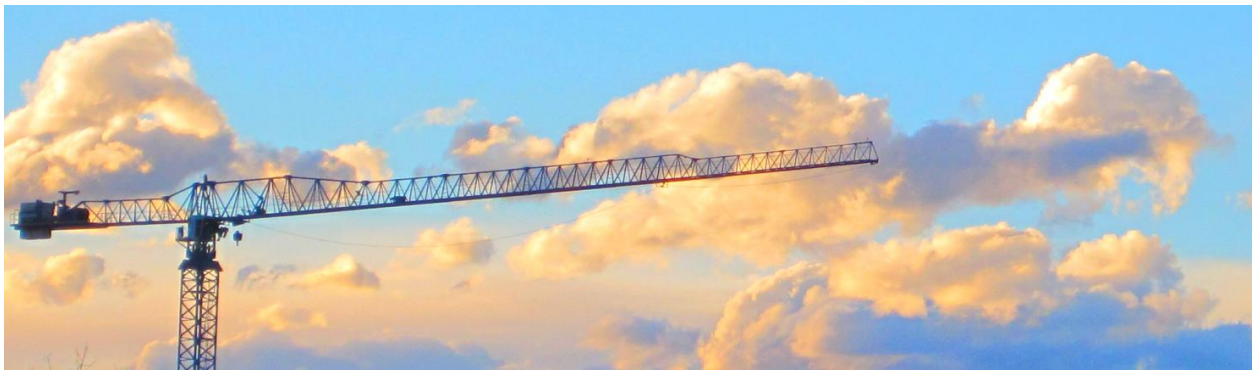
Cloud 2 Image Report

Scott Christian-Dold

MCEN 5151

April 11, 2011



The purpose of this image and its enhancements is to show the nature and beauty of clouds and develop the skills necessary for capturing them on film. Clouds are rapidly changing and every cloud image is unique. Therefore, it is very important to capture a worthwhile image of a cloud at the moment the cloud is present since the condition can never be perfectly duplicated. To ensure at least one quality image of the cloud described in this report was captured, a large number of exposures were taken. This image was taken in a series capturing the unique beauty of the small puffs of clouds made colorful by the sunset on the evening it was taken. The image displays the prominent features of the clouds and is complimented by the unnatural shape of the crane in the foreground.

This image was taken on April 5th, 2011 at 6:07PM in east Boulder. The crane in the foreground is being used to build the new building on the University of Colorado east campus. The altitude of the shooting location was 5,430 ft above sea level. The shot was taken from an open area in a park at an inclination of approximately 20 degrees. The camera was facing to the northwest.

The clouds pictured in this image are orographic altocumulus floccus opacus clouds. The skew-T weather data plot as show in figure 1 is collected from the Denver International Airport (DIA) via a weather balloon released at 6:00 PM mountain time. Based on the skew-T plot the clouds are forming around 5,670 meters (18,602 ft) where the two thick black lines come within close contact. This altitude is well within the range of altocumulus formation. The skew-T plot also indicates a stable atmosphere required for forming clouds of this type. They are deemed floccus because they take the form of shapeless tufts without a discrete flat bottom. The formation of this type of cloud generally indicates that the air at that altitude is relatively warmer than the surrounding layers.[1] This explains why the air moving over the mountains approaches the warm air over the city of Boulder and it immediately takes this cloud form. The higher temperatures at the base of the mountain in Boulder combined with the lower temperature towards the top cause massive convective currents that pull moisture up the mountain.[2] This attribute also defines these clouds as orographic, since they are created as a result of mountain interference. These clouds have a sub classification as opacus since they are not transparent.

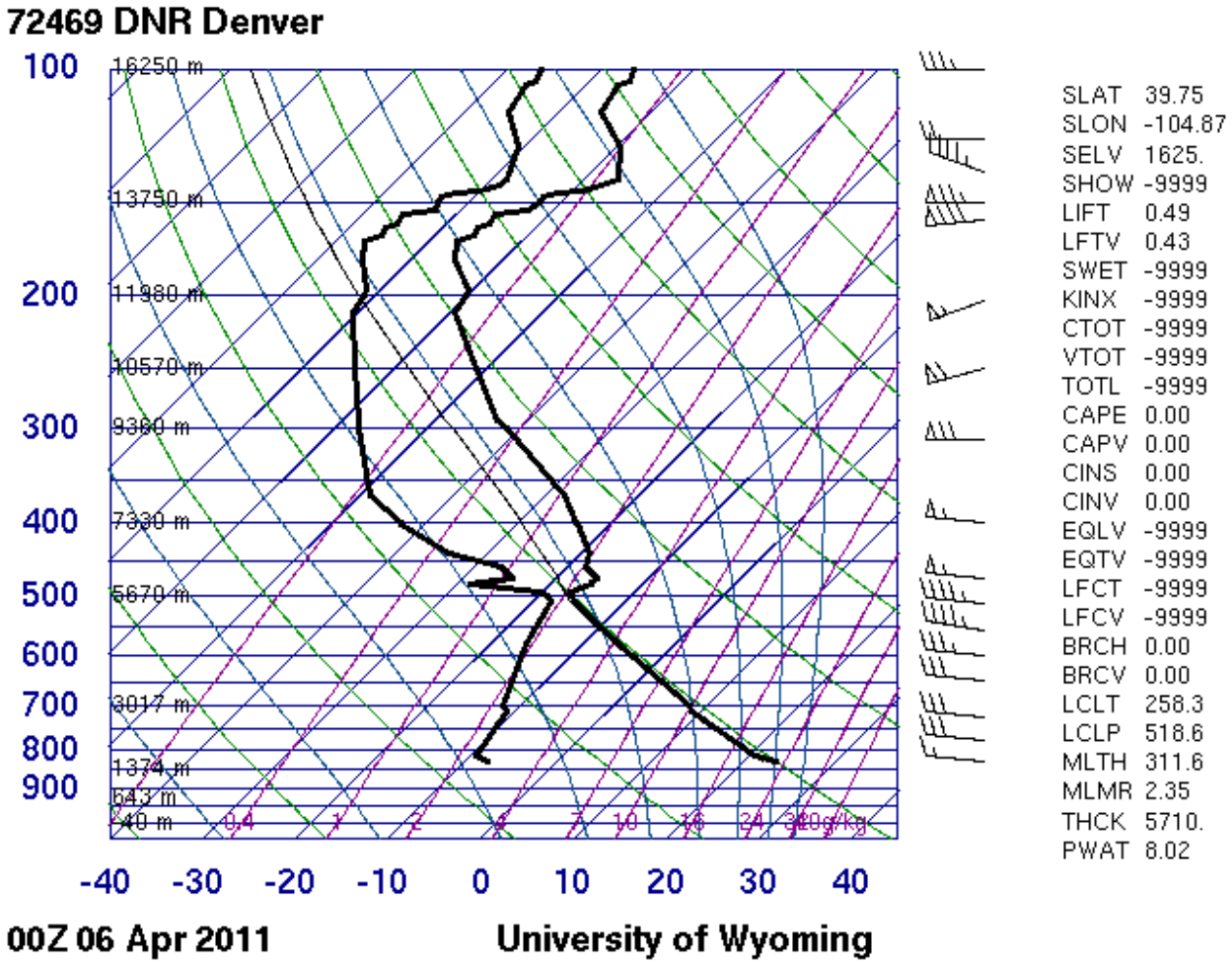


Figure 1: Skew-T plot for date of image

This photograph was taken with a Canon PowerShot SD1200 IS digital camera. A smaller, lighter camera was used since it needed to be carried at all times for immediate response to instant cloud formation. The size of the field of view is difficult to gauge in cloud applications, but the larger altocumulus cloud in the right side of the image is estimated to be on the order of one to two kilometers long. The clouds are about 13,000 feet away and the crane is approximately one mile away from the camera. To resolve each of these clouds the focus was set at infinity with a minimum aperture value of F2.8. Since a large field of view was required, the minimum focal length of 35 mm was set for a wide shot. ISO value was set at 80 since ample light was available. The shutter speed was set at 1/100th of a second since the clouds were nearly stationary. The original image pixel dimensions were 3648 by 2736 but was cropped down to 1475 by 430 in editing. The website picnik.com was used to enhance the image. The temperature slider under the color settings was moved 10% towards the hot side to give the images more of a warm sunset feel. The original image is shown in figure 2.

Figure 2: Original Image

The image that resulted from this process is one that captures both the beauty and science of that this cloud formation. The crane, though not related to the clouds, provides a strong diagonal and very rigid line structure to contrast the puffy gradual curves of the clouds. The viewer's eye is drawn up the arm of the crane and seems to be elongated by the nearly parallel puff of clouds behind it. The weight of the prominent clouds on the right is counterbalanced by the large cloud on the left. Some have commented that this image reminds them of the 50's labor union promotion murals that were created displaying industrial equipment and picturesque backgrounds. The physics of the clouds are well revealed and the image is aesthetically pleasing. If done again it would be nice to get to a position where both cranes in the original image had matching clouds in the background.

REFERENCES:

[1]Rangno, A. L. Sky Guide. Sixth edition. Greenwood Station. Seattle, 1995.

[2]R. Damiani, J. Zehnder, B. Geerts, J. Demko, S. Haimov, J. Petti, G.S. Poulos, A. Razdan, J. Hu, M. Leuthold, and J. *French. Cumulus Photogrammetric, In-situ and Doppler Observations: The CuPIDO 2006 Experiment.* BAMS, June 2007.