Cloud #1: Image Report

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The purpose of this image was to capture any type of cloud phenomenon that demonstrates fluid physics in a visually interesting way, fulfilling the first cloud assignment for the course. The intent of this image was to focus on one specific, considerably small cloud as opposed to a much larger one. The main reason I chose this one is because there appears to be Kevin-Helmholtz Instability near the top right portion of the cloud. I took many picture of the sky this day, and didn't realize this neat effect until sifting through the images later on.

This image was taken from the top level of the parking garage near the Engineering Center at the University of Colorado at Boulder. The camera was facing West to Northwest, and it was at an angle of ~15° above the horizontal. The image was taken on February 19th, 2014 at around 2:50 PM.

The main cloud featured in this image is an altocumulus. The one in the bottom left is more of a cumulus, since there are more distinct shapes present in the cloud. According to the Skew-T diagram (Figure 1) clouds were forming at around ~6000 m (6 km), and this is consistent with the assumption that this is an altocumulus cloud, which usually exist around that altitude. The rest

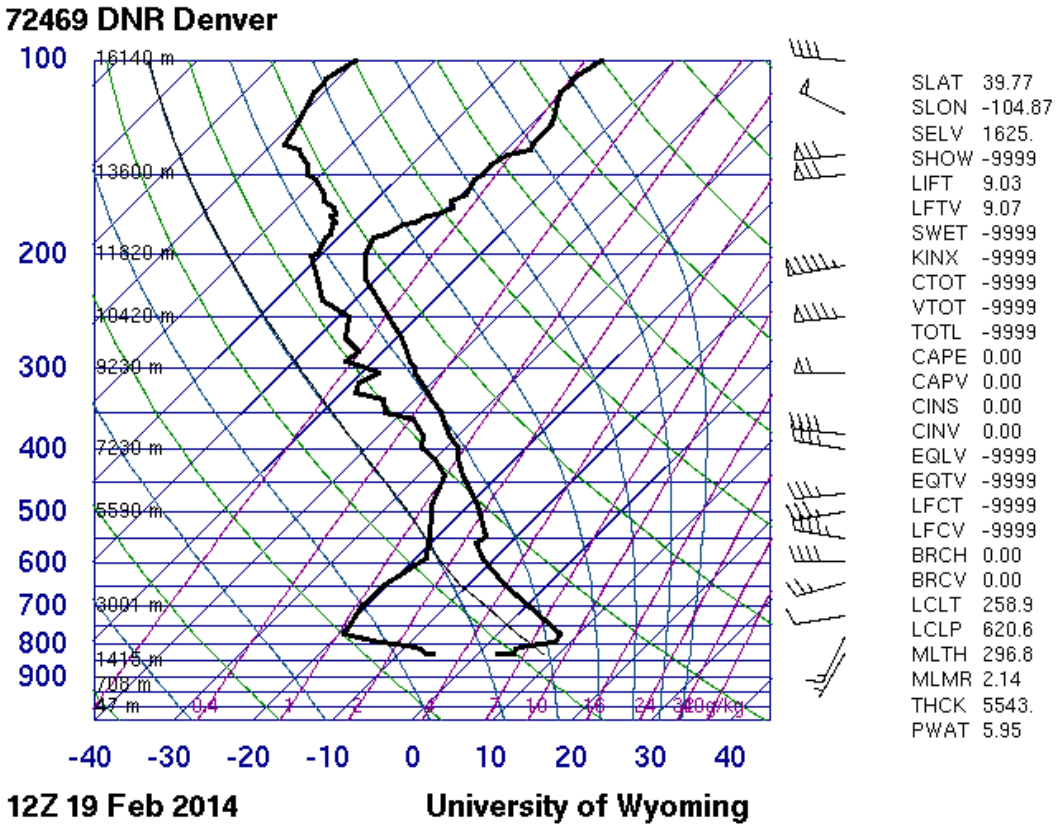

Figure 1: Skew-T Diagram

of the sky had similar clouds all throughout, appearing to be around the same altitude. Looking again at Figure 1, it appears that the atmosphere was stable due to the fact that *CAPE = 0*. Also, the winds at the altitude of this cloud appear to be decently strong, which explains the instabilities present throughout the cloud (i.e. the Kevin-Helmholtz Instability). The weather that day did not have any rain or snow, and the wind at ground level was fairly negligible. The temperature at ground level was about 59° F, according to weatherspark.com. The physics of the Kevin-Helmholtz Instability is quite complicated, but can be easily summarized. When there is velocity shear in a continuously flowing fluid, it creates this type of turbulence and a "vortex"-like pattern is observed.

The camera that I used is a Canon EOS 20D. The F-number was 20, and the focal length was 55. The lens is the standard lens that comes with the camera, EF-S 18-55mm f/3.5-5.6 IS II. The camera was obviously held very far away from the cloud. The shutter speed was 1/500 s, with ISO 250. The original image was 3504 X 2336 pixels (Figure 2). The cropped imaged is 1621 X 924 pixels. In terms of post processing, the image was cropped, with fairly minor alterations in contrast, exposure, and saturation.

Overall, I'm pretty satisfied with how this image turned out. I like how it captures a very neat fluid phenomenon and does it in an interesting way. Also, the presence of crepuscular rays present in the image made it very neat to look at. Lastly, the cloud looks very much like a dragon breathing fire, so that made it even more interesting. In terms of improvement, I think the cloud could have more details shown and more shadows present. However, I like how it turned out in the end.

Figure 2: Original Image