"Cloudy Color": 3606 x 1554 pixels, 1/640 s, f15, ISO 80

Clouds really ended up fascinating me by the end of this flow visualization class. There are so many different types of clouds that are affected by the atmosphere, winds, and sun. Iridescence, or irisation, is a phenomenon that captivated me. Although I had other pictures to use for this assignment, I kept coming back to view this one. After I did some editing, bringing out the colors, I couldn't bring myself to submit anything else. Investigating this phenomenon seemed extremely interesting, and something that I would enjoy doing. I took this image on March 30, at 5:17 pm near the Colorado border while in Wyoming.

I shot this image using my point and shoot camera, a Casio EX-H30. Small enhancements of the original image, seen at the end of this report, were done with Adobe Photoshop CS5. Cropping was the first thing done in the editing process. Although there were more spots with iridescence the colors in this section were better, as well as better cloud detail. Adjusting the color was important since the camera did not capture the subtlety of all the different colors. Simply adjusting the brightness did not work; instead it washed out the clouds or made them too dark. I thought that the dark spots were too dark, while the bright spots were too bright, in the original image. Curves is the perfect tool when this is the case, allowing isolation of both bright and dark colors. After increasing the brightness of the dark spots and darkening the bright spots the colors of the iridescence really popped. I then sharpened the image to the appropriate level. This brought out a lot of the detail in the smaller cloud wisps. I was now finished with my editing and very happy with "Cloudy Color."

Before going in to the effect that is seen in the clouds, it would be nice to know more about the clouds we are looking at. A skew-t plot provides a ton of

atmospheric data and is taken, usually, every 12 hours at airports.

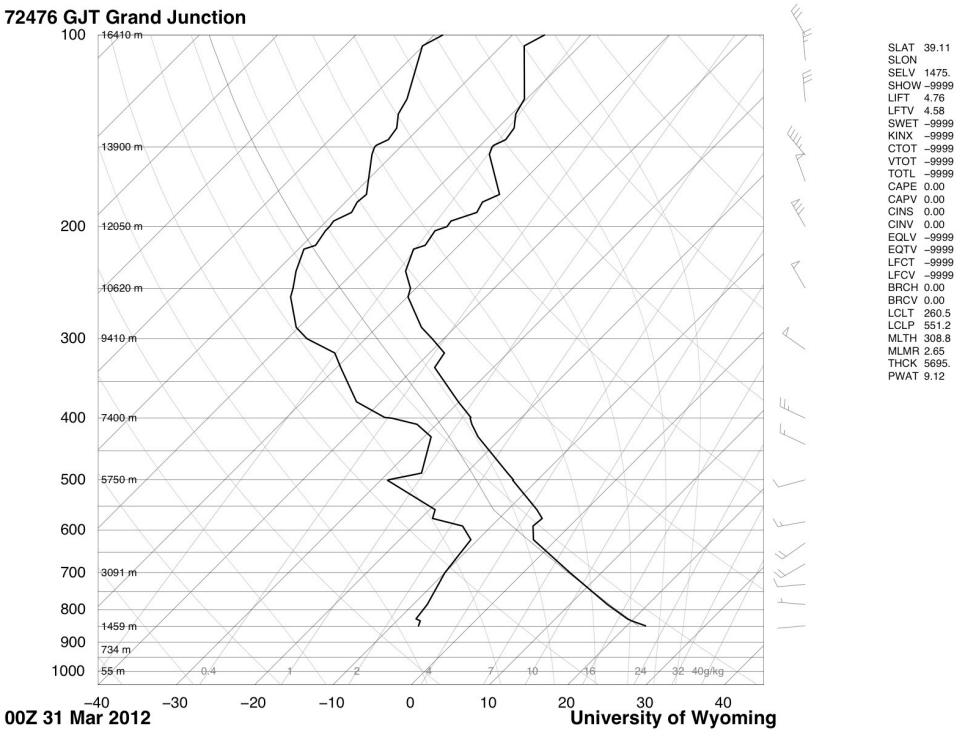

Figure 1:Skew-t plot from Grand Junction 00Z 31 March 31 2012

First thing to notice is the cape value in the table on the right in Figure 1[1]. This provides information on the stability of the atmosphere. A non-zero value signifies an unstable atmosphere while a zero value signifies a stable atmosphere[2]. Since we have a cape value of zero the atmosphere was stable when this photo was taken. This allows us to identify the cloud type, in a stable atmosphere, as well as the shape of the cloud. A stratocumulus cloud[3] fits the information we have and we can't forget about the iridescence. The other piece of information we can take from the skew-t is a close approximation of the height of the cloud. When the two lines on the skew-t come closer together it is possible for cloud formation. On that day this cloud was the lowest in the sky. The first point where the lines come close is at about 3,700 meters (12,000 ft.) above sea level. I was roughly 7,000 ft. above sea level making this cloud about 5,000 feet above the camera.

Iridescence is really what captured my attention in this image. What exactly causes this phenomenon? A common explanation is that water or ice particles in thin parts of the cloud create a prism like effect[4]. The index of refraction in the particles spread out different wavelengths, making certain colors viewable. Grouping of ice, or water, particles is required in order to produce a noticeable effect while sizes of the particles in the groups determine the color[5]. A larger particle bends the light more than a small particle, spreading out the light spectrum more. In large particles most of the light spectrum is spread out while the red portion is mostly undisturbed. My assumption is that the other colors in the spectrum work there way through the different smaller particles after exiting the

large particles. This is how the other colors of the spectrum become isolated and all of them can be seen in an image such as mine.

This image still draws my attention every time I look at it. The detail in the wisps is great and the colors, every one, are fantastic. I was hoping to find other explanations for iridescence, but was unable to. Everything I was able to find only provided the information that I relayed. I based my own assumptions from what I was able to gather and am lead to believe this is the proper explanation. Clouds continue to amaze me every day. In my opinion, they may be the single most important piece that allowed us to evolve to where we are as a species. Not only do they produce brilliant shapes, breathtaking sunsets and, my favorite, snow but they regulate the climate while being a major piece of the carbon cycle[6].

Original Image

Reference:

[1] "Atmospheric Soundings." *Wyoming Weather Web*. Web. 01 May 2012. <http://weather.uwyo.edu/upperair/sounding.html>.

[2] "SKEW-T: A LOOK AT CAPE." *WEATHER PREDICTION EDUCATION*. Web. 01 May 2012. <http://www.theweatherprediction.com/habyhints/305/>.

[3] "The Cloud Collector's Reference." *The Cloud Appreciation Society*. Web. 01 May 2012. <http://cloudappreciationsociety.org/collecting/>.

[4] Gerneke, Dane. "Iridescence." *The Cloud Collector's Reference*. Web. 01 May 2012. <http://cloudappreciationsociety.org/collecting/dane-gerneke/>.

[5] "Iridescent Ice Clouds from Aircraft Wings." *Institute for Atmospheric Physics*. Web. 01 May 2012. <http://www.dlr.de/pa/en/desktopdefault.aspx/tabid-2342/6725_read-16936/>.

[6] "Carbon Cycle." *Credo Reference*. Web. 01 May 2012. <http://www.credoreference.com/topic/carbon_cycle>.