Clouds 1

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Flow Visualization

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My motivation for the first Clouds project was to just keep my eyes open and peeled towards the sky whenever I could, in hopes of catching beautiful or interesting cloud formations. Since the beginning of the class, this was the most interesting, least busy, and most unique picture that I took. The clouds are smooth and elongated, as if painted with long brushstrokes. It seems as though there are two main bodies of altocumulus lenticularis, one behind the other, as well as other altocumuli lenticulari going off into the distance behind them (below the main formations). Together, the combination gives quite a striking and complex portrait of this sort of cloud formation.

This image was taken from the intersection of Folsom and Colorado streets, near the CU Engineering Center on campus. Upon leaving the engineering center, I noticed this cloud formation on my way to the bus stop. I positioned the camera so that it was between the metal fence posts that surround the field in the foreground of the image, and knelt down so as to avoid the many tree branches that were also in the way.

The picture was taken on Jan. 21st at 5:06 pm. The camera was facing north, and the angle was about 25º above horizontal.

The clouds in the image are altocumulus lenticularis. There are a few clouds in the upper right portion of the image that appear to be more highly saturated altocumulus lenticularis as well. Other than the surrounding lenticular clouds in the background, the sky was very clear westward towards the mountains, and more cloudy going east. The main lenticular clouds, however, lose their definition and slowly fade out going east away from the mountains (as expected by nature of lenticular clouds). It was a somewhat windy day, with winds hovering between a constant 5 and 15 mph during the half-hour period I was outside taking the photos. Below is the skew-T plot for that day:

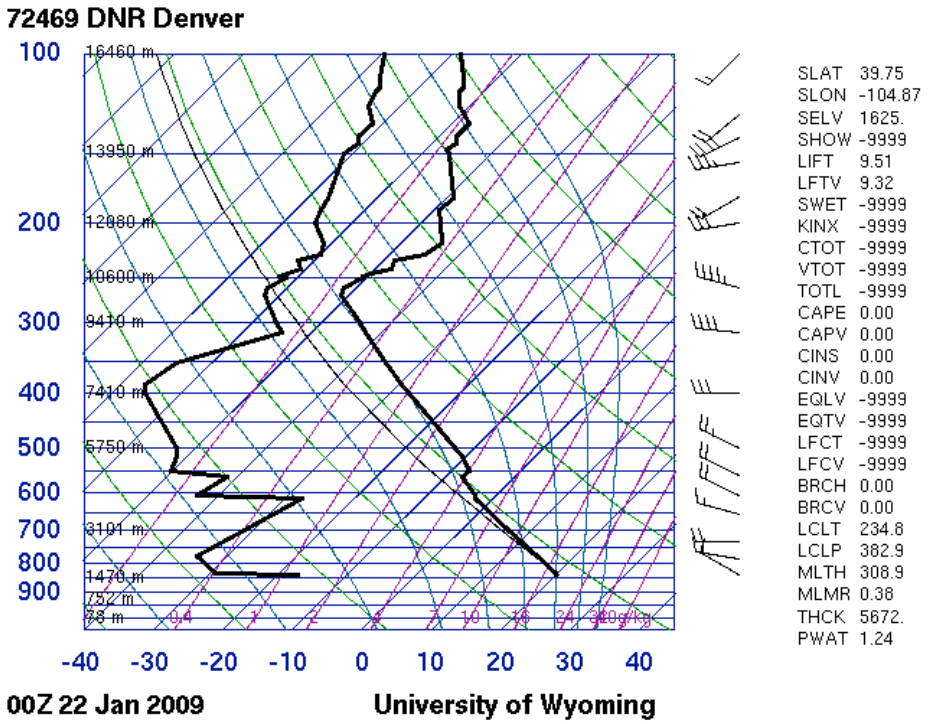

Fig. 1
Skew-T Plot for Denver 6p 1/21

From the Skew-T plot, it is most likely that the elevation of the imaged clouds was between ~9400m to ~11000m since this is the region in which the Dew Point and Air Temp have their closest meeting. The CAPE reading is at 0.00, indicating a stable atmosphere; though simply the presence of the altocumulus lenticularis shows the presence of a stable atmosphere—these clouds spread across the sky and lie flat instead of in rising plumes (unstable). The physics behind lenticular clouds are as follows. They usually form on the downwind side of a mountain range. When air flows over the mountains and drops in altitude, the air may pass through a dew point in the atmosphere, at which time the moisture in the traveling air condenses to produce the cloud formation. As the moist air continues to descend and travel away from the mountain range, it may pass out of the dew point region, causing the cloud to fade away. The main cloud body appears to have different levels due to the passing air, and localized regions of condensation. In the image, it also appears as though the cloud air goes from laminar to a bit turbulent by the end of the cloud; this may also be due to the cloud changing form as it goes from one altitude to the next.

The field of view was approximately 30 degrees. Judging from the estimated cloud altitude, and that the clouds seemed about 5 miles away (to the center of the formation), the camera is about 12800m away from the target. The lens focal length was 6.33mm, Aperture was f/5.6, the exposure time was 1/640 s, 0.00 exposure bias, ISO was 125, and the lighting was ambient. The camera is a digital, a Sony DSC-T30 *SteadyShot*. The starting image size was 3,072 x 2,048 pixels, and the final image size was 3,020 x 1,499 pixels. Photoshop was used to modify the final image. Modifications included cropping the photo to a more pleasing size [less distractions]. Photoshop "Curves" was used to brighten and deepen the blues of the sky, as well as add a bit of highlight to the whitest portions of the clouds (curvature points placed at: Output 17, Input 26; Output 248, Input 255, and the curve was a subtle s-curve with horizontal portions toward the dark and light extremities). Lastly, several branches as well as a billboard were removed from the shot using iPhoto's "retouch" option; there was nothing covering the lenticular (main) portion of the shot, only the above surrounding haze, and therefore no important information was destroyed.

The final image turned out quite well. This is one of the more complex depictions of altocumulus lenticularis I have seen as compared to previous submissions. The shortcomings of this submission are the grainy image quality (simply due to the more inferior camera used), and due to the rushed setting during which I took the picture (just before my bus arrived). I would have also liked the inclusion of more bare blue sky to the left of the cloud formation. Other than these small qualms, I think the photo has a good initial impact to the viewer, and depicts the phenomenon well. I am happy with the overall submission.