

Clouds 1



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Flow Visualization Assignment 2

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This is my firsts cloud assignment and the purpose of the image is to get familiar with cloud types and cloud physics. I was trying to capture a dramatic picture and get a unique situation with interesting physics and lighting.

This image was taken in Boulder on January 23, 2010 at 8:22 A.M. The picture was taken from an eighth-floor window, facing directly at the horizon, in the south-eastern direction.

The clouds showcased in my image are far in the distance, visible just on the horizon. They are stratocumulus castellanus clouds rising up in the east. I determined that they are stratocumulus because they are low, puffy clouds that are joined into a layer, not detached like cumulus clouds. The species is castellanus because of the crenellations seen at the top of the clouds[3]. I could not assign a variety to these clouds because I was not close enough to see if they were opacus, translucidus, perlucidus, duplicatus, undulatus, radiatus, or lacunosus. The rest of the sky had several other clouds in it, just at the top of the image can be seen an altostratus cloud, again it is too far away to determine a specific variety. Further in the foreground of the un-cropped image there are altocumulus stratiformis translucidus perlucidus clouds[3]. The clouds had been similar the day before, and the weather was very consistent. For the two days before and after this image was taken, the average temperature was 35 to 40 degrees Fahrenheit and the winds were 12-18 mph West or NW[2]. There was no weather system leaving or approaching.

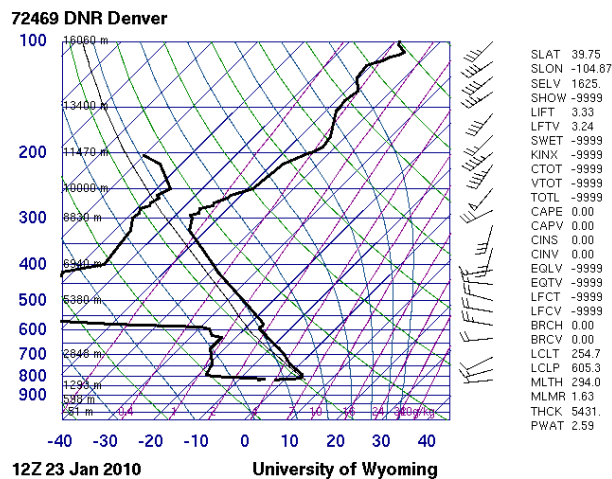


Figure 0.1: Morning Skew-T

The atmosphere was stable as the skew-T plot shows. The dew point was quite low, and the parcel had nearly the same temperature profile in the sky as its neighbors. The nearest skew-T plot would indicate clouds possibly at about 4000m altitude.

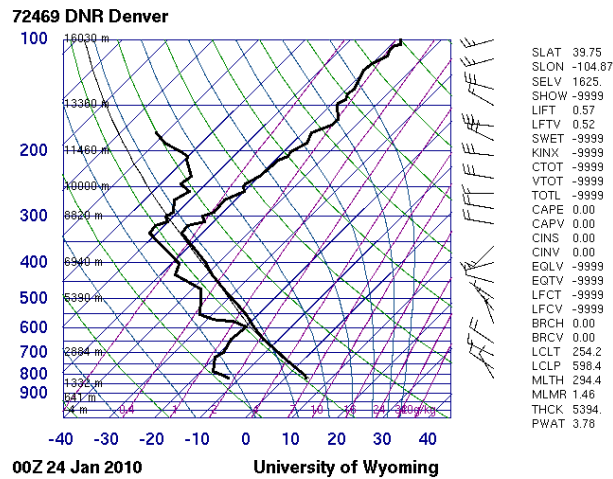


Figure 0.2: Evening Skew-T

This corresponds with the clouds seen in the image, but the skew-T indicates a clear ceiling for the clouds at just above 4000m, which is not seen in the image. However, looking at the skew-T for a few hours later, clouds can be predicted from 4000 all the way up to 7000m. Both skew-T plots indicate stable skies, but the cumulus clouds seen in the image challenge that as some of the plumes coming off the top of the clouds suggests slight instabilities. These clouds could have formed from stratus clouds clumping together, as there was some slight wind that morning. Alternatively, the cloud features seen could have formed from warm parcels of air rising up underneath the cloud layer, either from thermals coming up from the ground, or even radiative heating from the sun's longer wave light being absorbed at the bottom of the cloud[3]. It is hard to say exactly from this distance, but I expect that the shapes of the clouds are formed by the instability of warm air rising into cooler air, where it continues to rise and push up until it reaches an equilibrium point.

The photographic technique that I used was quite simple; I let the camera choose the settings, and just pushed the button. I estimate the size of the field of view to be about two miles across, based on the buildings seen just on the horizon. The distance from the horizon to the lens is about four miles, and the distance from the lens to the clouds is likely over twenty miles. The focal length of the lens was 17.6 mm. I used a digital camera, a Panasonic DMC-FX500. The original image is 3648x2736 pixels, and the final image is 2931x495 pixels. I used Photoshop and manipulated the contrast in the image via the "curves setting" I then increased overall brightness and contrast using the simple dialog box. The aperture for this picture was f/7.1, the shutter speed was 1/800 seconds and the ISO was set to 160.

This image captures some beautiful cloud behavior. I like that the image shows interesting clouds with great lighting from the sunrise. I am not thrilled about the resolution of the picture. Because the clouds are so far away, they do not seem to be especially clear. I think this image shows great cloud physics. One thing that I am not sure about is just how far away these clouds are and I wonder what is going on beneath them. I believe that I fulfilled my intent with this image to capture a unique scenario and lighting. If I could improve something, it would be my equipment so that hopefully the image looks clearer and closer. Overall, I am pleased with the image and the clouds that I captured.

Bibliography

- [1] "Atmospheric Soundings." Department of Atmospheric Science. University of Wyoming. Web. 21 Feb. 2010. <<http://weather.uwyo.edu/upperair/sounding.html>>.
- [2] "History : Weather Underground." Welcome to Weather Underground : Weather Underground. Web. 16 Feb. 2010. <<http://www.wunderground.com/history/airport/KBJC/2010/1/23/DailyHistory.html>>.
- [3] Pretor-Pinney, Gavin. The Cloudspotter's Guide. New York: Perigee Trade, 2006. Print.