

Clouds First

GROUP: Bryce Dickson, John Whiteman, Tobin Price, William Watkins

MCEN 4151

Professor Hertzberg

09/21/22



Introduction and Background

The purpose of this photo is for the “Clouds First” assignment which was assigned by Professor Jean Hertzberg for the course Flow Visualization at the University of Colorado at Boulder. The objective of this assignment was to capture a visualization of the physics behind a cloud in a way that is aesthetically pleasing in addition to identifying the type of cloud using information from a Skew-T plot from the day that the photo was taken. I attempted to capture a photo of a cloud above the flatirons in a way that showed the aesthetics of the cloud in addition to the flow phenomenon.

Team

This assignment was completed with the following team members:

- 1.) Bryce Dickson
- 2.) Tobin Price
- 3.) William Watkins
- 4.) John Whiteman

Procedure

The image that I submitted for the Clouds First assignment was captured on Table Mesa drive in front of the Table Mesa King Soopers facing the flatirons. I held my camera slightly above my head in order to get a clear shot of the mountain range and clouds while not allowing my photo to be blocked. I also made sure that there were no cars coming so that my photo was not blocked. Although I wanted to exclude most of the surroundings, I wanted to keep the stoplights as their colors were similar to the sunset which provided a complimentary effect in the image. The image was taken at approximately 6:33 PM on Saturday October 1st. Luckily, because the photo was within an hour of the sunset, I was able to capture a beautiful photo of the clouds above the flatirons with aesthetically pleasing colors.

The Physics behind the Phenomenon

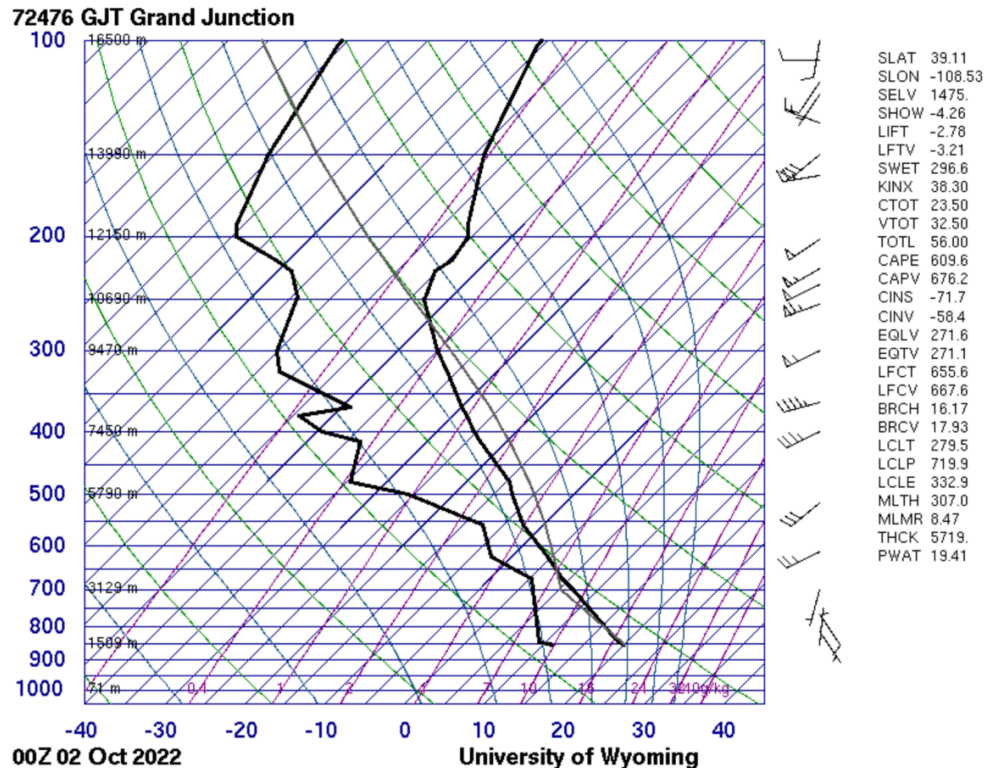


Figure 1: Skew-T Plot for Grand Junction on October 1st, 2022.

The Skew-T plot on October 1st, 2022 seen above shows an altitude of approximately 3400 meters (11154.86 ft.) where the dew point temperature and actual temperature are close. This allows me to make the assumption that this is the most likely altitude for the clouds that can be seen in the original photo. The CAPE value shown above of 609.6 indicates that the atmosphere was unstable which does bolster the intuition of the type of cloud. This leads me to believe that the clouds in the photograph are Altocumulus due to the altitude as well as the stability of the atmosphere. Finally, the slopes of the adiabatic temperature lines and isotherms indicate an unstable atmosphere as well.

Photography Technique



Figure 2: The Original Cloud Photograph after cropping (top) and the Edited Cloud Photograph (bottom).

In order to take the photo, I used my iPhone 12 Pro. I made sure to stand at a location that cars would not block the shot. I took the photo between the neighborhoods and the King Soopers grocery store so that I could get a full view of the Flatirons. I took the photo at 6:33 PM on October 1st which was near the time of sunset which allowed for a very interesting depiction of the clouds. This iPhone has various settings as well as 3 different camera lenses. I chose to use

the back dual wide camera (focal length of 4mm) 4.2 mm using an aperture with a value of f/1.6. I used an exposure of 1/725 and an ISO value of 32. The original image has a resolution of 4032 x 3024 pixels (width x height). For the editing in dark table, I cropped the image, adjusted the RGB curve, and changed the contrast values. This really allowed me to see the full form of the clouds in the photo.

Conclusion

My photo captures a visualization of the physics behind an Altocumulus cloud in a way that is aesthetically pleasing. I like how the details of the cloud were able to be outlined through post processing of the image that highlighted the features of the form of the cloud. The differences in color from the sunset was also very aesthetically pleasing. For future work, I think that the location that I took the photograph from could be improved by using a more strategic vantage point. In addition to this, I think that using one of the different camera lenses for the iPhone might provide a better resolution for the photo. Finally, potentially taking this photo at a different time of day might provide better images of the clouds or potentially better lighting. Regardless of these future suggestions, I believe that my image demonstrates a gorgeous depiction of altocumulus clouds and the physics behind the clouds phenomenon.