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MCEN 5151

Clouds Second – Altostratus Undulatus, 8:53 AM on November 6th 2019, Colorado and 30h St,
Boulder, CO



Figure 1: The final, edited photo of Altocumulus Undulatus

Context:

The Second Cloud assignment is an extension of the previous cloud assignment in the identification and physics behind cloud formation. The requirement for this assignment is to photograph a cloud between October 11th and November 13th, which allows a record of clouds throughout the entire semester. While I captured numerous photos throughout the month of clouds that caught my attention, the cloud image shown above caught my attention because of the texture. It was one of the only clouds in the sky and very prominent at almost 9 AM (I usually associate more developed clouds with the afternoon). I wanted to keep the trees in the image to give some context to the scale and altitudes of the clouds. I did not zoom or crop this image, and in post processing all I did was adjust the color gradient to contrast the color of the cloud with the dark blue sky.

Circumstances:

This photo was captured in Boulder, CO at the intersection of Colorado St. and 30th St. The camera was facing south and at approximately 30 degrees with respect to the ground. The image was taken at 8:53 AM on November 6th, 2019. It was one of the only clouds in the sky at that

time although there were very small, wispy clouds as seen at the top of the photo. That is probably what drew me to this cloud in particular.

Cloud Identification:

Identifying the cloud was challenging because what we had learned in class was different than what I was reading on the skew-T plot. I had identified this cloud as altocumulus due to its finger length and its position in the sky. This matched quite well in the skew-T diagram relating to the altitude, as the cloud formation occurred around 7,400 meters. On the other hand, the CAPE number was zero, which identifies a stable atmosphere. Altocumulus clouds are more associated with an unstable atmosphere, but as I learned from my previous assignment as well as my in-class critique, the CAPE number is an approximation of how the atmosphere behaves over a 12-hour period, therefore the cloud could have been the result of a quick system that moved through Boulder. In addition, the cloud has a wavy characteristic that may classify it as a mountain wave cloud, however it did not move over the mountains. Since this is the case, the cloud is further classified as “undulatus” speaking to that characteristic. Therefore, while I did capture Altocumulus clouds, this can be better described as Altocumulus Undulatus. I am interested in studying this phenomenon more and better reinforcing my argument that my cloud did not fit in the predicted category from my CAPE value.

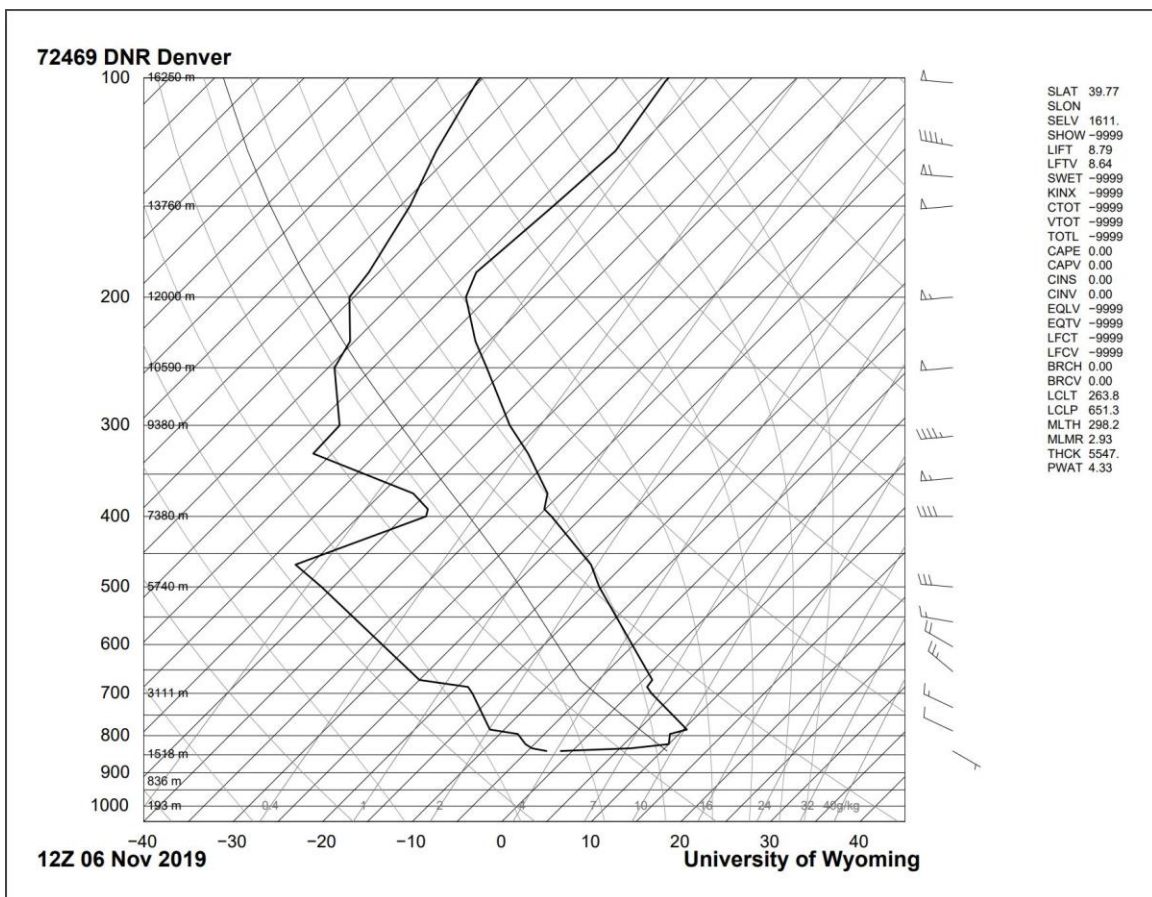


Figure 2: Skew T diagram for 6 AM - 6 PM on November 6th

Photographic Technique:

I captured this photo while I was walking to campus, so I did not use a high-tech camera to take the photo and used by iPhone 5SE camera. I intentionally chose to keep the trees in the photo because it added texture and scale. I also did not zoom because I did not want to risk pixelating the photo, something fairly common due to the age of my iPhone. My phone adjusted my settings accordingly and from the raw data it shows that my aperture was $f/2.2$, my shutter speed was $1/3200$ seconds, and ISO was 25. The original size of my image was 4032 x 3024 pixels and was not cropped for the final image.



Figure 3: The original photo before post-processing

A couple settings were manipulated in post processing. First, within curves, I adjust two points along the line to create more of a parabola to the image rather than maintaining the linear trend. The first point was adjusted to an output of 17 and input of 33 right at the start of the gray peaks. The second point was manipulated about halfway through the graph to an input of 250 and output of 273. I was not too concerned with the numbers. My technique for adjusting this photo was to move the point higher or lower vertically to adjust the sharpness and darkness of the photo. By adjusting these settings, I was able to exaggerate the color gradient of the sky and reduce a bit of the glare on the clouds to create a clearer, more visually pleasing image.

Image Conclusion:

This image, although seemingly simplistic, describes an interesting physical phenomenon of the addition of a wavy characteristic to the clouds. It was a treat to see this cloud in the sky, as I was just walking to class early in the morning and was immediately captivated by its uniqueness. I

enjoy the light bouncing off different layers of the cloud and its transition from dense to shear moving left to right, and bottom to top. To improve on my photography skills even after the class has ended, I would like to get more familiar with the capabilities of photoshop to improve the quality of the photo and hopefully upgrade my phone to achieve a better original picture. One of my goals from my previous project was to have more foreground to show the scale of the clouds, which I think was captured in this picture.

References:

- [1] University of Wyoming College of Engineering. Retrieved from:
<http://weather.uwyo.edu/upperair/sounding.html>