

CU Boulder

Clouds First Report

MCEN 5151-002

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Introduction

This image was captured as part of a cloud observation assignment intended to document and analyze atmospheric phenomena visible from the ground. The purpose of the image was to record the transition of storm activity during sunset, emphasizing the visual contrast between scattered sunlight and convective cloud development. The objective was to capture the remnants of the receding storm and identify the applicable cloud formations.

Image Details

The photograph was taken at Glendale Farm Open Space in Castle Rock, Colorado, on September 10, 2025, at 7:11 p.m. MDT, facing west with the camera angled approximately 25–30° upward from the horizon. The scene occurred shortly after a thunderstorm passed through the area, as residual convection dissipated in the evening light.

Cloud Identification

The clouds present are primarily Cumulonimbus remnants transitioning to Stratocumulus in the lower atmosphere. Surface winds were light, temperatures were cooling from the daytime peak, and visibility was good. The low solar angle created a strong color gradient across the image, with the illuminated horizon contrasting against the darker cloud base and producing a natural sense of depth. The vertical extent, dark underside, and streaks of precipitation near the horizon indicate a dissipating convective storm with continued moisture release. The Skew-T, shown in Figure 1, supports this assessment.

Station 72476 at 00 UTC 11 Sep 2025
GRAND JUNCTION/WALKER FIELD, CO., United States of America

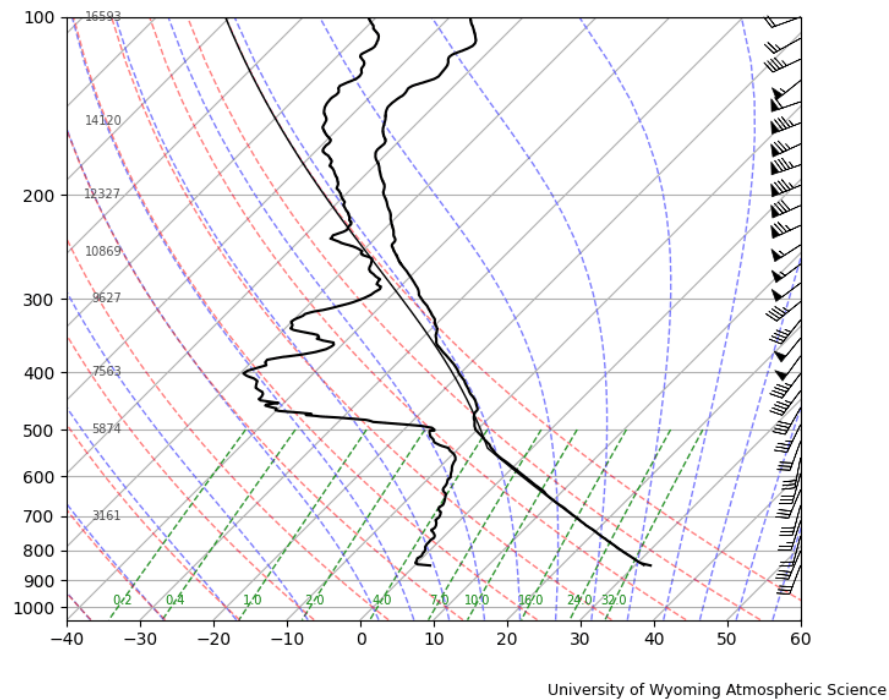


Figure 1. Skew-T Diagram

It shows a conditionally unstable atmosphere with a lifted condensation level near 700 mb and a level of free convection extending to 400 mb. This vertical profile corresponds to cloud tops reaching approximately 8–9 km in altitude. Moderate CAPE values and the separation between the environmental and parcel temperature traces indicate sufficient instability to support cumulonimbus formation. Winds near the ground were generally from the south but shifted to come from the west higher up in the atmosphere, a pattern that helps maintain the structure of storm clouds by creating gentle vertical mixing [1]. Warm afternoon temperatures, rising air along the Front Range, and leftover surface moisture together encouraged the formation of the tall cumulonimbus clouds seen earlier in the day. The photograph shows the storm in its final stage, with the fading anvil and remaining layers of rain clouds drifting behind the main storm system [2].

Photographic Technique

The photograph was taken using an iPhone 14 Pro Max phone camera, which automatically selected exposure parameters optimized for the low-light environment. The original image resolution was 3024 × 4032 pixels, later cropped and slightly adjusted for contrast and color balance using the iOS photo editor to emphasize cloud definition. The unedited

image (Figure 2) shows a flatter tonal range with less distinction between the horizon and the storm base. No artificial filters or compositing were applied, ensuring that the final version preserves the authentic color palette and structure of the atmosphere at the time of capture.



Figure 2. Original Image

Conclusion

The final image reveals the dissipating stage of a cumulonimbus cell during sunset, illustrating the interaction between residual instability and cooling evening air. The dark

lower layers contrast sharply with the illuminated horizon, demonstrating the effects of scattering, water-vapor density, and altitude on cloud coloration. The photograph effectively captures the transition from convective turbulence to post-storm calm, visually representing atmospheric re-equilibration following an unstable event. The scene also highlights how stratiform remnants and precipitation curtains can linger even after the main convective updrafts have weakened. A wider panoramic composition could provide additional context, but the current frame successfully conveys the scale and dynamics of the observed cloud system.

References

1. University of Wyoming Atmospheric Soundings. "Station 72476, Grand Junction/Walker Field, CO, 00 UTC 11 Sep 2025." Department of Atmospheric Science, University of Wyoming, 2025.
2. Lutgens, F. K., & Tarbuck, E. J. *The Atmosphere: An Introduction to Meteorology*, 14th ed., Pearson, 2021.
3. National Weather Service (NWS). "Cloud Classification and Formation." NOAA JetStream — An Online School for Weather, 2024.