Cloud Second: Altostratus

Noah Granigan

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I. INTRODUCTION

This image, *Figure 5*, is of altostratus clouds during the sunset in Boulder, Colorado on October 27, 2018. The intent of the image was to capture the colors that are so common in Boulder sunsets over the front range of the Rocky Mountains. I took several images while observing the sunset at about 6:14 PM local time. Altostratus clouds usually form over a large area and are mostly featureless [2].

II. APPARATUS & FLUID MECHANICS

To capture this image, I was standing in the middle of Farrand Field on the University of Colorado Boulder campus. The camera is looking WSW and captures a silhouette of the Flatirons along with the setting sun illuminating the clouds. The ceilometer reading, *Figure 2*, in Boulder suggests that the height of the cloud is approximately 5 kilometers [3], which agrees with the Skew-T plot, *Figure 1*, taken at the Denver International Airport approximately 60 kilometers away. The Skew-T also shows a CAPE of 0.00, indicating a stable atmosphere [1]. Altostratus clouds are composed of both water and ice. They are formed when a layer of cirrostratus clouds descend from higher altitude. Altostratus clouds can indicate that precipitation is on the way, because they often bulk out to form nimbostratus clouds which often rain or snow [2]. In the days after the image was taken, there was rain and snow in Boulder.

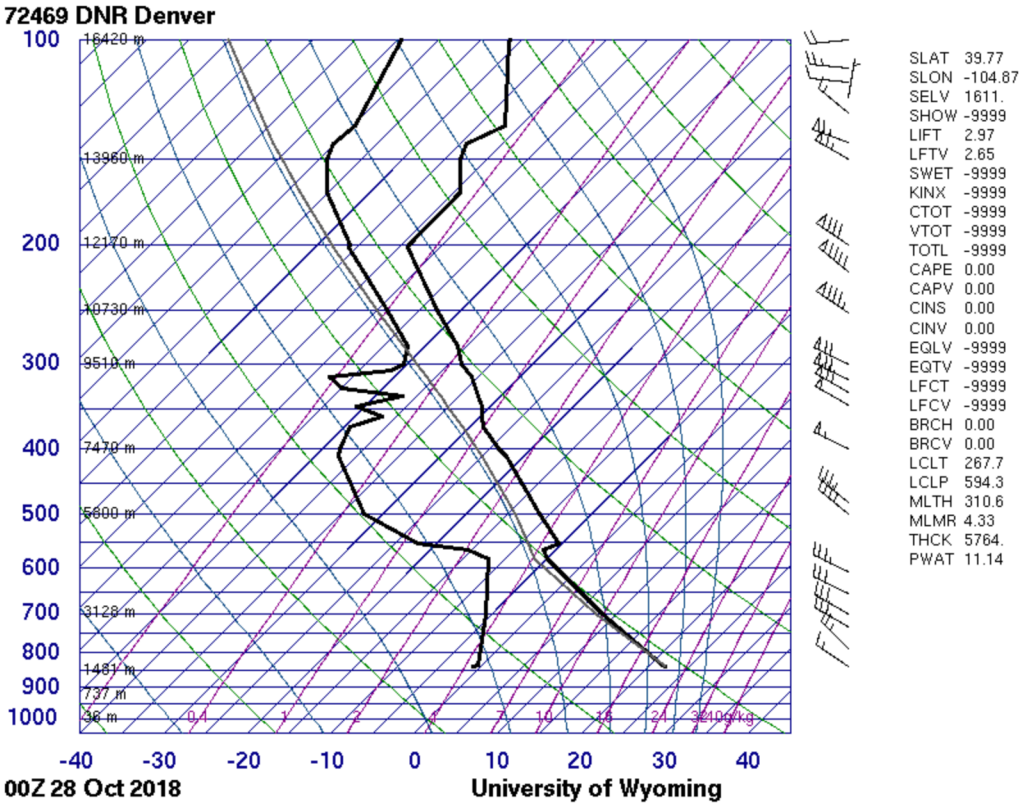

***Figure 1**: Skew-T Plot at Denver International Airport [1]*

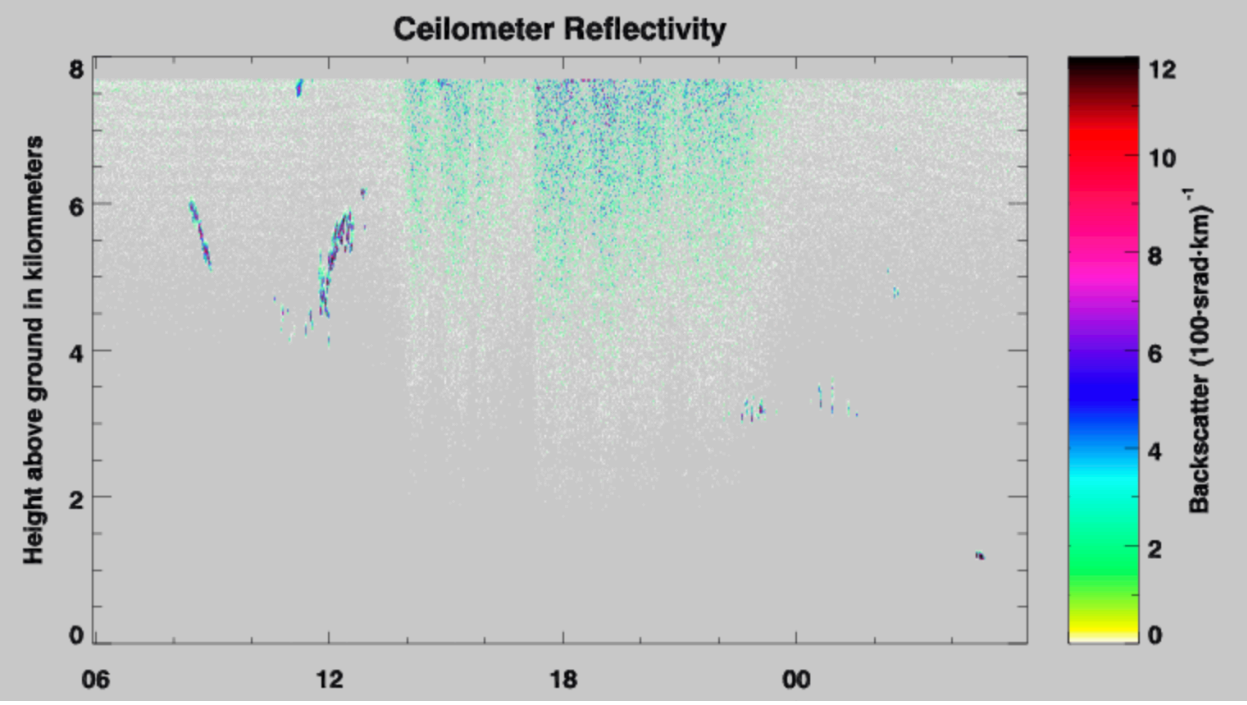

***Figure 2**: Ceilometer Reflectivity in Boulder [3]*

III. VISUALIZATION TECHNIQUE

No color aider were used in the making of the image. The image is naturally lit from the setting sun behind the mountains.

IV. PHOTOGRAPHING TECHNIQUE

The camera used for this photographs was an Apple iPhone 6S. The focal length was 4.15 millimeters and the exposure was 1/60 of a second. The aperture was f/2.2 and the ISO was 32. These settings are not surprising for the given circumstances. The field of view of the final image is estimated to be 1 kilometer horizontally by 6 kilometers vertically. I chose the camera location and angle so I could frame the cloud and mountains the best I could. The original image, *Figure 3*, had a size of 4032 X 3024 pixels, and the final image, *Figure 5* seen below, had a size of 4032 X 2628 pixels due to cropping. To keep the orange as natural as possible, I tried keep that color the same as best I could. I played with the curves to make the mountains at the bottom of the image completely black. The curve adjustments can be seen in *Figure 4* below.

***Figure 3**: Original Image*

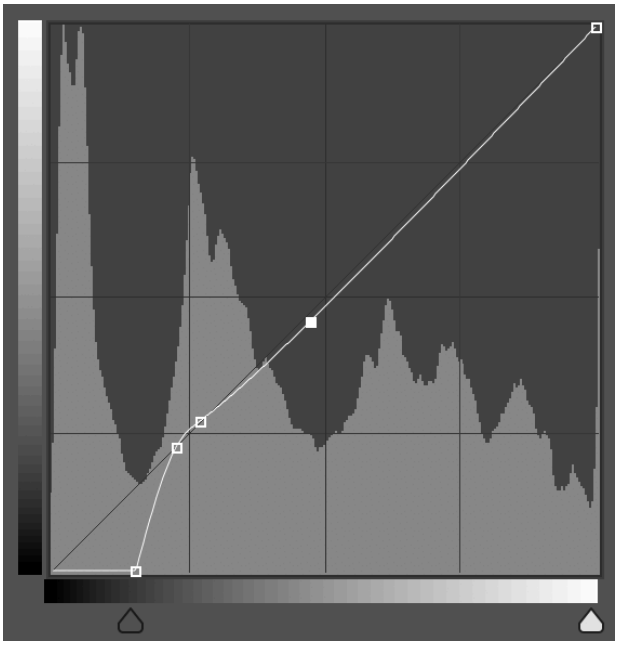

***Figure 4**: Curve adjustment*

V. RESULTS

The final image, *Figure 5*, shows the altostratus clouds being lit up by the setting sun. The large area and lack of features allows the cloud to be uniformly colored by the sunset. The contrast with the much lower grey cloud is something that I enjoy, and the framing of the Flatiron silhouette emphasizes the unique colors that we see so often in Boulder.

***Figure 5**: Final image*

VI. REFERENCES

[1] "72469 DNR Denver." *Department of Atmospheric Science, University of Wyoming*. http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2018&MONTH=10&FROM=2800&TO=2800&STNM=72469. Accessed 27 October 2018.

[2] "Altostratus Clouds." *Met Office*. https://www.metoffice.gov.uk/learning/clouds/mid-level-clouds/altostratus. Accessed 7 December 2018.

[3] "Requested Data for 10/27/2018." *Department of Atmospheric and Oceanic Sciences, University of Colorado Boulder*. http:// skywatch.colorado.edu/. Accessed 27 October 2018.