

Clouds Second
Meg Ivy
ARTF 5200

Cirrostratus and Contrail Clouds

13:48 PM November 10th, 2019

Laguna Place Boulder, CO



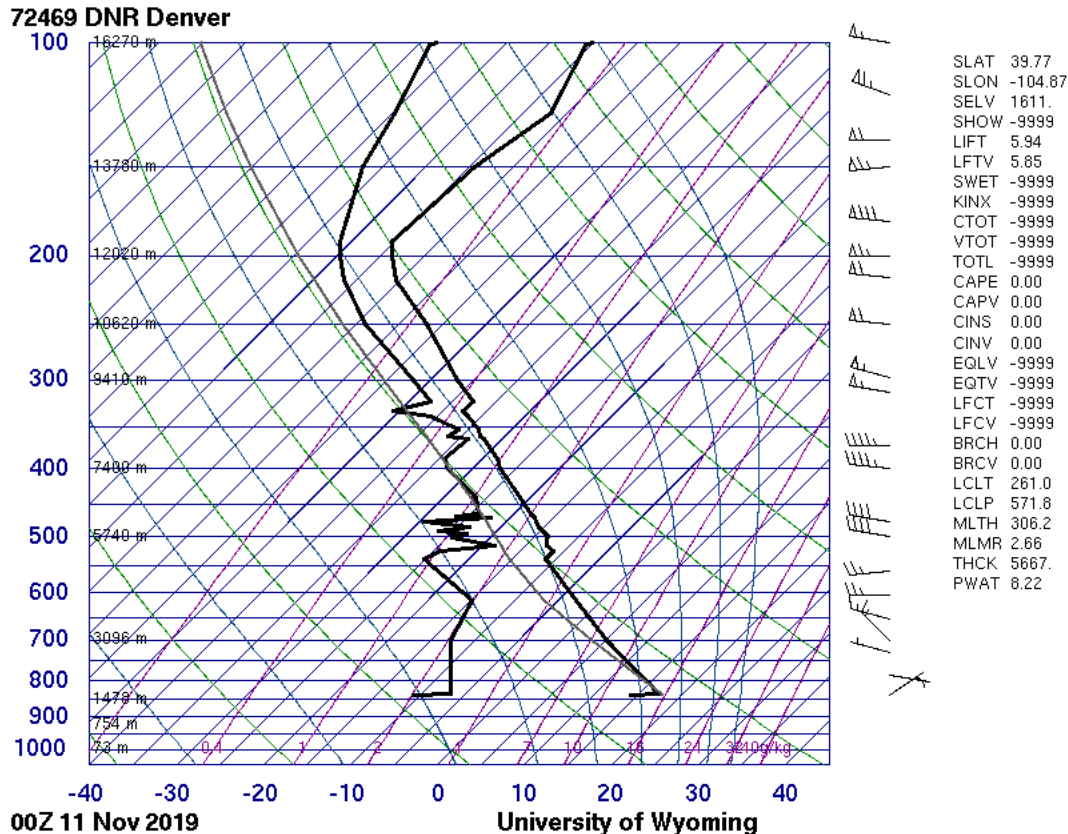
Introduction

The purpose of this image was to photograph clouds occurring naturally in nature. This is the second cloud assignment, so the clouds had to be captured after October 11th, 2019. The intent behind the image was to capture multiple types of clouds in one image. I also wanted to capture an image that had dimension and gave an idea of what the weather was like on the day the image was taken. In the images above, the original image is seen first, followed by the final processed image below.

Image Circumstances

The image was taken on November 10th, 2019 at 1:48 PM. It was taken in Boulder, Colorado on Laguna Place facing West toward the mountains. The image was taken about 30° from the horizontal at the clouds just above the mountains. On the day the image was captured, the low temperature was 57°F and the high was 68°F. There was no precipitation on the day the image was taken and the skies throughout were partly cloudy.

Clouds Description



In the image, cirrostratus clouds and plane contrails were captured. For a plane contrail to form in the sky, the water vapor that is expelled from the exhaust of the plane must condense. In order for the water to condense, the pressure must be high enough to cause the vapor to condense and freeze in the atmosphere. As a result, contrails only form at high altitudes, usually above 8 km where the air is very cold, less than -40°C ¹. As seen by the skew-T diagram² above, at around 8 km, temperature, as indicated by the blue slanted lines, shows that the temperature around the time the image was taken was less than -40°C .

As for the cirrostratus clouds, they usually form around 6 km high in the atmosphere. These clouds normally form in a stable atmosphere, which is confirmed by the CAPE value on the Skew-T diagram of 0.00. These clouds usually form in a high-pressure system where there are weak, or non-existent fronts. The next day, November 11th there was light snow, which would indicate a weak front on the day the photo was taken. In the high-pressure system, air tries to move out, which causes the formation of clouds at higher altitudes. In addition, on the day the photo was taken, there were very strong winds coming from the west, as also seen on the skew-T diagram, which could explain why the clouds look very spread out.

Photographic Technique

The image was taken on an iPhone 11, which has a 12 MP wide camera. The aperture of the image was $f/1.8$, shutter speed was $1/6400$, and ISO 32. The size of the original image was 4032 x 3024 pixels. The finalized image was 3003 x 2216 pixels. The distance from the clouds to the lens was approximately 8.6 km, since the clouds were approximately 6.2 km away on the ground and 6 km high. The field of view was approximately 3 km wide and 6 km high.

Not much was done in terms of processing the image. The image was cropped to centralize the clouds and eliminate surrounding distractions. The trees were left in the image to add a sense of reference to the clouds and create depth in the image. The contrast was increased slightly to reveal the shadows and depth in the clouds.

Conclusion

In conclusion, the image reveals a combination of cirrostratus clouds and plane contrails on a fall day in November. In the image, I like that there are multiple types of clouds that show a realistic view of the sky in fall. However, I do not like how the trees seem slightly distracting. I feel that the fluid physics of the cloud formations are clearly shown. If I could retake the image, I would try to take the photo from a higher elevation so that there were no distractions, such as telephone wires.

Sources Cited

¹Madigan, J. (2018, March 8). Contrail Education - Science. Retrieved December 8, 2019, from <https://science-edu.larc.nasa.gov/contrail-edu/science.html>.

²Oolman, L. (2019, November 10). Atmospheric Soundings . Retrieved November 10, 2019, from <http://weather.uwyo.edu/cgi-bin/sounding?region=naconf&TYPE=GIF:SKEWT&YEAR=2019&MONTH=11&FROM=1100&TO=1100&STNM=72469>.