

Cloud First



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ALTS 4151 - Flow Visualization

Cloud First: Cumulonimbus

Oct 11, 2024

The image above was captured for the cloud first assignment. This assignment aims to capture aesthetic images of clouds and use visuals and scientific data to identify them. Going into the assignment, I wasn't chasing any specific cloud features. I focused on the skies and waited for a particular cloud to speak to me. Something that I did not expect to happen while looking for cool clouds was to see the northern light. This was the first time in my life I had seen them. They were terrific, and I wanted to focus my report on them. However, I decided to refocus back on the clouds.

On one of the final days of taking a picture of clouds, I got lucky and found what I feel is the most perfect, classic-looking cloud. I think many would agree that when people think of or attempt to draw a cloud, one such as this comes to mind. I took this image standing on the roof of my house located in North Boulder, Colorado. I snapped the photo just after midday at 3:11 on Oct 11, 2024. While standing out on the roof, I pointed my camera to the west and aimed it roughly 45 degrees above the horizon.

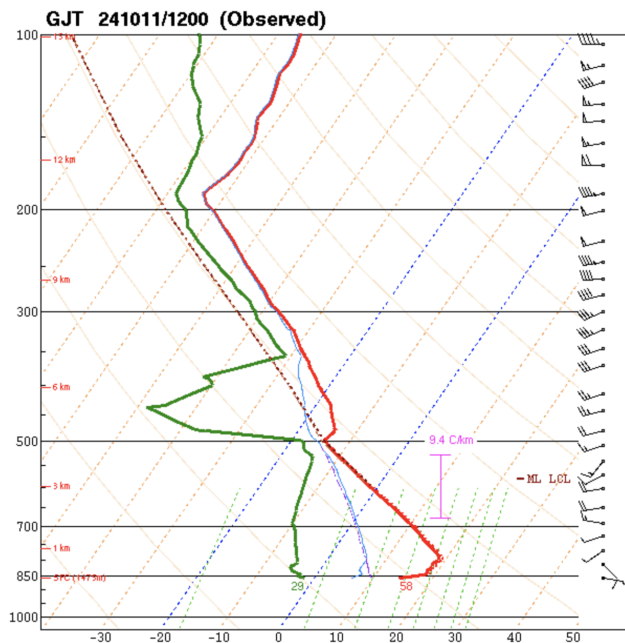


Figure 1: Skew-T Chart of Oct 11, 2024

The image shows a small cumulus cloud sandwiched between two larger ones above and below. Cumulus clouds are known for their size and fluffiness. The weather

observations of the day also support this hypothesis. On that day, the weather was very mild. The low was 50 degrees Fahrenheit, and the high was 66, with winds reaching a max of 3.8 mph. Additionally, the day was dry, with no rain and partly cloudy skies. This weather aligns with cumulus formations as the clouds appear in fair weather conditions. The weather on that day was consistent, with no large changes on the days before or following. The atmosphere was also very stable, as the lapse rate was very consistent. On top of that, there were no fronts on their way. The skew-t chart above is from the Oklahoma NWS/Storm Prediction Center. The graph indicates that there are likely cloud formations at three points. The first location is roughly 4.5 kilometers above sea level, the second is 5 kilometers above sea level, and the third is 11 kilometers above sea level. The graph indicates the probability of cloud formations at that location because of the proximity of the dewpoint and temperature at those heights. The graph shows this when the green line (dewpoint) gets close to the red line (temperature). Another clue is that there are cloud formations, and the temperature line quickly moves to the right. In the graph, this happens at locations one and three. This corresponds to what I witnessed in person, with two large cloud layers sandwiching a thin layer of smaller clouds between. Additionally, the expected cloud height aligns with the cloud height projected by the skew-t chart. When I viewed the clouds in person, they appeared to be hovering just over the tops of the mountains. This height is roughly 4 kilometers above sea level.

I used the camera on my iPhone 13 Pro to photograph this cloud. The primary reason that I used that camera is that I did not have access to my Sony mirrorless camera at the time. The iPhone camera was the only one that I had the opportunity to use at that moment. The iPhone 13 Pro camera has a 12-megapixel sensor capable of 15x digital zoom and has three lenses, including a telephoto. At a 3x zoom, the iPhone camera has a FoV of 22.8 degrees. This makes a FoV of 4.56 at a zoom of 15x. Both the original and edited images are 4043 pixels wide by 3024 pixels tall. To take the picture, the camera was set to a focal length of 140mm, iso of 32, aperture of f2.8, and

a shutter speed of 1/1325s. In post-processing, I turned down the highlights and brightness while increasing the saturation, black point, contrast, and shadows below the before and after can be seen.

Figure 2:



Before (left) and After (right)

The formation of a cumulus cloud indicates a stable atmosphere. I really love the gradient of blue that is formed in the sky behind the cloud. It gives off a very dramatic feeling to the image. I also really like the pillow-like look of the cloud itself. It looks so full and fluffy. I also really enjoyed that the top and bottom clouds were there to frame the subject. I feel that the other clouds give the subject scale and make the image more interesting. I would like to try taking a similar picture with a mirrorless camera to see how it affects the visuals.

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