Author/Videographer: Ari Matrajt
Assignment: Cloud 2
Course: MCEN 5151, Flow Visualization
Date: December 5, 2023
Cloud Type: Stratocumulus
Image Time Stamp: December 4, 2023, 16:44 MST
Image Location:UClub on 28th, Boulder, CO (N 40° 00.183', W 105° 15.477')

Figure 1: Image of Stratocumulus cloud

Introduction

The image in Figure 1 shows a stratocumulus cloud over Boulder, Colorado. It was taken on December 4 during sunset. The image has a wide range of oranges and pinks and a texture resembling cotton candy. I chose this image over other cloud images I captured throughout the semester because this cloud is a great example of flow visualization and has great aesthetic appeal.

Image Circumstances

The image in Figure 1 was taken in Boulder, Colorado, near the UClub on 28th residential area. The specific coordinates are N 40° 00.183', W 105° 15.477', and an elevation of around 5430 feet over sea level. The image was captured at 16:44 MST as the sun was setting. The camera was facing North when the image was taken, at a 45° angle with the horizon to eliminate other objects from the frame.

Cloud Information

The image in Figure 1 shows a cloud system composed of stratocumulus clouds above the mountains. The main cloud can be seen in the center of the frame, having an orange hue. Below is the Skew-T Plot from the Grand Junction weather station, a measurement taken from the University of Wyoming website for atmospheric data.

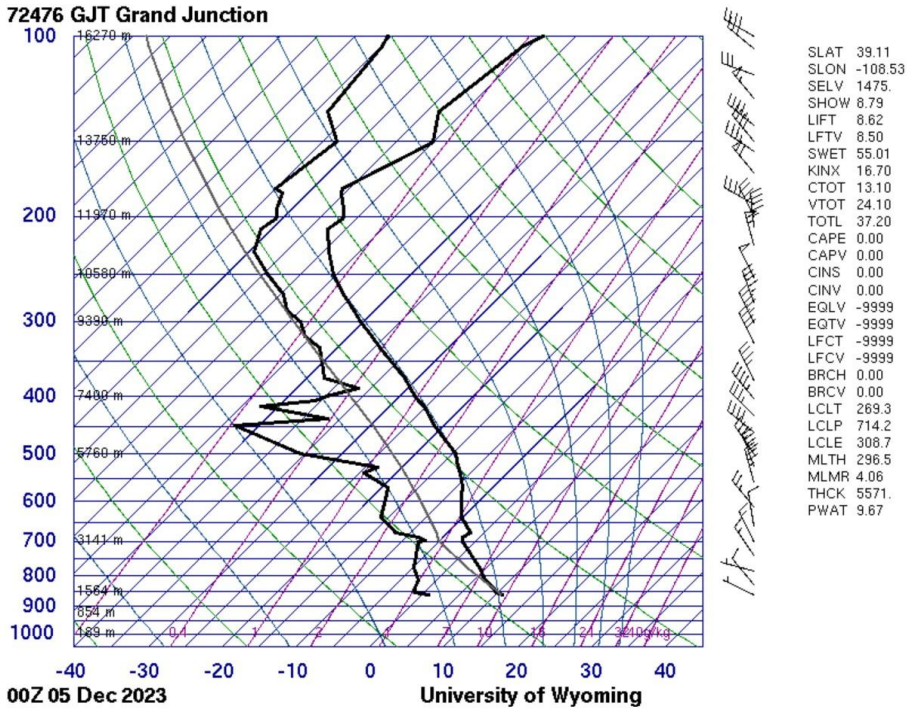

Figure 2: Skew-T Plot of Grand Junction for the Time the Image in Figure 1 was captured [1]

The Skew-T diagram is a useful tool to assess the atmospheric conditions at a given location and time, being especially useful to determine the height at which clouds can form. Figure 2 shows a CAPE value of 0, which means the atmospheric conditions were unstable. Figure 2 also shows that clouds could be formed at around 2500m, aligning with the known altitude of stratocumulus clouds. This altitude usually ranges from 500m to 2000m, but stratocumulus clouds can be formed at higher altitudes too. Stratocumulus clouds usually consist of rounded masses, lines, or waves, and don't lead to precipitation [2]. Dry air prevents the clouds from moving in the vertical direction, remaining stagnant at lower altitudes [2]. It was a semi-clear day with a few clouds in the sky, mostly individual clouds and small masses.

Photographic Technique

The image in Figure 1 was taken using an iPhone 11 Pro, with an ISO of 100, an aperture of f/1.8, and a focal length of 4.22 mm. The approximate height of the cloud is 2500m, while the distance to the object would be around 6000m. The image consists of 3024 pixels by 4032 pixels. The post-processing of the image was key in slightly changing the feel of the image, making it look like a painting. To do so, the sharpness was increased, the color zones were shifted to reduce unnecessary brightness, the diffusion effect was used to mix the clouds with the background, and the tones were equalized to dull the brightness of the clouds. The purpose of this was to make the image look like a canvas painting, soothing the audience.

Figure 3: Unedited image of Stratocumulus clouds

Image Conclusions

The image in Figure 1, shows two stratocumulus clouds floating peacefully in the sky during a sunset. The pink hues are a result of the setting sun, making the clouds look like cotton candy. The blue sky contrasts with the pink clouds, balancing the frame. I think the image looks very peaceful and hope that is the feeling the audience experiences when looking at the picture. Overall, I think this image conveys flow visualization and physics at the same time, with the texture of the cloud showing how it moves through the air and the physics behind the Skew-T graph explaining its movements and characteristics. In the future, I think the post-processing could be slightly improved to make it resemble a painting even more, but I am satisfied with the final product.

References

[1] *Atmospheric Soundings*, University of Wyoming, weather.uwyo.edu/upperair/sounding.html. Accessed 6 Dec. 2023.

[2] “Learn about Stratocumulus Clouds.” Whatsthiscloud, 16 May 2023, whatsthiscloud.com/cloud-types/stratocumulus/.