

Cirrostratus Clouds



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Flow Visualization
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Context

This image is for an individual project entitled, 'Clouds 2,' for the course flow visualization at the University of Colorado-Boulder. The purpose of this assignment along with the previous clouds assignment is to begin learning about the nature of clouds and weather. The idea is to snap a picture of unique, beautiful, and interesting clouds. Once the picture is taken, it is important to correctly identify what type of cloud is in the picture. The original idea for this image was to snap a picture of the light wispy clouds right above campus on April 9, 2010. This image was captured near the engineering center at the University of Colorado-Boulder. The camera was facing east and pointed approximately 45 degrees above the horizontal.

Weather Phenomena

The picture was taken on April 9, 2010 at 12:07 pm mountain time. This corresponds to 19Z in Zulu time. Skew-T plots are only available twice daily; one at 00Z and one at 12Z each day. The closest Skew-T plot to the time this picture was taken is five hours later at 00Z on April 10. This time is fairly close and should provide an accurate assessment of the atmosphere at the time the picture was taken. Another limitation of the Skew-T plot is the location in which the data is taken. The nearest data gathered to where this image was taken is the Denver area (DNR in the Skew-T). The Skew-T for the Denver area at 00Z on April 10 is shown in figure 1 below.

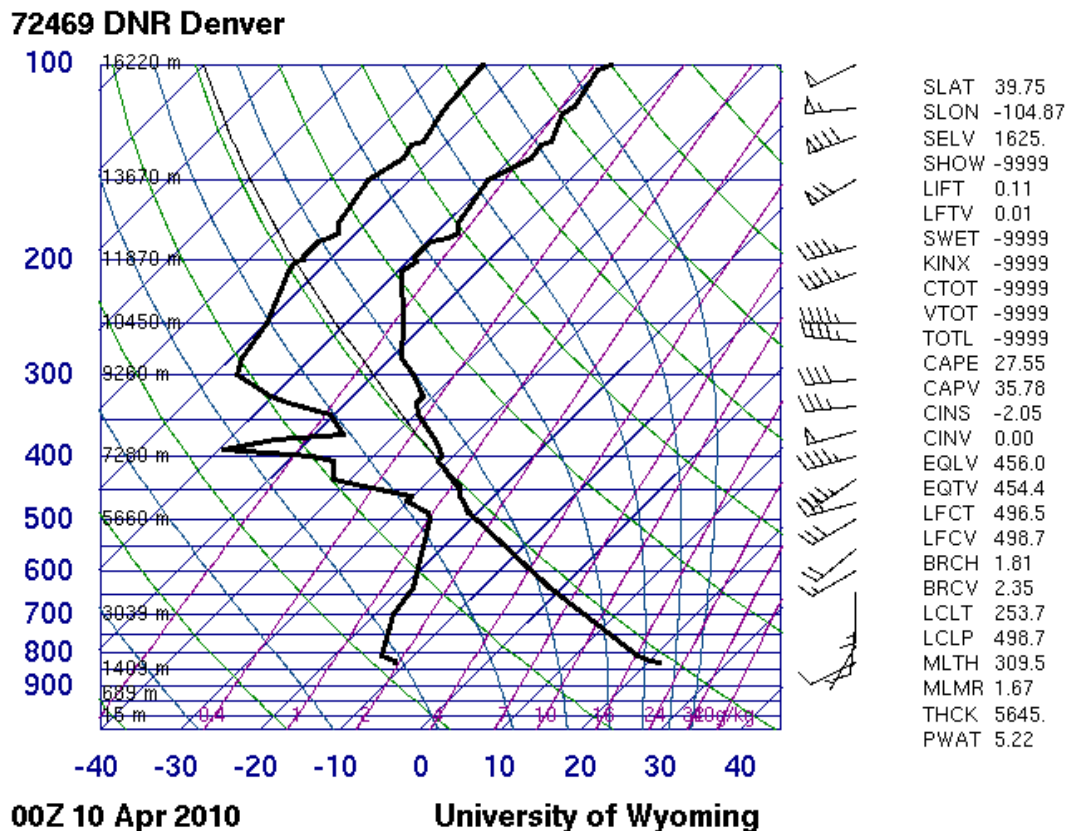


Figure 1-Skew T Chart (00Z 10 = 5 pm 4/9 Mountain Time)^[1]

Based on the data provided in this Skew-T plot, the atmosphere seems stable at the time the image was taken, but is beginning to turn unstable. Although the clouds in the picture seem light and wispy, potentially indicating a stable atmosphere, the Skew-T seems to suggest an unstable atmosphere at the time and shortly after. The slopes of the parcel line and the local air temperature line indicate an atmosphere that is turning unstable. If you lower a parcel of air it is denser than its neighbors and it will sink. If you raise a parcel of air it is less dense than its neighbors and will rise. These are indications of an unstable atmosphere.

The cloud in the image looks most like a cirrostratus.^[2] 'Cirro' comes from the Latin word cirrus meaning curl of hair. Stratus clouds are characterized by horizontal layering, which can be seen in the image. Cirrostratus clouds are high clouds with uniform layers and usually appear before a rain or snow storm.^[3] Since the Skew T predicted an unstable atmosphere it makes sense that these clouds appeared before the storm later in the evening. The elevation of the clouds in the image is approximately 12,000 feet above sea level. This is based on how far away the clouds were and the angle of the camera, which was positioned at Boulder's elevation of 5400 feet above sea level. The clouds in the image seemed to be moving southward and bringing a storm with them for the evening. There was a lot of wind the entire day.

Visualization Technique

The main technique used in this image is shooting unique clouds on a beautiful afternoon. These clouds struck me because they were such an interesting shape and they covered so much of the sky. I left the building in the bottom of the image to give some perspective of how much of the sky these clouds covered. These clouds are very choppy looking and have gaps in between where they appear. It looks almost like food prepared by a chef that has been neatly chopped. The sky was incredibly blue that day and the contrast between the blue and the white really sticks out in this photo. The buildings at the bottom provide a type of frame for the clouds in the image. This gives the image a central focus of the clouds while still allowing some perspective because of the buildings.

Photographic Technique

The original image was slightly darker than the image shown here. The intent of the image was to show the bright white clouds in the blue sky. The focus of this image was to capture the uniquely shaped clouds in the center while framing the buildings around it. The field of view is a couple hundred feet across.

The image was taken with a digital *Canon Powershot SD870 IS*. The original image size is 3264 pixels wide x 2448 pixels high while the cropped image size is 3174 pixels wide x 2118 pixels high. The camera exposure specifications for the photograph were; an aperture equal to 13, the shutter speed at 1/200 s, and ISO speed setting at 80. The focal length was 10.8 mm. The flash did not fire. The image was processed in Photoshop and saved as a .TIFF file. The only changes made to the image in Photoshop were adjusting the contrast by using the 'Levels' and 'Curves' features. The darker colors were made brighter.

Revelations

The image reveals a cirrostratus cloud sitting above the CU-Boulder campus on a sunny day. Several pictures of the cloud were taken, with this one being the most interesting. The Skew-T chart shows that these clouds are bringing in an unstable atmosphere in the evening. I like this image because it reminds me of summer afternoon showers. These are the types of clouds that show up during a bright sunny day, but bring in a late afternoon rain storm. The contrast between the brilliant blue sky and the perfectly white clouds is one of the many reasons I love Colorado and more specifically Boulder.

The one thing I dislike about the image is the trees in the bottom of the image. I think the buildings are effective by adding a frame to the image and bringing in a nice red color. However, the trees just seem to get in the way, at least in my opinion. To develop this idea further I would take more high quality images of the clouds over the engineering center as they take different shapes.

References

[1] Skew-T Plots. University of Wyoming. Department of Atmospheric Science. Online.
<http://weather.uwyo.edu/upperair/sounding.html>.

[2] Cloud Guide. Utah Education Network. Online. <http://www.uen.org/weather/clouds/cirros.shtml>.

[3] Cirrostratus Clouds. Windows of the Universe. Online.
<http://www.windows.ucar.edu/tour/link=/earth/Atmosphere/clouds/cirrostratus.html>.