



Clouds 1

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Introduction:

The purpose of this particular photo was to capture the unique behavior of clouds in the mountain regions of Colorado. During some of the outdoor mountain activities that I take part in I have notice that there is often unique cloud behavior in the high country than what we are use to seeing in the front range. The mountains themselves affect how the clouds propagate and ultimately form. Each time I would travel up to the mountains I would look for unique cloud behavior and attempt to capture it. The image that is discussed in this report was the most dynamic image that I found.

Image Background:

This image was taken on January 16, 2010 at the base of Keystone mountain resort facing west. The image was taken at approximately 2:00pm at LaDonte's Cabin at an angle that was 40-55 degrees from the horizontal. The camera was hand held and set to a standard camera setting. Shown in the image below we can see a sectioned view of the map of the keystone resort, this shows the location of the photo as well as the direction that the photo was taken (west).



Section of Keystone Resort map³

Cloud Physics:

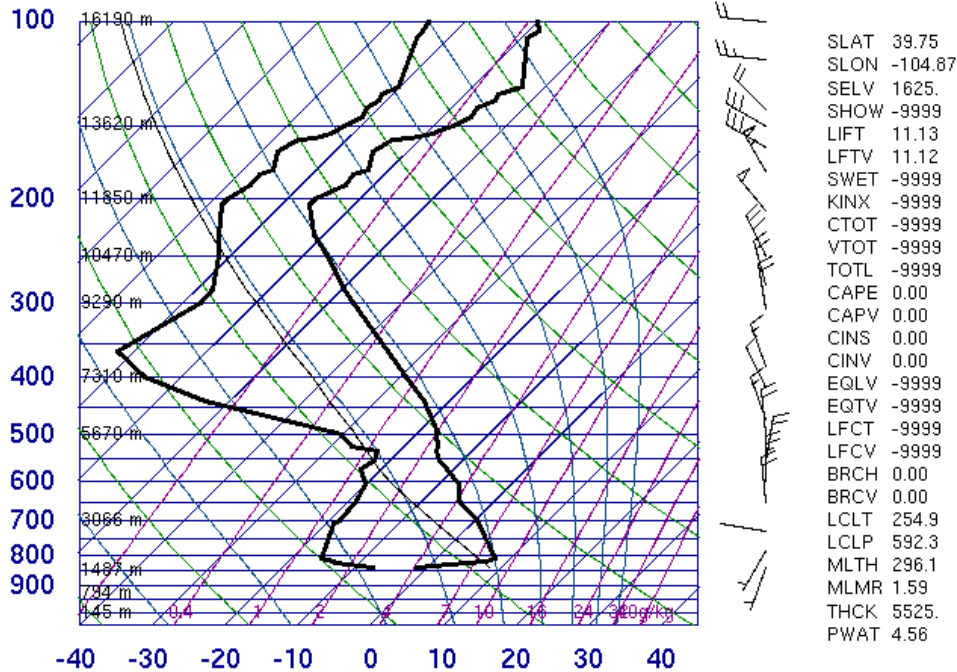
Based on the clouds general shape I have come to the conclusion that it is a sample of altocumulus, more so the altocumulus stratiformis perlucidus meaning that it is a mid-level cloud¹. These types of clouds are general found between 6,500 and 23,00ft, and based on where the photo was taken we can assume that it is within the is range as well as the cloud was above mountain peaks (around 9,000-1,100ft) as well. In addition these types of cloud commonly have a common layer of separate

'cloudlets', which matches the description of the clouds in this image. We can also see in the image how the mountains affect the clouds, as the clouds near the peak (top left of photo) are more spaced out than the clouds that are away from the peak. This shows how the winds that are blown up/around the peaks can break up cloud formations.

These formations are often caused by radiation from the surface of the Earth, the hot air rises into lighter air masses. This process generates convection currents until the heated air reaches a neutral buoyant region, more so reaches a thermal equilibrium with the surrounding air particles. When the particles reach these equilibrium points it cools and becomes less buoyant, this starts the formation of the convection patterns. Due to the inherent unstable nature of clouds the particles tend to travel in these convection patterns forming the cloudlets. The individual cloudlets are formed by the development of transition zones between the differing convection patterns formed by radiation from the Earth's surface⁴.

We can also learn some information about the stability of the cloud based on the skew-t plot that was taken on that particular day. The skew-t plot shown below was taken in Denver Colorado, which is around 50 miles away. This does not provide a lot of information as to what the conditions were up in the mountains but it is still interesting to look at. With this said we could see from this skew-t plot that at the elevation the clouds are stable.

72469 DNR Denver



12Z 16 Jan 2010

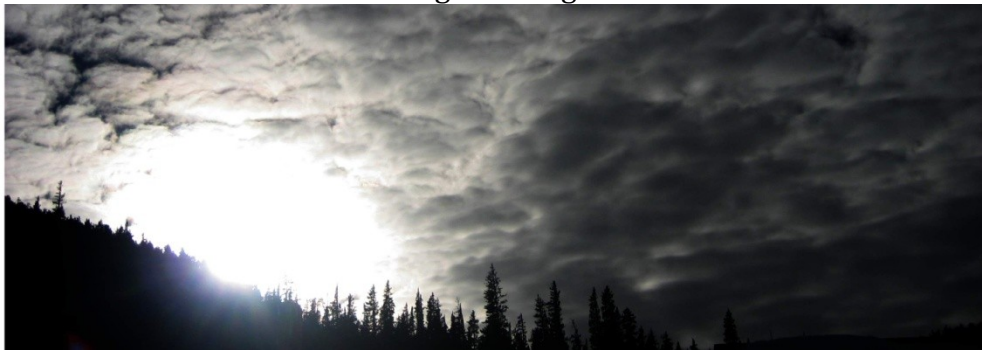
University of Wyoming
Skew-t Plot: January 16, 2010²

Photographic Technique:

This photo was taken with a Canon PowerShot SD630 with an exposure time of 1/1,500. The photo was taken with an F setting of 6.3 and the image size was 2816x2112 pixels. This image was then taken into Photoshop and altered by both cropping the image to size and adjusting the colors and contrast using the levels tool. The image was cropped to 2874x993, this was done to remove the building that was in the bottom of the image in addition to enhancing the focus of the image. The image alteration can be seen below by directly comparing the two photos.



Original Image



Final Image

Summary:

In general I am very pleased with the final result of his photo as it shows a unique situation in cloud behavior. Since the sun is behind the clouds we can see the general thickness of the clouds and their spacing between one another. With that said we also see how the clouds are altered by the mountain range, which was the purpose of this image. This assignment has given me a new found admiration for cloud behavior and development and has caused me to look at them in more detail.

Reference:

1. "The Clouds Collector's Reference." *The Cloud Appreciation Society*. Web. 22 Feb. 2010. <<http://cloudappreciationsociety.org/collecting/tina-moore/>>.
2. "Atmospheric Soundings." *Wyoming Weather Web*. Web. 27 Feb. 2010. <<http://weather.uwyo.edu/upperair/sounding.html>>.
3. "Keystone Trail Maps | KeystoneResort.com." *Keystone Ski Resort - Colorado Ski Area | KeystoneResort.com*. Web. 27 Feb. 2010. <<http://www.keystoneresort.com/ski-and-snowboard/trail-map.aspx>>.
4. Characteristics of Altocumulus Clouds - by Philp Babitsky - Helium." *Where Knowledge Rules*. Web. 27 Feb. 2010. <<http://www.helium.com/items/1376159-altocumulus-clouds>>.



Complete Map of keystone resort³