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MCEN 5151
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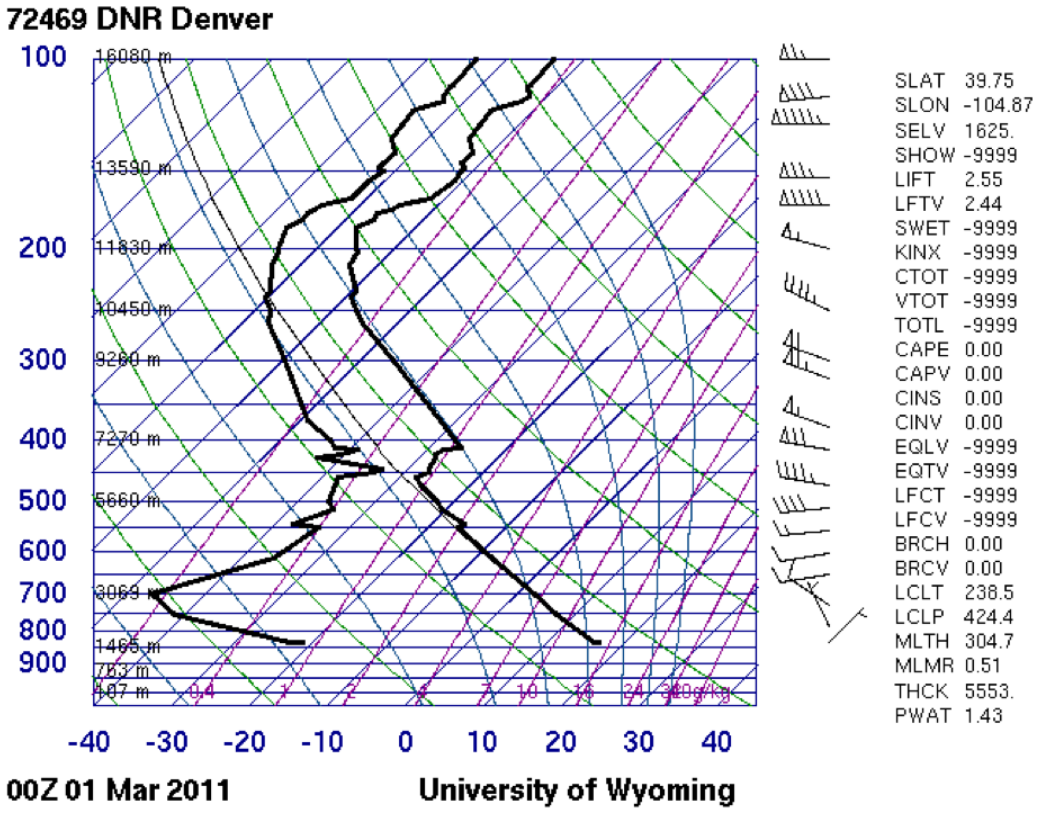
Clouds #2

For the second cloud assignment, I took many images of clouds on different days throughout February and March 2011. I had several quality cloud images to choose from, but I ultimately decided to go with a sunset cloud because the colors made the final image more visually appealing and dramatic.

The image was taken on February 28th, 2011 at 6:06pm from downtown Denver at 17th and Platte Street. I was facing northwest with a camera elevation of approximately 20° above the horizon. The entire lower foreground was edited out, making the image look like it was taken at a higher elevation above the horizon.

The cloud in the image is a mountain wave cloud, or altocumulus lenticularis. Mountain waves are created by underdamped air oscillating downwind of the mountains, and the resulting clouds are trapped at the peaks of the oscillations. The wind was from the west at 7mph, resulting in north-south orientation of the wave perpendicular to the wind vector. The skew-t plot below shows the atmospheric conditions at almost the exact time the image was taken. The temperature profile shows that the atmosphere was stable at the time the image was taken.



The stable atmosphere was created by a high-pressure system that also lead to a warm temperature of 53°F. The high-pressure system remained in the region for the next three days. The altitude of the cloud can be estimated by determining the lifting condensation level from the skew-t plot. From the intersection of the dry adiabat and the constant mixing ratio lines, the LCL was approximately 6300m, or about 15,000ft above ground level. I believe this corresponds reasonably well with the visual altitude of the cloud.

The list below summarizes the image parameters. The distance to the clouds was ~5 miles and the width of the field of view was at least 3 miles.

Camera:	Canon PowerShot SD870 IS
Focal Length:	17.3mm
ISO:	ISO 500
Shutter Speed:	1/200 s
Aperture:	*f*/5.8
Original Pixel Size:	3264 x 2448
Final Pixel Size:	3264 x 2242

The image was modified using Photoshop. The original image had a building and a light pole in the foreground. These were eliminated using the clone tool. Unfortunately, the building was rather large, so the blur created by the clone tool is obvious if you're looking for it. But I think the elimination of the foreground was important to create a cleaner image that put more emphasis on the cloud. The image was then slightly cropped to eliminate the remaining foreground structures. The image contrast was increased to remove the "hazy" look, and the hue/saturation were slightly boosted to make the colors brighter. With the modification of the colors, I didn't want to produce a fake image that didn't represent reality, so I tried to make only small changes.

Overall, I felt like I produced a decent image. With the evening light, the camera had to increase the ISO for enough light. The increase in ISO lead to a somewhat grainy quality at the top of the image, but I felt like the image was good enough to make up for the slight loss in clarity. I had several images to choose from on different days, but I've always liked sunset colors more than almost any other type of cloud photo.