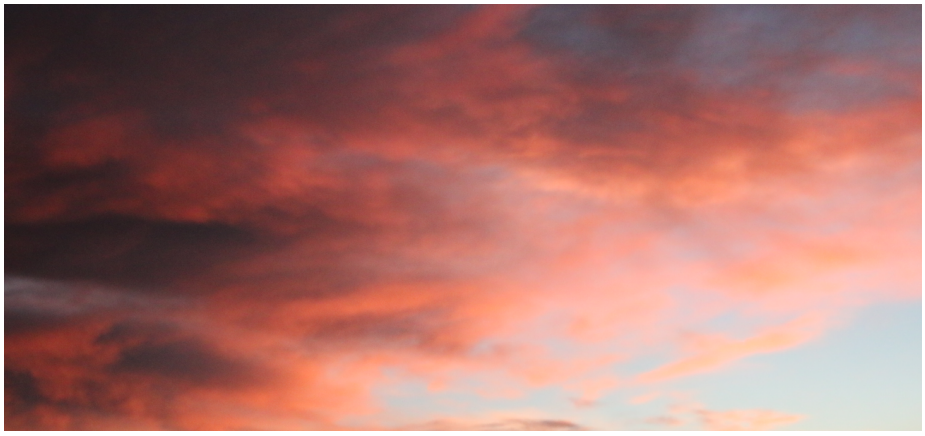
Clouds First 2026

Alex Knight



MCEN 5151-001
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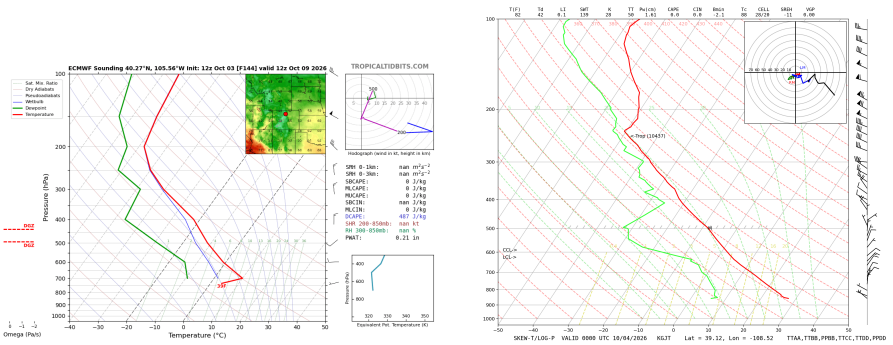
1 Introduction

For the Clouds First assignment I wanted to image a cloud at sunrise or sunset. I felt that the sunlight from that angle would allow for a lot of detail of the cloud to be present while also adding some nice color to the image. The increased shadows would allow for more information on the type of cloud and could better illustrate wind currents.

2 Fluid Behavior

The main way to diagnose the fluid behavior of this image is to begin by determining what kind of cloud it is. There are a few preliminary observations we can make before jumping into more technical tools. First, we should mention that these clouds are very large, which implies that they are lower to the ground. This eliminates any Cirrus type of cloud. Also, since there is no rain, this means that this is not cumulonimbus or a nimbostratus.

With that discussed, we can now examine the Skew-T plot. Since this photo was taken in an area where there is not a nearby weather station, seen below are both the simulated data [2] based on actual location [1], and measured data from a facility nearby.



(a) Estimated Skew-T (b) Actual Skew-T

Figure 1: Initial and final image of flow

The simulated data appears fairly similar. An important thing to note about a Skew-T plot is that clouds are most likely to form at "choke-points" in these plots, where the air temperature and dew point temperature become very close together. Since there are a few points where these points occur, we can use our initial observations to hone in on a region. Since we know this is not a cloud high in the atmosphere, we can eliminate any points less than 300mbar. Based on these, we can find points where clouds are most likely to occur is the region at roughly 420mbar which is roughly at 22,000 feet. Pairing this with the general shape of the cloud, we can say that this cloud is likely an altocumulus.

3 Visualization Technique

Since this was not produced in a controlled environment I could not add any tracers or marked boundary materials to outline what the flow was doing. Arguably, the atmosphere itself was able to contribute to the marked boundary technique. Since clouds are a collection of water molecules and dust, they display what the wind currents are doing and how the atmospheric conditions are behaving.

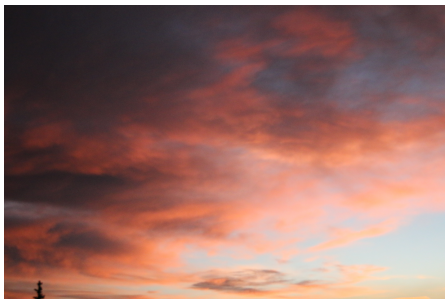
For the lighting, I wanted to take this photo at sunrise or sunset. I feel that when the sun is hitting a cloud at an angle tangent to it, there is much more definition than if it were straight above it. This also allowed me to capture some very dark shadows of the cloud as wel as the very bright edges of it that were closer to the sun. This led to an interesting pink hue that tinted the cloud, while also using shadows to show the density and depth of the cloud.

4 Photographic Technique

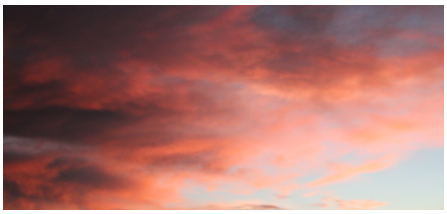
This image was taken on a Canon EOS 70D which has a sensor size of 22.5mm by 15mm. Since the cloud was at roughly 20,000 to 22,000 feet and I was at an elevation of 9,800 feet, the distance from my camera to the cloud was roughly 10,200 to 12,200 feet.

For the lens, I used a EFS 18mm to 55mm focal length lens. This image was taken using the 38mm focal length setting. I also used a shutter speed of 1/3200 seconds, the f number was f/5.

Below is a before and after image of my photo. The original was 5472 by 3648 pixels and the edited one was 5200 by 2420 pixels. I did very little post processing. The main one was cropping the image, which I am beginning to have mixed opinions on as it takes away from the overall scale, and a minor increase in contrast, shadows, and highlights to bring out some more of the reds and darken the shadows.



(a) Initial image



(b) Final image

Figure 2: Initial and final image of flow

5 Image Assessment

I really like how my image turned out. I like catching symmetry in my pictures and I am happy that I was able to capture a contrast in the light and dark along the diagonal axis of the image. On a second attempt, I would like to go for a larger scale. From where I was it was difficult to capture the full scale of the cloud, so I hope to try and capture a full cloud next time.

References

[1] Levi Cowan. *ECMWF Model*. Accessed 2026-10-19. Tropical Tidbits, 2026. URL: https://www.tropicaltidbits.com/analysis/models/?model=ecmwf&region=us&pkg=T2m.

[2] *Upper-Air Page: RAL Real-Time Weather*. Accessed 2026-10-19. Ucar.edu, 2026. URL: https://weather.ral.ucar.edu/upper/.