

Clouds First: Cumulus congestus with Virga

Anton Ignatenko | MCEN 5151 Flow Visualization

October 9, 2026, 18:28 | Superior, CO

INTRODUCTION

This image was produced for the Clouds First assignment in MCEN 5151. My primary goal was simply to get a neat photograph of the clouds as the sun set. I knew that the sky around Longs Peak often produces nice visuals, so I went out to take some photos, and this shot turned out well. While I didn't originally set out with a strict scientific mission to document a specific fluid phenomenon, the final image happened to perfectly isolate streaks of virga falling from a decaying cloud base over the mountain silhouette. I completed this project individually.

IMAGE SETUP AND CIRCUMSTANCES

I took this photograph on October 9, 2026, at 18:28 in Superior, Colorado. The camera was facing directly west toward the Front Range and the silhouette of Longs Peak, angled upward at an elevation of roughly 10 to 15 degrees.



***Figure 1.** A wider shot of the sky facing west, showing the vertical nature of the clouds surrounding Longs Peak.*

CLOUD IDENTIFICATION AND FLOW PHYSICS

The main cloud featured in the final image is a *Cumulus congestus* exhibiting virga. As seen in the wide reference shot (Figure 1), the sky was filled with mid-sized, lumpy clouds with noticeable height. This shape indicates an unstable atmosphere, where warmer, less dense air naturally wants to keep rising. There was no major weather front moving in at the time, these clouds were simply reacting to evening cooling after a warm day heating the air.

To confirm this, I looked at the Grand Junction (Station 72476) Skew-T diagram for 00Z on October 10 from the University of Wyoming archive (Figure 2) [3]. On the diagram, the environmental temperature and dewpoint lines pinch closely together between 450 and 420 mbar. This indicates a layer of highly saturated air, placing the physical cloud layer at roughly 21,000 to 22,000 feet above sea level. This altitude makes perfect visual sense, as the cloud is hovering well above the 14,250-foot summit of Longs Peak.

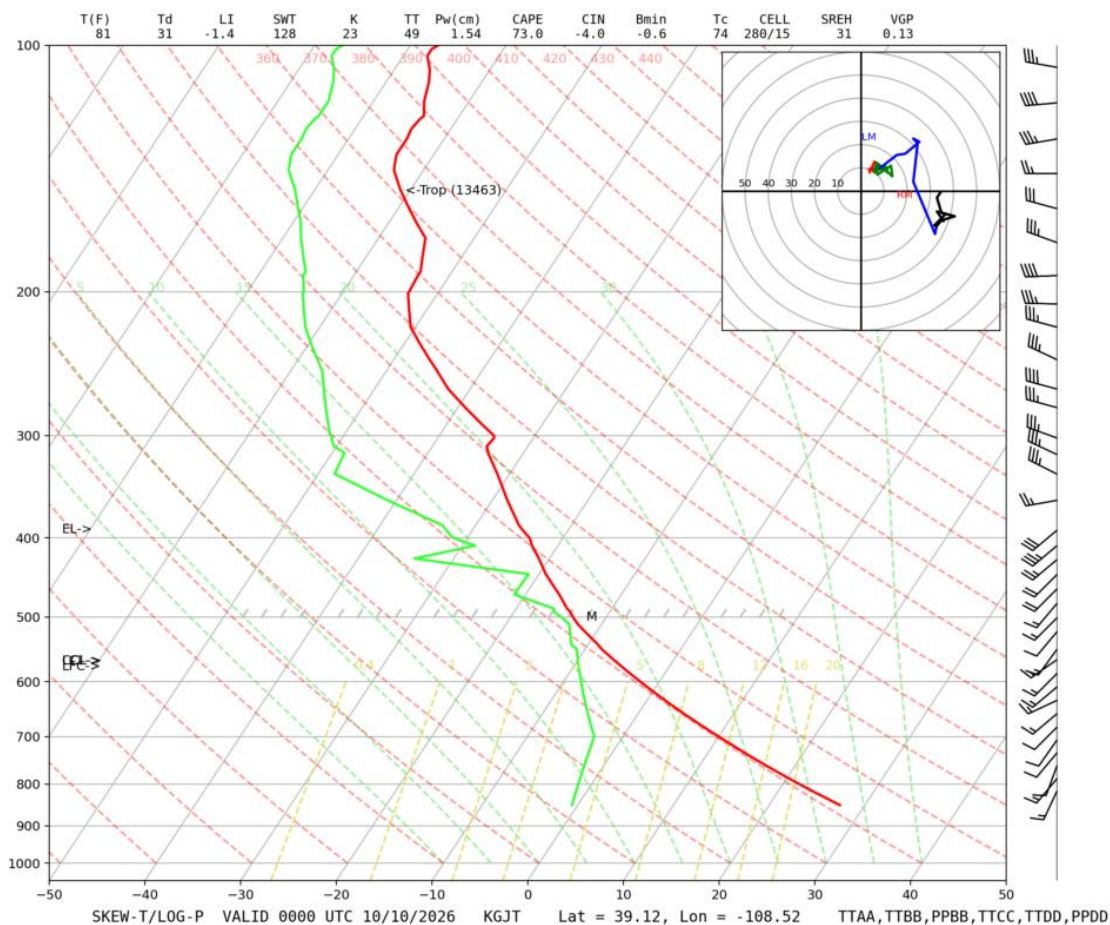


Figure 2. Skew-T diagram for Grand Junction, CO (Station 72476) at 00Z on October 10, 2026. The temperature and dewpoint lines pinch between 450 and 420 mbar.

The physics of the main image show a system in a state of decay. Because I took the photo at twilight, the sun had already set, cutting off the thermal heat that was pushing the air upward [1]. As the cloud lost its upward momentum, it began to dump its moisture. This precipitation

evaporated in the dry air beneath the cloud base before hitting the ground, creating the falling streaks of virga [2].

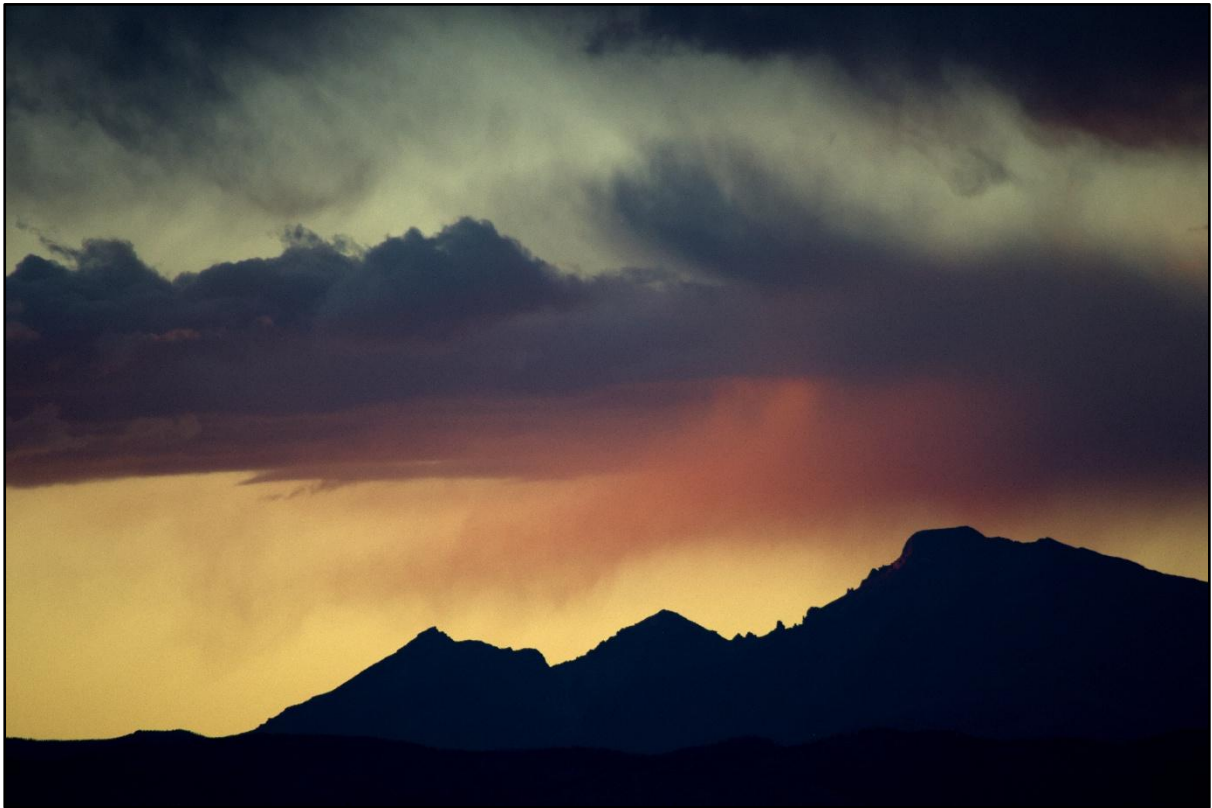


Figure 3. The final edited image showcasing virga falling from the Cumulus congestus base.

VISUALIZATION AND PHOTOGRAPHIC TECHNIQUES

I shot the image using a Pentax K-r DSLR equipped with an SMC Pentax-DA L 1:4-5.8 55-300mm ED lens. The distance from where I was photographing to Longs Peak was about 30 miles, yielding a field of view that covers several thousand feet across the cloud base. To naturally frame out the foreground and capture the fluffiness and dimension of the cumulus clouds against the shadows of sharp peaks below, I zoomed all the way in to a focal length of 300mm. The camera settings were an aperture of f/6.3, a shutter speed of 1/500s, and a true ISO of 800.

I processed the original .pef RAW image (Figure 4) in Darktable. Since the image was already framed well in-camera, I did not need to crop it. My biggest edit by far was using the sigmoid module to adjust the contrast. This single change brought out the deep shadows in the mountain silhouette and gave the clouds much more dimension. I also used the velvia module to boost the warm sunset colors, and made a few minor background adjustments to clean up noise and balance the exposure in the sky. The original image dimensions were 4309 x 2868 pixels, and the final exported image is 4308 x 2868 pixels.



Figure 4. The unedited original photograph.

CONCLUSION

The final image does exactly what I wanted it to do: it clearly shows the delicate texture of virga and tells the story of a dying convective cloud. I really like how the sharp silhouette of the mountain contrasts with the soft and painted look of the evaporating rain. If I were to develop this idea further, taking a time-lapse video would be a great way to show the actual progression of the virga. Additionally, this photo does not clearly show the defining height of the cumulus congestus. Fitting this in the photograph would solidify the cloud classification.

REFERENCES

- [1] National Weather Service. (n.d.). "Principles of Convection." *National Oceanic and Atmospheric Administration*. Accessed October 19, 2026. https://www.weather.gov/source/zhu/ZHU_Training_Page/convective_parameters/skewt/skewtinfo.html
- [2] American Meteorological Society. (2012). "Virga." *Glossary of Meteorology*. Accessed October 19, 2026. <https://glossary.ametsoc.org/wiki/Virga>
- [3] National Center for Atmospheric Research (NCAR) / UCAR. (2026). *Upper Air Observations: Skew-T/Log-P Diagram, Station 72476 (Grand Junction, CO), 00Z 10 Oct 2026*. Data retrieved October 9, 2026. <https://weather.ral.ucar.edu/upper/>