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MCEN 4151: Flow Visualization

Professor Hertzberg

April 19, 2012

Clouds Assignment #2: April 19, 2012



Raw "Before" Image

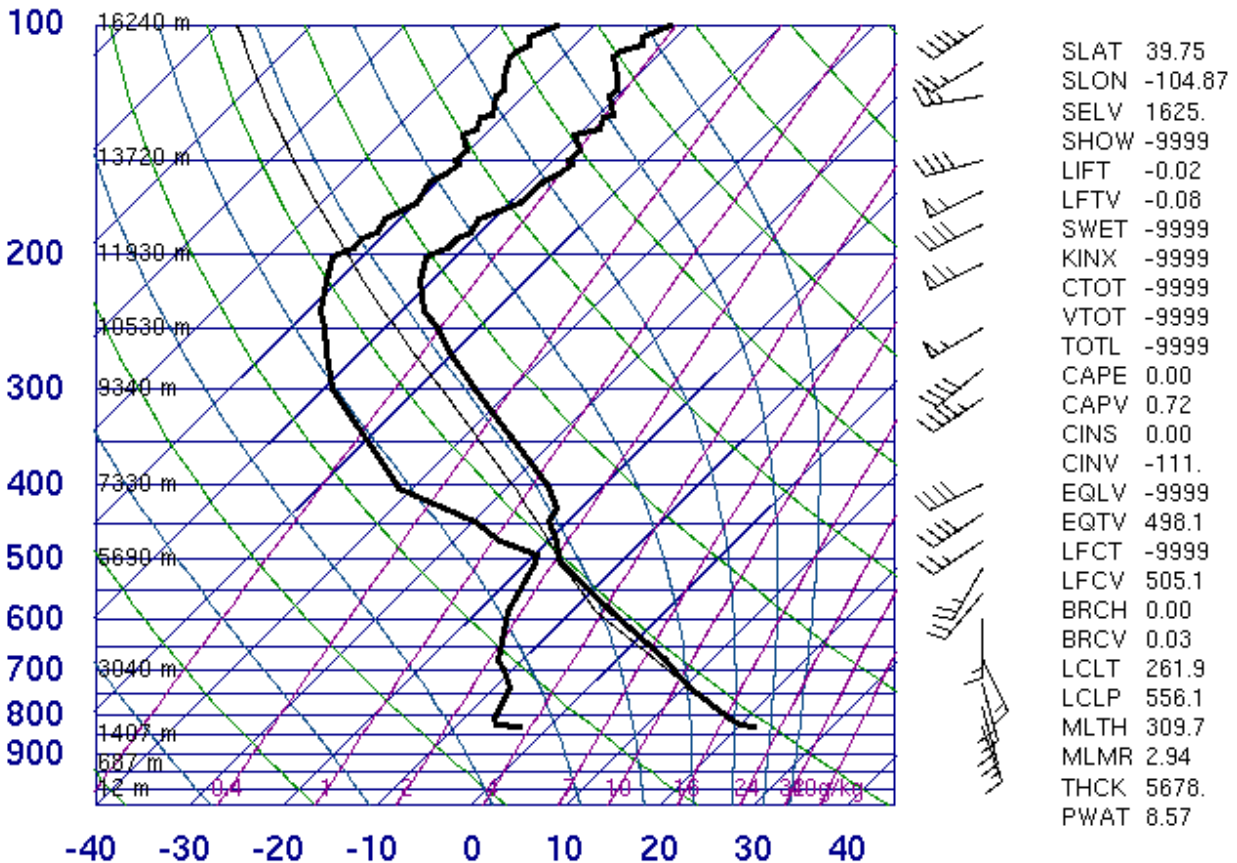


Post-Photoshop "Final" Image

This image was taken to fulfill the requirements of the Clouds #2 assignment in the Flow Visualization class offered at the University of Colorado in Boulder. I attempted to capture the beauty of a cloud formation lit from behind by the sun. After capturing the image I wanted to alter the colors and edit the photo so as to enhance the features of the atmospheric phenomenon and contrast the cloud from the background.

This cloud was photographed from the sidewalk to the west of Reed Hall on the University of Colorado campus in Boulder. The camera was directed north-west at approximately 85° from the horizon. The image was taken at 3:30PM (Mountain Standard Time) on the 5th of April in 2012. The following Skew-T plot^[3] of the atmosphere in Denver at 6:00PM MST was made available through the use of weather balloon sounding by the University of Wyoming.

72469 DNR Denver



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University of Wyoming

From the data presented on the right, we see a CAPE value of zero, which indicates a stable atmosphere. The plot also shows a high relative humidity at 5960 meters. The image appears to be a fine example of altocumulus stratiformis perlucidus, and also appears to have an optical effect known as corona^[1].

The 3rd of April was very cool, with 100% cloud cover for most of the day. Then a warm front moved in on the 4th of April was about 60°F during the day, and had 50% cloud cover for most of the day but no precipitation. There was 90% cloud cover and low 70°F at the time of the image^[2], which is in agreement with the other clouds observed in the sky. In the following days there was very little cloud cover and high temperatures of 73°F and 61°F, respectively, and no significant weather.

The camera used to capture this image was a Nikon D50 DSLR. A focal length of 22 mm, exposure time of 1/4000 second, F-stop of f/9 and an ISO of 400 were used to capture the image. A low ISO was chosen to prevent a “grainy” image, and then the shutter speed was made very fast to prevent the pixels from oversaturating from the direct sunlight. The focal length and F-stop allowed for an acceptable depth of field to capture as much of the clouds as possible. In the raw (.NEF) image the field of view is 2000 by 3008 pixels. Based on the 85 degree angle at which the shot was taken and the

difference between the cloud altitude and altitude of Boulder, we can use trigonometry to find that the cloud is approximately 4100 meters away from the camera.

Photoshop was used to create the final image. The image was left un-cropped to leave as much of the cloud formation as possible. This makes the field of view for the raw and final image about 38° and 26° in the horizontal and vertical dimensions of the image. The contrast was enhanced, as well as the brightness. The most obvious change was the increase in temperature, which greatly enhanced the oranges in the photo. Vibrancy and brightness were then increased and the tone curve was adjusted to amplify the contrast from the darker sky in the background and give the cloud a “fire” effect.

The cloud is very well illuminated in the image, and the fire-like effect was accentuated effectively. The range of orange to black and the very bright sun give the picture a good color spectrum. It might have been more interesting to include the other, more stable clouds that were in the other parts of the sky along with the mountain wave cloud. Overall the image achieved its purpose.

Citations:

^[1] <http://cloudappreciationsociety.org/collecting/ally-summey/>

^[2] <http://weatherspark.com/#!graphs;a=USA/CO/Boulder>

^[3] http://en.wikipedia.org/wiki/Wave_cloud

^[4] <http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2012&MONTH=04&FROM=0512&TO=0612&STNM=72469>