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Cloud #2 - MCEN 5151
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The fifth project of the Flow Visualization class was titled "Cloud #2." The goal of this assignment was the same as in "Cloud #1": to provide a fascinating cloud photo, identify the species of clouds and explain why the clouds are present using meteorological data (SKEW-T chart). I wanted to capture some high clouds such as cirrus since they show amazing, defined streaks that are contrasted by a blue sky. The weather cooperated this time and provided some beautiful days with blue skies and high cirrus clouds.

The photo location was on the University of Colorado campus in Boulder, CO, near the Coors Center. The photo was captured on 4 April at roughly 0940. It was a very beautiful day with blue skies and the occasional cloud. The cloud that I took an image of was above the Engineering Center, about north-northwest from where I was standing. The camera was facing roughly 80 degrees from the horizon. The area is around 5600 feet above sea level.

Figure 1: Submitted image for project

Figure 1 is the image submitted for this project and looks like a dancer in a graceful move. It looks like a cirrus cloud. A cirrus cloud is described as the following: "In the form of

delicate, white streaks, patches, or bands of falling ice crystals, [cirrus clouds] are detached from each other and have fibrous or silky appearances."[1] Clouds-online.com describes cirrus clouds as fibrous, threadlike, white feather clouds of ice crystals, whose form resembles hair curls.[2] The best fit for a subspecies is the uncinus since it has fallstreaks that are the shape of hooks or commas.[1] There are three defined hooks within the cloud. Figures 2 and 3 show examples of cirrus uncinuses.

Figure 2: Cirrus uncinus in Leipzig, Germany[2]

Figure 3: Cirrus uncinus in Mainz, Germany

Cirrus clouds are usually an indicator of changing weather for the worse. After 4 April the pressure continued to drop for three days until a low pressure system arrived, bringing with it cold temperatures and some precipitation.

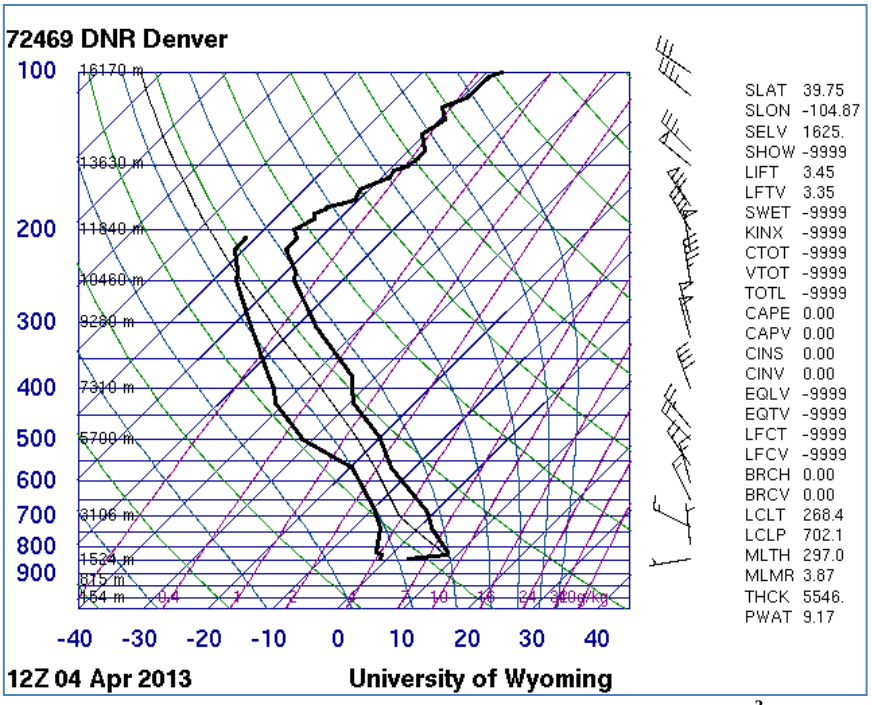

Figure 4: Skew-T chart for Denver at 0600 MST[3]

Cirrus clouds are typically found in the 16,500 ft (5029 m) to 45,000 ft (13716 m) range.[1] Looking at Figure 4, the stable atmosphere would support the cirrus cloud range. Also, the

winds in the range are in the northerly direction. The cloud is moving in the north direction, but as the ice crystals fall behind, they create the swirl that is assisted by the lower westerly winds lower in the atmosphere. As the ice crystals drop, they warm up and eventually evaporate, never making it to the ground. On the ground the winds were blowing to the west at 3 mph, and the pressure was high that day at 30.16" Hg.

The field of view is estimated to be around 500 feet by 750 feet. The distance from the camera to the cloud is guestimated at 35000 feet. The camera used was a Canon PowerShot SD 870IS and was used in the auto mode since there was plenty of light and time to capture the image. The F-stop was f/4, and the focal length was 12 mm. The exposure time was 1/640 seconds, and the ISO was 80. The original image was 3264 pixels wide by 2448 pixels high. The image was edited using Canon's photoshop program ZoomBrowser EX. The image was cropped, the contrast was increased, and the blue was brightened a little.

I really like the image that I captured. It has nice flowing lines and is clear since it is set to a very blue sky. Learning to carry my camera at all times paid off by getting a few good captures. The physics of the cirrus clouds make sense after doing the research and finding why they look the way that they do.

References

[1]Pretor-Pinney, Gavin. The Cloudspotter's Guide: The Science, History, and Culture of Clouds. 2006.

[2]http://www.clouds-online.com/cloud_atlas/cirrus/cirrus_6.htm#cirrus_6

[3]SKEW-T obtained from: http://weather.uwyo.edu/upperair/sounding.html