Second Cloud Assignment:

Stable Atmosphere, North Boulder, CO

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Flow Visualization

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Background

Since the start of the semester I have traveled around the country, and I have noticed the different types of clouds with the change in geography. That being said, Colorado possesses a lot of cloud formations along with their famous sunsets. My last cloud image was from a plane in the middle of Wisconsin so I thought it would be nice to keep it in state and capture a Colorado sunset. There were plenty of opportunities as it seems Colorado produces a glorious sunset every day. The weather was ideal for all these clouds because deep into November there has been only one snowstorm and cumulus clouds are still very common with this warmer weather.

Camera and Details

For my image I wanted to drive away from Boulder and capture a colorful sunset while looking at the flatirons. When I drove up to north from boulder I stopped off Neva Road (8 miles north of Boulder) right before sunset. After waiting for the sun to go down I noticed that the clouds were ideal, but were changing colors. The camera used was a Panasonic DMC-FZ1000 DSLR on just the auto setting. For the image I chose I was facing directly west with a roughly 30° upward tilt from ground level. This image was captured on October 28, 2016 at 6:22pm, roughly 20 minutes after sunset. Below you can see the conditions in which the image was taken at. There was not much wind and the conditions were pretty clear with a couple clouds here and there.

Time (MDT)	Temp.	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
6:17 PM	71.6 °F	32.0 °F	23%	30.01 in	10.0 mi	WSW	5.8 mph	-	N/A		Clear

Figure 1: Weather Underground information around time of image, Boulder CO

Skew-T and Cloud Identification

Cloud identification can be tricky sometimes especially right against the mountains, because you do not want to misidentify a cloud as a mountain cloud. These mountain clouds, sometimes called lenticular clouds, will not move and are sometimes described as a “stationary lens-shaped cloud that form at high altitudes, normally aligned at right angles to the wind direction” (Crystalinks). There are multiple cloud formations in the image I captured, but none are mountain clouds. The closest clouds, the pink ones can be identified as small stratocumulus because they are very close to the ground. The large band of cloud behind the stratocumulus clouds are altocumulus. This is because they are higher up and still have a thicker foundation than a stratus cloud. The very far clouds high up and behind the mountains are the hardest to identify because they are kind of hard to see but if I had to take my best guess they would be cirrus clouds. Along with a Skew-T analysis, the atmosphere conditions and other conditions can be identified. Below is the corresponding Skew-T diagram for sunset on October 28, 2016.

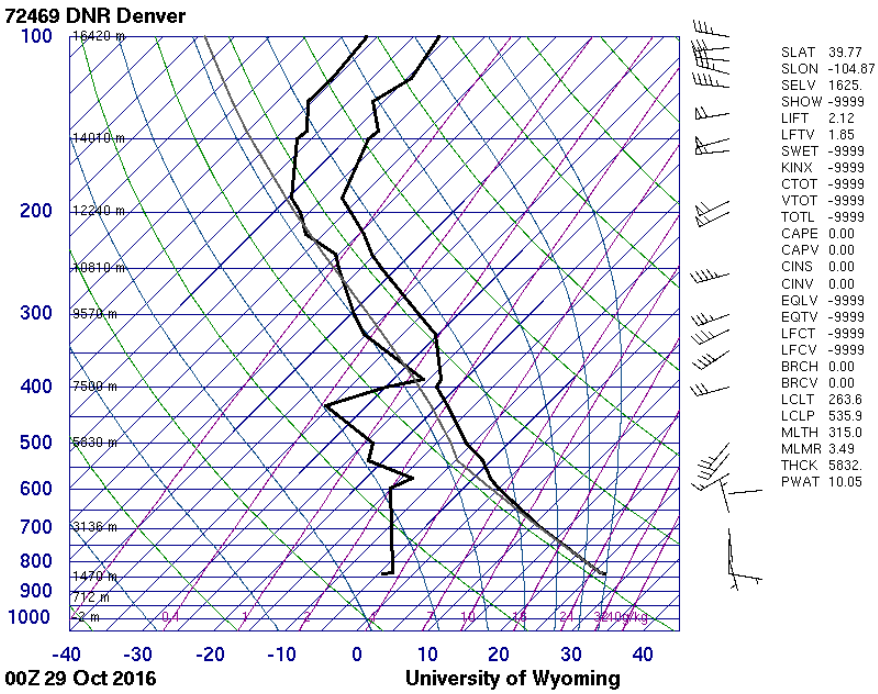

Figure 2: Skew-T for Denver sunset on October 28, 2016

According to the figure 2 (University of Wyoming), the CAPE value is 0.00 which indicated a completely stable atmosphere. The dew point curve and the ambient temperature curve only get close once, and that is around 7500 m (24,600 ft). This close point probably indicates the high up cirrus clouds. The skew-T is located in Denver so it is not completely accurate but it is the best we can do. The clouds at lower elevation usually only last a couple of minutes to hours and because the atmosphere is different next to the mountains which may explain why the curves don't come close at lower elevations.

Post Processing

As mentioned earlier a Panasonic DMC-FZ1000 DSLR was used to capture this image. The f stop value was f/3.8, ISO 125 and shutter speed 1/100. The mm length was 60mm because I zoomed in a little to capture the clouds better. The overall frame size is probably five miles from left to right. For the edited version I did a hefty dose of post processing because I really wanted to make that orange/pink "pop" out of the image. I changed the curves a little to generate the silhouette effect on the mountains and upped the contrast. Finally I lighted the red scale to get a pinker look on the colorful fronts of the clouds. The original image size was 1920 x 1280 pixels and after the cropping the final size dropped to 1714 x 902 pixels. Below you can see a side by side view of the original and edited versions of these very pretty clouds.

Figure 3a: Edited Image

Figure 3b: Original Image

Conclusion

Overall, I am rather pleased with the image. I wish I spent more time post processing the image especially to get those telephone wires out. The overall image seemed very grainy which seems very strange to me because the ISO was very low. It might have been effected because it was after the sun went down and not enough natural light was supplied. I am very pleased with pulling the color out and really making the pink grab your attention right away. I realize it may look a little abnormal but I like that touch and most of the comments agreed while some people hated it. A lot of people disliked the wires which I agree with. Not as nice as my first clouds but I still am proud with this piece.

Sources

http://www.crystalinks.com/lenticular.html

http://weather.uwyo.edu/upperair/sounding.html

https://www.wunderground.com/history/airport/KBDU/2016/10/28/DailyHistory.html?req_city=Boulder&req_state=CO&req_statename=&reqdb.zip=80301&reqdb.magic=1&reqdb.wmo=99999