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MCEN 4151
Clouds 2 Report
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I. INTRODUCTION

The purpose of this image was to capture an example of cloud formation that was also visually pleasing. The goal was to take advantage of the unique lighting conditions that exist at sunset. This image was taken while at Chautauqua in Boulder.

II. WEATHER ANALYSIS

The final image was taken on 13 November at 5:48 pm MST. The elevation of Boulder, Colorado is 5328’ and the image was taken while facing north. The closest sounding station is Denver and the Skew-T diagram can be seen in **Figure 1**.

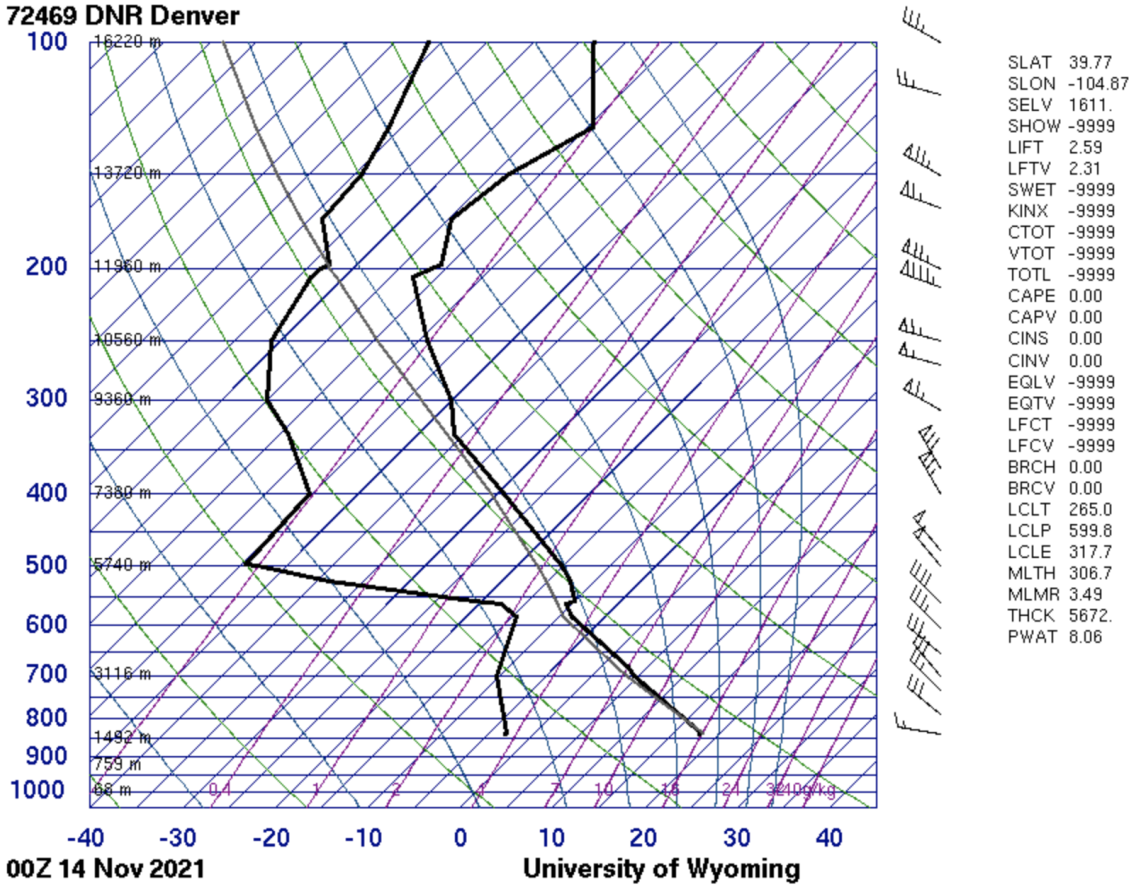

Figure 1. Skew-T Diagram from 00Z 13 November 2021 for sounding station DNR Denver

From the diagram above, multiple observations can be made about the cloud formation and the potential altitude of the clouds. First, the Convective Available Potential Energy (CAPE) can be used to determine whether the atmosphere was stable at the time the photo was taken. If CAPE value is greater than zero, then the atmosphere is unstable, which means there is a high potential for cumulus and cumulonimbus clouds which can lead to thunderstorm formation. In this case, the CAPE was 0, meaning the atmosphere was stable. When the environmental temperature (black right line) is close to the environmental dewpoint (black left line) there is a high probability for cloud formation at that specific altitude. Looking at the chart above, the lines come close together just below 5740m (18,860). I would estimate that this is closer to 4200m (13,770 ft). There also appears to be clouds around 12000m (39,400ft) which is shown by the Skew-T as the lines do converge inwards around that level. From inspection and from the Skew-T altitudes it can be asserted that the lower level clouds that are more prominent in the photo are small cumulus clouds. Their shape resembles cumulus clouds and has that upward and lumpy formation. Additionally, the clouds near the top of the photo are cirrocumulus since they have that flat and thin look and exist above 20,000 ft AGL.

III. POST-PROCESSING & IMAGE SPECIFICATIONS

Similar to the last project, this image was a very opportunistic capture. However, I was doing a separate photoshoot with my friend's camera for a few friends for their graduation photos and decided to capture the cloud formation above. A Sony a6400 was used to capture these clouds. The original dimensions of the picture were 6000 x 3376 with a focal length of 26mm. The exposure time was 1/250. The original and final images can be seen below in **Figure 2**.

Figure 2. Original photo (left) vs. final photo (right) with processing

For post processing, the brilliance, highlights, contrast, and saturation were turned up. This helped sharpen the white clouds and darkened the blue sky. This contrast helps bring out all of the clouds and makes the clouds in the background more visible. Though the clouds are scattered I believe they accent the photo in a way that is very visually appealing.

IV. CONCLUSION

Overall, this was a very successful cloud capture project. I was hoping to capture something that was visually appealing while also encompassing the fluid mechanics of cloud formation. If I were to improve this in the future I would have tried to capture a photo on a cloudier day which would have allowed for a more vibrant sunset. Overall, I feel the quality of the Sony camera that was used was more than suitable for this project.