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MCEN 4151

Flow Visualization

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## **Cloud 2 Image Report: Low Flatirons Cloud**



Figure 1: Low Flatirons Cloud Image

## **Introduction:**

The purpose for this assignment is to continue learning about clouds and expand the horizons of the photographer by attempting to capture a different type of cloud. The images are allowed to contain buildings and other objects as long as the clouds are the main focus of the picture and the objects are not too distracting. This image shows the very rare event of a cloud sitting midway over the Flatirons. Clouds that were seen at that time of the day formed and vanished quickly.

The cloud was spotted from one of the parking lots of the University of Colorado at Boulder on February 23rd in the evening hours; a short time after the sun set behind the mountain. The camera was pointed south-west and at an angle of 20 degrees from the horizon.

## **Cloud Data:**

The cloud shown in this image is smooth, flat and parallel to the horizon, which makes it seem like a low stratus cloud. The skew-T plot of this cloud is shown below on figure 2. Normally, by looking at the closeness of the two black lines (the temperature sounding and the dew point temperature during the day), one can tell where condensation is most likely to occur. In figure 2, this occurs at a height of about 6000m. However, it is apparent that this cloud is not at that height. The height of the Flatirons Mountain is about 1,400 ft. (426.72m), so it can be estimated that the cloud that was captured at 600 ft. (182.88m). Unfortunately, the skew-T plot that was provided by the University of Wyoming soundings website does not have data for this low of a height. The time the picture was taken was right after a snow storm had passed through the town.

A closer look at the Skew-T plot can reveal the stability of higher clouds during the sounding. The atmosphere seems to be stable due to 2 things: the first is the CAPE number is 0.00, indicating a fairly stable atmosphere. The second indicator is evident when comparing the slopes of the temperature log line with the adiabat (the thin black curve). Seeing that the slope of the adiabat is slightly less steep than that of the temperature log, this also indicates a fairly stable atmosphere. Additionally, one can notice the wind barbs on the right side of the skew-T plot, indicating some amount of wind at low heights (5mph at the lowest recorded sounding). The importance of this is not the wind speed, but direction. At those

low heights, the wind was recorded to be blowing from North to South, which agrees with the observation during the day of the image.

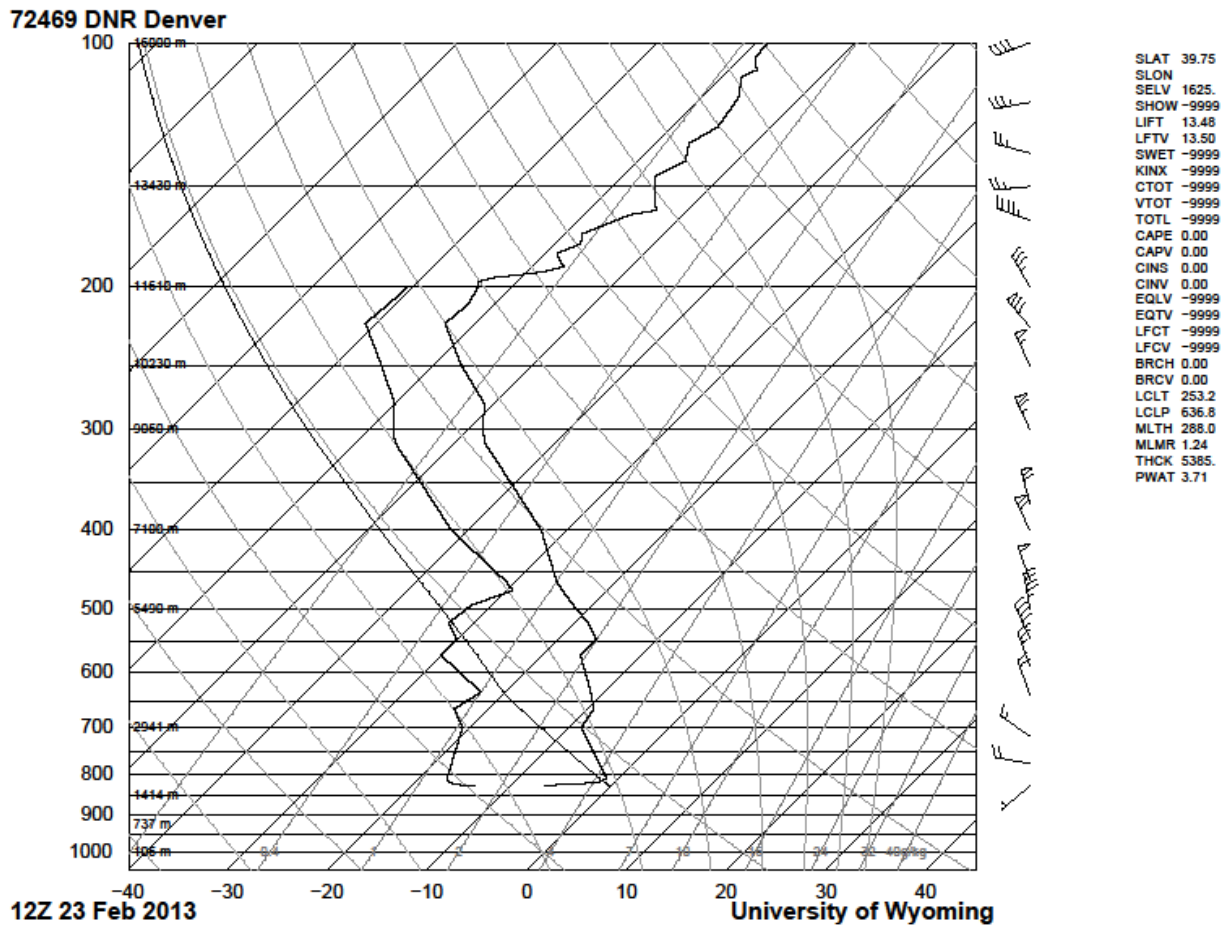


Figure 2: Skew-T plot

## Photographic Technique:

The picture was taken with an Olympus E-500 using a wide angle lens. The zoom was at 81mm and ISO 1600, F13 and shutter speed 1/40 s. The focus was adjusted manually to provide a better view of the cloud. The image was edited by adjusting the tone curve to an S-shape, as shown in class, so that the contrast is better shown between the sky and the cloud. It should be noted that shooting with such a high ISO setting can severely reduce the quality of the image by introducing a grainy effect. Since these types of low clouds are very unstable and vanish quickly, the photographer did not have time to adjust the camera settings to an

ideal value. Instead, many pictures were taken quickly with different settings, and the best result was submitted for this image assignment. The light post shown in the image is shown to bring some warm colors into the snowy-feel of the scenery.

### **Conclusions:**

This cloud image serves to capture a very rare moment when a cloud is seen under the flatirons. In ideal circumstances, the camera settings could have been improved to produce a less grainy image by lowering the ISO setting and increasing exposure time. However, the photographer was very aware of the graininess of the image and still chose to submit it due to its unique beauty.