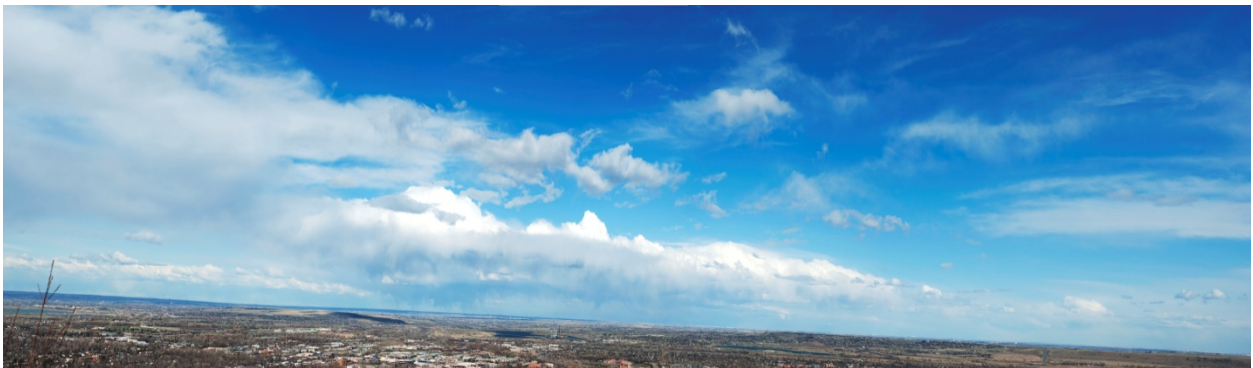


Clouds 2 Image



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Image Overview

This cloud image was taken for the second cloud assignment in the Flow Visualization class. The purpose of taking a photograph of clouds is to observe their interaction with the environment and explain this interaction. This image was taken to show the development of clouds ahead of a storm system that was trapped in the mountains.

Image Location

The image of the fractostratus and stratocumulus clouds was taken from the first lookout point on Flagstaff Rd in Boulder, CO. The coordinates of the location where the image was taken are 40° 00'21.77" N and 105° 17'33.24" W. The elevation of the lookout point is 5,971 ft. The images were taken facing directly due East on April 6th, 2010 at 3:24pm (MDT).

Cloud Information

There are two types of clouds viewed in the image. Both types are clouds that are classified as being in the low-level family of clouds. The darker clouds that are on their own in the middle-upper portion of the image are fractostratus clouds. They are classified as fractostratus clouds because of their darker appearance, less vertical development, and due to the fact that they are separated from other clouds in the image.¹ The clouds that appear to be producing precipitation in the middle of the image above the horizon are stratocumulus castellanus clouds. They are designated as stratocumulus castellanus clouds because of the puffy vertical development, the lower altitude at which they were observed, and the light precipitation that they are producing². There appear to be no other clouds in the image. According to the HPC weather archive from April 6th, there appears to not be any front that is moving through the region. In the morning forecast, there is a trough of low pressure that starts in the foothills and spreads out over northwest Colorado and the upper Midwest. In the afternoon forecast, the trough has moved out of the region³. Early in the morning, there was a hail storm that was brief in the Boulder area. Immediately following the short hail storm, there was a brief thunderstorm in the area that lasted for roughly 25 minutes. It was mostly cloudy for the remainder of the day following the thunderstorm. It was an extremely windy day with the average wind speed of 15 mph, a maximum sustained wind speed of 40 mph and gusts up to 50 mph. At the time the images were taken, the wind

¹ *Weather tutorial fractostratus page*. Retrieved 4/17/2010, 2010, from <http://quest.arc.nasa.gov/aero/virtual/demo/weather/tutorial/fractostratus.html>

² *Stratocumulus cloud - wikipedia, the free encyclopedia*. Retrieved 4/17/2010, 2010, from http://en.wikipedia.org/wiki/Stratocumulus_cloud

³ *HPC daily forecast map archive*. Retrieved 4/17/2010, 2010, from http://www.hpc.ncep.noaa.gov/noaa/noaa_archive.php?month=04&day=06&year=2010&cycle=12&format=gif

was blowing at 40.3 mph in the WNW direction⁴. When the images were taken, the atmosphere was unstable due to the soundings having CAPE values of 21.33 and 2.76 J/kg. This is shown in the Skew-T plots in Figure 1.

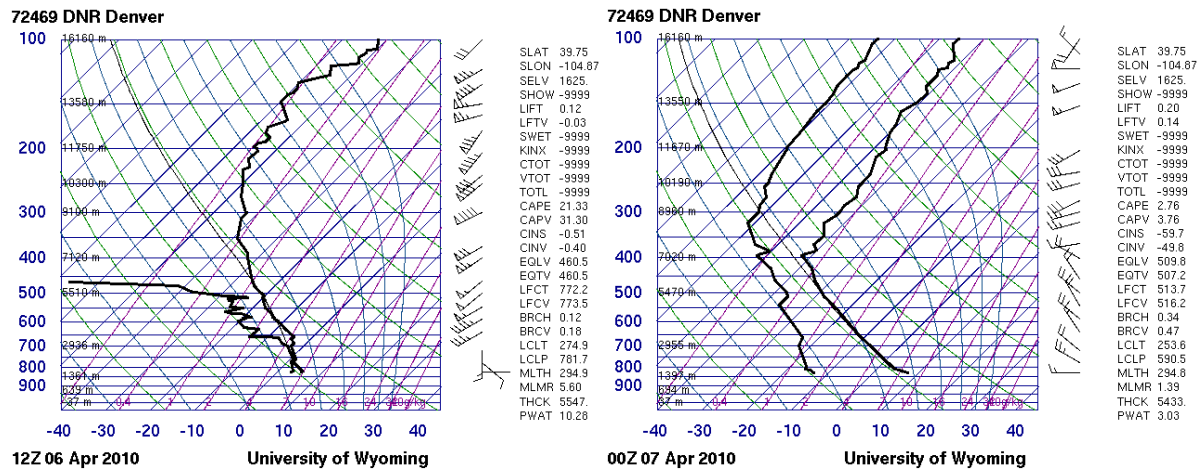


Figure 1: Skew-T Plots for April 6th (6am and 6pm)⁵

In the 6am reading, it is obvious that there is precipitation due in the 700-850 mb region due to the dew point curve intersecting the temperature curve. You would also expect to see clouds in the 1500-5000m range. In the evening reading, you would expect to see clouds around 5000-7000m. In the images at 3:24, the clouds appear to be relatively low, and this does not correspond well to the 6pm reading. Also from the Skew-T plots, you can see that the winds aloft were very high. The stratocumulus clouds are formed by “warm” air rising and cooling, thus condensing.

Photo Information

The image is composed of 16 images that were stitched together using Photoshop CS4. The images were taken using a Nikon D90 DSLR with a Nikkor 50mm f/1.8 prime lens. The estimated field of view is 25 miles wide. The camera settings were the same for all 16 images. The ISO was 200, the exposure was 1/1000 sec, and the aperture was f/8.0. Each image was 4288x2848 pixels. The stitched photo ended up being 18821x3674 pixels. The image was edited in Photoshop CS4. The final image was automatically stitched together in Photoshop. The stitched image had to be cropped, and the levels were adjusted to make the blue and the grey colors stand out. Those were the only adjustments made to get to the final image.

⁴ History : Weather underground. Retrieved 4/17/2010, 2010, from http://www.wunderground.com/history/airport/KBJC/2010/4/6/DailyHistory.html?req_city=Boulder&req_state=CO&req_statename=Colorado

⁵ University of Wyoming. (2010, February 27). Atmospheric Soundings. Wyoming, United States of America.

Conclusion

The image reveals how clouds develop ahead of a storm that is stuck in the mountains. Boulder saw no precipitation at the time, but there was heavy snow to the West and light rain to the East. Overall, I am happy with how the final image turned out. I like how the images were stitched to create a fairly large panorama of what was happening over the Eastern plains. I would change the image though so that it wasn't so large, so that it revealed a little more detail in the center of the image. I also would change the image by rotating it so the horizon was perfectly level and crop out the bottom left portion of the image.