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Flow Visualization

Clouds 1 Report

The purpose of taking this assignment was to photograph clouds to better our understanding of the way clouds move and form. My motivation for this assignment was to capture the most unique cloud image I could. This meant straying away from taking pictures of cloud formations that I see everyday. This included large masses of cumulus or stratus clouds that covered a large portion of the sky. I was shooting more for a single cloud that I could photograph.

The picture that I took for this assignment was taken in Boulder, Colorado. I drove west up Baseline road into the foothills. A few miles into the foothills is the Chautauqua Amphitheatre. I drove about a mile past the Amphitheatre and pulled off to the side of the road. Here I was at an altitude of about 6500 feet above sea level. The cloud that I photographed was approximately 9500-10,000 feet above sea level based on the skew-T plot for the day. Also, I could tell that it wasn't too much higher than 10,000 feet because of how close it looked to the ground when not looking through the camera lens. When I took this picture, I was facing south, looking into the midday sun around 12:00 pm on Thursday February 18, 2010.

The photograph that I submitted was of a cumulus-fractus cloud. I tracked the development of the cloud I used for 5 minutes or so. It started out as a small cumulus shaped cloud. It was low enough to be included in the stratus layer as well. As the cloud moved west to east across my field of view, it slowly started to break apart. It almost seemed as if there was an invisible force pulling apart the cloud like cotton candy. When it was in front of the sun is when it had the most interesting shape. What I liked about this image is how the sun made the cloud appear darker than it actually was. With the cloud directly between the sun and where I was standing, it almost created an eclipse-like image of the cloud. On the day I took this image, the sky was very blue and riddled with clouds to the west of Boulder. They were moving relatively fast across the sky, and accumulated into a large gray mass once they got on the east side of Boulder. It was a relatively calm morning though. The afternoon was a different story. By three o'clock or so that afternoon the sky had turned completely overcast and it was snowing pretty hard. This is very typical of weather in Colorado though; especially in Boulder. Many times this winter it has been nice in the morning and snowing in the afternoon.

After looking at the skew-T plots for the day (figure 1 below), I was kind of shocked to find out that the atmosphere was stable in the morning, despite the moving clouds. The skew-T plot for the evening also showed a stable atmosphere. These skew-T plots were taken at Denver International Airport, about 40 miles away from Chautauqua Amphitheatre where I took this picture. The weather patterns on February 18 suggest cumulonimbus clouds are the predominant formation because they were producing precipitation in the form of snow. This sort of matches the picture of the cumulus fractus that I took. Since I took my picture in the morning before the snow started, this could be

why they differ from each other. Again I would estimate my cloud to be at a height of about 10,000 feet. Since air is always rising when clouds are being formed, the cloud that I photographed could have been gaining altitude to meet up with the other clouds that eventually turned into clouds that produced snow.

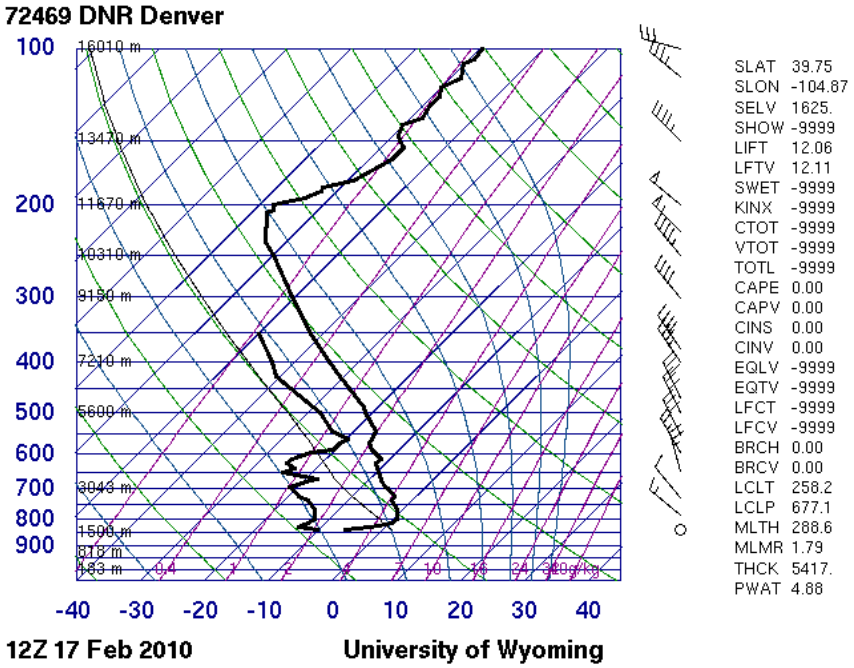

Figure 1: Skew-T plot from February 18th, 12pm

The field of view for this image is kind of hard to estimate. Being that the clouds are about 3,000 feet off the ground from where I was standing, and the angle of the camera was approximately 105 degrees above the horizontal, I calculated that the cloud was about 3100 feet away from the lens of my camera. The picture was taken with a focal length of 7.109mm and a shutter speed of 1/1500 second. The f-stop and aperture values were both f/6.3, and an ISO speed of 80. The image size is 2816x2112 pixels, and no flash was used for this image since it was taken outside on a sunny day. The camera that I used was a 6 mega pixel, Canon Powershot SD 630 digital elph with a 3x lens zoom.

To me this image reveals the beauty and mystery of clouds. This image shows that beauty in a cloud shape I have never witnessed before. I like how there is a contrast between the dark cloud in the foreground and the bright background lit up by the sun. If I had a chance to submit this picture again, after reading the comments people posted about my picture, I would probably use Photoshop to make the contrast between dark and light even more definite. This being said, I am still very happy with the picture that I took.