Report #5 – Clouds Second Assignment Fall 2018

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MCEN 4151-001: Flow Visualization

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1   ABSTRACT

The Cloud Second assignment built upon the techniques used to produce Cloud First assignments, given to students in MCEN 4151-004: Flow Visualization. The intent of the assignment was to encourage students to improve their photography skills compared to the first cloud assignment. The main focus of pictures were clouds, which represent one of the most sophisticated and naturally beautiful flows in science, having both turbulent instability and laminar stability in different cloud types. With the presence of the sunlight, clouds and their ability to reflect and accent earth's colors, this assignment produced a great amount of amazing pictures.

The phenomena studied in this report focuses on the stability and instability of clouds, and the cloud types produced. SkewT plots were taken from University of Wyoming website for the Department of Atmospheric and Science for the specific time that the picture below was taken:

Figure 1: Edited Cloud Second picture taken on the way back to University of Colorado Boulder on Highway 119, a beautiful lenticular cloud seen on the stratus level on a Thursday morning.

2   FLOW APPARATUS

The setup to produce this image was fairly simple. The location that the picture was taken on was on the eighth floor of the Engineering Center, specifically the ECOT wing, accessed by the elevators and the exit staircase. The time the photo was taken was at 6:30 P.M. after the sun almost finished setting on September 10th, 2018. The camera used to take this was Olympus OM-D mirrorless with a 14-42mm lens.

3   VISUALIZATION TECHNIQUE

The camera was angled upwards at approximately 15 degrees perpendicular to the x-axis. The camera used was an Olympus OM-D mirrorless camera with a 14-42mm zoom lens. THe shutter speed was at 1/200, capturing the moment well. The background needed to be sharp so the aperture was fairly small, f/6.3 was used. ISO was set at 200 so as much natural light could be captured, as the sun had almost fully set. The camera was not zoomed in at all.

Figure 2 : Raw, unedited version of the photo taken with the visualization technique above. Post processing was simply done in Photo Editor that comes with Windows 10. The contrast was set to +25, warmth +30, saturation +10, tint -15, light +5, these settings were repeated four times, saved and redone to get the retro-like and cinematic feel to the edited picture.

4   PHYSICS REVEALED

The Skew-T diagram for November 15, 2018, 12:00 P.M, from the University of Wyoming website for the Department of Atmospheric and Science reveals a CAPE of 0.00. The CAPE being 0 reveals that the clouds are perfectly stable as you can see one lenticular cloud and stratus clouds in the majority of the picture seen in figure 1.
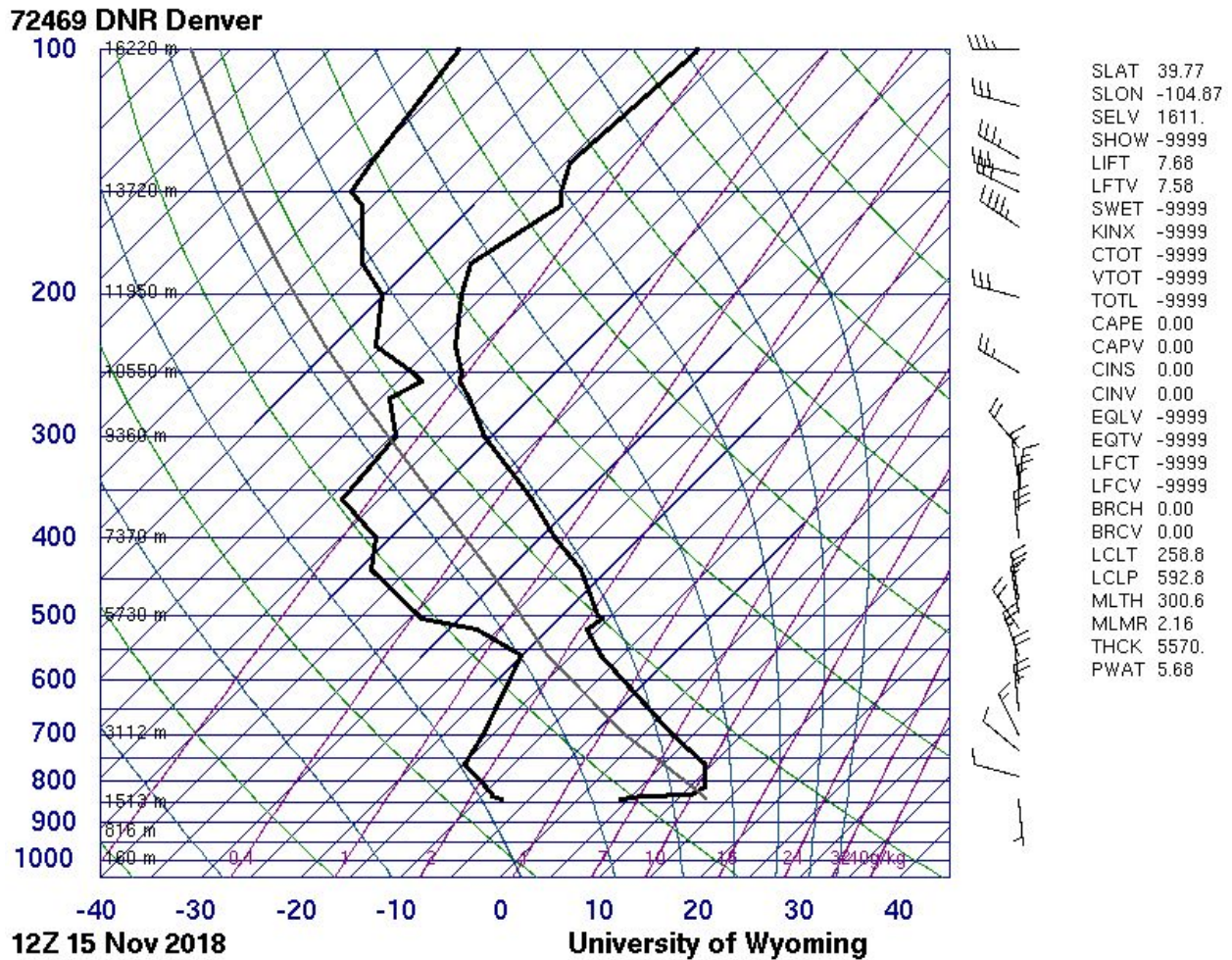

Figure 3: Skew-T diagram taken from the University of Wyoming website for the Department of Atmospheric and Science[1]

5   CONCLUSION

Both the post-processed and raw photos reveals the complex motions of stable flows of cloud formations, specifically lenticular clouds. I would like to have done less of a tint on my picture, as my laptop screen color settings are different than the standard for some reason, so it appeared more tinted and green than I had hoped.. Also I would like to capture some different clouds, definitely some more turbulent and unstable clouds which would produce some dramatic photography, I feel. Overall, this was a great project, and I have gained a newfound appreciation for clouds.

6   REFERENCES

[1] Oolman, Larry (2018, September 10). *72469 DNR Denver.*
http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF%3ASKEWT&YEAR=20 18&MONTH=09&FROM=1012&TO=1100&STNM=72469