Clouds First Report: Panorama of Stratocumulus Clouds

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1. Introduction

The goal of this report is to describe the process and background behind a panoramic image of stratocumulus clouds as required for the First Cloud photo assignment of the course "Flow Visualization" (ATLS 5519).

2. About the Image

This panorama was taken on September 16, 2019 at 6:27pm MST in North Boulder near the Wonderland Lake Trail. The camera was facing northwest. The background was a blue sky with large hills on the lower to middle left side of the image. The image was taken at ground level.

3. Cloud Characteristics

The clouds captured in the image belong to the stratocumulus genus of clouds. A combination of stratus and cumulus clouds, stratocumulus clouds are usually rounded at the base, large in size, and dark grey in color [1]. Depending on the temperature of the cloud top, stratocumulus clouds are formed from either droplets or ice crystals; droplets become ice crystals when the cloud top temperature is cooler than 23 degrees Fahrenheit [2]. These low-level clouds typically occur at approximately 6,000 feet above ground level. These clouds often do not produce precipitation, although they often occur as a predecessor to thunderstorms. The arrangement of stratocumulus clouds is highly varied; these clouds almost always form in groups, but depending on the species and variety, they can come in waves, sheets, or lines. Stratocumulus clouds are also known to produce crepuscular rays (sunbeams), which occur just before sunset.

The atmosphere at the time of capture was stable with a Convective Available Potential Energy (CAPE) value of 0.00 J/kg, as depicted by the skew-T diagram in Figure 4 below.

5. Photographic Technique

The following camera settings were used to capture the photograph:

Camera and Image: iPhone 7, 16,382 x 2432 pixels (w x h)

Focal length: 4 mm

Exposure settings. ISO 80, shutter speed 1/1008 sec, f-number of 1.8.

Minimal editing was done to create the final image. Contrast was increased slightly to better define the clouds, some darker regions within the clouds were brightened, and the saturation was increased.

Figure 1. *Final version of the panorama, with improvements made to contrast, exposure and saturation.*

Figure 2. *Original unedited panorama.*

Figure 3. *One small section from the edited version of the panorama.*

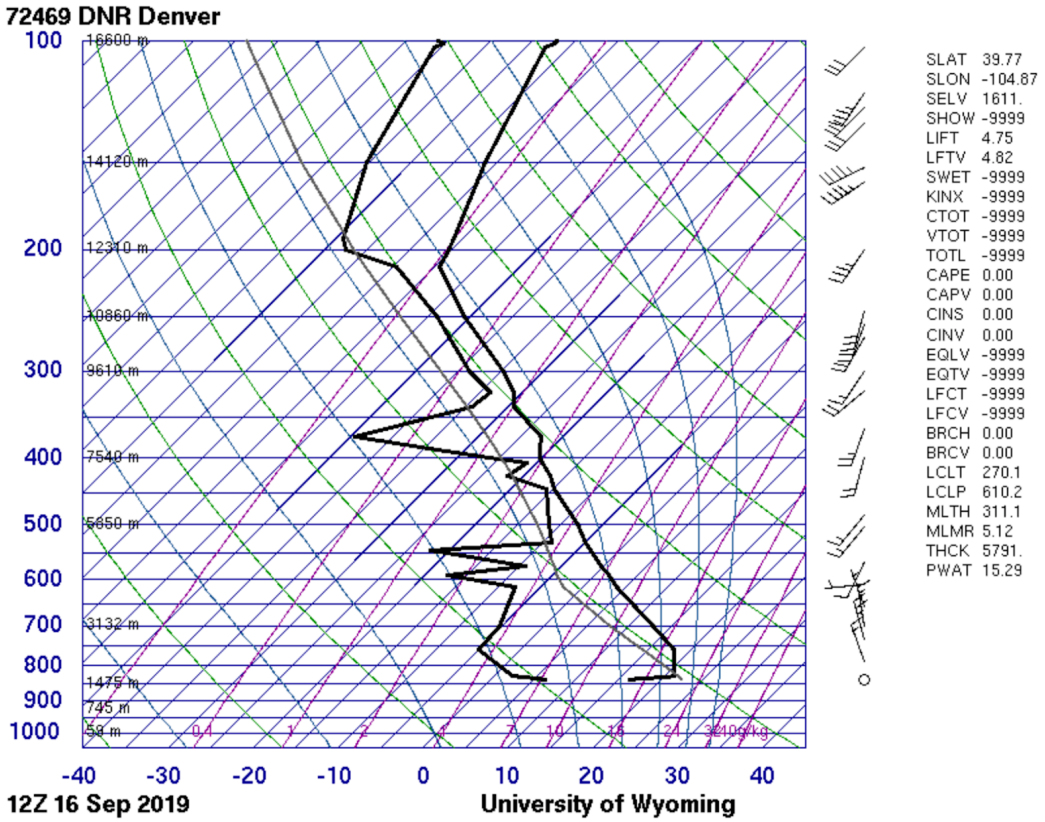

Figure 4. *Skew-T diagram depicting stable atmospheric conditions at the time of image capture.*

6. Image Commentary

Flanked by trees on either end of the panorama, with the clouds reaching out over the mountains near sunset, I find this image really captures the natural beauty of Boulder, Colorado (this image was taken after a hike). The dark stratocumulus clouds stand out against the bright blue sky, with pleasantly warm hues on the west-facing side of the clouds.

References

[1] World Meteorological Organization, ed. (1975). *Stratocumulus, International Cloud Atlas*. **I**. pp. 39–42. ISBN 92-63-10407-7. Retrieved 28 November 2014.

[2] Ragno, A.L. *Enyclopedia of Atmospheric Sciences, Second Edition.* Academic Press, 30 September 2014.