Jaewon Kim
MEID: 770-906

Cloud 1 Report

The first cloud assignment; the purpose of this assignment was to analyze clouds formation and its dynamic behaviors due to constantly changing weather. This assignment was done by taking a picture of any interesting clouds formation and using the available resources such as skew T plot, commonly known as weather sounding data and necessary research was done to understand the phenomena of clouds.

Clouds are formed when the moisture content evaporates from oceans, lakes and ponds. Evaporated moisture will then rises up into colder area of atmosphere. Once the vapor has been cooled to saturation, the cloud becomes visible. There are three main categories in clouds classification: low, middle, and high level clouds. These clouds classifications are based upon their height above the ground. For example, high-level clouds include: cirrus and cirrostratus, which only has one genus and it is in the high altitude range (above 20,000 Ft) and occurs mostly in the form of filaments [3]. Other commonly observed clouds formations are stratus and cumulus. Stratus and cumulus occur in the high, medium and low levels of troposphere. Stratus clouds are mostly sheet-like in structure, and cumulus appeared rolled and/or rippled [3].

Based on my final image, I have made a scientific assumption that these clouds could be identified as stratocumulus and it turns out that I was incorrect it was actually altocumulus perlucidus. In coming sections will discuss the location, clouds analysis and detail photographic techniques used to capture this image below (Photo 1).

Photo 1 Final Clouds Image

This image was taken on February 17, 2011 about 5:45pm. I was right near East Boulder Recreational Center (EBRC), which is located in-between 55th and 56th off South Boulder road. I was facing northwest toward Longmont at the moment when this photo was taken. I would have assumed that the elevation of that location is near 5800 Ft. above sea level.

After doing some research and discussing my final image with fellow flow visualization classmates I have concluded that my clouds would be specified as altocumulus perlucidus due to its irregular sample of small gaps in the cloud cover. I used the weather underground link, which was provided by Professor Hertzberg to gain a better understanding of the weather history of a few days prior and after of when this was photographed [2]. Based on weather history from February 10th through 16th, data have appeared that there was not much of change in weather

systems. It was mostly cloudy with average high and low temperatures of near 50s and 30s. However, on 17th low temperature had drastically dropped down to 17 degrees and the wind was blowing approximately Southwest 12mph. Based the weather history, it was windier than previous two days and a small amount of precipitations moving into front range.

In addition, skew T plot was used for analyzing the stability of the atmosphere and also to gain a better understanding where clouds would be formed [1]. Although I do not fully trust skew T data due to various reasons I have decided to use the data in order to make the best scientific assumptions. Inaccuracy of sounding data could be often related to when and the location of where the weather balloon was sent off relative to my final image was taken. For this instant, February 18, 00Z weather sounding data from Denver International Airport (DIA) was used. Based on skew t plot, the CAPE value was zero, which suggested that the atmosphere was stable. However this is where I disagree with the weather sounding data. I believe that the atmosphere stability was actually conditionally stable due to small precipitation interactions in the atmosphere. The weather sounding data also revealed that the clouds would have been formed near 12,400 Ft., which makes sense for identifying the clouds formation as altocumulus. This plot is shown in Figure 1.

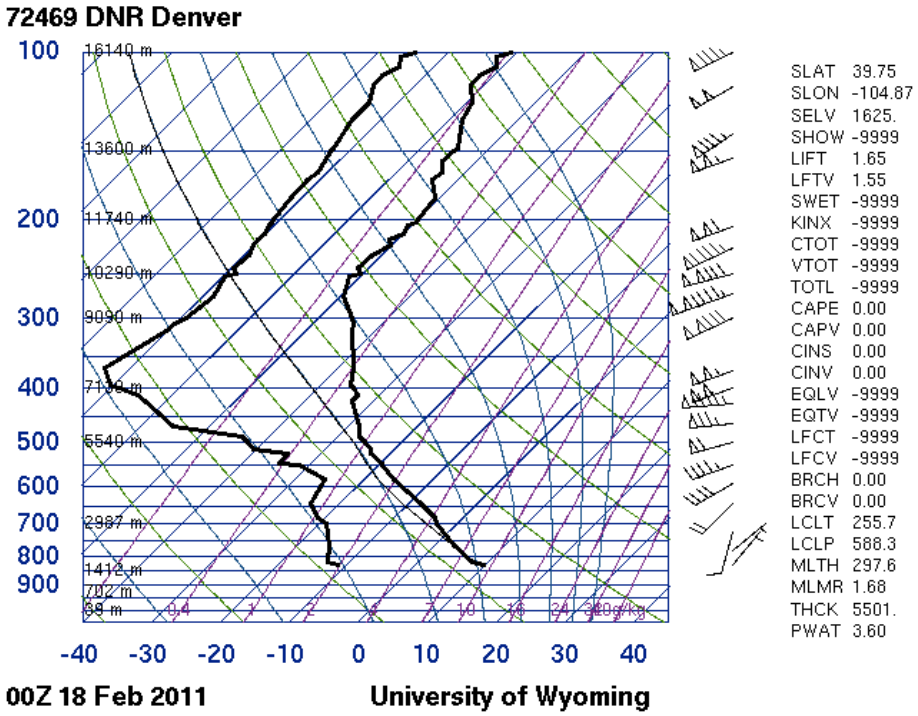

Figure 1 Skew T-plot February 17, 2011

As stated before the purpose of this assignment was to capture dynamics of clouds formation due to constantly changing weather systems. In the following section will overview the detail photographic technique used and what had influenced me to choose these choices. Based on assumption of clouds location (from skew T plot) I believe the distance from the object to lens were approximately two miles. Canon EOS Rebel T2i Digital Single Lens Reflex (DSLR) camera was used along with EF-S18-135mm lens where the maximum focal length is 18.0 mm. This camera was set to Aperture priority (AV) mode. The shutter speed, aperture value, and ISO

were set to following parameters: 1/200 sec, f/7.1, and 100. Overall pixel dimension (X by Y) was 8432 by 4966. The flash was not used and metering mode was set to evaluate mode. During editing of the final image, I have increased the contrast to bring out the blue sky and shadows from the trees in foreground. Thus, resulted the stronger characteristics of the darker blues from the sky and dark and gloomy clouds in lower left of the final image. The editing was done using Photoshop CS5.

I'm very proud of how my final image turned out. Although I found it to be very difficult capturing true images of clouds dynamic behaviors due to constantly changing weather. I would improve my photographic technique by using time elapse feature or maybe try panoramic effect. Overall it was a great learning experience using DSLR camera to capture images of clouds but most importantly I have learned so much about the physics behind the clouds formations.

Jaewon Kim
MEID: 770-906

References

1 Atmosphere Sounding Data Skew T- diagram weather.uwyo.edu
2 http://weatherspark.com/
3 G. Pretor-Pinney, “The Cloudspotter’s Guide The Science, History, and Culture of Clouds,” Rev. the Penguin Group. June. (2007)