Brock Ewing

Flow Visualization

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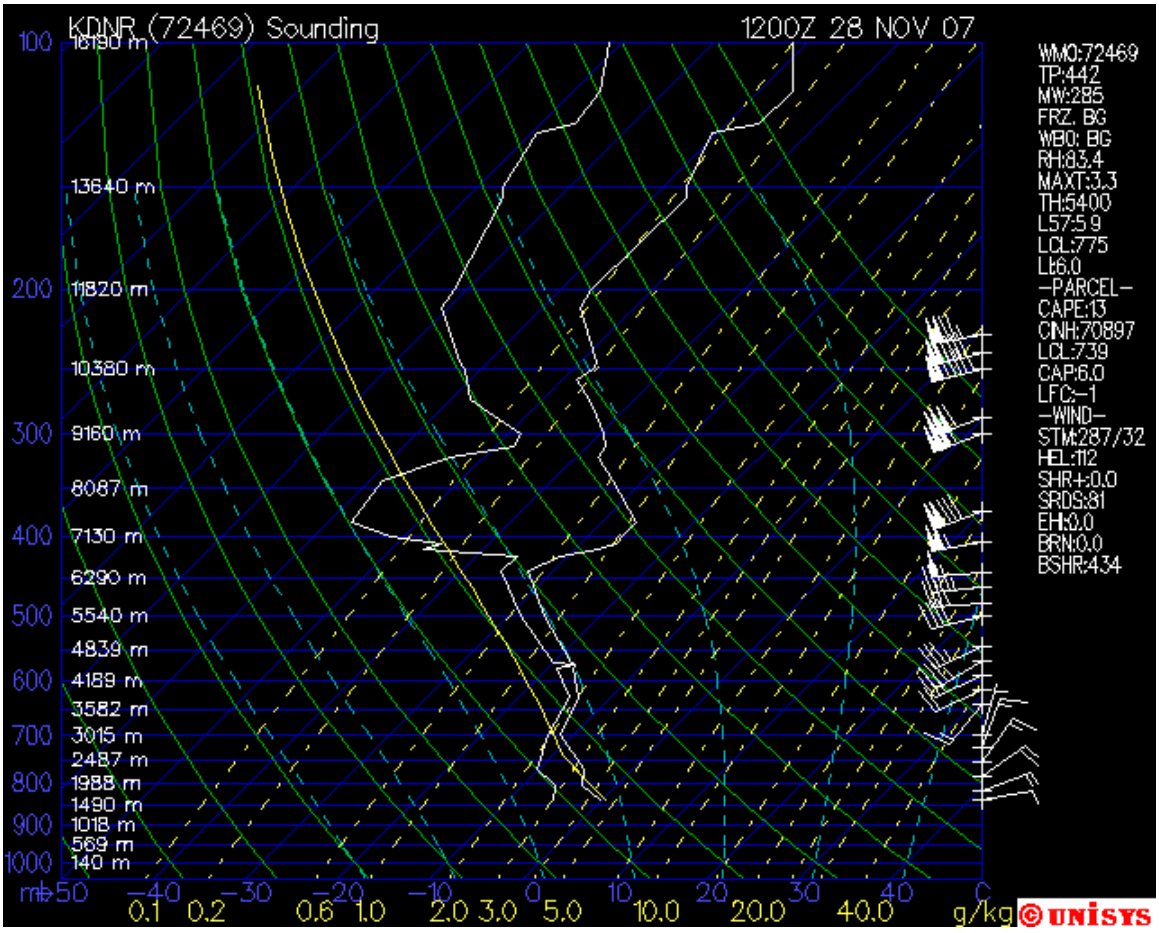
Clouds 2

The purpose of this assignment was to show the complexity and beauty of fluid flow through the observation of clouds. One of the coolest parts of this project is that the same physical properties and phenomena that applied in our small-scale experiments from previous projects still apply at a much larger scale. For my image, I wanted a photo that was both visually pleasing and demonstrated a common cloud formation. I also wanted to incorporate CU's campus for two reasons: One, because I think it is a beautiful campus and two, because as I found out after the last clouds assignment, shooting a picture up at the sky with no earthly reference can produce a very disorienting image. After taking many photographs from on the campus, I finally decided to take to the hills west of Boulder and shoot some clouds that were above the campus from a ways away. I like the serenity of the final image.

The set-up for this picture is very simple and I feel does not need a diagram to explain. It was taken November 28th. I am on a mountain shooting south-east out over boulder. The clouds are almost directly above the city below. The clouds are lit by sunlight from almost directly above and slightly to the right of the frame. All three cloud groups are at about the same altitude. The clouds at the top of the frame are closer to me and the clouds at the bottom of the frame are further away from me. The clouds shown

are stratocumulus and based on the skew-T plot from that day are about 7,000 feet above me. Stratocumulus clouds sometime form when warm air is forced to rise over hills, which is what I think is happening to the two clouds nearer to me. That is why they appear broken up is because they came over the hill I am standing on. The cloud in the distance is not nearly as broken up and is much larger. It could be classified as a cumulus cloud. There was no precipitation that day, but stratocumulus and cumulus clouds do not always indicate precipitation.

Skew-T plot:



As said before, the clouds were lit by sunlight as the tiny water droplets were too far away to light using flash or other lighting source. The sunlight provided cool shading effect.

It is hard to estimate the size of the field of view, but based on the altitude of the clouds (7,000 ft) and approximate angle of view, I would estimate it to be about 12 miles by 2.5 miles. The photo was taken with a 8 Mega Pixel Canon PowerShot A630 digital camera. It was shot using a focal length of 29 mm. The image is 2448 x 3264 pixels. The photo was taken with an aperture of 4.0, shutter speed of 1/1250 sec, and f-stop of f/5. I did very little adjustments to this image as I wanted to keep it as true to the natural world as possible. I brightened it a little and upped the contrast some. I also slightly increased the saturation of some of the colors.

I am very pleased with the resulting image. The large fluffly clouds look very serene hovering over the city I live in. The image does a good job of showing the immensity of the clouds compared to the tiny buildings below. The broken shape of the clouds also show how the mountains to our west can break up clouds that are moving low over the top of them. My original purpose of incorporating the CU campus was not quite realized in this photograph, although you can distinctly see the towers at Williams Village. However, I think the image turned out great as it shows a good deal of the city of Boulder.