Clouds 1

MCEN 5151 – Flow Visualization
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Introduction:

The purpose of the clouds assignment is to get a nice picture while also learning about clouds at the atmosphere. This particular assignment was very difficult for me. I know very little about framing and composition of photographs. It seemed like every picture I took of a cloud didn't really look like a picture of a cloud as much as an accidental picture of the sky that happened to have a cloud in it. For this reason, I took a different approach. As can be seen, my picture ended up being more of a landscape picture with some clouds in it. While this may go against the purpose of the assignment, it was the only way I could get a good looking cloud image.

Circumstances:

This photograph was taken in the farm lands on the outskirts of Erie, Colorado. It was taken on Sunday February 16th at around 3:30 pm. I was looking northwest and straight out. This means the camera was about 6 feet off the ground with an essentially horizontal orientation.

CLOUDS!

This image captures several cumulus clouds. I determined this by looking at several sources. First of all, I had to determine the cloud elevation. WeatherSpark[1] is a great resource for finding this out, see figure 1 below.
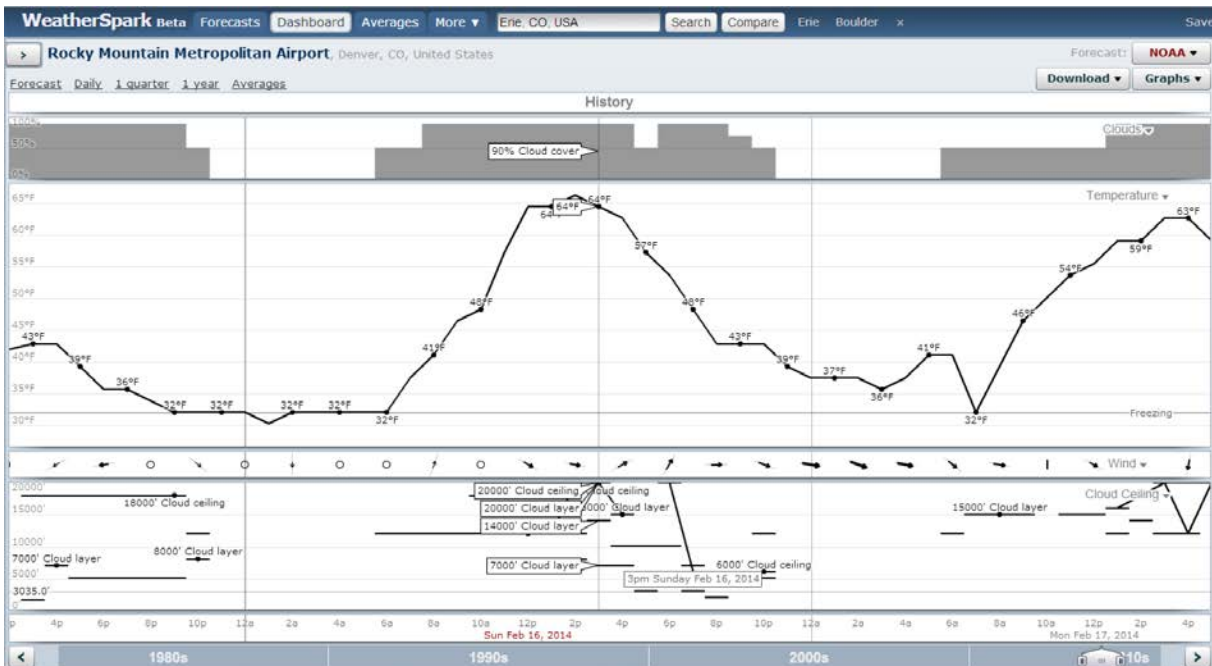

Figure 1 - Weather data from WeatherSpark.com[1]

As you can see, the lowest cloud layer was at 7000 feet. With this data in hand, we can turn to the handy *Cloudspotter's Guide*[2] to figure out what type of clouds are in the image. Looking at the big classification picture with shape and elevation in mind, figure 2, it is obvious that these clouds are either cumulus, stratocumulus, or cumulonimbus.
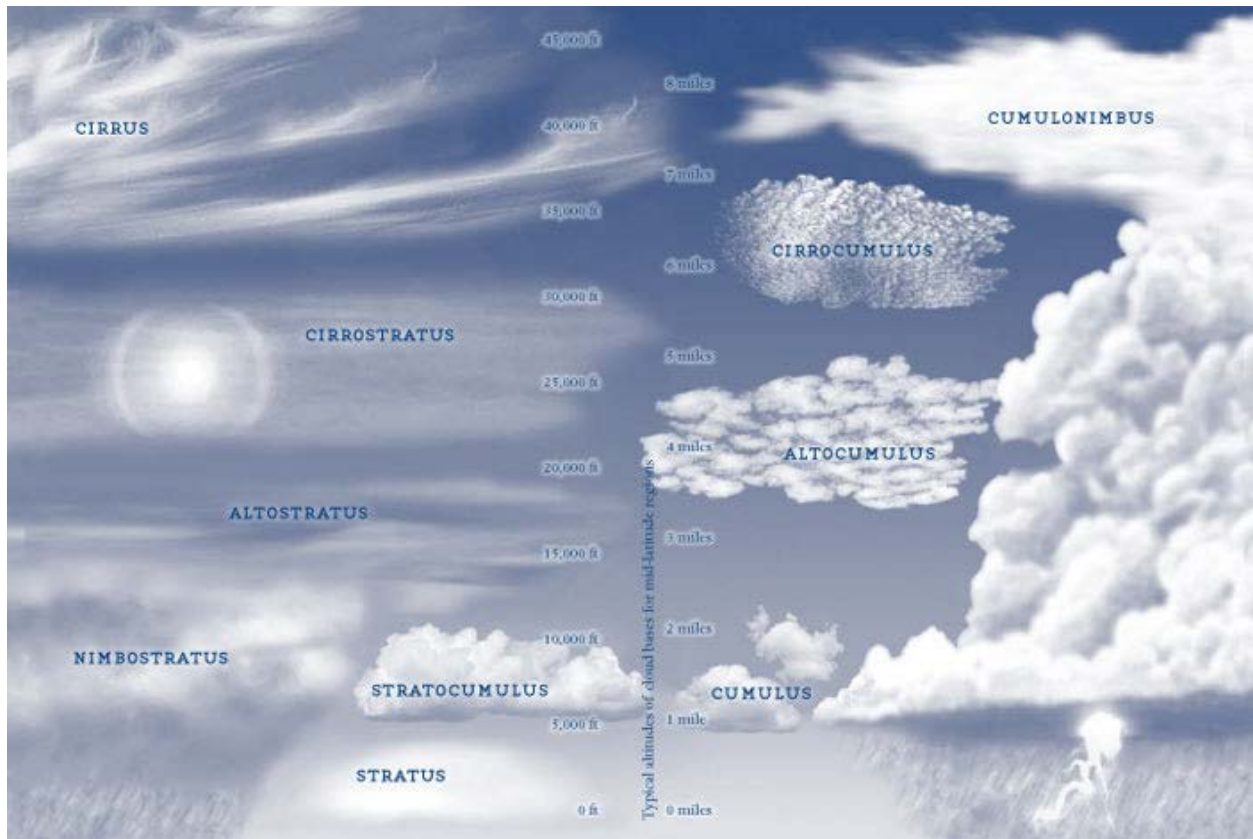
Figure 2 - Cloud classification figure[3]

According to *The Cloudspotter's Guide* stratocumulus clouds have flat tops and are typically attached to form a layer. The clouds in this image don't seem to have flat tops at consistent heights and are separated, so we can rule out the stratocumulus. The guide also says that cumulonimbus are very, very tall. The clouds in the image are not tall at all. Clearly these clouds are cumulus clouds.

To confirm this classification, the atmosphere should be at least slightly analyzed. The most important tool in analyzing the atmosphere is the Skew-T diagram. A Skew-T diagram for this time is shown in figure 3. The website goes off Greenwich Mean Time, so even though the figure says February 17th, it's actually for February 16th in Colorado.
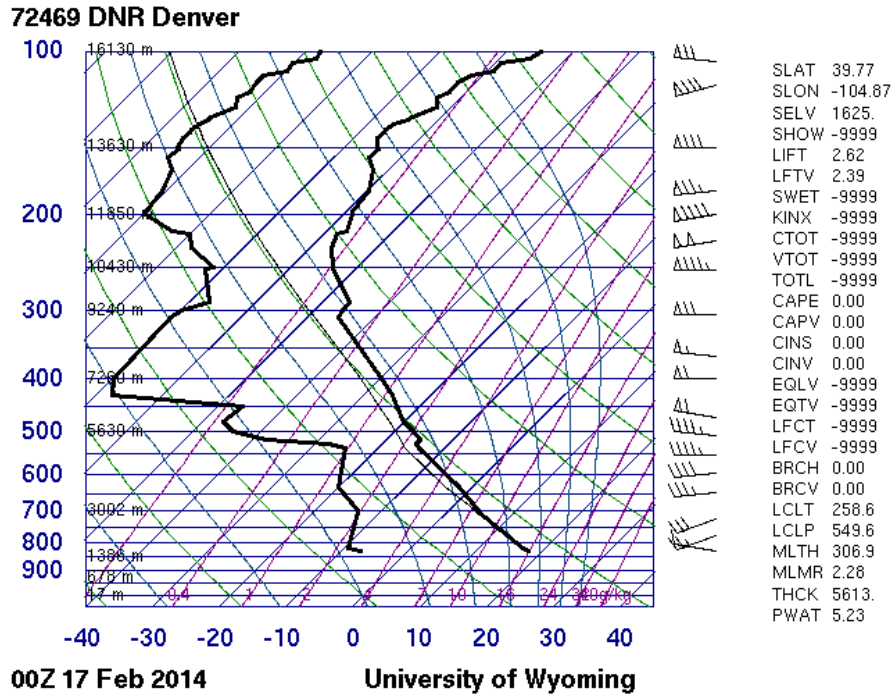
72469 DNR Denver

100 16130 m

13630 m

200 11850 m

10430 m

300 9240 m

400 7260 m

500 5630 m

600

700 3092 m

800 1390 m
900 670 m
      47 m

-40 -30 -20 -10 0 10 20 30 40

00Z 17 Feb 2014   **University of Wyoming**

SLAT 39.77
SLON -104.87
SELV 1625.
SHOW -9999
LIFT 2.62
LFTV 2.39
SWET -9999
KINX -9999
CTOT -9999
VTOT -9999
TOTL -9999
CAPE 0.00
CAPV 0.00
CINS 0.00
CINV 0.00
EQLV -9999
EQTV -9999
LFCT -9999
LFCV -9999
BRCH 0.00
BRCV 0.00
LCLT 258.6
LCLP 549.6
MLTH 306.9
MLMR 2.28
THCK 5613.
PWAT 5.23

Figure 3 - Skew-T diagram of Feb. 16th at 6:00pm[4]

This figure shows a CAPE of 0.00. That means that there was a very stable atmosphere at the time of the picture. This further confirms the conclusion of cumulus clouds because they are known to form in stable atmospheres. The clouds pictured were about at an elevation of about 7000 feet according to WeatherSpark. This is slightly surprising considering the two dark lines (temperature and dew point) aren't all that close together at a height of 2000 meters. However, the lines are farther apart in most places, so if clouds were going to form anywhere, that would be one of the heights where it happened.

This day was very calm. There were very, very mild winds and no storms formed before or after the picture was taken. This is expected with the stable atmosphere as storms typically form when the atmosphere becomes unstable.

Photo Technique:

The photos were taken with a Canon EOS Rebel T2i D-SLR camera. The original photo can be seen below in figure 4.

Figure 4 - Unedited cloud image

The field of view in this image is huge and I don't even know how to approximate it. It's probably several miles at the horizon where the clouds are. The photo itself has a pixel measurement of 5184x3456. For this photo, I really let the camera do everything automatically. I didn't want to start messing with shutter speed, ISO, and aperture and end up getting a blurry or oversaturated picture. Since the clouds are well defined, the camera is able to handle it much better than with other fluid pictures where there are no distinct edges. I think this was a good decision as I'm still not fully familiar with exactly how to pick out settings that will give a good looking picture. In this setting, my camera came up with a shutter speed of 1/250 second, and ISO setting of 100, and an f number of 10. I like what it did, the picture turned out quite well.

After the image was taken, there was some minor post processing done in Gimp. The image was obviously cropped to make the barn and dark clouds on the right less dominating. This cropping also moved the tree over to be in a better position by the rule of thirds. After that I upped the yellows some to give the picture a nice, home front look. While some people in the critique thought the yellows were a bit much, I really like where they ended up. However, I also upped the contrast and I may have gone a little too far with that. This is something to be more careful of in the future.

Conclusion:

I'm generally quite happy with this picture. I think going the route of photographing a landscape rather than a particular cloud was a good decision. With that approach, I was able to get some nice clouds while also producing a good looking picture. I was also fairly happy with the post-processing of the

image. While some people didn't like it, I think I really improved the picture and gave it a distinct feel that went great with the landscape, although I should be more careful about the contrast in the future. All in all, I ended up with I product I'm happy with in this assignment.

References

1. "WeatherSpark Dashboard." *WeatherSpark*. 16 Feb. 2014. Web. 6 Mar 2014. <http://weatherspark.com/#!graphs;ws=29761>.

2. Pretor-Pinney, Gavin. *The Cloudspotter's Guide: The Science, History, and Culture of Clouds*. New York: Berkley Pub. Group, 2007. Print.

3. "Moisture, Clouds, and Percipitation." *Wallacegensci9.* Web. 6 Mar. 2014. <http://wallacegensci9.wikispaces.com/Moisture,+Clouds+and+Precipitation>.

4. Atmospheric Soundings." *University of Wyoming College of Engineering*. N.p., 16 Feb. 2014. Web. 06 Mar. 2014. <http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2014&MONTH=02&FROM=1700&TO=1700&STNM=72469>.