

ATLS 4151 - Flow Visualization Clouds First Report

Can you smell what Duane is cooking?

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Stratocumulous clouds in Boulder, CO at 10:10 am MDT (16:10 UTC) on September 11, 2026

The purpose of this assignment was to produce an aesthetically pleasing cloud image that demonstrates flow physics. The image was taken at the tail end of a massive cumulonimbus cloud. As I saw the size of the clouds I attempted to create a dramatic image to show the sheer scale relative to buildings we students pass on a daily basis.

This image was shot facing northwest near the Duane physics building on the CU main campus at 10:10 am MDT (16:10 UTC). The ground elevation in Boulder is about 1650 meters and the angle of the camera from vertical was about 5° .

The cumulonimbus clouds in the photo occurred at the tail end of one large cloud formation that stretched many kilometers north, south and west. As mentioned before, the photo was taken facing west. These clouds rolled over in the morning and the rest of the day was sunny and cloud-free. There was no precipitation the day prior to, day of, or day after this image was taken. I took this image at a time too early in the course too early to have known to save the Skew-T diagram for that day, so the best recorded Skew-T data I could find is from Salt Lake City at 12:00 PM (18:00 UTC).

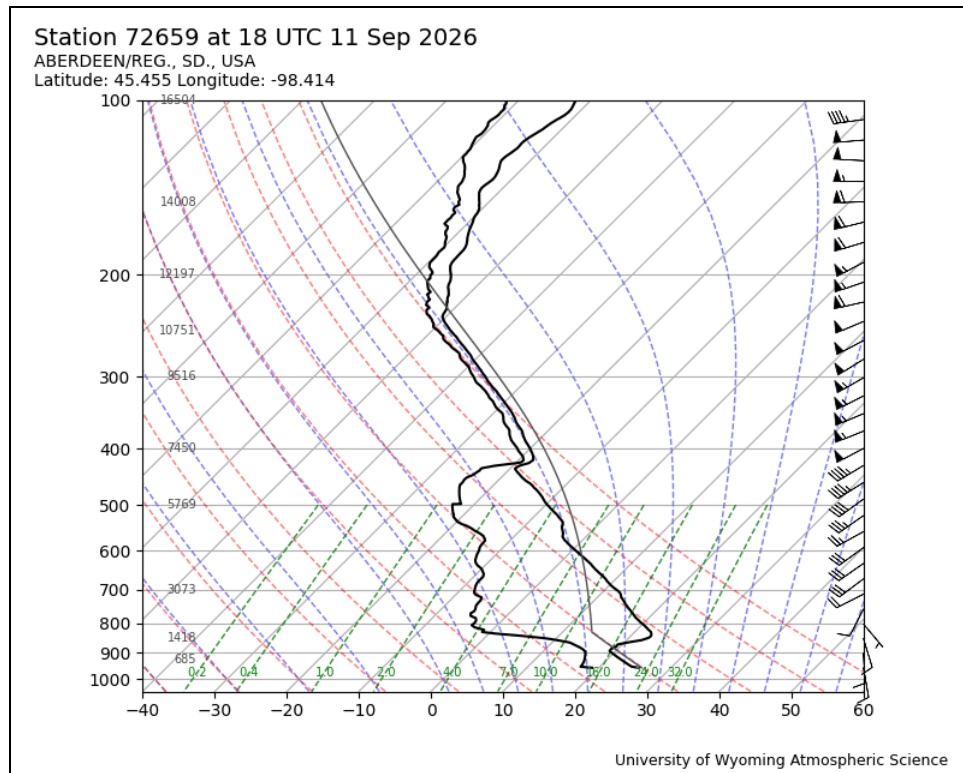


Figure 1: Skew-T diagram

In using the parcel method to categorize the atmospheric stability of this day, the Skew-T diagram in Figure 1 indicates an unstable atmosphere. I would like to add that the atmosphere in Boulder the day of the image was stable, and stratocumulus clouds generally occur in stable atmospheres. Since the data in the Skew-T was taken so far from the time the photo was taken, I would suggest it should not be used to determine stability. The Skew-T also suggests that there would be clouds around 700 and 7000 meters above the ground. Since stratocumulus clouds generally occur below 2000 meters and they were definitively higher than the nearby Bear peak (923 m above Boulder), I would estimate the cloud height to be about 1400-1700 m above ground level. Again, disagreeing with the Skew-T diagram. For the next report, I will be sure to save the Skew-T data before too much time passes.

I took this photo with the main camera of my iPhone 17, which has a focal length of 26 mm. The aperture was set to f1.7, ISO 40, shutter speed 1/1848 s, and final pixel density 3992 x 2994. Since the east-most edge of the clouds was approximately 2 km from my location at the time and 1500 m from the ground, I estimate that the clouds within the field of view are about 2500 m from the location of the photo. When editing the photo, I made the following adjustments within the apple photos app:

Table 1: Photo Adjustments

Exposure	Brilliance	Highlights	Shadows	Brightness	Saturation
-19	12	-29	-5	-4	-17

In conclusion, this image shows a stunning and dramatic cloud formation present in our everyday lives. While I was able to capture the scale of this cloud with respect to the buildings in the photo, I would have liked to more clearly show the flow physics. In the future, I will be sure to save the day-of Skew-t data and capture more photos of the sky surrounding the chosen field of view for more context.