

Stable Stratocumulus Cloud

39.900912°N, 105.094499°W, 11/19/2024 at 4:27 PM

### **An Analysis of “Sunset”**

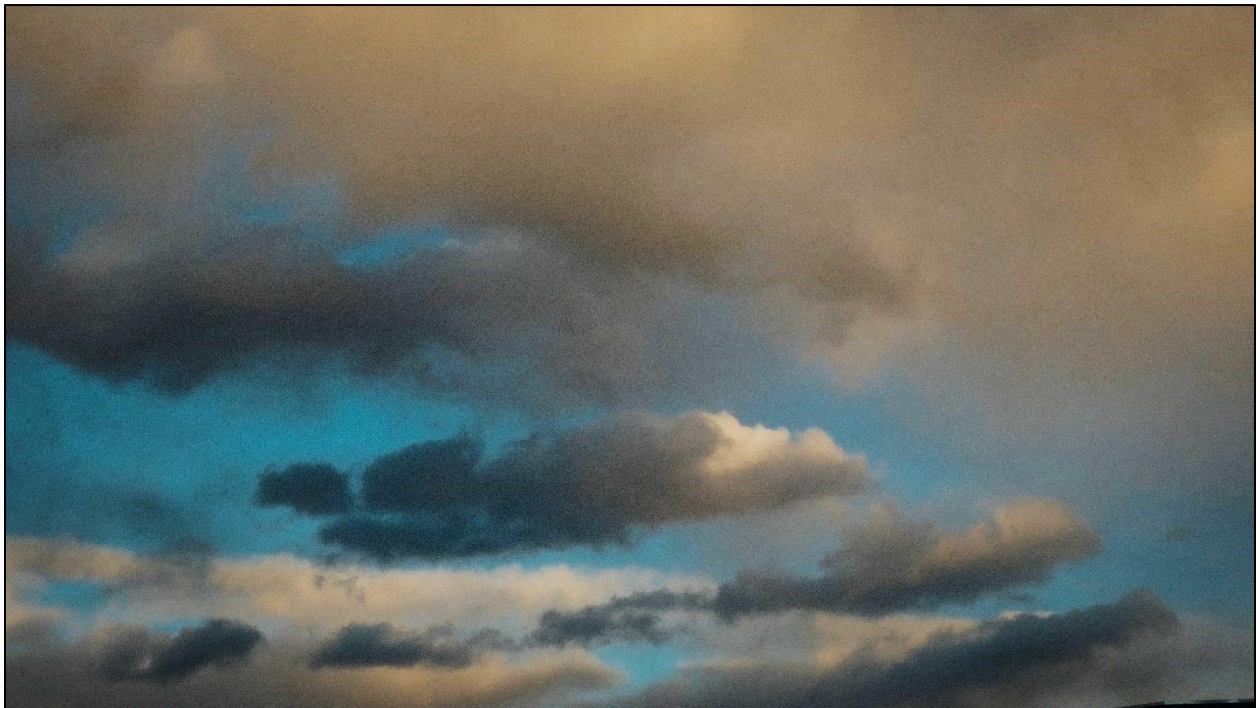


Figure I: “Sunset” Final Image

#### (I) Project Background

The image shown in Figure I above was taken specifically for the Clouds Second project; part of the Flow Visualization curriculum at the University of Colorado Boulder. The goal of the project was to capture an interesting and artistic cloud formation and analyze its formation and background weather physics. This image was selected out of many because to me it had the most unique and dramatic color gradient. The image depicts the straggling remnants of a stable stratocumulus cloud at sunset, and the composition reminded me of a renaissance painting.

## (II) Environmental Background

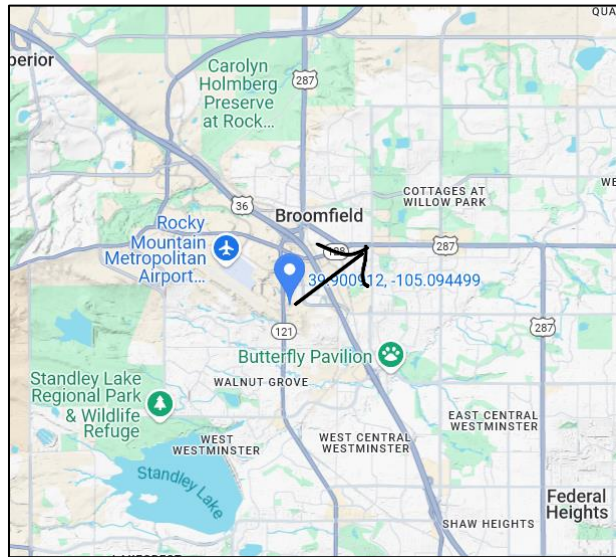


Figure II: Location (Credit: Google Maps)

The image was taken on the south side of Broomfield, Colorado at coordinates  $39.900912^{\circ}\text{N}$ ,  $105.094499^{\circ}\text{W}$ . This location is approximately 5,350ft above sea level, and the camera was about 20ft off the ground facing northwest when the image was taken. The image was taken on November 19<sup>th</sup>, 2024 at 4:27 PM with winds blowing eastward. This weather did not precede or take place after a precipitation event, and are clouds formed in a stable atmosphere.

## (III) Cloud Physics and Analysis

Based on the Skew-T diagram shown in Figure III below (courtesy of the University of Wyoming), the cloud pictured was formed in a stable atmosphere at about 3.1km of elevation. Due to the atmosphere being stable and the cloud being in the low troposphere (suggested by the more significant dewpoint and temperature “bump” at about 3.1-4km) the clouds in this image are likely stratocumulus.

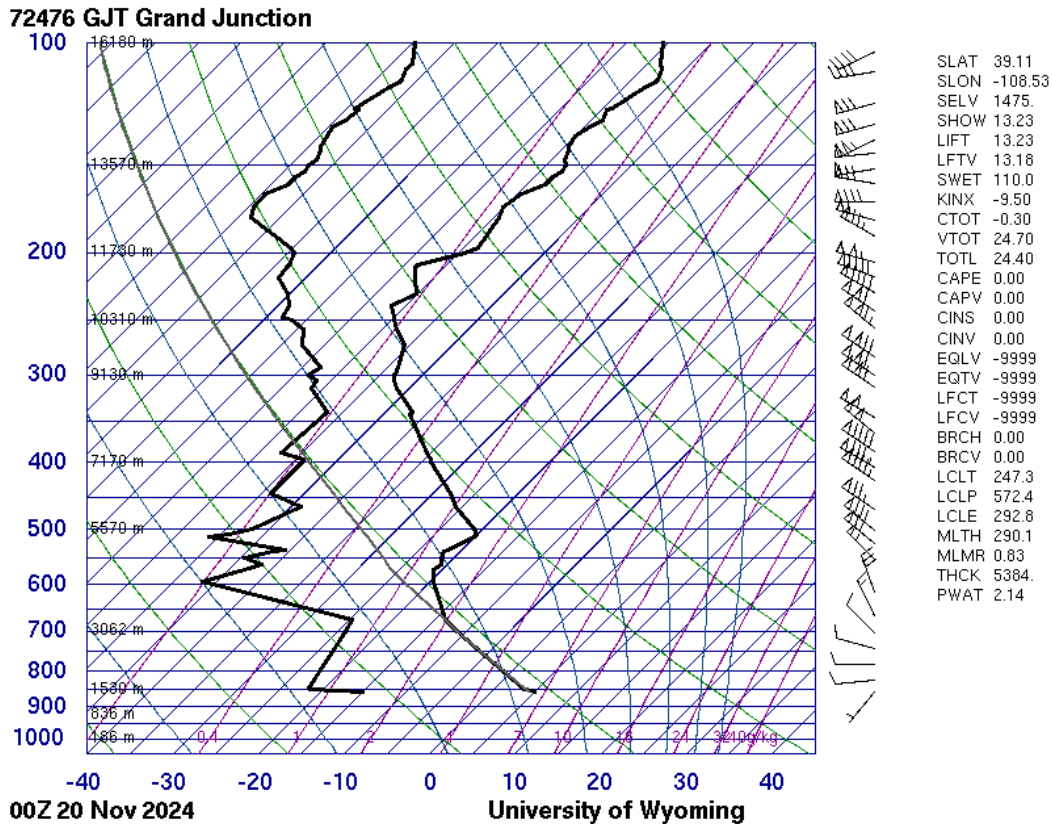
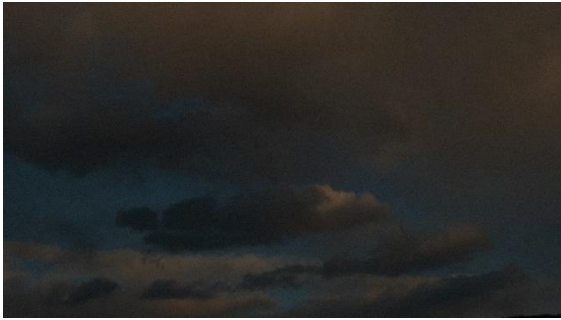


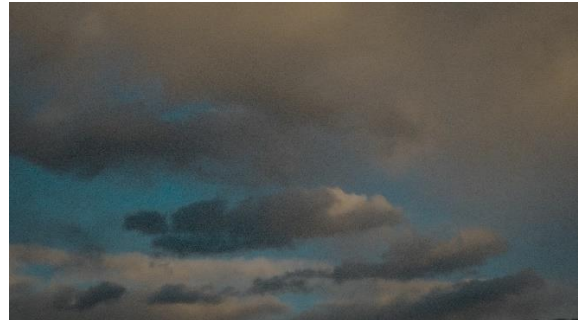
Figure III: Skew-T Diagram

The rest of the sky retained isolated stratocumulus clouds on an otherwise partly cloudy day. The day before had a similar weather pattern with partly cloudy conditions and no precipitation all day. Given we are now in the fall season, weather is making the general transition from unstable to stable, and I would otherwise predict the formation of low-altitude cumulus clouds given the circumstances of the image. This generally seems to be the case given the Skew-T plot and the non-rain producing wisps shown in the image. The clouds in the image were likely formed over the Pacific Ocean before blowing westward to Colorado. The relatively stable atmosphere allowed for the clouds to make it across the Rocky Mountains over time, leading to wispy and aged clouds recently descended from the upper atmosphere.

(IV) Photographic Techniques



Unedited Image



Edited Image

Figure V: Image Comparison

The image was captured using a Fujifilm XT30 II digital camera with the below settings.

<b>Camera Type</b>	Fujifilm XT30 II Mirrorless Digital Camera
<b>Aperture</b>	f/5
<b>Focal Length</b>	34.3mm
<b>Shutter Speed</b>	1/500
<b>ISO</b>	80
<b>Unedited Image Size</b>	6240x3512
<b>Edited Image Size</b>	6240x3512

I would estimate the cloud to be approximately 1 mile from the camera, with the image capturing about 1000ft of horizontal distance. Ultimately, this image was chosen out of a few for its composition. Even though the camera settings were not ideal for the low light levels (this was one of my first photos and I put too much trust in the viewfinder's brightness), I appreciated the dramatic and "full" feeling invoked and decided to brighten and edit the image. I edited the image in post-processing using Adobe Lightroom with an emphasis on increasing exposure, darkening shadows, and modifying the color gradient to focus on blues and oranges. I didn't feel that cropping the image was necessary, and felt the grain to be appropriate, and so I refrained from further editing.

## (V) Conclusion

To me the image is representative of the average Colorado cloud (on the rare occasions when it is cloudy), and so I find it to be interesting to investigate in further detail. In comparison with my Clouds First photo, I can see a clear difference between a “young” and unstable cloud and an “old” and stable cloud. Though the image does not capture a rare or extraordinary cloud formation, I do not think that takes away from its beauty, and I am content with the image taken. That said, in the future I would definitely like to review my images after the first shot to give me more light data to use in post-processing. I started out with a high shutter speed and so my raw images came out under-exposed. I was able to artificially brighten the image in post-processing, but it did limit my editing capabilities, especially when it came to reducing grain and altering the color gradient.

### **Bibliography:**

“Google Maps” <https://www.google.com/maps>

“University of Wyoming Skew-T Diagram”  
<https://weather.uwyo.edu/upperair/sounding.html>