MCEN 4151: Clouds 1 Report

Will Dietz

October 24, 2022

1 Context and Purpose

For my first clouds project, I thought of getting higher up to capture the clouds over the divide. I went to the 11th floor of Gamow Tower in CU Boulder (part of the physics building, Duane) and captured the clouds to the West. I also took some photos to the North and South, but I liked the view to the West because of the mountains and abundance of clouds.

2 Circumstances and Conditions

As mentioned, the picture was taken from the top of Gamow Tower on CU Boulder's main campus. The elevation of Boulder is 5,318 feet, so the elevation I was at when I took the picture is $5,318 + 11 \times 14 =$ 5472 ft. The camera was pointed directly West and had a very small angle of elevation (approximately 10 degrees above the horizontal). It was taken at approximately 1:30 PM on September 30th, 2022.

3 Cloud Data and Details

The weather in the morning was mostly clear and that afternoon was partly cloudy. The clouds were stratocumulus. The sky to the South and East was clear and the sky to the North had similar cloud formations as were captured in the photo. This was similar weather to the day before, and there was light wind blowing East. The Skew-T chart showed a CAPE of 0, and thus the atmosphere was stable. The chart is included in Figure 1. Stratocumulus clouds are formed in stable conditions which agrees with what I captured in my image. According to the Skywatch observatory, the clouds were at approximately 4,000 meters above ground level which seems reasonable based on the photo. See Figure 2 for the Skywatch Data from that day. Winds at 4,000 m appear to be blowing East according to the Skew-T chart which is in agreeance with the clouds moving that direction on that day.

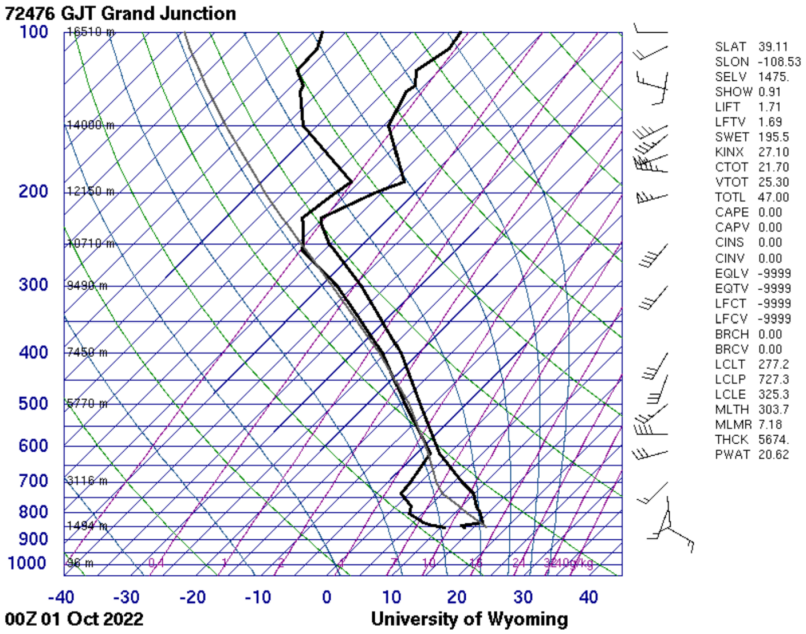


Figure 1: Skew-T From Grand Junction Shortly After Photo

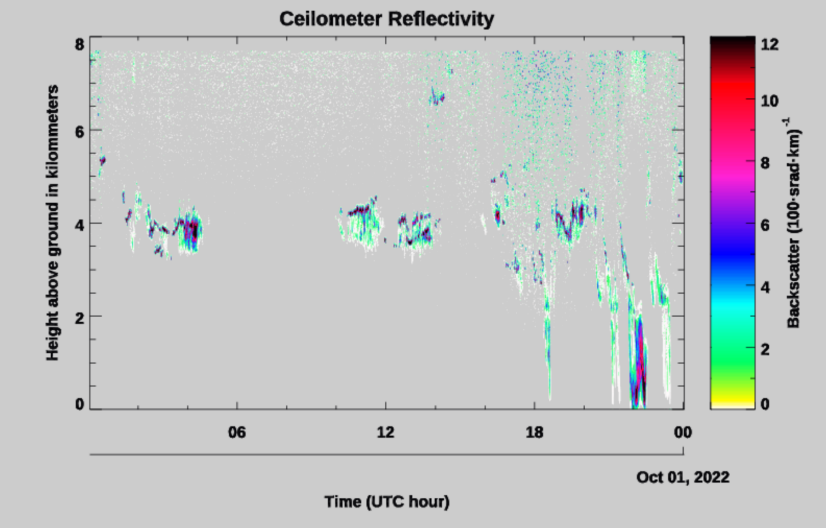
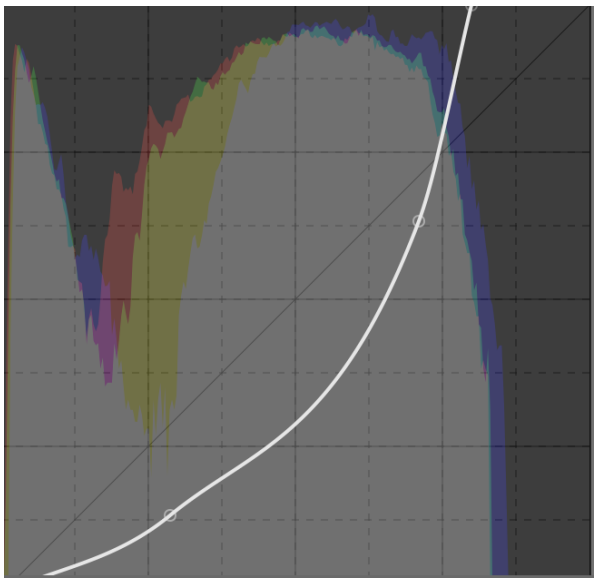


Figure 2: Skywatch Ceilometer Reflectivity. Picture was taken near 19:30

4 Photographic Technique and Choices

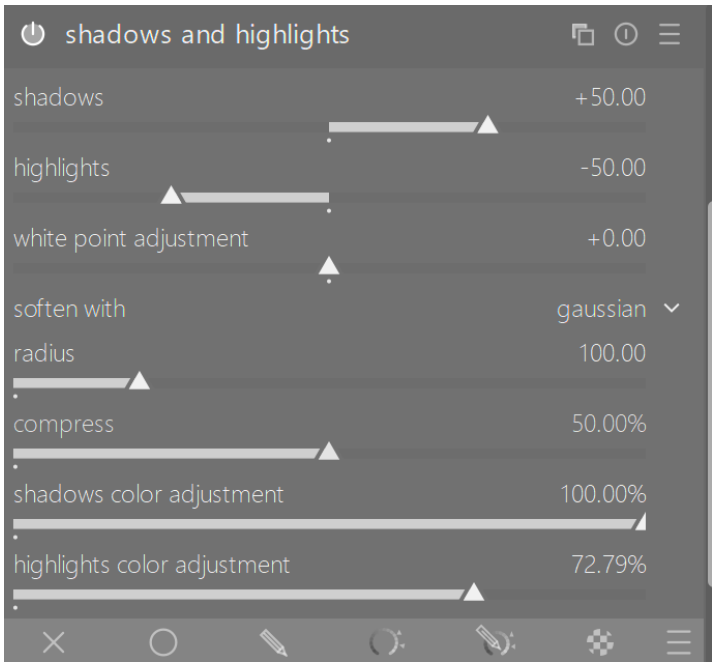
The image was taken on a Sony ILCE-7M3 with an FE 28-70mm F3.5-5.6 OSS lens. The field of view of the photo is on the order of tens of miles in depth and miles in width and height. The focal length was 32 mm. ISO was set to 160 with an aperture of f/16 and an exposure of 1/80. The original picture was 6,000 by 4,000 pixels while the cropped version's width was reduced to 5,226 pixels.

I used DarkTable for editing the image. I cropped the image slightly to cut out some glare on the window and an unwanted obstacle and I adjusted the RGB curve, the saturation, and some of the highlight and shadow settings as shown in Figure 3. The before and after images can be seen in Figure 4.



(a) RGB Curve

(b) Contrast, Brightness, and Saturation Settings



(c) Shadow and Highlight Settings

Figure 3: Main Image Editing Settings

(a) Unedited Image

(b) Image After Edits

Figure 4: Before and After Edits

5 Further Work

I really like the landscape that contextualizes these clouds. I think the image reveals some of the journey that clouds make over the Rocky Mountains to get to Boulder. Something I would like to explore is trying a timelapse or something that shows how these clouds migrate or develop over the mountains as I know they have an effect on the clouds. Additionally, I dislike the glare in the bottom right corner of the image and would like to be able to avoid that in the future by trying to get a more flat on shot through the window.