

Brayden Hass

Flow and Visualization

Cloud Report 1

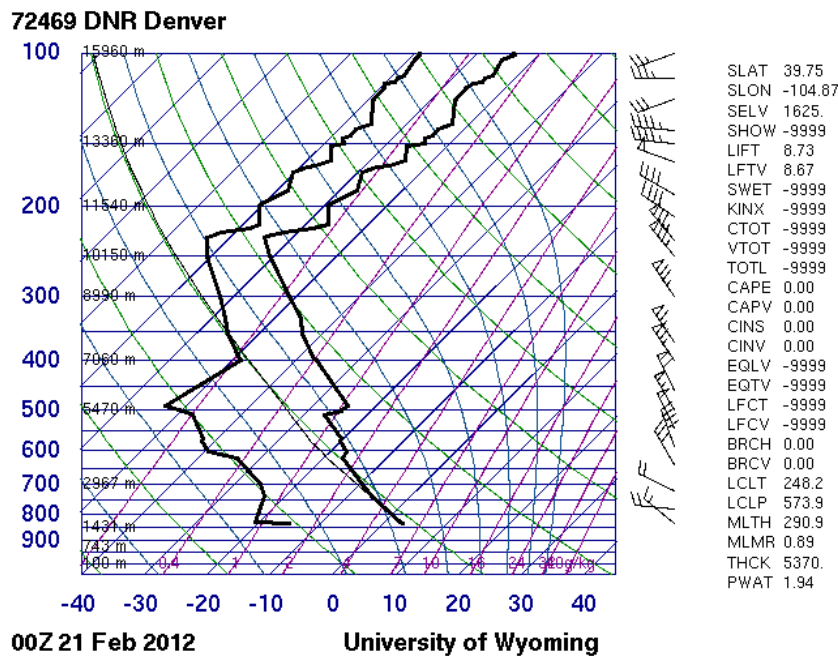


The photograph of clouds above was done for the first cloud assignment of Flow Visualization the spring semester of 2012. My first attempts to photograph clouds proved unsuccessful. The photos were not particularly interesting. I wanted to capture a few textures of clouds that were spread across the immense backdrop of the sky. After a few outings to local viewpoints in Boulder, Colorado, I was able to get an image which captured what I was looking for.

This photo was taken from a viewpoint called “Lost Gulch Overlook” located just a few miles west of downtown Boulder, CO. The photo was taken at approximately 5:45 PM, just moments after the sunset on February 20th, 2012. The large cloud emanating from the upper left hand corner of the photo, if you follow it down to its end, points a little west of due north. Below it, you can see Longs Peak on the horizon, one of our many peaks above 14,000 feet in Colorado. The lookout is at about 7350 feet above sea level. For the photo, I angled the camera approximately 30 degrees above horizontal.

The main cloud in the image, coming in from the upper left hand corner is the very end of a *Stratocumulus Lenticularis* cloud that extended behind me for approximately a mile and hovered directly over the Flatirons in Boulder. To clarify, the Flatirons are a group of sandstone formations on the Eastern face of the foothills in Boulder. The cloud is slowly drifting East over Boulder, as these mountain wave clouds tend to do. There was no precipitation around the time of the photo. The clouds in the right hand side of the image which appear stacked are also the same type of clouds. Typically these clouds appear smoother; however there were high winds that day which were giving them this rougher, more fractured look. Along the horizon there is the presence of several, more clearly, stable clouds.

Stratocumulus Lenticularis clouds are common in Boulder and could be seen in the days before and after this photo was taken. These clouds form as a result of the formation of a standing wave that takes place on the downwind side of a mountain. As the wind blows over the mountain, it drops and overshoots its stable altitude. It then rises and forms the cloud as it overcools, drops and repeats. There can be several of these wave clouds forming in strips, or sometimes just one. By examining the Scew-T plot from the University of Wyoming's upper air soundings page, shown below, it is clear that the atmosphere was stable around the time of the photo and that few clouds would be forming. This makes sense with the image I have taken; since the vast majority of the sky has no cloud coverage. Stable clouds are forming only in a few localized areas. The clouds in the image were at most a 2000 feet away from me, so from where I was standing, so I would estimate them to be at about 8000 – 10,000 feet above sea level.



To take the photo I used a Canon EOS Rebel T2i with a Tamron 10-24mm, f/3.5 – 4.5, wide angle lens. Using a wide angle lens allowed me to capture the sky more completely and recreate to feeling of viewing the entire sky. The horizon encompasses roughly 40 miles of distance and the cloud in the foreground (top of image) is about 2000 feet away. Prior to cropping, the original raw image was 5202 x 3465 pixels. I shot the photo at the lowest ISO possible in the low light that I had, in order to reduce the graininess the ISO was set to 400. The aperture was set to f/3.5 and the shutter speed was at 1/41.5 seconds. By using a tripod I was able to keep the camera steady during this slow exposure. I did a little post processing using the program Gimp. Really I just lightened the image and cropped out some of the bottom. The original can be seen below.



I like the way my image captures the in the setting of a huge open skyline. I do wish that it had not been so dark, perhaps if I had arrived ten minutes before the sunset I could have gotten a better image. The composition is also nice in the photo, the cloud coming in from the upper left draws the viewer's eyes across the blue gradient in the sky. I also like the range of textures, the soft yet rough clouds, the smooth gradient in the sky and the snow covered mountains come together well. The image clearly shows a range of stable cloud formations and the mountain wave cloud in the presence of wind. In the future I would like to make a time laps video of clouds forming over the mountains.

Sources for weather, atmospheric, and cloud data:

“Weather Spark Beta”, <http://weatherspark.com/#!/dashboard;q=Boulder+CO,+USA>

“University of Wyoming Dept. of Atmospheric Science”,
<http://weather.uwyo.edu/upperair/sounding.html>

“The Cloud Appreciation Society”, <http://cloudappreciationsociety.org/>