyze. At 7pm on Tuesday, March 26, the weather at the Grand Canyon was 56°F with winds from the Southwest gusting at 27.6MPH. According to WeatherSpark.com the

humidity was 17% while the pressure was 30 Hg. From a non-numerical standpoint, I recall experiencing strong winds during this image, but the weather did not drastically change from this day to the next. Because of the absence of a severe weather change, and due to the continuity of the clouds, these clouds are most likely of the class *altostratus*. It is difficult to guess the elevation of these clouds; however, because the South Rim is situated at 6,800ft and the clouds are meant to exist at higher elevations, these clouds are most likely at 15,000ft. This is supported by the vast distance of these clouds from the camera in the image, and the fact that altostratus clouds exist around 15,000ft. Graphically, the conditions for an altostratus cloud are shown with the use of a skew-T plot. Below, a skew-T plot for 00Z on March 26th is shown – because the image was captured around 6:55pm on March 26th, the skew-T plot is merely 55 minutes out of synch.



In the skew-T plot of Flagstaff, AZ – the closest location to the Grand Canyon – the angle between the isobar (the Grand Canyon is about 1012.1mb) and the T-curve is large enough to conclude that the atmosphere is unstable. This is supported yet by the gusty conditions.

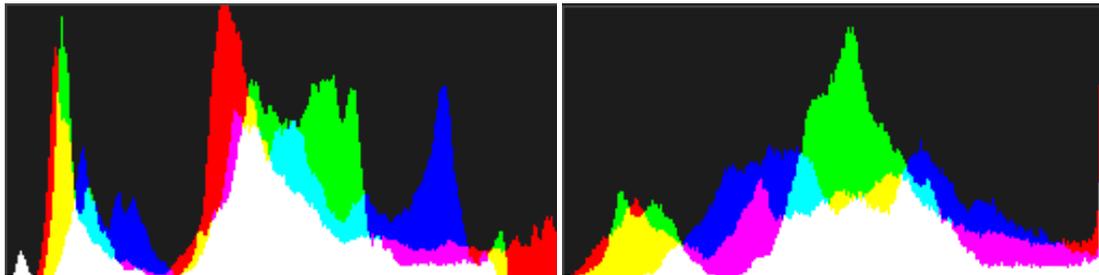
Photographic Technique

Due to the ability to view vast and breathtaking scenery at the Grand Canyon, the field of view in this image is most likely 0.5 – 1 miles wide. The clouds are estimated to be about

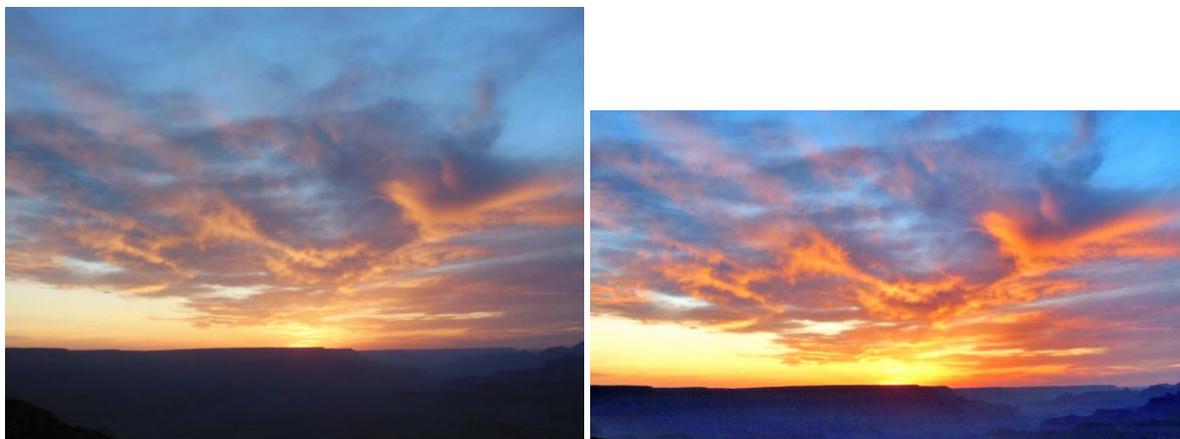
15,000ft above the South Rim. This puts a vertical distance of about 8,200ft between the camera and the clouds. The digital camera used in this experiment was borrowed from a friend due to the spontaneity of the image. The camera is a Nikon COOLPIX S6300. The following auto-settings were used to capture the image:

- Focal length: 7.7mm
- ISO: 320
- Aperture: f/3.8
- Shutter speed: 1/250sec
- Digital zoom: ratio of 1.00

The original image is 4,608 by 3,456 pixels in size. During the editing process, the image was cropped to pixel dimensions of 4,588 by 2,538. The contrast of the image was increased, as well as shadow protection, while brightness was decreased. These editing steps allowed for the warmth of the sunset colors to be emphasized, as well as for the outline of the canyon to be illuminated by stripping shadow protection. The histograms below depict the change in the color spectrum after editing the image.



A comparison between the original and final images is demonstrated subsequently.



Conclusion

This image attempts to capture not only the vastness of the Grand Canyon but also the sunset over the horizon with the use of cloud imagery. Choices during the editing process attempted to improve the quality of the lighting in the photo in order bring out details in the

Canyon and the clouds. One major setback in this experiment is the use of someone else's camera with the auto-settings. Though the image itself is distant, the quality of the photo is grainy at best due to these setbacks. The objective to capture the Grand Canyon was not achieved as successfully, due to the poor lighting, but the editing accentuated the detail of the clouds. For future improvements, rather than improving the editing software, a more qualified camera is necessary for capturing the phenomenon. Overall, the image elicits a serene, peaceful, and vast mindset when viewed. It is ironic that the gusting winds go unnoticed in the image, since the photography has the ability to freeze the clouds in time, and the rocks of the Grand Canyon are unmoving. This disparity between the reality and the image adds a deceptive quality to the conditions required to produce an image such as this one.

Works Referenced

http://www.atmos.millersville.edu/~lead/SkewT_Stability.html

http://www.bobspixels.com/kaibab.org/misc/gc_gen.htm

<http://www.colorado.edu/MCEN/flowvis/course/Lecture2013/08.Clouds2.pdf>

<http://weatherspark.com/#!dashboard;q=Grand%20Canyon>

<http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2013&MONTH=03&FROM=1600&TO=1600&STNM=72376>