

# **Clouds First Report**

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Flow Visualization: The Physics and Art of Fluid Flow

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## I. Introduction

This photograph captured stratocumulus and cumulus clouds that formed in the afternoon of March 4, 2018. It was fairly windy that day, but there was little to no cloud cover for the first half of the day. After about 2 pm, winds from the west carried a system over the Rocky Mountains, and a temperature drop also occurred. This would have been more noticeable if I had been closer to the mountains.

## II. Cloud Visualization

My image was taken at the Pikes Peak Shuttle parking lot at Denver International Airport, facing north-west around 5:30 pm. The picture was taken approximately at a 10-degree angle from the ground, with the clouds being toward the top of the picture. The clouds seemed to almost span the sky, with stratus clouds forming closer to the horizon and stratocumulus and cumulus clouds forming slightly higher in the sky. I chose to crop my original image to just show the stratocumulus and cumulus clouds. This was because my foreground had a lot going on in it, as I was in a parking lot.



*Figure 1: Original Image*



Figure 2: Edited image

I had been traveling from Colorado Springs to Boulder and then out to Denver, so I don't exactly know if there had been precipitation earlier that day. Based on the skew-T plot data for that day, the atmosphere appeared to be unstable during the first part of the day, meaning the lowest levels of air were warmer and more humid than the air above it. This warmer air then rose in the atmosphere, and since there was only colder air above it, this warm and humid air continued to rise. However, later in the day when the cold front came in during the late afternoon, the atmosphere became stable. Due to the location of the clouds in the sky, I believe that the atmosphere was still unstable at 5:30 pm, as these clouds seemed relatively high in the sky.

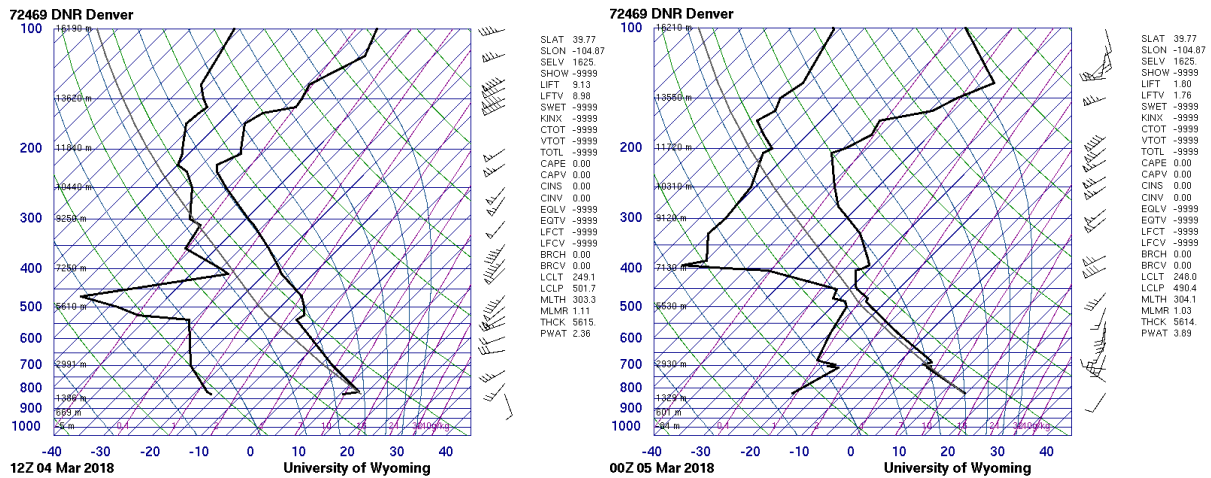


Figure 3: Skew-T diagrams [1] for the afternoon of March 4, 2018 into March 5, 2018

### III. Photographic Technique

For the photo, I used my iPhone 8 Plus camera. It is a 12 MP camera model with a wide-angle and telephoto lens. This was captured using the wide-angle lens with a 28 mm focal length. This image was captured using an exposure time of 1/3247 sec and a f-stop of f/1.8 with an ISO of 20.

A small focal length of 4 mm was used to slightly zoom in on the clouds above the parking lot. The edited image is 2387 x 1513 pixels while the original was 4032 x 3024 pixels. The photo was edited using the Adobe Photoshop Express app for IOS where I cropped the image and increased the contrast to bring out the blueness of the sky and slightly darken the clouds. These changes can be seen in the differences between Figure 1 and Figure 2.

#### IV. Conclusion

I really liked the final image that I was able to produce for this assignment. I like how I left the one light pole on the right side of the image. It seems to be standing up extremely tall, almost taking on the clouds. The clouds turned out awesome in the edited image as well. I was worried about losing some of the quality of the picture when I cropped it, but I am very pleased with how it turned out. If I were to change anything about this image, I would have slightly increased the crop on the bottom of the picture to get rid of the light pole that appears at the bottom left of the image.

#### V. References

[1] Atmospheric Soundings, [weather.uwyo.edu/upperair/sounding.html](http://weather.uwyo.edu/upperair/sounding.html).