Clouds First

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MCEN 5151: Flow Visualization
Assignment: Team First

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Figure 1: Photo of clouds above the foothills, taken from **Chautauqua** on 8/30/2026 at 6:40pm. **Cumulus cloud**, drifting off the mountain beneath **altostratus** and **altocumulus** clouds.

Context and Purpose

I took this photo (Figure 1) for the *Clouds First* assignment for the MCEN 5151 – Flow Visualization course at CU Boulder. Summer afternoons in Boulder often bring thunderstorms that build over the mountains and move east over Boulder. My goal was to capture an interesting cloud formation over the foothills.

Circumstances

I took this photo from the Enchanted Mesa trail in Chautauqua Park, in Boulder, CO. This photo was taken facing north along the foothills and my camera was angled up from the horizon between 5-10 degrees. I took the photo at 6:40pm MT on 30 August 2026, approximately an hour before sunset. Afternoon storms had rolled through Boulder a few hours before the photo was taken, but the sky was still overcast.

Clouds and Atmospheric Conditions

This photo contains three types of clouds. The upper cloud formations consist of altostratus and altocumulus clouds. The clouds that look like long thick streaks are altostratus, and the clouds that look like waves are altocumulus. Coming off the mountain in the foreground there is a small poofy cumulus cloud. See the original, unedited and uncropped photo (Figure 2) for a wider view of the surrounding cloud conditions. Storms had passed through Boulder, from west to east, between 2:30 and 3:00pm MT the same day, but the sky remained overcast after the storms.

Figure 2: Original, unedited photo

According to the National Weather Service's Area Forecast Discussion from August 30 (National Weather Service Boulder, 2026), storms were making their way off the Continental Divide and northern Front Range, capable of producing strong winds. The atmosphere was weakly unstable that day. Southwesterly winds continued to bring monsoonal moisture into the area the following day.

Figure 3 shows the skew-T plot of the sounding launched from Grand Junction (the closest location to Boulder) at 5:08pm MT, approximately 90 minutes before my image was taken. The LCL was at 680 hPa. Lawrence (2005) gives us an estimate of the LCL height:

$$z_{LCL} \approx z + 125(T - T_d) = 1655 + 125(26 - 8) = 3905\,\text{m} \tag{1}$$

This elevation makes sense, given the clouds are significantly higher than the foothills. The atmosphere was slightly unstable.

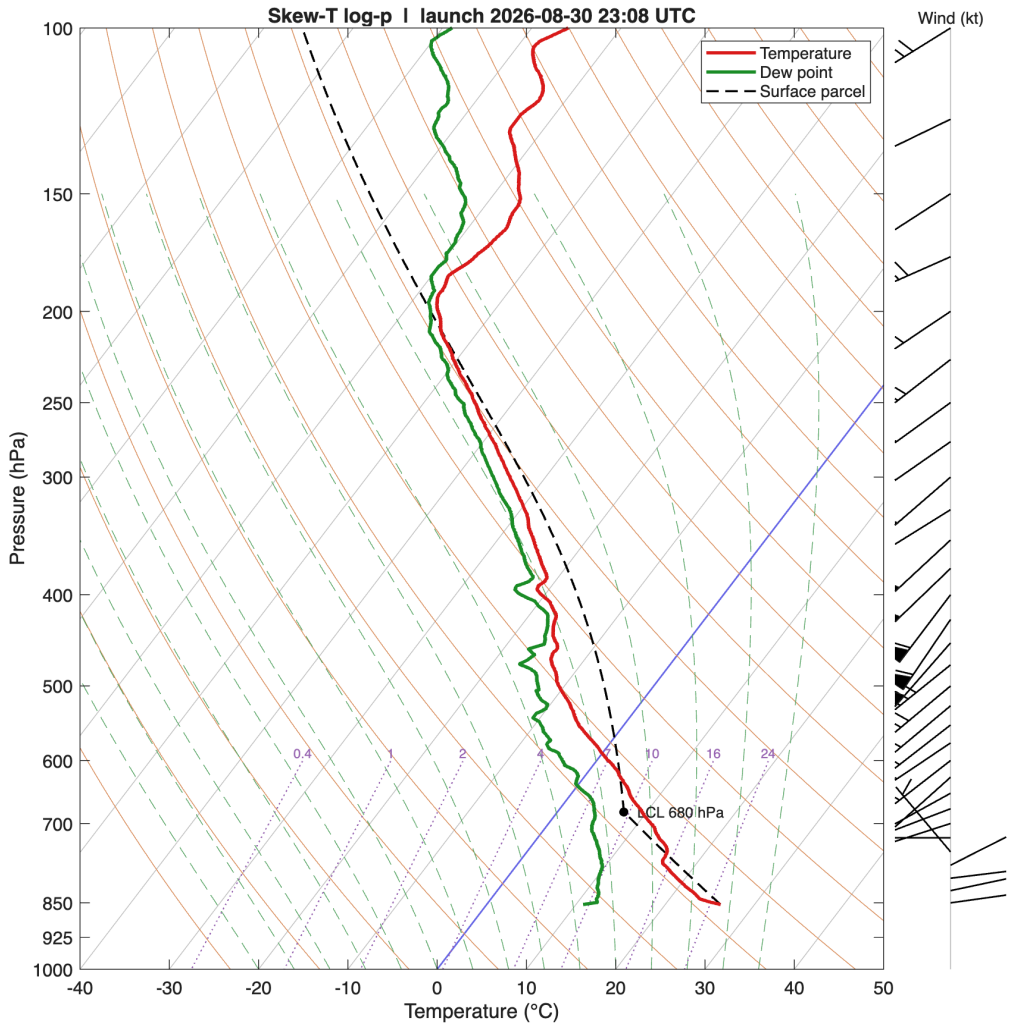

Figure 3: Skew-T diagram of the sounding launched from Grand Junction at 5:08pm MT, approximately 90 minutes before my image was taken.

Photographic Technique

I shot the image on a Canon EOS R6 Mark II with a Canon RF 24–70 mm f/2.8L IS USM lens at 70 mm. The exposure was 1/100 s at $f/5.0$ and ISO 320. I underexposed slightly to preserve detail in the bright sky (upper left). The original raw file is 6000×4000 px, and I cropped it down to 2576×1717 px. I darkened the shadows to turn the foothills into a silhouette, turned down the blues in the sky, and adjusted the lighting to make the texture of the clouds more pronounced. Figure 2 shows the unedited image as it came out of the camera.

Discussion

This image shows a few different types of cloud formations in one image, all above the foothills west of Boulder. A small, fluffy cumulus cloud coming off a mountain underneath more broad altostratus and altocumulus cloud layers. I like the mood of the final image. I tried to reduce distractions and direct the viewer's attention to the cloud formations interacting with the foothills beneath them. The sliver of sunset in the bottom right gives some context and life to the photo as well. I achieved my goal of capturing a visually-interesting interaction between clouds and the mountains. In the future, I'd be interested to take a time-lapse of the small cumulus cloud to see exactly how it is interacting with the mountain, and whether it is growing or shrinking.

References

Mark G. Lawrence. The Relationship between Relative Humidity and the Dewpoint Temperature in Moist Air: A Simple Conversion and Applications. *Bulletin of the American Meteorological Society*, 86(2):225–234, February 2005. ISSN 0003-0007, 1520-0477. doi: 10.1175/BAMS-86-2-225. URL `https://journals.ametsoc.org/view/journals/bams/86/2/bams-86-2-225.xml`.

National Weather Service Boulder. Area Forecast Discussion, issued 30 August 2026, 23:46 UTC, 2026. Published: Retrieved from the Iowa Environmental Mesonet NWS text archive.