

Clouds First Report

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Course: Flow Visualization | Section: MCEN 4151

Assignment: Clouds First

Cloud type: Stratocumulus

Image taken: September 5, 2026, at 6:14 p.m. MDT | Boulder, Colorado

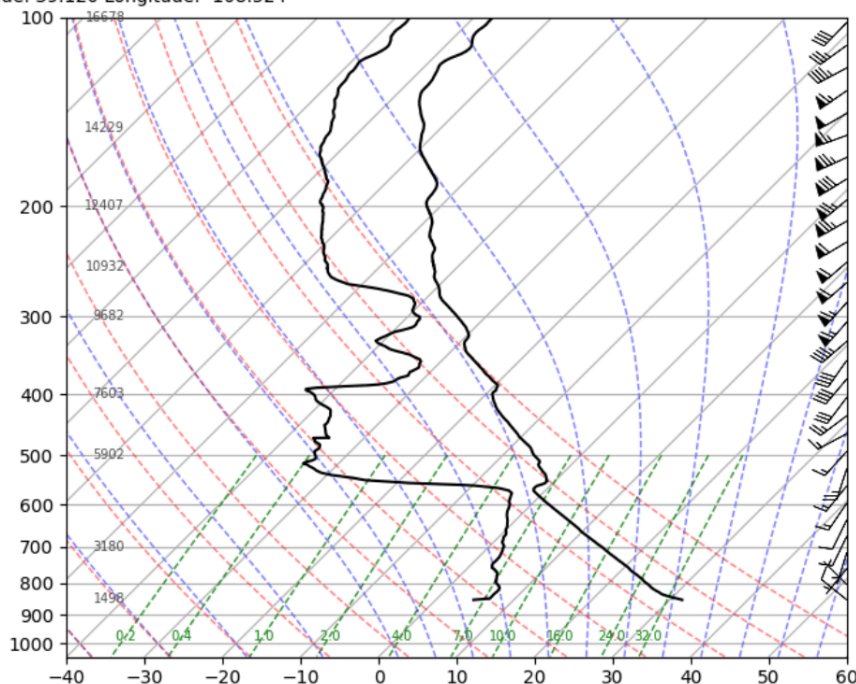


I took this photo for the Clouds First assignment in my Flow Visualization class. I was hanging out with friends at the pool, but it was getting cold and windy. With the assignment in mind, I looked up and noticed the shapes of the clouds. What caught my attention was the line of blue sky in the middle that seemed to separate the clouds into two sides. I thought it looked really interesting and wanted to capture it in a photo.

I took this photo at the pool at 1075 Monroe Drive, Boulder, Colorado 80303, on September 5, 2026, at 6:14 p.m. MDT. The coordinates were 40.00565° N, 105.24286° W, and the ground elevation was approximately 1,610 m above sea level. I was facing west, approximately 273°, while holding my phone flat with the camera pointing straight up at the sky, about 90° above horizontal.

The clouds in the image appear to be stratocumulus because they have rounded, clumpy shapes that spread out into larger patches. Some areas are white, while others have darker gray shading. A gap of blue sky separates the clouds into two sides, and the rest of the sky had similar clouds. The day before, the sky was mostly clear and sunny, with very little cloud cover and no precipitation. When I took the photo, it was mostly cloudy and the temperature was 29°C. The wind was coming from the northwest at 306°, with a speed of 23 km/h and gusts up to 35 km/h. It did not rain in the hours after the photo, but the weather app forecast about 1 mm of rain for the next day. The surface weather map showed no front directly over Boulder. There were fronts north of Colorado, but this single map does not show whether they were approaching Boulder [1].

Station 72476 at 00 UTC 06 Sep 2026
GRAND JUNCTION/WALKER FIELD, CO., USA
Latitude: 39.120 Longitude: -108.524



To examine atmospheric stability, I used the Grand Junction Skew-T diagram shown below [2]. Its timestamp is September 6, 2026, at 00 UTC, which corresponds to September 5 at 6 p.m. MDT, about 14 minutes before my photo. The temperature profile suggests that the lower atmosphere was well mixed, with a more stable layer around 580–550 mb. In this layer, temperature changes relatively little with height, which can limit how far rising air continues upward [3]. This could favor clouds that spread out rather than grow into tall towers, which agrees with the appearance of my photo. However, Grand Junction is across the mountains from Boulder, so its sounding may not represent the exact conditions where I took the photo.

The temperature and dew-point lines come relatively close near 580 mb, suggesting a possible cloud level around 4,800 m above sea level. If the clouds over Boulder were at that elevation, they would be about 3,200 m above the ground. This is a rough estimate, not a measured cloud height, since the lines do not fully meet and the sounding is from another location. At that height, altocumulus would also be possible, so my identification of stratocumulus remains tentative. Without a reference point in the photo, I cannot confirm the height from appearance alone.

During critique, it was suggested that the opening in the middle could be an area where air was sinking, while air on either side was rising. As air rises, it expands and cools. If it cools enough, water vapor condenses into droplets and forms clouds. As air sinks, it compresses and warms, lowering its relative humidity and allowing cloud droplets to evaporate. This could explain why there is a clear opening with clouds on both sides. The pattern is consistent with this explanation, although a single photo cannot confirm the direction of air movement.

I took the photo with the main digital camera of an Apple iPhone 15 Pro, using automatic settings. The camera has a 24 mm equivalent focal length and an aperture of $f/1.78$. The photo was taken at ISO 80, with a shutter speed of $1/12,345$ s and exposure compensation of 0 EV. Both the original and edited images are 4284 pixels wide by 5712 pixels tall, or approximately 24 megapixels. I chose this framing because I wanted to include enough clouds to show their pattern and the clear opening between them. Using the rough cloud-height estimate discussed earlier, the distance from the camera to the clouds overhead would be about 3.2 km. Based on the 24 mm equivalent focal length and the image proportions, I estimated a field of view of approximately 57° horizontally and 72° vertically. Using these angles and the estimated distance, the image would cover about 3.5 km horizontally and 4.6 km vertically at cloud level. These measurements are approximate because the cloud height was not measured locally. I edited the image in the Apple Photos app using the Dramatic Cool filter at an intensity of 76 to increase the color contrast. I did not crop or resize the image, and the original image is included below for comparison.



The image reveals an interesting pattern in the clouds, with an opening of blue sky separating them into two sides. I really like this separation, the contrast between the gray and white clouds, and the sunlight shining through in the corner. There is nothing I particularly dislike about the photo, and I would not change anything about the final image. The cloud shapes and the clear opening help show how air movement can affect where clouds form and disappear. As discussed during critique, rising air could help form the clouds on either side, while sinking air could cause droplets to evaporate in the middle. Although the photo cannot confirm this movement, it makes the idea easier to visualize. One question I still have is how long the opening lasted and whether it moved or changed shape over time. Overall, I fulfilled my intent of capturing the gap in the clouds and explaining a possible reason for how it formed. To explore this idea further, I would take a time-lapse of a similar sky to see how the clouds and the opening change.

References

1. NOAA Weather Prediction Center. *Surface analysis, September 6, 2026, 00 UTC*. [Surface Analysis Archive](#).
2. University of Wyoming. *Grand Junction sounding, station 72476, September 6, 2026, 00 UTC*. [Radiosonde Archive](#).
3. National Weather Service. *Temperatures—The Inversion*. [Temperatures - The Inversion](#).
4. ChatGPT for spelling