Allison Hamrick

MCEN 4228

Cloud Assignment 1

Image Taken: February 10th, 2010 2:15PM

Clouds are merely visible masses of frozen crystals suspended in the atmosphere. The purpose of this image was to capture some of the physics that take place within these clouds. The intent was to capture a variety of different clouds, and to learn what types of clouds are typical to appear near the horizon during fair weather.

The photo was taken on February 10th, 2010 at 2:15 in the afternoon and the location was 28th and Arapahoe at the bus stop. The camera was facing North in the sky, and was angled at about 30° above the horizon. The elevation of the photo was between 5,000 and 10,000 ft.

These clouds are very representative of mountain wave clouds. They form in the rising branches of mountain waves and occupy the crests of the waves. Considering the elevation at which the photo was taken, the clouds were probably a mixture of stratocumulus and cumulus. The whispy cloud looks like a cirrus cloud, but the elevation was too low for that type of cloud. It was probably a fractus wave cloud that was about to disappear. The weather was very nice for most of the day, with an average temperature of 62°F. These were the only clouds in the sky that afternoon, the rest of the sky was completely clear. It was somewhat windy, and the clouds looked similar the day before and the day after.

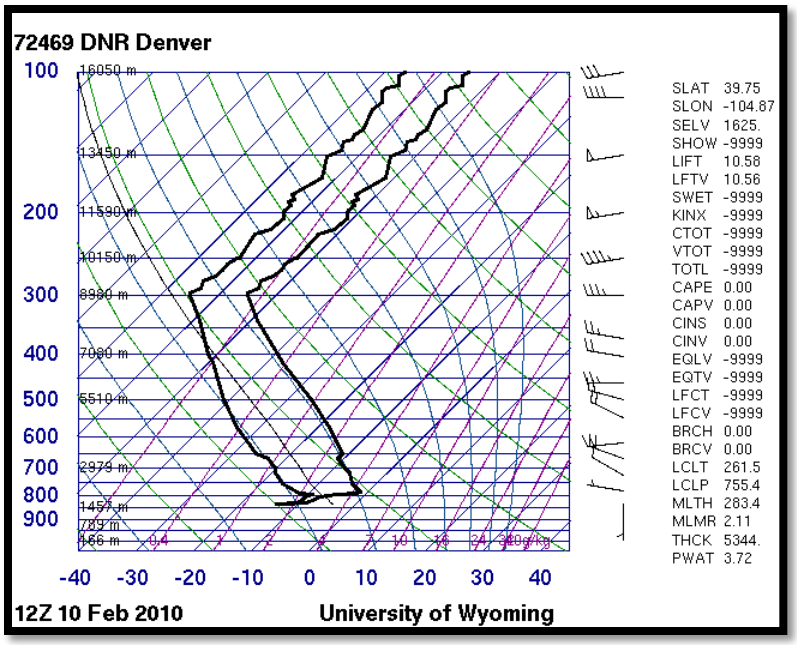

Figure 1 – Skew-T for February 10 at 6AM

The Skew-T to the left in Figure 1 reveals the temperature profile fot the morning of February 10th. There was not a Skew-T for the afternoon of that day. The temperature and the adiabatic cooling line are relatively the same. The CAPE value is 0, revealing a stable atmosphere.

Stratocumulus clouds are low layer clouds, composed of individual or joined-up cloud clumps. They usually are found below 8,000 feet, which would make sense for the elevation this picture was taken at. There appears to be a pileus on the bottom right of the photo, which is also called a cap cloud. However, pelei are normally indications of severe weather, as they indicate a strong updraft within the cloud. They also tend to change shape rapidly, which this cloud was not doing. This cloud was merely pretending to be a pileus. They normally appear over a cumulus cloud, giving the parent cloud a "hoodlike" appearance. They are formed by strong updrafts acting upon moist air, causing the air to cool to its dewpoint. This picture is representative of mountain wave clouds. These are formed when there is a strong breeze blowing into the face of a suitable mountain range, and when there is a stable temperature gradient in the atmosphere. Once the air is displaced upwards, it oscillates around its initial temperature.

The intent again was to capture multiple types of clouds that occur at the same elevation. Thus, three photos were taken with a Panasonic DMC – ZS1 and stitched into a panorama using the correlated stitching program to show a bigger portion of the sky. The final photo dimensions were 3848 by 4858 pixels, with 200 pixels/in resolution. This correlates to X and Y dimensions of 19.24 and 24.29 inches. The photos were taken in landscape mode to ensure that the background was in focus. The focal length was 12.8 mm with a shutter speed of 10/5000 sec and an ISO setting of 80. Once the panorama was stitched together, Photoshop was used to increase the contrast and the saturation.

This image was successful in revealing a variety of cloud types that exist around 8000 ft. The whispy cloud reminded me of Falcor from the movie "The Never-ending Story", with his fluid movements through the air.

Figure 2 - Falcor

I thought that the contrast and the focus of the image were of good quality, and that the fluid physics were shown well. There were a lot of different textures within the chaos of the moving clouds, and it provided for a beautiful image. I still do not understand the physics due to the mountain waves as well as I would like to. I would also like to be able to capture a picture of a real pileus cloud, to see what elevation and clouds normally surround that type of phenomenon. It would be interesting to record what the weather and cloud types appear before and after the formation of a pileus cloud.

Resources

Unisys Weather. 11 Feb. 2010. Web. 22 Feb. 2010. <http://weather.unisys.com/upper_air/skew/skew_KDNR.html>.

The Cloud Appreciation Society. Web. 11 Feb. 2010. <http://cloudappreciationsociety.org/>.