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Team First
Flow Visualization 2023
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The image above was taken for the Clouds First assignment in the Fall 2023 section of Flow Visualization. The purpose of this assignment is to take pictures of clouds and explain the art and science behind the images that we obtain. This assignment was very interesting due to the large amount of interesting clouds that we get to see here in Boulder. The cloud above caught my eye due to the dark color on the right side contrasting with the blue skies on the left. In addition, the wispy underside of the cloud made it seem as though it was painted onto the sky.

This picture was taken on October 12, 2023, outside of the University of Colorado Boulder Engineering building, facing northeast at an angle of about 40°. This day was largely overcast with a high of 59° and a low of 41°(Weather Underground). Despite the darkness to the right side of the picture, it had not been raining in Boulder on that day yet. Below is the Skew-T plot for the weather in Colorado on this day.

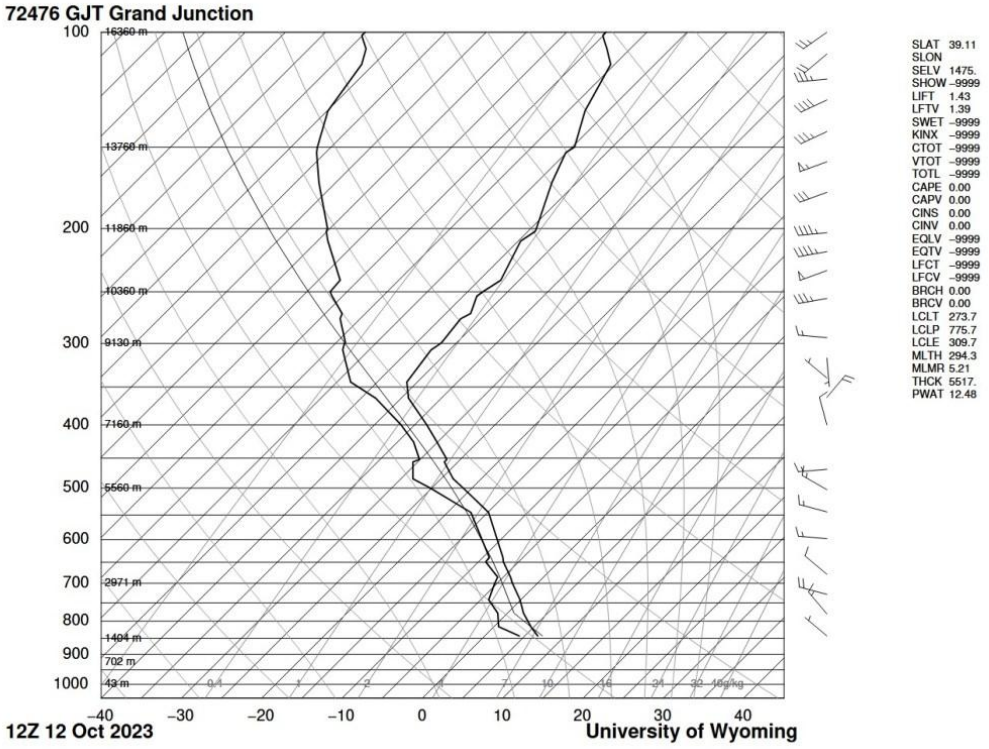

Figure 1: Skew T Plot

As we can see from how close the temperature and dew lines are on the plot above, most clouds would be forming lower to the ground. This is consistent with the qualitative data, as the cloud that was pictured was not very far up in the sky. In addition, we can see that the CAPE is at 0, which signifies that the atmosphere on this day was stable. Combining both of these pieces of information, lead me to classify the cloud pictured as a stratus cloud.

Stratus clouds form in stable atmospheres due to the vapor that makes up these clouds falling to lower elevations(Idaho State University). They can often produce rain or snow. When figuring out how to classify the pictured cloud, I initially thought it was a Nimbostratus cloud. However, the cloud pictured did not produce any rain and it wasn't quite dark enough to fit into this classification. Next was determining whether this cloud was a Stratus Nebulosus or Stratus Fractus. Due to the wispy geometry at the bottom of the cloud and its darker coloring, I settled on Stratus Fractus. These clouds are often the smaller ones that you may see under a larger cloud that produces precipitation (Met Office). What the picture depicts is that separation and fragmentation occurring as it gets closer to ground level.

I captured this image on my Google Pixel 7 pro. This phone camera has an aperture of 1.9 and ISO 99. Due to the low elevation of the cloud, I was able to get a relatively high definition picture of the cloud. In the original image, there were light poles and cars, so I cropped those out and used Google's magic eraser to get rid of the light poles. I increased the contrast in order to add a little bit more vibrancy to the image as well. The original image was 4032 × 2268 and I cropped it down to 4032 × 1316. The original image vs the final image can be seen below.

Figure 2: Original image

Figure 3: Final Image

I was pleased with how the image turned out. I really like the contrasting colors on each side of the picture. I was torn on whether to try to edit out the trees at the bottom of the image. I was worried that editing them out would be relatively noticeable. I think that one of the things that makes this cloud so interesting is that it does not fit perfectly in any categorization of cloud.

It shows that there can be a mix of atmospheric factors that impact cloud formation and that each cloud develops in its own unique way.

Citations:

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"Stratus Clouds." *Met Office*, www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/clouds/low-level-clouds/stratus#:~:text=What%20are%20stratus%20clouds%3F,form%20of%20mist%20or%20fog.