



Mountain Guardians

Figure 1. Featured Image

Clouds First Report

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A Mountain Wave cloud rests above a Foehn Cloud Wall near Mt. Audubon and surrounding peaks in the Indian Peaks Wilderness Area on the morning of Feb. 28, 2018 at 8:20 AM.

Special thanks goes out to my grandmother Char for providing a wonderful shooting location in her back porch.

Clouds provide a beautiful glimpse into the state of impermanence. They suggest upcoming weather systems while being shaped by the landscape around them. My Clouds First Assignment introduced me to being ready, armed with a camera, at any moment to take advantage of the weather. I woke up early for a small handful of mornings to witness sunrise clouds, however this image was taken on a morning just before a 9AM class where the only clouds to be seen were distant but approaching from the west. Any day that clouds can be seen interacting closely with the mountains is a good day in my opinion.

The picture was taken at a residence situated on a west-facing hill north of Baseline Reservoir in Boulder, CO. The camera was pointing about 15 degrees north of west. It was mounted on a tripod and mainly angled horizontal to the horizon. It was taken after the sun had risen in the morning at 8:20AM. The landscape and clouds were about 25-30 miles away.

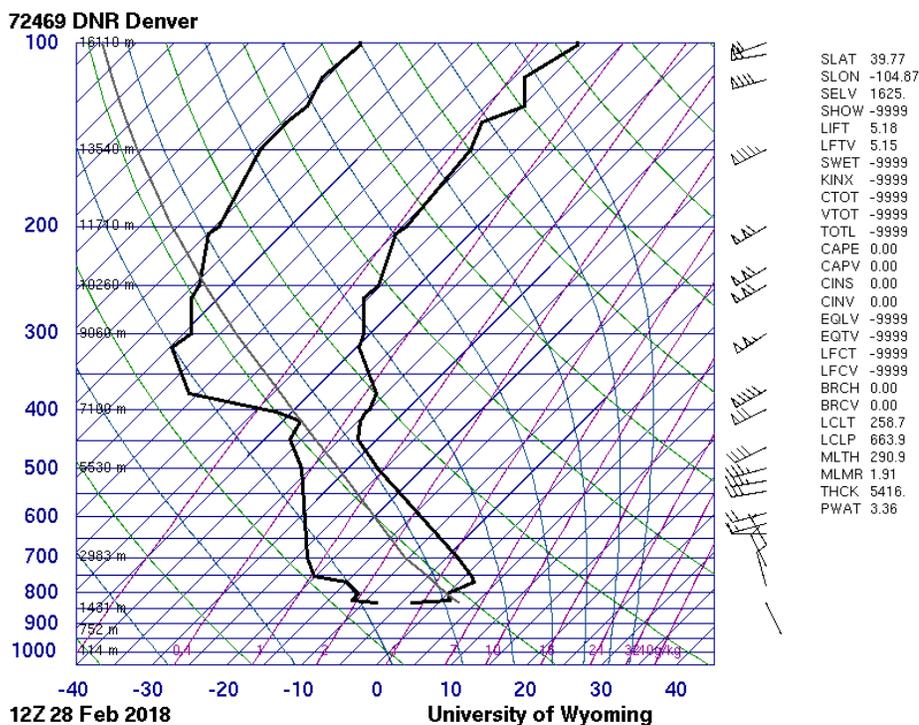


Figure 2: Denver Skew-T Diagram for Feb 28, 12Z

The clouds witnessed could be described as Mountain Wave clouds, where the peaks and valleys of the mountains force air movement into a low-frequency sinusoidal pattern. A few ephemeral clouds could be seen, but at the time there were almost no clouds above or to the east. Most clouds laid in the high peaks, including the Foehn Cloud wall. The cloud wall present meant that precipitation was likely

falling onto the peaks. The weather reported partly cloudy in Boulder, but the day started as clear, in tune with the prior day's forecast. There was an occasional hint of a breeze throughout the day. As can be seen, the CAPE was zero, meaning that the atmosphere was generally stable at the time. If a block of air was adiabatically lifted, it would drop. However, there are segments in the skew-T diagram where this is not the case. The black lines represent the sounding data collected as the weather balloon ascends and descends. At any point in time, if a path is traced parallel to a green line (the adiabatic line) from the starting point, and the black line is above, the air will rise due to instability. If the line is below, it is stable and will sink after having risen.

The camera used was a Canon EOS 60D. It was zoomed all the way in on a long-range lens to 155mm: the field of view was rather small. The Indian Peaks and the clouds above were estimated to be 25-30 miles away, 15 degrees northeast. This prediction was gathered by taking the geolocations of the camera and the location of Mt. Audubon then using trigonometry to find the distance and angle between the two points. See Table 1 at the end to view pictures from Google Earth depicting my method for searching for the mountains' names. The original size of the picture was 5184x3456px, a size of 17.9 megapixels (See Fig. 3) and was not cropped. Exposure time was 1/2500 sec and aperture f/5.6. ISO was a low 160, yet grainy texture in the sky was still present. Thus, an unsharp mask was applied in GIMP to a negative layer of the image and blended. The vignette was a natural part of the camera's aperture which affected how the above cloud was lit. No other clouds were present above it. Brightness and contrast were increased to accentuate the clouds among the sky and to silhouette the trees in the foreground. Blue mid-tones were increased on the histogram to further accentuate the clouds.

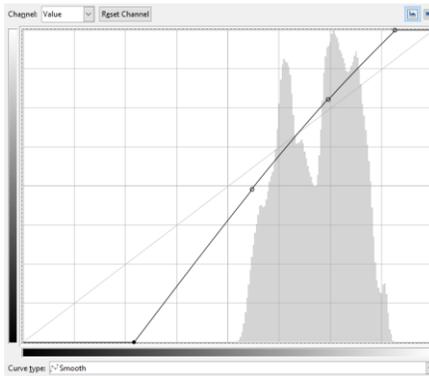


Figure 3. Histogram Edits

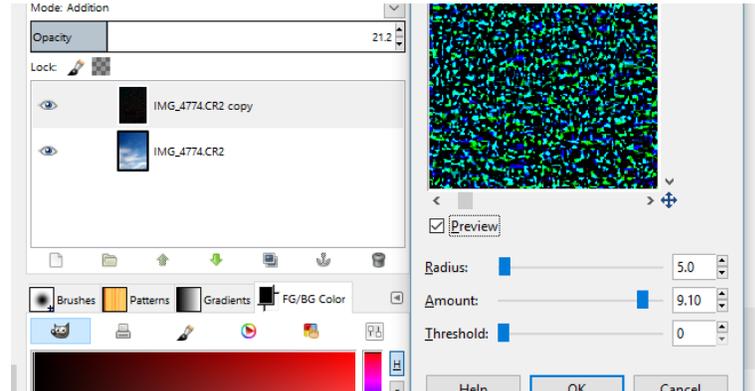


Figure 4. Unsharp Mask Blending

The image reveals the relationship between clouds, mountains, and snow. Peers noted that the snow and Foehn Cloud Wall blend together, signifying the idea that snow comes from this formation of clouds. Their mountainous shape formed by the land below also suggests this. The stratocumulus mountain wave cloud sitting above suggests that this type of cloud is not likely to become snow but instead drift off to the side. One could imagine it being a sort of dog or animal flying to the right above the landscape.

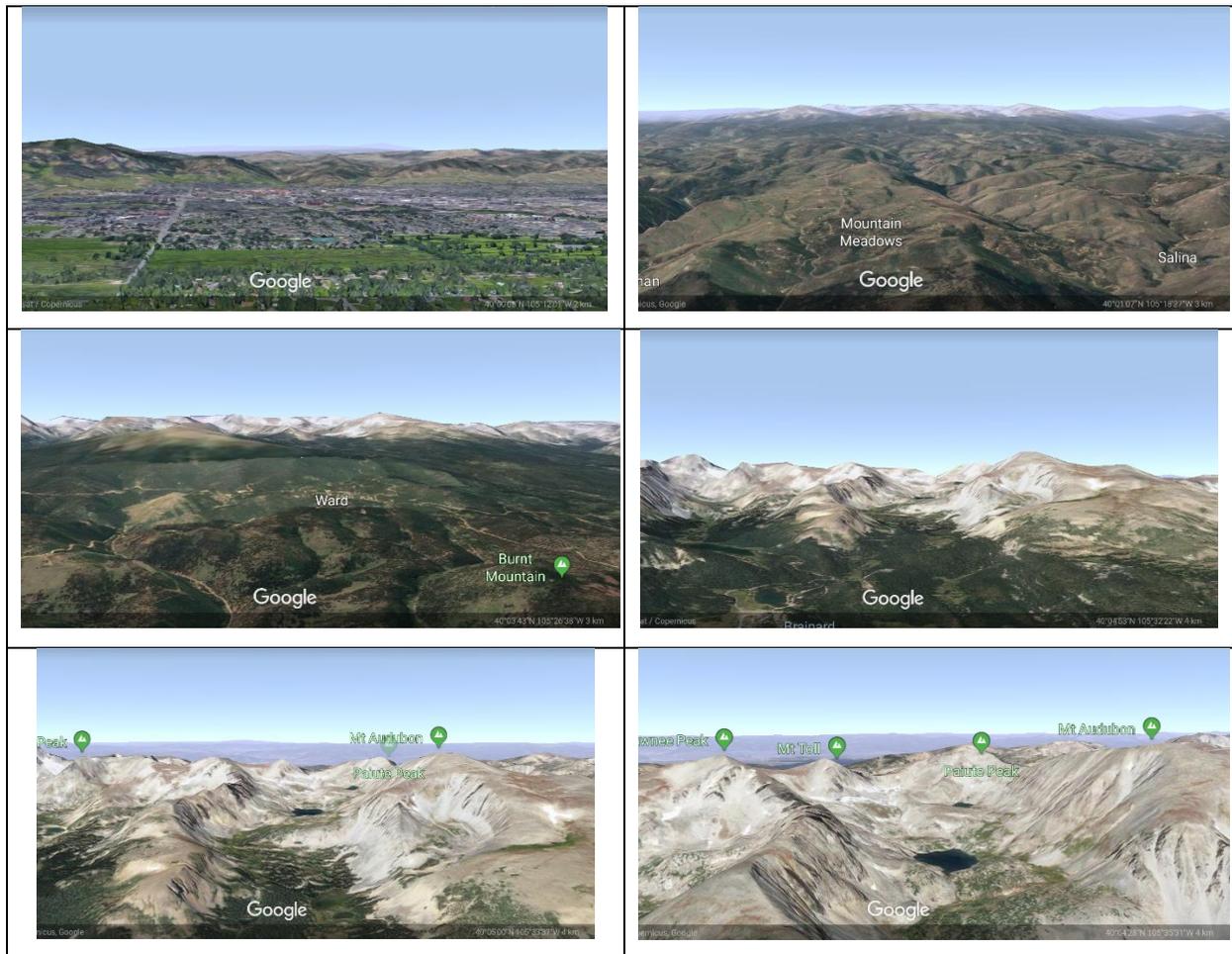


Table 1: Google Earth zooming in from approximate shoot location to the Indian Peaks mountain range pictured. See the featured picture to compare.



Figure 5: Original Picture