Project 2: Clouds I

Figure 1: Final Clouds I image.

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Introduction

The second assignment for MCEN 4151 was called Clouds I. The purpose of this assignment was to encourage students to observe clouds on a daily basis and try to understand what is happening in the atmosphere. There are many types of clouds, but cumulus clouds seemed like the most exciting.

Location

This image was taken at the top of Fern Canyon Trail in Boulder, CO on September 3, 2015 at 3:30pm. The image is facing west and the camera was angled a few degrees above horizontal.

Atmosphere

On the day this photo was taken, there were clear skies in the morning with scattered thunderstorms coming in from the mountains (west). This was a perfect day to capture cumulus/stratocumulus clouds that are carrying lots of water and are ready to rain. The picture was taken in the afternoon when the storms were just starting to be visible from Boulder. From the picture, one can see that a cloud had just rained and the vapor that got dragged down by the rain is lifting back up to the join the rest of the cloud. These are cumulus and stratocumulus clouds. The sky was covered with scattered stratocumulus clouds to the west but was fairly clear to the east. The atmosphere was considered stable with possible unstable layers because the Convective Available Potential Energy, or CAPE, was very low. The following figure shows the Skew-T diagram for Denver on September 3rd at 6 pm. This is the closest Skew-T available for Boulder.

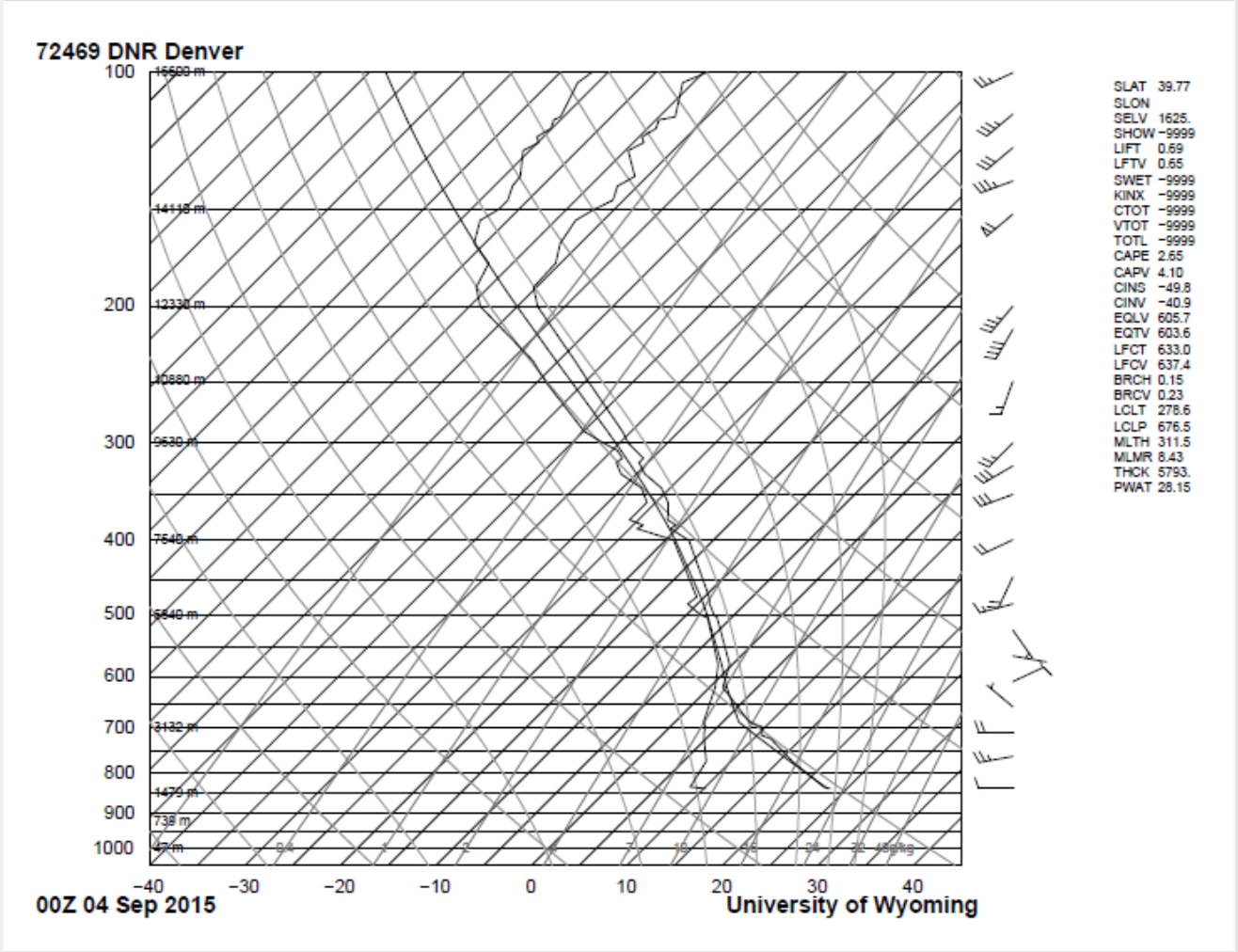

Figure 2: Skew-T diagram for Sept 3rd at 6 pm

This diagram shows how close the temperature line follows the dew point line. The clouds were resting around 2,000-3,000 meters above sea level. Stratocumulus and cumulus clouds occur at lower elevations than most other types of clouds. The scattered storms probably accounted for the unstable layers, but this was a stable atmosphere.

Image Capture

The photo was taken with a Panasonic Lumix DMC FZ70 16.1 MP camera. The aperture was set to 5.5 and the shutter speed was set to 1/800. Because this picture was taken outside with a fair amount of light available, the ISO was set to 200. The camera came with a recommended developer program called SILKYPIX 4.3 Developer Studio. In this program, the contrast was increased and the exposure was decreased. This allowed the cloud to show more of a distinct shape instead of having it blend into the gray background. The original photo is displayed below.

Figure 3: Original unedited photo.

Conclusion

This image shows the movement of the water vapor in a cloud that has just released rain. Clouds pass over our heads every day and always exhibit fluid flow phenomena. This image successfully captured the stratocumulus cloud that was moving towards Boulder. The original photo didn't pop as much as it did in real life, so using a developer program really helps exaggerate the physical features of clouds. In the future, it may be better to climb higher so that no landscape is there to take away the focus of the clouds.

References

1. https://en.wikipedia.org/wiki/Stratocumulus_cloud
2. http://weather.uwyo.edu/upperair/sounding.html