Cloud Second Report

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Figure 1. Screenshot of the Video taken on 04 December in Boulder, CO

Background

Initially, the intent of this video was to capture a wide array of clouds as the tail end of a storm moved out of the area. The wide array of clouds would be able to meet my scientific and artistic objectives of showing various cloud patterns and demonstrating the beauty of each cloud type respectively. However, there were only two main types of clouds that were captured. The video instead captured the formation and movement of the clouds. While this was not my initial intent, the product of the video displayed an interesting phenomenon that I was not expecting to capture and was mesmerizing to watch. Figure 1 is a screenshot of part of the video taken.

Location Information

Table 1 contains the photograph location, time, cloud type, camera direction and distance information for this video so similar video can be replicated.

Location	Boulder, CO
Date	04 December
Time (MST)	1600-1705
Type of Cloud	Altostratus, Altocumulus
Camera Direction	Almost directly overhead
Camera Angle	Perpendicular to the Horizon

Cloud Characteristics

There is one major type of cloud captured in this video: stratocumulus. These clouds are layered stratus and cumulus clouds. They often have layers with thick and thin sections and are found at the front of or behind a storm system [1]. This assertion is supported by the Skew T Diagram in Figure 2 which shows the weather data captured in Grand Junction, CO. Grand Junction, CO, the location of the closest weather station that generates these charts, is approximately 190 miles from the photography site [2]. The Skew T Diagram indicates that the clouds will mostly occur at elevations between 3,000 meters and 5,000 meters, where the temperature (the line on the right) and dew point soundings (the line on the left) are closest [4]. Per the National Weather Service, stratocumulus clouds are frequently found at these altitudes. Additionally, this video was taken following a storm front, further justifying the identification.

Figure 2. Skew T Diagram for Grand Junction, CO on 04 December 1200Z [3]

Atmospheric stability is determined by comparing the consistency of the distance between the temperature and dew point soundings [4]. Additionally, it is indicated by the CAPE value in figure 2. A value on zero indicates the atmosphere is stable. For 04 December, the distance between the lines stays relatively consistent and CAPE is zero, indicating a stable atmosphere. This is a little unexpected since a storm had gone through the day before, however there was no precipitation that day. The lack of precipitation is an indication of a stable atmospheric environment [5].

Visualization Techniques

To capture this video, I waited for a particularly windy day knowing that numerous clouds would blow through my video. I incorrectly assumed that there would be a lot of different types, however I captured the formation of clouds instead. When setting up the camera, I angled it so that the branches of the tree overhead framed the video. I thought this provided important depth the video and provided perspective. Timing filming for this video was an integral part of my process. I was targeting a windy day that would have a lot of cloud movement which was achieved on 04 December. I started filming immediately after a strong windstorm had blown through. It was also the afternoon following a storm that had blown through that morning. Prior to filming, I was hopeful that I would be able to capture a sunset, however that was not the intent of my experiment. Everything converged at the right time, allowing me to capture many of the elements I had been targeting.
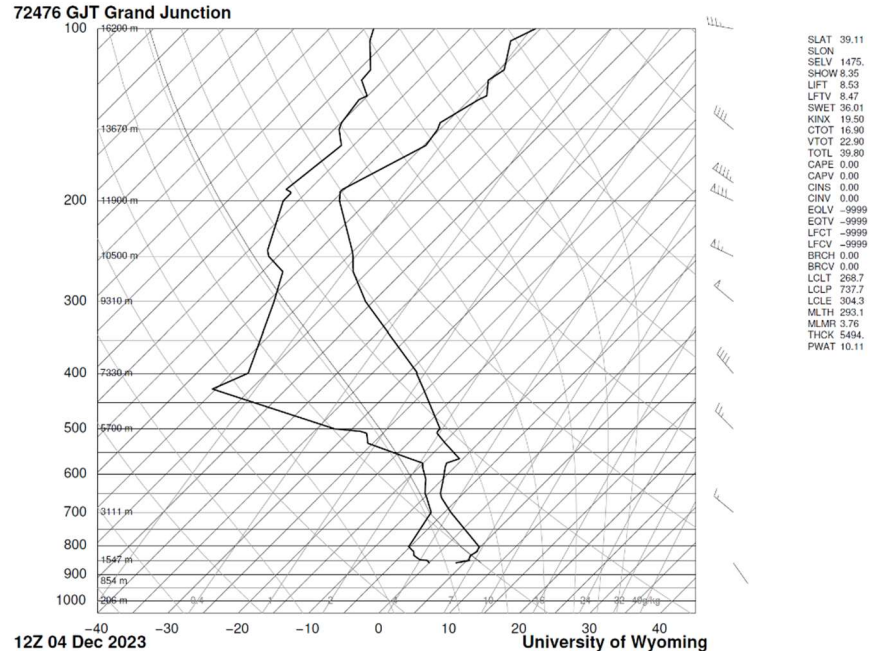
Photographic Techniques

The camera I used to take this video was a Canon EOS 50 Mark II with the 15 to 45 mm lens. The video was recorded at a pixel height and width of 3840 by 1660. This was compressed down to 1280 by 720 following post-processing. Unfortunately, the lens length was not recorded for this video, however the rest of the camera characteristics are listed in Table 2.

Table 2. Camera Specifications for the Video

Specification	Description
Aperture	Various
Exposure	Various
ISO	Various
Frame Rate	29.97 frames/s

To capture this video, I set up my camera to take a time lapse. The time lapse settings were taking 600 photos total every six seconds. After the first video, I noticed that there were some cool cloud features and set it up to take a second video using the same settings. Each photograph was automatically focused by the camera to help create a more consistent video [6]. The final video was portions of each video combined into one using Clip Champ. Other than adding the title slide, I did no additional editing.

Conclusions

This was a very interesting process for me and I'm really pleased with my results. I want to continue to experiment with this medium of capturing information because it has a natural/unmanufactured component that I really appreciate. I also feel like you can capture a lot of information. I was also able to meet the objective I set forth in my cloud first of using my camera to take my video as opposed to my phone. I think the camera yielded far more interesting results and am happy I was able to compare the two end results.

References

[1] WMO, "Cloud classification summary," International Cloud Atlas, 2017.

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[2] "How far is it? - Straight Line Distance Calculator," www.gps-coordinates.net. https://www.gps-coordinates.net/distance (accessed Oct. 25, 2023).

[3] L. Oolman, "Atmospheric Soundings," weather.uwyo.edu.

http://weather.uwyo.edu/upperair/sounding.html (accessed Dec. 14, 2023).

[4] J. Hertzberg, "Clouds 3: Skew - T and Instability," Flow Visualization.

https://www.flowvis.org/Flow%20Vis%20Guide/clouds-3-skew-t/ (accessed Oct. 26, 2023).

[5]"Loveland, CO Weather History | Weather Underground," www.wunderground.com.

https://www.wunderground.com/history/daily/us/co/loveland/KFNL/date/2023-12-4 (accessed

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https://www.youtube.com/watch?v=7Q1jF56CNCA (accessed Dec. 01, 2023).