

Stratocumulus

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Clouds First Report
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Figure 1: Stratocumulus in stable atmosphere at 7:28pm MST on 10/2/2026 looking northeast over Boulder, CO

Context and Purpose

This image was taken for the Clouds First assignment. I was trying to capture the colorful display of clouds at sunset. I am most interested in large, fluffy clouds that stem from atmospheric instability due to their pleasant texture and commanding presence in the sky. The one shown is a stratocumulus in the low atmosphere sprawling across the plains.

Circumstances of the Image

This photo was taken after sunset at 7:28 pm on September 2nd. It points northwest from Flagstaff overlooking Boulder. The weather was fair and the camera was angled at a one or two degrees above the horizon. The sun had just sank below the mountains and left a dim light, but the clouds in the atmosphere were still illuminated.

Cloud Physics

The weather was clear on September 2nd with no precipitation. The Skew-T chart indicates that the atmosphere was stable. Following the start point at the bottom of the temperature line, the differential element of air rises parallel to the dry adiabat. The "neck" of the Skew-T is where the temperature and dew point lines are close together and create an environment conducive to cloud formation. This occurs at 600 to 500 millibars, which is relatively low in the atmosphere. The element is cooler than the temperature line here, so it is denser than the surrounding atmosphere and wants to sink. The atmosphere is stable. Clouds in a stable atmosphere are trapped below stable layers, forcing them to expand horizontally. Clouds named with "stratus" as the root word are typical here because it is latin for "spread out".

The cloud is a stratocumulus due to its cauliflower-like shape and flat, creeping appearance. These form when a cumulus rises and hits a stable point in the atmosphere. It cannot rise anymore and spreads horizontally into a sheet [1]. This is consistent with the Skew-T chart, which shows atmospheric stability. The clouds are at a height of about 7,000 ft, which is also consistent with stratocumulus formation. Pressure altitude is a scale that measures altitude as a function of a standard model of air pressure [2]. This is a reasonable way to estimate the height of clouds because the values orbit a standard model of the atmosphere. A pressure of 600 millibars corresponds to a pressure altitude of about 13,800 ft [3], which is about 7,500 ft above ground level in Boulder.

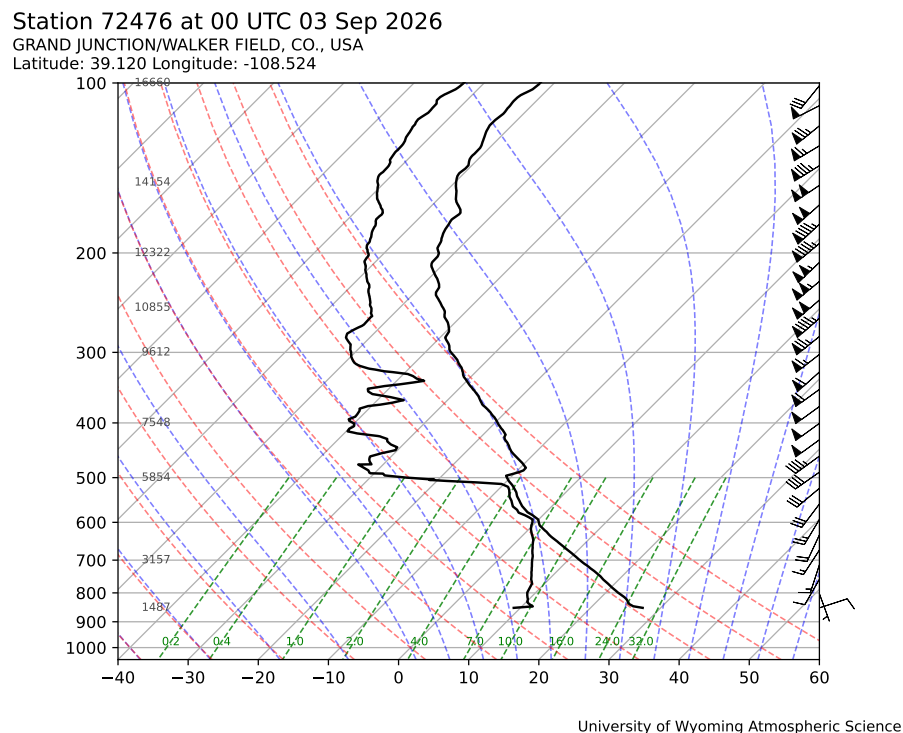


Figure 2: Skew-T chart at 00Z on 10/3/2026

Photographic Technique

My camera is a Canon Rebel T3i DSLR camera. I took pictures from about two feet away from the experiment. The field of view was about 28.7 degrees diagonally for my camera. The settings of my camera were 55mm focal length, f/5.6 aperture, 1/100 shutter speed, ISO 320, and flash disabled. The original image has a size of 5202 x 3464 pixels and the final image was cropped to 3704 x 1992.

The original image is below. I rotated and cropped the image in postprocessing. The final image can be seen at the start of the report.



Figure 3: Original image before adjustments

Discussion

The image shows the stratocumulus in the distance being illuminated by the evening sunlight. I like the colors and scale of the image. The contrast between the upper layer of the cloud and the low-light haze underneath is interesting and makes the cloud appear to dwarf the city of Boulder. I don't like that the image is slightly grainy and is noticeably lacking in resolution. I would like to take this image again with a higher focal-length lens to capture the cloud in more detail. I would also like to try this slightly earlier to reduce the monochromatic haze.

References

- [1] "A Day in the Life of Stratocumulus." AMS Headlines, 11 Dec. 2025, headlines.ametsoc.org/2021/04/09/a-day-in-the-life-of-stratocumulus/.
- [2] Brombacher, W. G. "Altitude by Measurement of Air Pressure and Temperature." *Journal of the Washington Academy of Sciences*, vol. 34, no. 9, 1944, pp. 277–99. JSTOR, <http://www.jstor.org/stable/24531101>. Accessed 30 Oct. 2026.

- [3] US Department of Commerce, NOAA. “Pressure Altitude Calculator.” National Weather Service, NOAA’s National Weather Service, 16 Aug. 2023, www.weather.gov/epz/wxcalcpressurealtitude.