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 MCEN 4151
 18 October 2026

“Clouds First” Report

Cloud Type	Date	Time	Location	Coordinates
Altostratus	30 September 2026	18:47	Boulder, CO	~40.01060° N, 105.25651° W

Table 1

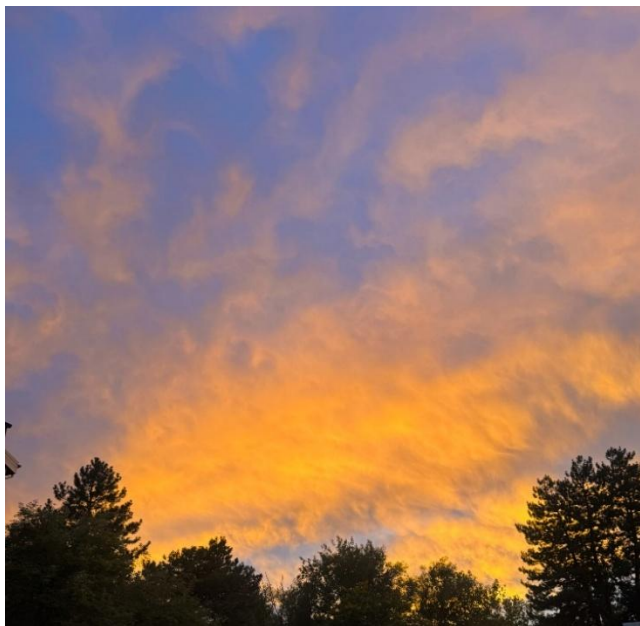


Figure 1

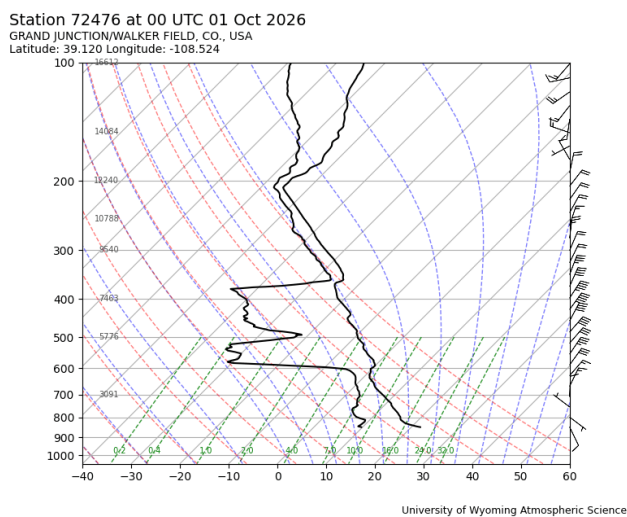


Figure 2

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Our third project of this course was titled “Clouds First”. It aimed to have students individually observe and understand a flow visualization that is seen and experienced everyday—Clouds. Sunset clouds have a sense of magnificence around them, especially when they sit at a height where the setting sun rays light them up. The evening of September 30th was an evening like that. Following a bleak, dreary day was a beautifully striking sunset lasting only 20 minutes that lit up the sky in pinks, purples, oranges, and yellows. Lucky enough to be outside during this time, figure 1 was taken, showing altocumulus clouds filling the sky. This report will detail image specifics and cloud type with scientific evidence associated with the picture submitted for this “Clouds First” assignment.

Figure 1 was taken in the evening of Sept. 30th at 18:47 p.m. at the approximate coordinates of 40.01060° N, 105.25651° W in Boulder, Colorado. The iPhone used was pointed at an angle of ~30°. The temperature was in the low to mid-60°s F. The hours before held rather gloomy, grey weather which added to the astonishment surrounding the eye-catching sunset. A couple of peers taking this course also photographed the event at different locations around the city, furthering the sentiment that the sunset truly lit up the entirety of the Boulder sky.

Based on the photograph and Skew-T diagram, the cloud type can be determined. Visually, the clouds are wispy and patchy. One large cloud is present at the bottom of the image and scattered above it are similar looking but much smaller and thinner clouds. Examining figure 3 (University of Wyoming, annotated), the temperature and dewpoint lines are convergent between 3,000 meters to around 4,439 meters. This is where the clouds formation has likely occurred and can be associated with either altostratus or altocumulus clouds. If we follow the slope of the temperature curve, we see that it follows the moist adiabat (blue lines) closely and remains upright in comparison to the dry adiabat (red lines). These characteristics point to a stable atmosphere housing an altocumulus cloud. Altocumulus would be the correct specification over altostratus due to the cloud appearance being patchier and less uniform.

The temperature at the time the photo was taken was in the mid 60°’s F with little to no winds present. The temperature throughout the day was bleak and between the high 60°’s F and low 70°’s F with southwesterly winds at the height of cloud formation. These clouds are at mid-

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level height, so saying clouds aloft may be appropriate. In terms of physics, “clouds are created when water vapor turns into liquid water droplets” (NASA, para. 1). Water vapor rises and cools and a cloud is formed when that temperature converges with its dewpoint. In terms of altocumulus clouds, they are “regularly found in a layer that is colder than the surrounding air” (Cadez, para. 1). The definition of the clouds in figure 1 can be described by, “If we suppose that such a cloud is stable...seen at moderate altitudes...the boundaries can be sharply defined only on the condition that it borders a warmer atmosphere” (Cadez, para. 1, 3). This evidence supports the hypothesis that the clouds pictured are of the altocumulus type.

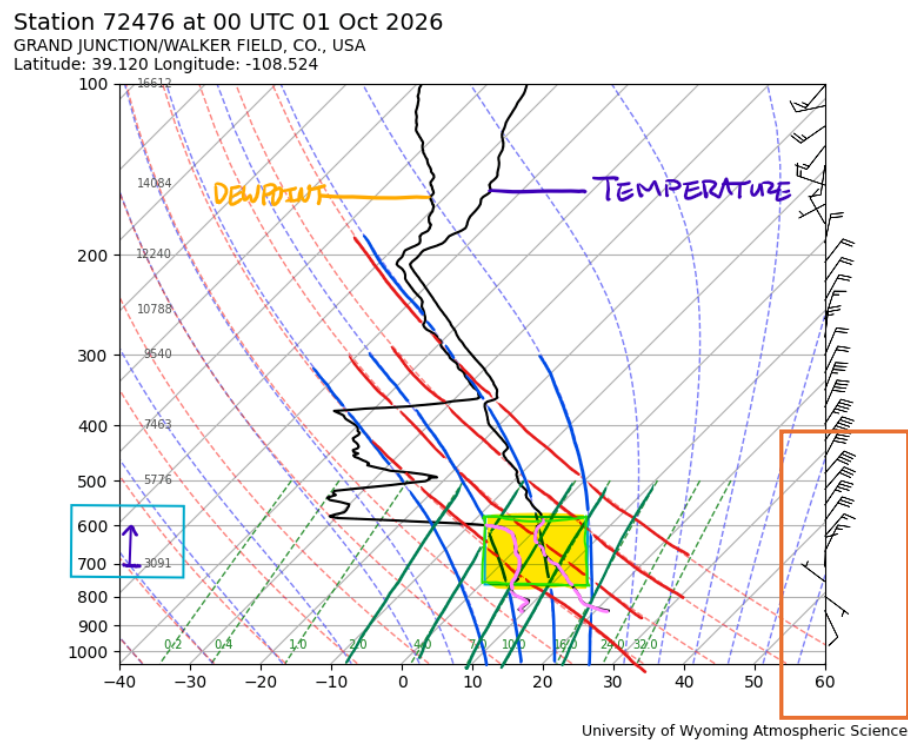


Figure 3

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This image was taken with an iPhone 15 pro camera with ISO 64, focal length 24 mm, aperture of $f/1.78$, and a shutter speed of $1/121$ s. The raw image resolution, figure 4, was 4284×5712 while the final image (fig. 1) had a resolution of 1179×1193 . For post processing, the image was cropped to eliminate the cars in the bottom of the raw image. Along with this, the saturation of the main orange increased to remove some of the present transparency. The surrounding clouds and blue sky were increased in exposure as well as saturation to create an overall “fullness” and boldness to the patchy raw image. The editing was done lightly to not take away from an observer’s ability to specify what type of cloud was photographed.



Figure 4

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In closing, the final image reveals an altocumulus cloud in a stable atmosphere within a beautiful sunset. Visually, the image is strong. Editing did not take away from science or physics and when critiqued, peers noted on the delicacy and radiance of the clouds. In the future, a more scientifically striking cloud would be chosen. While this cloud was a successful assignment submission, a cloud found in an unstable atmosphere may pose for better scientific analysis and observation.

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Citations:

Čadež, M. “La formation des Nuages Altocumulus Translucidus.” *Pure and Applied Geophysics*, vol. 54, 1963, pp. 182–89. *Springer*, <https://doi.org/10.1007/BF01988263>.*

“5.3: Skew-T Log-P Diagram.” *Geosciences LibreTexts*, LibreTexts, 16 Sept. 2025, geo.libretexts.org/Bookshelves/Meteorology_and_Climate_Science/Atmospheric_Processes_and_Phenomena/05%3A_Atmospheric_Stability/5.03%3A_Skew-T_Log-P_Diagram.

“How Do Clouds Form?” *NASA Science*, National Aeronautics and Space Administration, 3 Sept. 2025, science.nasa.gov/kids/earth/how-do-clouds-form/.

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