Flow Visualization Cloud Assignment #1

Bronco Stratocumulus

Jonathan Fritts

The purpose of this assignment was to observe several clouds over the span of a few weeks and capture images of various types of clouds. Clouds show an interesting fluid phenomenon of how the atmosphere is reacting to temperature, wind, humidity and several other factors. Although clouds are always changing, different types of clouds can be classified by their altitude and stability of the atmosphere at the time. Many clouds on a day-to-day basis look like figures or things we observe in everyday life. The cloud I captured immediately caught my eye because of the "bronco figure" the cloud presented. It appears that a horse's face (left side) is pointing down and its hind legs and tail (right side) are up in the air as if it were a bucking bronco in the clouds. Unfortunately, I did not stage the picture as well as I would've liked. I wish I would have found a better location to cut the tree out of the view of the final shot, although there were several trees surrounding me and I wanted to capture the image quickly because of how fast clouds will move and change shapes.

The image was taken in my hometown just south of Castle Rock, CO. This cloud was captured at about 3:00 p.m. on January 11, 2013 facing northwest. The sky to the west and north was filled with more clouds of similar structures and shapes, but there existed no clouds south and east of the location. The image was taken on top of a hill and therefore the camera did not need to be angled much towards the sky. Therefore, the camera was pointed at about a 5° angle from the horizontal. Using surroundings and my best judgment, I believe the cloud extended about three or four miles up into the troposphere. The weather was relatively mild and there was no storm front that had recently come through. The temperatures were cold, around 11° F, and there was little wind. The weather forecast predicted a possible chance for precipitation on the next day, but there was none. It appeared that the atmosphere

was stable at the time. The following Skew-T diagram[1] confirms and shows that the atmosphere was stable around the time the picture was taken.

72469 DNR Denver

SLAT 39.75
SLON -104.87
SELV 1625.
SHOW -9999
LIFT 5.38
LFTV 5.31
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 256.4
LCLP 595.1
MLTH 297.4
MLMR 1.76
THCK 5480.
PWAT 4.05

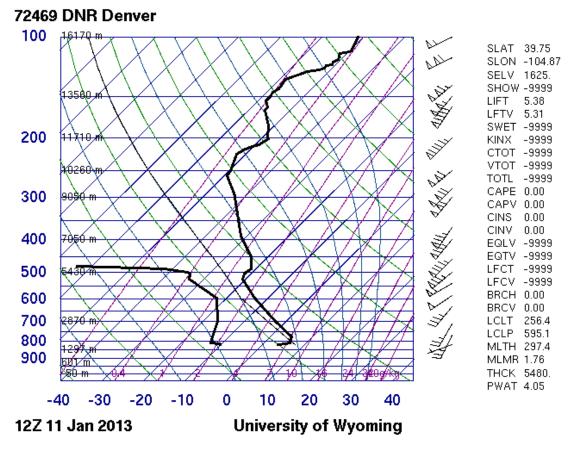12Z 11 Jan 2013   University of Wyoming

Figure 1 - Skew-T Diagram

The convective available potential energy (CAPE) value was equal to zero supporting more that the atmosphere was stable. The slope of the temperature line at about 5000 m confirms my assumed height of the clouds. The picture shows the clouds are somewhat flat and slightly puffy in some areas, but are joined together across the sky. Taking into account the cloud base height, structure of the cloud and stability of the atmosphere, it can be assumed that the primary types of clouds in this picture are of the stratocumulus type. These shallow cloud layers are created from convective currents of dry, stable air that prevents continued vertical development[2].

A few editing techniques were used to edit the original image. The curves feature was used and an "S" shaped curve was made to increase the contrast of the image. Red and yellow colors were also enhanced in the image to give the cloud a pink/orange look to it in order to support the "Bronco theme" of the image. The image was also cropped to avoid having the oak, house and other unwanted features that draw viewer's attention away from the cloud.

The following photographic techniques were used to capture this image:

Date and Time	January 11, 2013 at 3:00 p.m.
Type of Camera	Digital Canon S90 Powershot
Lens Specs	6.0 – 22.5 mm
Aperture	F 5.6
Shutter Speed	1/125 sec
ISO	100
Direction/Location	Northwest/Castle Rock, CO
Photoshop Processing	• Increase of red and yellow to give orange color • Increase contrast making "S" shaped curve

The images before editing and after the editing processes are shown below:

Figure 2 - Image Before Editing

Figure 3 - Image After Editing

Perhaps the most interesting thing about clouds is the unique structures and forms they take on. There are several types of clouds that can be classified. Of the two major types, strato-family and cumlus-family, the clouds captured in this image represent a combination of the two. I have always been fascinated by shapes and figures people's minds will make up when they look at the clouds. I was very excited to capture one of these figures that I think many other people would agree they see as well. As I stated before, I wish I could have taken this picture without any obstructions of view in the shot, although part of the art of photography is timing. In addition to seeing shapes in the clouds, it is now interesting to have knowledge of the stability of the atmosphere from determining the type of clouds present.

References

1. Atmospheric Soundings: Wyoming Weather Web (2012). Retrieved January 11, 2013 from University of Wyoming, Department of Atmospheric Science Web Site: http://weather.uwyo.edu/upperair/sounding.html
2. Cloud Classification and Characteristics Retrieved February 25, 2013 from http://www.crh.noaa.gov/lmk/?n=cloud_classification