

# Cloud Image 1



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MCEN 5151: Flow Visualization

University of Colorado Boulder

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## **Introduction**

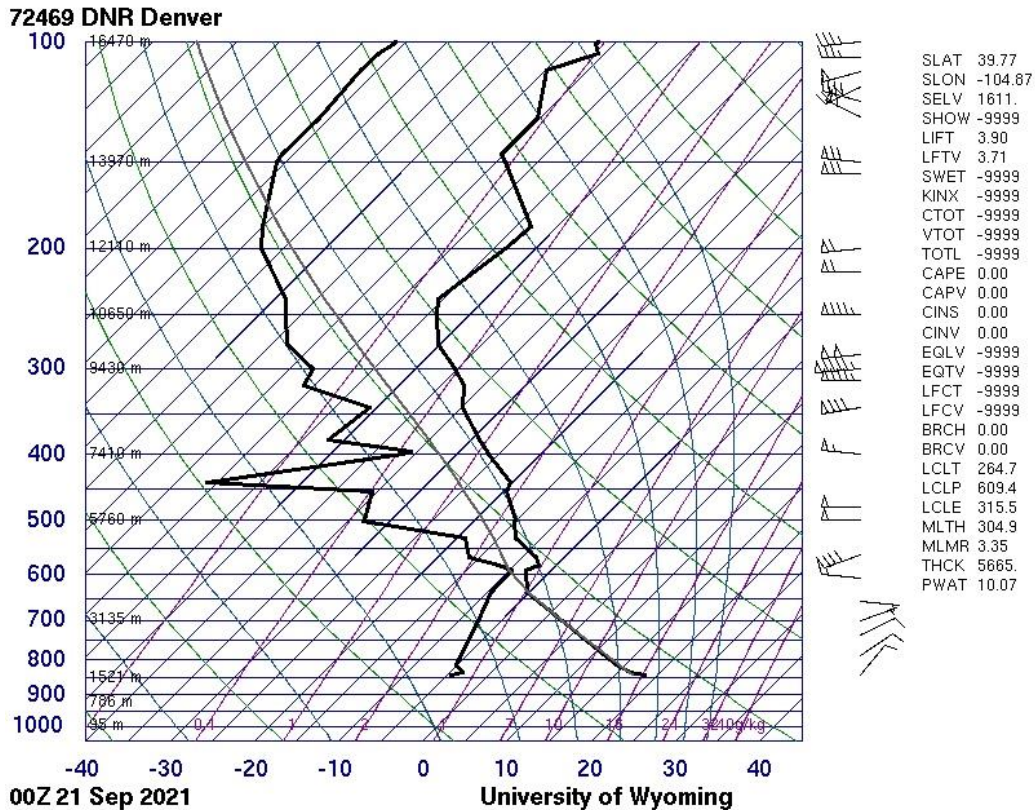
The report will discuss the cloud image, circumstances of the image, analysis of the cloud with a skew-T plot, photographic technique, and conclusions about the image. This report is for Cloud Image 1 assignment in MCEN 5151 Flow Visualization, and the purpose is to allow students to explore and learn more about the formations of cloud. The intent for this photo is to visualize the stratocumulus clouds during sunset.

## **Circumstances of the image**

The image was taken on September 20, 2021, at 7:01 pm. The location is in Boulder, CO on Baseline Rd near the University of Colorado campus and the Shell gas station. The direction of the clouds is West, and the incidence angle was around 35 degrees. The clouds seem to be at around 5000 ft above ground or less.

## **Analysis**

I identified the clouds as stratocumulus clouds because these are large, dark, and rounded masses that form in a group [1]. The typical height of these clouds is around 1200 – 6500 ft, which are low in height [1]. This makes sense because the clouds look close from where I was standing and seem relatively near the mountains. After doing more research, I found that the temperature on that day is around 61 degrees Fahrenheit with zero inch of precipitation and wind speed of 30 mph [2]. This data matches from what I remembered that day because I was freezing while I was biking to my car. The Skew-T plot shown in *Figure 1* is for September 21, 2021, 00Z which is September 20, 2021, 6 pm (mountain time) [3]. This is about 1 hour before the picture was taken. The plot indicates a CAPE value of 0, which shows the atmosphere was stable [3]. I believe it did not rain that day, so this matches with the data. On the plot, where the dewpoint temperature and true temperature lines are close, shows cloud formations. The plot indicates cloud formation at around 4400 meters, which is way above the observed stratocumulus clouds [3].



[3]

Figure 1. Skew-T plot for Denver, CO 00Z 21 Sep 2021

## Photographic Technique

The image was taken with an iPhone XS in normal mode. The size of the image is 4032 x 3024 pixels with a resolution of 72 x 72. The lens is iPhone XS back dual camera with 6mm f/2.4. The aperture value is 2.5261 and shutter speed of 1/114. The focal length is 6mm with an ISO speed of 125.

I uploaded the image to Gimp and made a couple of edits. I did not crop the image because it was in the frame that I wanted it to be. There were no distractions, and I liked to use the mountains as a reference point for height. I slightly increased the brightness as well as the saturation. This overall improves the appeal of the image and makes the sunset a little more colorful. I took the image very horizontally, so I did not need to adjust any angles to straighten it out. *Figure 2* shows the before and after edits on the photo.



*Figure 2. Before and After Edit on Gimp*

## Conclusion

Overall, the image reveals low stratocumulus clouds with a sunset. I enjoyed capturing this image because it was beautiful, and it also reminded me of molten lava. I also saw people stopping and capturing these clouds. I liked how I captured the mountains to show a reference point for height. The Skew-T plot have some data that matches this image, while other data doesn't. This makes sense due to the location. Boulder is more in the mountains, so the clouds will form somewhat differently than Denver. Next time, I would like to capture a different type of cloud and investigate its characteristics.

## Reference

[1]: "Stratocumulus Clouds." *Met Office*, <https://www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/clouds/low-level-clouds/stratocumulus>.

[2]: "Denver, CO Weather historystar\_ratehome." *Weather Underground*, <https://www.wunderground.com/history/daily/us/co/denver/KDEN/date/2021-9-20>.

[3]: 72469 DNR Denver Sounding, <http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2021&MONTH=09&FROM=2100&TO=2100&STNM=72469>.