



Alto cumulus Lenticularis Sunrise from Mt. Bross

MCEN 5151: Flow Visualization

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Clouds First Assignment: Alto cumulus Lenticularis

Date Taken: 6:52 AM - 10/3/2026

Location: Peak of Mt. Bross (14,178 ft)

1 Introduction

The image of an altocumulus lenticularis cloud upon sunrise from the summit of Mt. Bross (14,178 ft) visualizes the orographic effects of the mountain ranges on the air and atmosphere in the area. This photograph was taken in accordance with the Clouds First assignment, utilizing the visualization principles outlined in MCEN 5151: Flow Visualization. The primary objective was to capture the flow phenomena of a lenticularis cloud from the top of a 14,000+ foot mountain during sunrise. Initially, there was no intention of photographing the clouds during sunrise on this hike, but when the summit was reached, the opportunity presented itself and could not be passed up. Artistically, the photograph creates an illusion of the clouds being on fire, blending the intricate cloud dynamics with a beautiful natural scene.

2 Image Circumstances

This photograph was taken from the peak of Mt. Bross on October 3rd, 2026 at 6:52 AM. This image was taken in a northeasterly direction, with a camera inclination angle of approximately 15° , such that the mountain range could frame the bottom of the photograph.

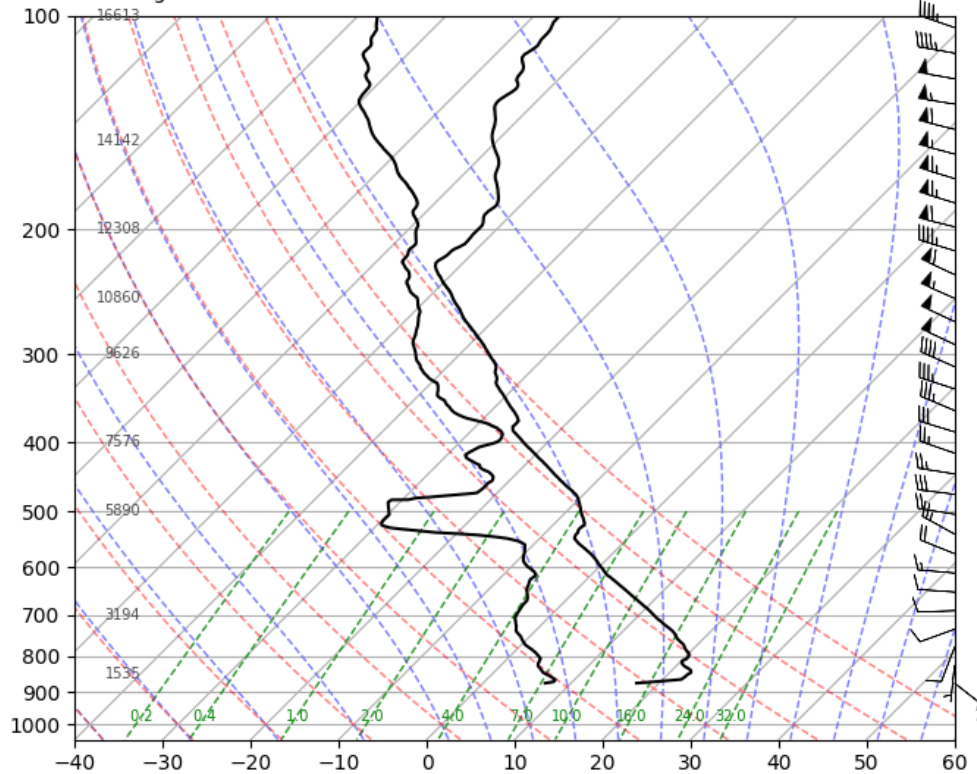
3 Cloud Information

The cloud visualized in the image is an altocumulus lenticularis cloud that has been "ruffled" by fast winds. The night leading up to this photo was a clear and calm night, with no precipitation. Similarly, there was no precipitation for the rest of the day following this photo, but many more clouds developed in the sky through the late morning and into the middle of the day (12:00 pm). At the time this photo was taken, there were no other clouds in the sky in any direction. There was no front approaching at the time this photo was taken, either. Furthermore, there were sustained winds of approximately 30 mph at the top of the mountain when the photo was taken. This would explain why the lenticularis cloud isn't as "smooth" as what is normally expected, as the 30 mph winds at the peak of Mt. Bross indicate small amounts of random turbulence in the atmosphere affecting the look of the cloud. To further assess the atmosphere and cloud data, a Skew-T plot of the atmospheric conditions at the time the photo was taken in Salt Lake City, Utah was studied, which is pictured below in [Figure 1](#).

Station 72572 at 12 UTC 03 Oct 2026

SALT LAKE CITY/INTNL UT., USA

Latitude: 40.773 Longitude: -111.955



University of Wyoming Atmospheric Science

Figure 1: Skew-T Plot[1] of Atmosphere When Photo was Taken

As can be identified in the Skew-T diagram shown on Figure 1, the Lifting Condensation Level (LCL), which is the first point where the dewpoint and environmental air temperature lines come close together, is at approximately 550 mbar, which corresponds to an elevation of 15,965 ft. This would indicate that the clouds visualized in the photo are at this elevation, which is around 2,000 ft higher than where the photo was taken from. Furthermore, the Skew-T diagram indicates a stable atmosphere. This was determined by following the dry adiabat (red lines) at the starting temperature of the environmental air temperature line (black line on the right) until the LCL is reached, where the moist adiabat (blue lines) were then followed. When the line was drawn on the plot to resemble this, it was found to be entirely to the left of the environmental air temperature line, meaning the atmosphere was cooler and thus more dense, allowing the air in the atmosphere to continually sink and creating a stable atmosphere. Orographic effects are also essential in understanding the physics of the cloud in this image[2]. Because this lenticularis could formed in between two large mountain ranges (seen in the photo), there is great evidence that it was caused

by orographic mountain effects. This happens when the mountains force air up to higher elevations due to the topography of the mountainsides, meaning warmer air is being raised in altitude to cooler conditions and then condensing in the air to create clouds. Although the cloud looks stationary, there is actually air continually moving through it, causing a constant process of evaporation and condensation of the water particles in the air as it moves up and down in elevation due to the topography of the mountains. Lastly, there was significant wind at the top of the peaks, which would also indicate high winds near the clouds themselves. This would explain how the lenticularis cloud is less "smooth" than what these type of clouds usually offer, as the random turbulent flow of the air around the peaks causes the cloud to be more ruffled up.

4 Photographic Technique

The photographic technique was incredibly simple for this photo, as it simply required taking a photo with an iPhone 14 camera by hand from the top of a mountain.

The field of view in this photo is estimated to be 8 miles horizontally (from the edges of the furthest mountain range), and 2,000 ft vertically (the distance from the cloud).

The specifications for the camera used on the iPhone 14 are a focal length of 26 mm, aperture of f/1.5, an ISO of 40, and a shutter speed of 1/190 s. The uncropped resolution was 4032×3024 pixels, which was cropped down to 4032×2805 pixels.

Post-processing of this photo included cropping the bottom of the photo to minimize the impact of the mountain range on the clouds, as well as very slightly adjusting the tone curve of the image to make the dark colors a bit darker and to bring out the middle tones a bit more. The original, unedited photo is pictured below in [Figure 2](#).



Figure 2: Original, Unedited Clouds First Photo

5 Artists Statement

This image brings out both the complexity of flows in clouds, as well as the simple beauty that these intense flow fields in the atmosphere can create. I love the colors of the clouds in this image and the way that the light catches the clouds, making them look like they are clouds of fire, which greatly contrasted the cold temperatures I was experiencing that morning. Furthermore, the mountain range in the backgrounds adds a great dramatic effect to give scale to the clouds.

The intent of this image was fulfilled, as it captured all of the flow dynamics as well as the colors I was interested in for the sake of this photo. Although identified as an altocumulus lenticularis cloud, I am skeptical about if the cloud is in a transitional state out of the lenticularis phase and into simply an altocumulus cloud. Had I been able to examine the cloud for a longer period of time, I would be able to make a better hypothesis on this, however I had to continue onward with the hike. In future cloud photography, I will be sure to be cognizant of what the cloud is doing both before and after the photo is taken.

References

- [1] University of Wyoming Department of Atmospheric Science. (2026). *Upper Air Soundings*. <https://weather.uwyo.edu/wsgi/sounding?datetime=2026-10-03%2012:00:00&id=72572&src=BUFR&type=PNG:SKEWT>
- [2] Cloud Appreciation Society. (n.d.). *Lenticularis*. Cloud Library. Retrieved October 18, 2026, from <https://cloudappreciationsociety.org/cloud-library/lenticularis/>