Cloud Image #1 Report

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This report documents the picture captured for the first cloud assignment in the spring 2012 Flow Visualization course. The intent of this image was to capture a visually appealing cloud that demonstrated a specific type of cloud formation in a clear and beautiful way. Many different pictures were taken, of many different types of clouds and formations. The intent was to capture a very clear image, not to capture any type of cloud in particular. The final image managed to show a clear cloud image, as well as some wonderful lighting effects due to the sunrise of a nice clear morning. The effect was changed with a bit of color inversion that will be discussed later in the report. The image that this report focuses on can be seen below:
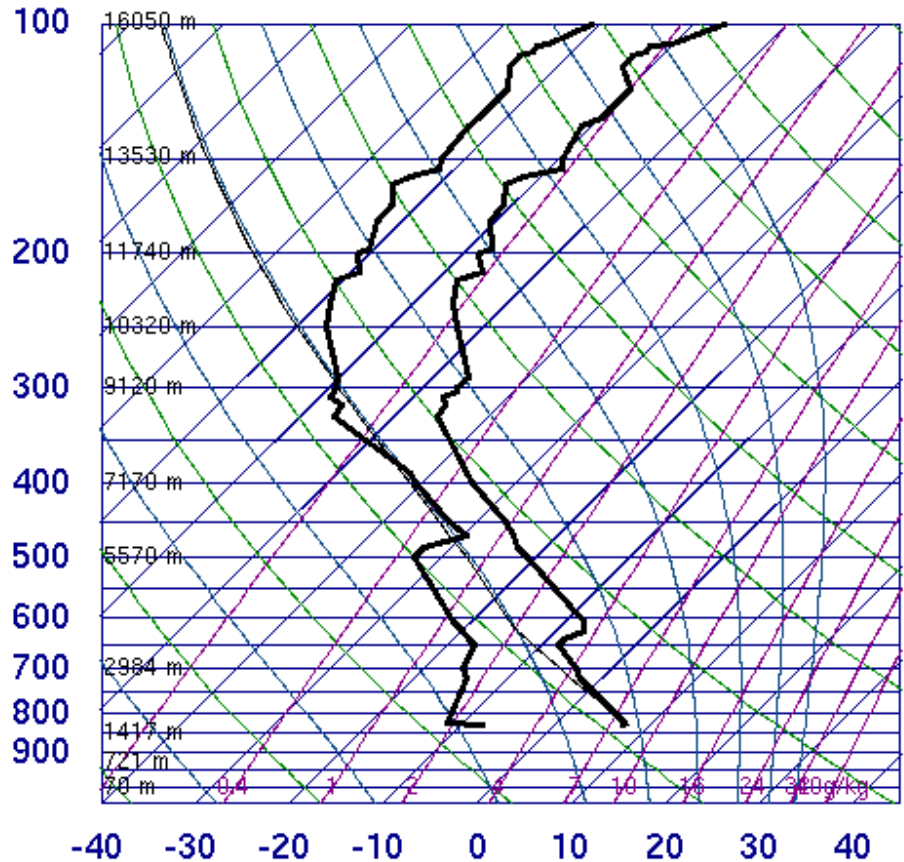

The image was taken during the sunrise in Boulder, CO, at approximately 6:30 AM on the 22nd of February. The image was taken from a balcony on the fourth floor of an apartment building, and the cloud was over the East horizon, causing a slight upward angle on the shot. The camera was angled approximately 20-30 degrees up from horizontal for the shot, influencing the lighting effect seen from the rising sun onto the bottom surface of the cloud.

As can be seen from the photo above, the image focuses on one main cloud. The original image contained multiple clouds, but was framed to focus on this one excellent example. The specific type of cloud being observed is a stratocumulus, a cloud formed at a mid-level altitude often during stable weather conditions. There were very high winds during the day of this photograph, but not within a few hours of the image. The image was taken early in the morning, which was the most stable atmospheric conditions seen that day. The lighting effects are inverted, so the darkness seen on the bottom portion of the picture actually represents the sunrise and light rays hitting the cloud. The light portion on the upper portion of the screen was actually shadow cast by the cloud itself due to the extreme angle of the sun in

the early morning. The Skew-T Diagram from 6:00 AM on the morning of this image is shown below:

72469 DNR Denver

SLAT	39.75
SLON	-104.87
SELV	1625.
SHOW	-9999
LIFT	6.44
LFTV	6.39
SWET	-9999
KINX	-9999
CTOT	-9999
VTOT	-9999
TOTL	-9999
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	257.7
LCLP	612.7
MLTH	296.4
MLMR	1.89
THCK	5500.
PWAT	5.30

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From visual inspection this looks like a very stable atmosphere, as one would expect to see in an early morning shot. The CAPE value supports this initial assessment, with a value of 0 showing good stability in the early morning air. It is not immediately apparent as to the height of this cloud, but by looking for the closest point where the two lines come together and considering the type of cloud being observed, it would place the cloud around 5600-6000 m in the air. This is a bit high for a stratocumulus cloud; however from the density and overall shape, it is not likely that this is an altocumulus cloud (a type that would be seen at higher elevations). This diagram helps to understand how such a stable and clear cloud was observed as the sun was rising, with very stable conditions, low winds, and overall a wonderful morning for these types of clouds to be formed over Boulder.

This picture was taken with a Canon PowerShot SX 130 IS, a nice point and shoot camera with good settings for taking quality pictures. The Aperture Value was set at f/4.0, a shutter

speed of 1/400 sec and ISO of 80. The focal length was 5.0 mm. The Pixel Dimension in the X direction lands at 4000, while Pixel in the Y direction is 1176. Due to the stability of the cloud, a slower shutter speed and lower ISO were able to be used, allowing for a clearer image. The cloud itself is estimated to be approximately 6000-8000 m from the lens at the time the image was taken. The most obvious photoshop effect in play is the color inversion, which was one of the only processing techniques used for this image. Contrast was increased a bit to show the difference in lighting, and the exposure was adjusted minimally for visual appeal of the color above the cloud. Other than these effects and cropping, the image remains the same as the original. The original image can be seen below:

I think that this image is a great combination of beautiful lighting and a wonderful cloud example. I like the density of cloud, the unique shape, and the way it was captured in the early morning sun. I think the physics are shown well in this image, with a strong example of a very specific cloud type in a stable environment. I was very pleased with this image, and if I had it to do again I would not change much. Feedback was provided that the image may be a bit overexposed, and while I don't feel that it was, I would go back and look at the minimal

photoshop work I did. Other than that, the only thing I could think to improve this image would be a higher quality camera, but I personally find it to be a very beautiful photo.

References:

http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=2012&MONTH=02&FROM=2200&TO=2200&STNM=72469