

Zeus is Coming!



A cumulonimbus cloud just west of Horsetooth Reservoir on September 19th, 2026, at 4 pm

Tegan Chanders
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Dr. Sunberg
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Introduction

Zeus is Coming! was taken for the clouds first assignment for the Flow Visualization class at CU Boulder. The assignment was to learn about fluid flows through clouds and become better at photography. The intent of the image was to capture a thunderstorm right before it hit and convey the ominous feeling of waiting for it to get to you.

The image was taken just west of Horsetooth Reservoir, which is outside of Fort Collins, CO. The image was taken on September 19th, 2026, at 4 pm while on a hike at Horsetooth Falls. The clouds were southwest of the trail and 30° from the horizontal. The author experienced the storm roll over in about 30 minutes while there was rain, thunder, and lighting. 30 minutes after the image was captured, the sky was blue and sunny.

Cloud Physics

This is a cumulonimbus cloud and was part of Colorado's typical afternoon thundershowers. The cloud was just west of Horsetooth Reservoir in Fort Collins at 4 pm MDT on Sept 19th, 2026. The Skew-T plot is from Grand Junction at midnight UTC on Sept 20th, 2026, which is the closest plot to the actual location and time. The rest of the sky was sunny until about 45 minutes before the storm and then returned to blue skies and sunny after the storm. It rained heavily, was windy, and there was thunder and lightning for about 30 minutes during the storm. The Skew-T plot is shown below in Figure 1 and was sourced from [1].

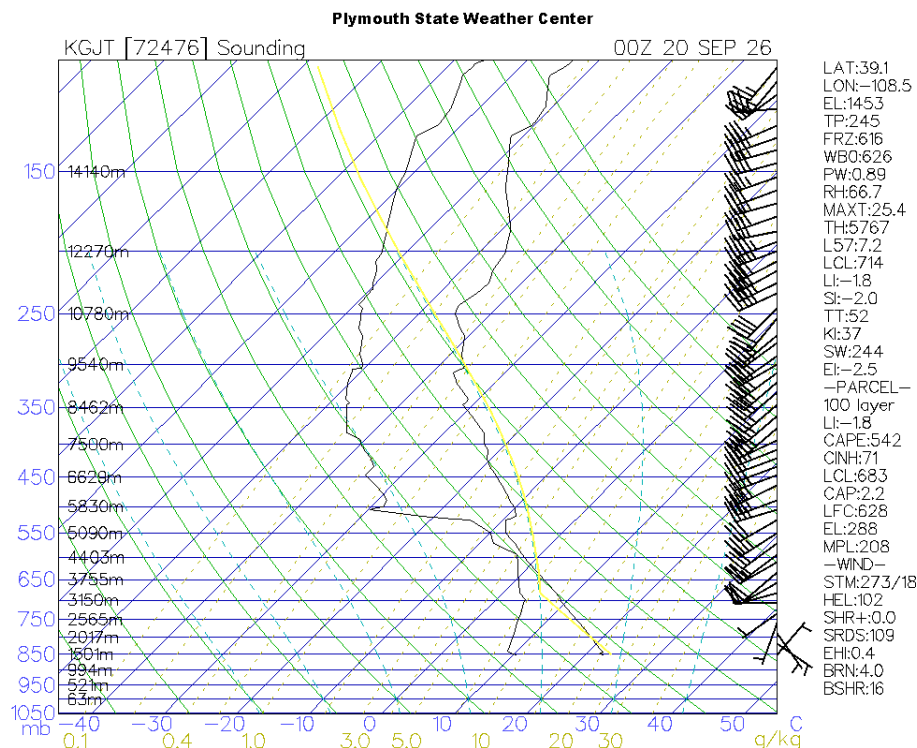


Figure 1: Skew-T plot from Grand Junction on September 19th, 2026, at 6pm MDT

According to the LCL, the clouds start around 3150 m. The test air parcel line crosses over the temperature line, meaning the atmosphere is unstable. Cumulonimbus clouds occur in unstable atmospheres and can extend from around 1600 m to the troposphere. There is also always rain, thunder, and lighting under cumulonimbus clouds which there was plenty of in this storm. All of these factors support the identification of a cumulonimbus cloud. The wind is from the west and blows east which is the direction the cloud was traveling. The wind was about 30 knots or 35 mph at the elevation of the clouds.

Cumulonimbus clouds transport sensible and latent heat and moisture into the upper portions of the troposphere and lower stratosphere. The center of the cumulonimbus is called the cell and is identified by using radar. The cell is the local maximum in reflectivity because it is very moisture dense [2]. The cell also has strong updrafts which sometimes create a “vault” in the middle of the storm where you can see blue sky. In the middle of the storm in the image there is a lighter spot which could be a vault.

Cumulonimbus clouds have three stages: cumulus, mature, and dissipating. The cumulus stage is characterized by updrafts and cloud towers which are very tall clouds. The mature stage has updrafts, downdrafts, and rainfall. The dissipating stage has downdrafts and dissipating rainfall. A cumulonimbus cloud usually only lasts 45-60 minutes, with the mature stage only lasting 15-30 minutes [2]. This image was taken at the transition between the cumulus stage and the mature stage.

Visualization Technique and Photography

The photo was shot using an iPhone 14 camera with the specifications shown in Table 1. The camera chose most of the settings automatically and tried to balance exposure. The photo was taken to include as much cloud as possible and also includes the ground to give a sense of scale. The image was edited in Darktable. It was cropped to focus on the center of the storm, and the contrast was adjusted to highlight the dark and light of the storm. The original image and edited image are shown in Figure 2 below.

Table 1: Camera specifications

Camera Model	Apple iPhone 14
Lens	12MP Main
Focal Lenth	26 mm
Distance from Object	6300 m (4 miles)
ISO	50
Size of Field of View	79.5° diagonal
Shutter Speed	1/775
Aperture	$f1.5$
Original Dimensions	4032 x 3024 pixels
Edited Dimensions	1600 x 991 pixels



Figure 2: Original image on left and edited image on right

Conclusion

Zeus is Coming! reveals the power and ominous feeling of an approaching thunderstorm which was my intent with the image. I like the power in the image and the framing of the image. The flow physics of a cumulonimbus cloud are shown, and the scale of the storm can be seen from size of the trees and foreground. I wonder what a picture looking straight up at the vault would look like. I am very happy with the image but using a DSLR would have helped capture more detail and I also wish I had taken more images of the storm to better understand it.

References

- [1] Plymouth State Meteorology, “RAOB Selector for Archived CONUS Data,” vortex.plymouth.edu. <https://vortex.plymouth.edu/myowxp/upa/raobplt-a.html> (accessed Oct. 17, 2026).
- [2] W. R. Cotton, G. Bryan, and S. C. van den Heever, “Cumulonimbus Clouds and Severe Convective Storms,” *Storm and Cloud Dynamics - The Dynamics of Clouds and Precipitating Mesoscale Systems*, pp. 315–454, 2011, doi: 10.1016/s0074-6142(10)09914-6. (accessed Oct. 17, 2026)