



Clouds First Report

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Introduction

This image was created for the 2025 Clouds First assignment, the third project in the Flow Visualization course at CU Boulder. The intent of this project was to capture a visually interesting cloud structure that could also be presented in an artistic manner. Several photos of varying structures and varying times of day were taken between August 22, 2025 and October 8, 2025 for this project.

The photograph used for this image was captured on September 9th, 2025 at 9:17am. The photo was taken in front of the main entrance of the Ann & H.J. Smead Department of Aerospace Engineering Science Building. The perspective of the photo is facing south-west, with the phone tilted at roughly 30 degrees upwards. This image was edited to both accentuate the elongation of the cloud structure and to provide a visually striking tone.

Cloud Discussion

Station 72476 at 00 UTC 10 Sep 2025
GRAND JUNCTION/WALKER FIELD, CO., United States of America

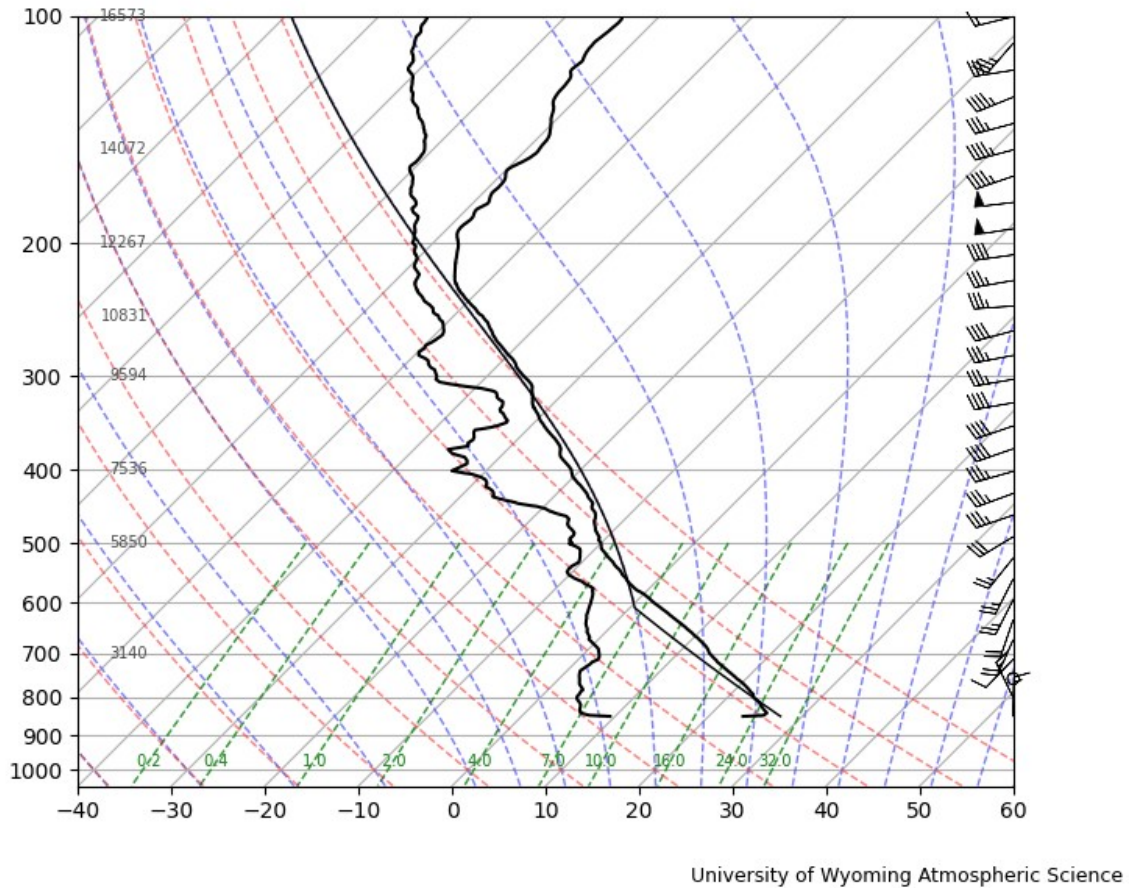


Fig 1. Skew-T diagram provided from data at the Grand Junction/Walker Field

The cloud types in the image appear to be Stratocumulus Volutus on the bottom, while the one at a higher altitude appears to be Stratocumulus floccus. Stratocumulus Voltus, also known as the “roll cloud” (Hamblyn 2022) is one of the rarer stratocumulus cloud species, but shares similarities with “shelf clouds”. Stratocumulus Voltus is characterized by their long tube-shaped structure that appears to roll about a single axis. They are generally standalone and free-floating from other cloud shapes/structures. The roll cloud in the image most likely formed from the winds coming off the Front Range mountains. Floccus clouds can be found amongst various cloud types but are easier to identify in their stratocumulus variation. The word ‘floccus’ is translated from Latin, meaning lock of wool (What’s This Cloud 2025), which the cloud in the upper photo of the image really evokes. Stratocumulus Floccus also usually have a ragged underside while appearing more cumuliform in their structure on the top. Contrary to the darkening of the image, the day was bright and sunny when the photograph was taken. The atmosphere can be inferred to be unstable as Stratocumulus Flocus clouds form in an unstable atmosphere (Galvin 2003). Straocumulus Flocus forms from convective movement of well-mixed cooler air meeting warmer moister air,

which is a typical sign of an unstable atmosphere. Stratocumulus clouds tend to form between 2,000 – 7,000 feet with Stratocumulus Voltus tending to form around 2,000 feet or below.

Visualization and Photographic Technique



Fig 2. Original Un-edited Photo

The initial photograph was captured using a Samsung Galaxy S22 Ultra smartphone. The photo was taken with the stock camera app with default settings. The focal length used for the captured image was 8mm with a F-stop of f/2.4. The original photo has a width and height of 4000 x 3000 pixels (Figure 2). The final image was cropped to a width and height of 1300 x 639 pixels and slightly rotated to be more level with respect to the horizon. The default Samsung Galaxy photo editing software was used to auto-balance the colors in the photo. Further processing was done using Darktable to further edit the RGB-curve of the image to accentuate the shadows and to crop the image.

Conclusion

This image reveals uncommon cloud types that formed most likely due to dynamics involving the Front Range mountains near the building. I really like how long and uniform the

roll cloud appears in the image, and the fact that it continues out of frame to give a greater sense of immense scale. I dislike the overall quality of the image, as a higher quality image could have been achieved using a DSLR rather than a phone camera. In terms of fluid physics, I believe the cloud types observed are indicative of the forces at work in the image. However, I would like to know what weather events usually precede/follow these cloud formations for even greater insight. I believe I fulfilled the intent of my image, but an object separate from the cloud formations could have been provided to give an even greater sense of scale. If I could improve an aspect, it would probably be the editing as I have learned of more advanced options to darken the image while lessening the noise present. To develop this idea further, I can try and observe the sky at the same time of day and in similar conditions to see if that's enough to form these clouds.

References

Hamblyn, Richard. *The Pocket Cloud Book Updated Edition: How to Understand the Skies in association with the Met Office*. David and Charles, 2023.

What's This Cloud. n.d. "Floccus Clouds: Puffy, Ragged Tufts | WhatsThisCloud." Accessed October 21, 2025. <https://www.whatsthiscloud.com/cloud-species/floccus>.

Galvin, J. F. P. "Observing the sky—how do we recognise clouds?." *Weather* 58, no. 2 (2003): 55-62.