Flow Visualization: Clouds 2 Assignment Report

The image seen below is a submission for the spring semester of Flow Visualization assignment, “Clouds 2”. This assignment prompted students to search for and photographically capture artistic cloud phenomena. Clouds are everyday fluid flow visualizations and are thus relevant to the course.

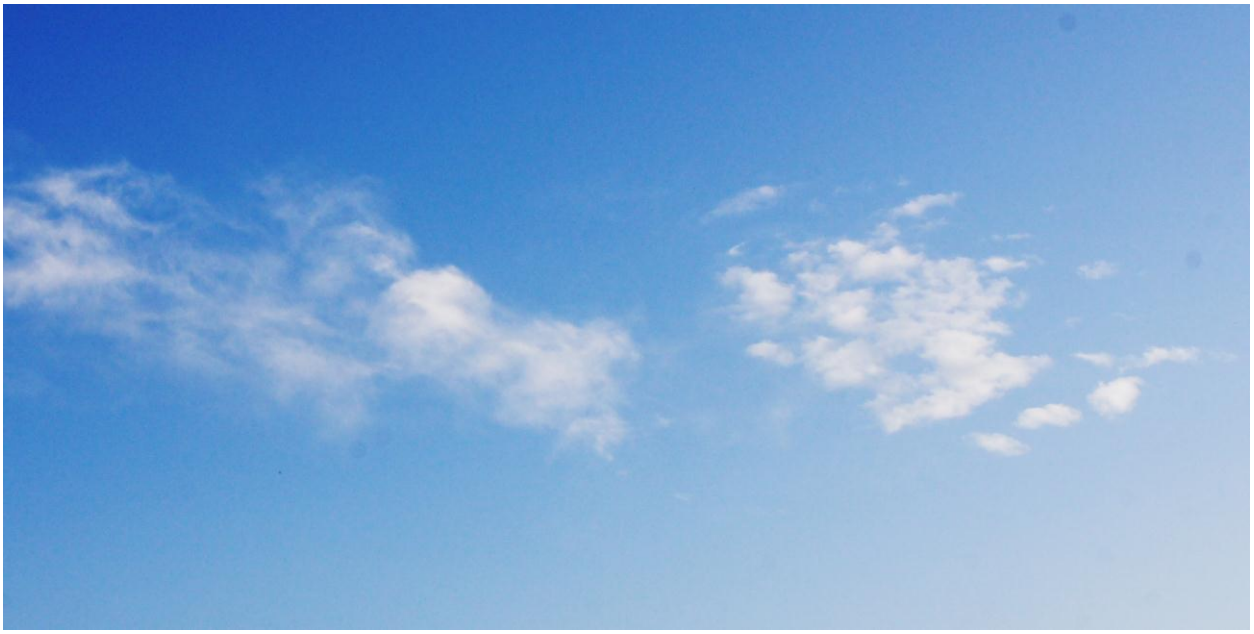

Figure 1 - Submitted Image

The cloud shows a nice evolution across the span of the image. The color of the sky and the shapes of the cloud change from one side of the image to the other.

This photograph in particular was taken outside the University of Colorado Boulder’s Engineering Center. This location provided clear vision to the clouds while also blocking out some of the glare from the sun and nearby windows. The photograph was taken at a 25 degree incline in a southwestern direction. The angle of the photo and altitude of the location used give the clouds an approximate altitude of 13,000 feet above the ground (approximately 18,000 feet above sea level), information usable to select the type of clouds and location on Skew-T diagrams. The date was Monday, April 9th at roughly 6 PM.

The photograph was taken during a day with no winds. In fact, very few clouds were visible in the sky during the day. Before using skew-T plots to verify the stability of the atmosphere, it was already assumed to be completely stable due to the weather. According to the

skew-T plots for the time of image capture for the Denver area, the atmosphere was indeed stable (CAPE = 0). The plot itself can be seen below.

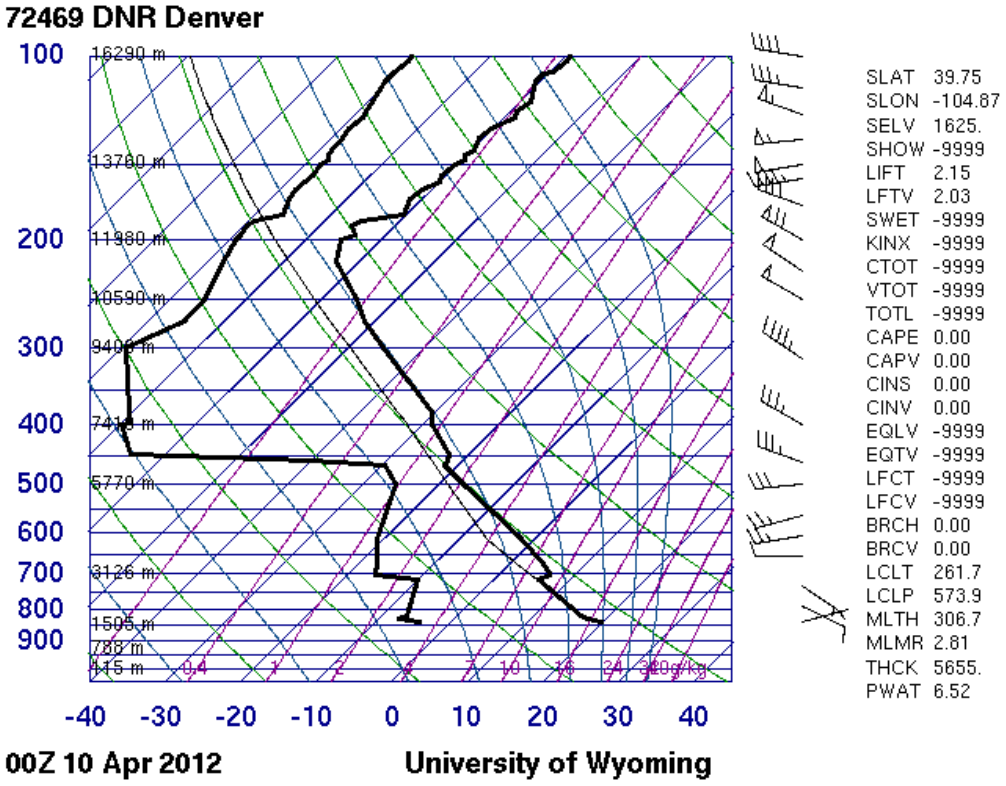

Figure 2 - Skew-T Plot of Image Capture

The cloud is estimated to be to be at an altitude of slightly under 6,000 meters, or about 18,000 feet. However, the capture location's altitude is approximately one mile, and the height of the clouds would be approximately 13,000 feet as previously stated. Based on the shape and altitude, the cloud is assumed to be altocumulus. Altocumulus clouds often exist in the 6500 – 20000 feet altitude range. The existence of this cloud can be seen at the approximated altitude in the skew-T plot. Initially, when classifying the cloud type, it was thought that the left side of the image contained altostratus clouds and as the image pans to the right, the clouds were altocumulus. However, based on the proximinity and shape, it is likely that the entirety of the image is altocumulus.

The original, unedited image can be seen below. It was taken using a Sony SLT-A55V DSLR camera.

Figure 3 - Original, Unedited Image

The focal length was 28 mm, F-number was 14, and exposure speed was 1/200th of a second. The ISO of 400 was used in combination with the other settings to best capture the cloud in sunset lighting conditions. Adobe Photoshop was used to crop the image from its original resolution of 4812 by 3264 in addition to slightly increasing the contrast. The curves were also slightly modified to increase the contrast between the left and right sides of the image.

In conclusion, the clouds captured show interesting shape variation from left to right. The cloud seemingly stretches to the right and then begins to explode into small puffs of white. Although the sunset lighting may have decreased the sharpness and crispness of the image, the intended visualization was captured and a wholistic artistic value is maintained. Also, at the time, the camera's capture file mode was bugged and could not be changed from "fine" (jpeg) to the intended raw format. This may have also caused some quality loss. For future cloud image capture, the file format would be changed. Lighting has a larger dependency on the overall

weather conditions and time of day and can be accomodated for by altering other camera settings.

Works Cited

"Atmospheric Soundings." *Department of Atmospheric Science*. University of Wyoming College of Engineering. Web. 03 Mar. 2012. <http://weather.uwyo.edu/upperair/sounding.html>.

“Altocumulus cloud.” *Wikipedia.org*. Web. 07 May. 2012. <http://en.wikipedia.org/wiki/Altocumulus_cloud> .

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