

FLOW VISUALIZATION

# Clouds I

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Cirrostratus Fibratus

**Kyle Manhart**

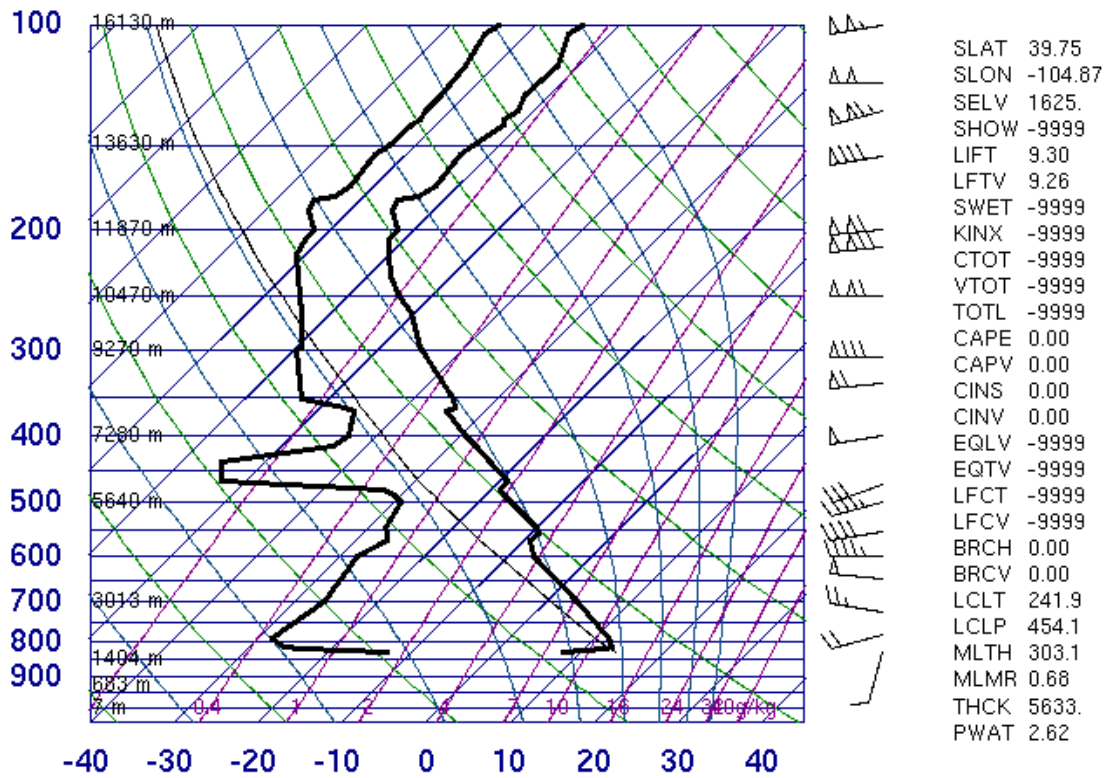
**2/16/2011**

The purpose of this assignment was to capture cloud phenomenon for the first clouds assignment. Many photos were taken for this assignment around the University of Colorado at Boulder campus, some better than others. Several photos of nimbus and cirrus clouds had been taken but many of these photos contained unwanted details such as buildings and trees. The concept was to capture a detailed and focused photograph of a cloud or group of clouds and to study the physics in the formation of these clouds. Therefore it was important to make sure the primary draw of the photograph was the formation and not items that draw away from the object. Therefore images were taken until these criteria were met.

The final photograph was taken on Wednesday, February 16, 2011 on the Integrated Teaching and Learning Laboratory on the east side of the University of Colorado-Boulder campus. The photograph was taken at 11:59 am Mountain Standard Time facing South-Southeast. The approximate elevation in Boulder is 5,340 ft. above sea level (1655 m) and the angle of the camera was approximately 30° to the horizontal.

The clouds present in the photo appear to be altocumulus or altostratus. A detailed study of the skew-t plot would later confirm the clouds to be Cirrostratus Fibratus. Up to this time the sky had appeared clear (observed at 9:00 am and 10:30 am). Following, clouds had appeared throughout the afternoon but the atmosphere had remained stable. In the following days winds had picked up but no large temperature or weather transitions occurred as did any prior to the 16<sup>th</sup>.

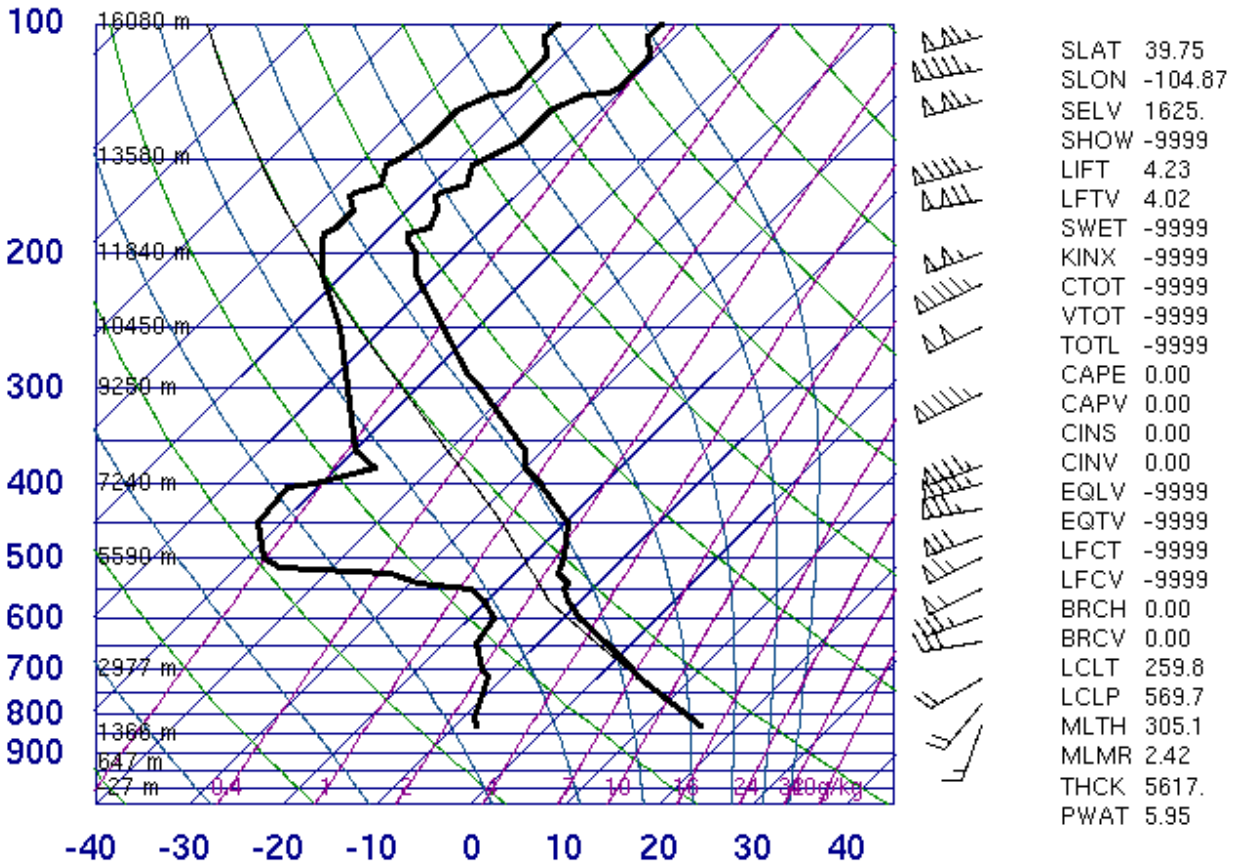
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Since the photograph was taken at noon Mountain Standard Time the skew-t plots for 6:00 am and 6:00 pm on February 16<sup>th</sup> were utilized. Studying the plots it can be seen that at 6:00 am the prime elevations for cloud formations was approximately 12-16,000 m and 12-15,000 m at 6:00 pm. Corresponding to these elevations the cloud formations are cirrostratus fibratus. Studying the stability, it is seen that the CAPE value along both plots is 0.00, concluding that the atmosphere at both times was stable and determined stable at the time of the photograph. This data along with inspecting the plot for the segments in which the temperature and dew point lines (Heavy black lines) are closest corroborates the formation of cirrostratus clouds.

Upon seeing this formation I really liked the way in which the clouds arced out in different directions from what appears to be a central point on the left side of the photograph. The field of view in this photo is approximately 100-110 meters. The clouds are approximately 12,000 meters away. The photograph was taken utilizing a Panasonic DMC-FZ35 12MP camera. An exposure of 1/800 sec with a focal length of 5mm was utilized in conjunction with an aperture of 3 and an ISO-80. No flash or tripod was used to in the taking of the photograph. In order to capture the full range of the clouds the field of view was widened and in the process captured the pillars on the Integrated Teaching and Learning Laboratory balcony. Additionally the event centered was captured in the photo. The image was

therefore cropped down to omit these. The final image size was 3324x1965 pixels (originally 4000x3000 pixels). The colors were also adjusted utilizing the curves to bring out more blue. Additional changes included utilizing Photoshop to sharpen the image and increase the contrast.

I like the photograph and the way the clouds appear to be originating from a single point. If I could take the photo again I would adjust the camera and myself so that at a minimum I could get rid of the pillars without editing and utilize the full field of view. I would also implement the camera hood to remove the sun from the photo, although I do like it. It would also have been nice to have gained a little elevation to promote the expanse of the photo. Another way to take the photo would have been to take multiple photos and create a panorama style photo. I believe I captured the physics. The sun shining through the clouds shows the thickness of the clouds and increasing the field of view would help show the size of the clouds.

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

[2] About Cloud Classifications. Cloud Appreciation Society. Online.  
<http://cloudappreciationsociety.org/collecting/about-cloud-classifications/>

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