

Clouds 2



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Flow Visualization
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Boulder gets some very good altocumulus lenticularis clouds, which hadn't really caught my attention as a category of cloud before taking the Flow Visualization class. My first submission was of an altocumulus lenticularis; however, it failed to really capture the formation from an interesting enough perspective and thus provided for a somewhat ordinary image. I like very much the altocumulus lenticularis clouds of Boulder and ever since the first image I have been most vigilant for this sort of cloud formation again. Finally on April 1st of this year there was one of the best days of the clouds since the beginning of the semester.

The image I chose out of the many I took showcases one of the more interesting altocumulus lenticularis I've seen (in the bottom left portion of the image); this very small "satellite" cloud persisted throughout the day without any near neighbors along the front of the mountains. The major cloud formation in the right of the image is also an altocumulus lenticularis, although very much resembles an arcus cloud [1] (a very impressive cloud formation that resembles a wall, usually located at the front of an approaching storm). This right-most altocumulus lenticularis seemed to spread across almost the entire front-range, and was not possible to efficiently capture. This angle manages to give a perspective of how large the major cloud formation was as well as image the small persistent satellite cloud to its left.

The image was taken in south Boulder (elev. ~5400ft) at the intersection of South Foothills Hwy and Eldorado Springs Dr (Hwy 170). The photo was taken at 6:37p on Sunday 3/1/09, facing north, with the angle at ~35° above the horizontal.

Other than the altocumulus lenticularis clouds that appear in the image, there is also the faint trace of altocumulus stratisformis along the front (left) edge of major formation, as well as in the top left portion of the image. Below is the skew-T plot from Denver for that day:

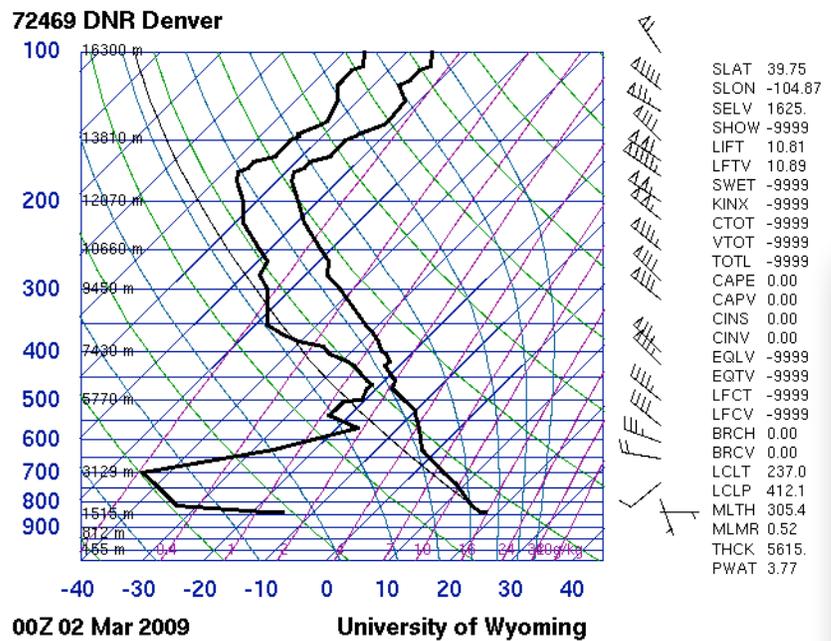


Fig. 1 [2]
Skew-T Plot for Denver 6p 3/1/09

This skew-T unfortunately must be taken with a grain of salt, though, since not only does altocumulus lenticularis usually occur directly in the wake of a mountain range, but also there were clearly no such formations moving east in the sky that day. Discussions of the relation between skew-T data and altocumulus lenticularis, as well as a description of the reason for their formation is described in the previous Clouds project submission [3].

The field of view was approximately 20 degrees. At this angle, the farthest point of the largest formation is most likely ~7 miles away, making the camera about 11000m away from the center of the target. The lens focal length was 18mm, Aperture was f/13.0, the exposure time was 1/400 s, exposure was set to “Normal program”, ISO was 400, and the lighting was ambient. The camera is a Canon Digital Rebel XT. The beginning and final image size are the same at 3,456 x 2,304 pixels. The only modification to the image was an iPhoto “retouch” to eliminate a black spot in the right portion of the image.

I’m pleased that I was able to take photos that day. Unfortunately, I did miss out on some pretty interesting images earlier when I didn’t have my camera on me (those clouds never reformed). This image did turn out quite well, though. The largest lenticularis coming down from the diagonal is an excellent attention grabber. The satellite lenticularis provides for a strange but pleasantly asymmetrical figure that causes the viewer’s eyes to scan through the entire image, and the faint stratisformis provide a pleasant background detail that would otherwise be replaced by empty blue sky.

Works Cited

- [1] Wikipedia. (2009, March 17). *Wikipedia, the free encyclopedia*. Retrieved April 14, 2009, from Arcus cloud: http://en.wikipedia.org/wiki/Shelf_cloud
- [2] University of Wyoming. (n.d.). *Department of Atmospheric Science*. Retrieved April 14, 2009, from Atmospheric Soundings: <http://weather.uwyo.edu/upperair/sounding.html>
- [3] Duggan , J. R. *Clouds 1*. University of Colorado - Boulder, Mechanical Engineering.