

Cloud 1

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Flow Visualization

Fall 2016

Introduction

This image was taken for the first cloud image for the Fall 2016 Flow Visualization Course. The intent of the image was to capture cloud formations from a different point of view, nearly level with them while hiking a 14'er, and see what sort of formations were visible from the increased altitude.

Image Circumstances

The image was taken on September 3rd 2016 at approximately 7:30 in the morning. I was facing northeast, with the camera near 0 degrees from the horizontal. I was located above the tree line on Mt. Huron at an altitude of approximately 12,500 ft.

Cloud and Atmosphere Information

The clouds in the image are altocumulus and cumulonimbus. The altocumulus cloud is front and center in the image, and the cumulonimbus are in the background slightly behind the mountains. Altocumulus clouds typically form 6,500 to 20,000 feet and cumulonimbus clouds form from 1,500 -65,000 ft. Since these clouds were nearly level with me at the time of the photo (12,500 feet) both clouds are well within their formation altitudes. When the photo was taken the atmosphere was moderately unstable, as shown through the cape value in the skew-T below, as well as the fact that about 45 min after this photo was taken it was hailing on the summit of Mt. Huron. The winds were approximately 20 mph blowing to the northeast. The sky to the southeast of the image was clear and the cumulonimbus clouds in the image were what brought the hail to the mountaintop. Based on the skew-T the temperature at 12,500 feet was 23 degrees Celsius and the dew point was 16 degrees Celsius. At this altitude is also close to where the dew point line and temperature line are closest, so it is reasonable to expect cloud formation at this altitude.

72469 DNR Denver

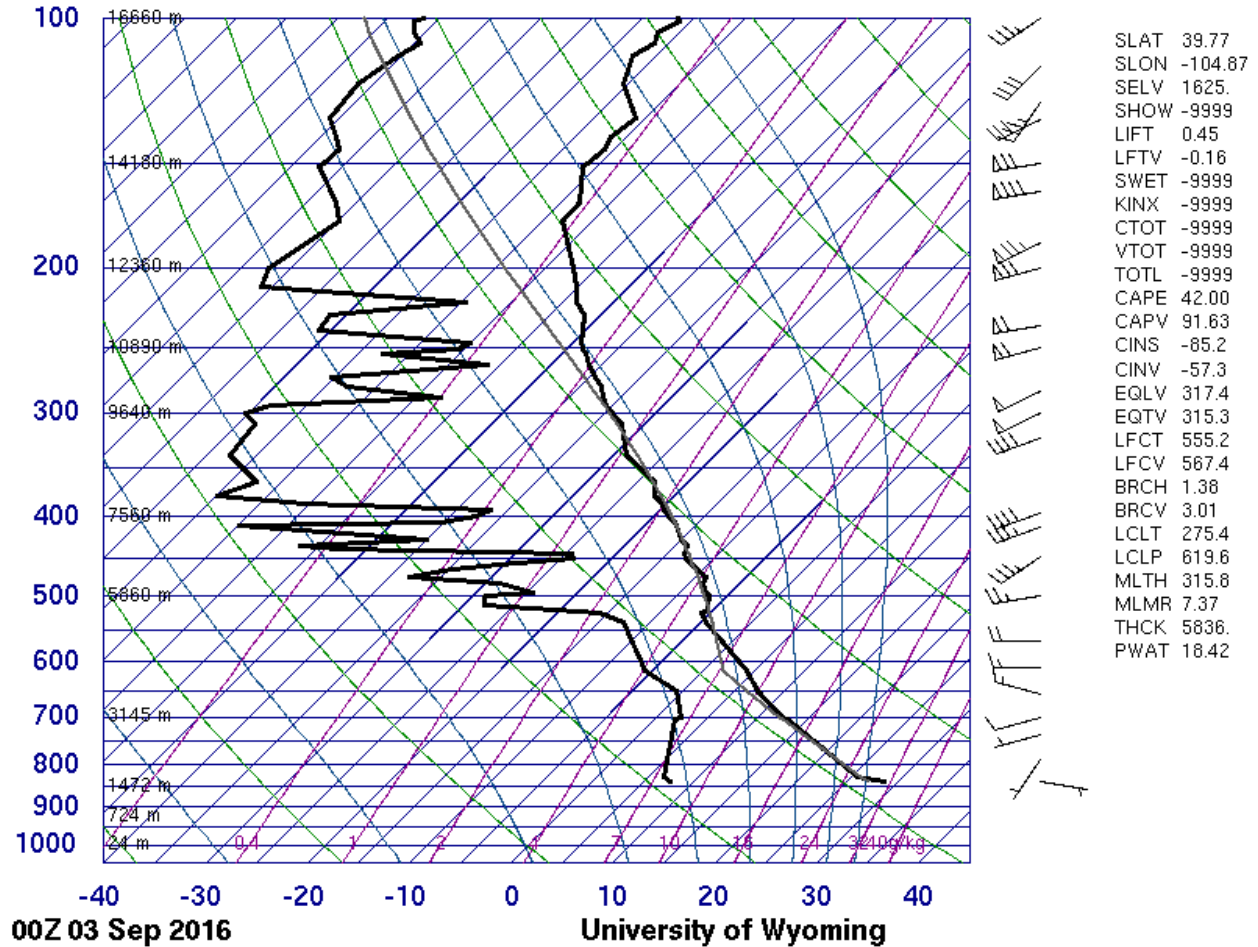


Figure 1: Skew-T Diagram from Denver Airport at 6am

Photographic Technique

The photo was obtained using a Canon EOS 50D with a 28-135mm lens. No tripod was used, but the shutter time was fast enough that one was not needed to obtain a clear image using reasonably steady hands. Lighting was obtained from the rising sun from the east. Due to the abundance of natural light a low ISO, fast shutter speed, and mid-level aperture. The camera was approximately 1000 feet from the cloud in the foreground and 3000 feet from the mountains and clouds in the background. With the shutter speed at 1/125 of a second the foreground cloud moved approximately 3 inches, and at 1000 feet from the camera this motion is not noticeable at this shutter speed.

Table 1: Camera Setting

Camera	Canon EOS 50D
Lens	28-135mm 1:3.5-5.6 IS
Original Image Size	2352 X 1568
Final Image Size	2352 X 1568
Field of View	~ ½ mile by 3/16 mile
Focal Length	28mm
Aperture	f/10
Shutter Speed	1/125
ISO	100
Exposure Bias	0
Distance From Cloud	1000 feet



Figure 2: Original Unedited Image

The original image (Figure 2) shows the clouds as mostly white with a slight yellow tinge, and the mountains as brown and shadowy. This image was then edited in GIMP. I left edited image size the same as the unedited. Then I changed the RGB color curves to obtain the purple hue on the final image. I added the purple tinge help make some of the features in the shadows really pop. It also

added a nice amount of absurdity to the mountains that I enjoy. While changing the color curves I managed to keep some of the whitest clouds mostly white and the blue sky a nice deep blue.

Image Discussion

I really enjoy how this image came out with the purple, and I think I fulfilled my intent to get an interesting view of clouds from photographing the clouds from nearly the same altitude. One possible change to the image would be to crop down some of the blue sky to bring the focus even more onto the altocumulus cloud. Moving forward it would be nice to get other cloud images from above 12,000 feet on hikes to try and photograph other clouds at the same elevation as the camera, or see some interesting formations over the mountains that high up.