

## **Clouds Assignment II**



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MCEN 5228**

**The Image:**

I believe this cloud is captured best by the quotation from Ellen Fowler in her book *Wisdom of Folly* when she said “Though outwardly a gloomy shroud, the inner half of every cloud is bright and shining: I therefore turn my clouds about and always wear them inside out to show the lining.”[1] I first caught sight of this cloud while leaving Upper Dream Canyon off of Lost Angel road. I had just finished a wonderful summer day of rock climbing and was returning to the car when this combination of sunset and clouds was unavoidable to escape. It looked as though the entire sky was ablaze. The sky was overcast except in the horizon where the sun was setting over the mountains. In this location the sun illuminated the clouds to form these bright burning colors. This initial curiosity is what drove me to take this photo, and then to use what knowledge I have of fluids to better understand the phenomena.

The intent of the image is to interpret the movement of the atmosphere above by examining the movement of this cloud. It was after capturing this image that I was able to classify this particular pleasing cloud form as Stratocumulus. The prefix “strato” refers to a low cloud elevation ranging from ground level to 6,500 ft [2] at which this cloud type is most likely to occur. The word “cumulus” comes from Latin and means heap or accumulation, which accurately describes the roundness of the shape of this cloud.

**Image Details:**

**Direction:**

West

**Location:**

Upper Dream Canyon off of Lost Angel road

**Time:**

7:00 pm

**Date:**

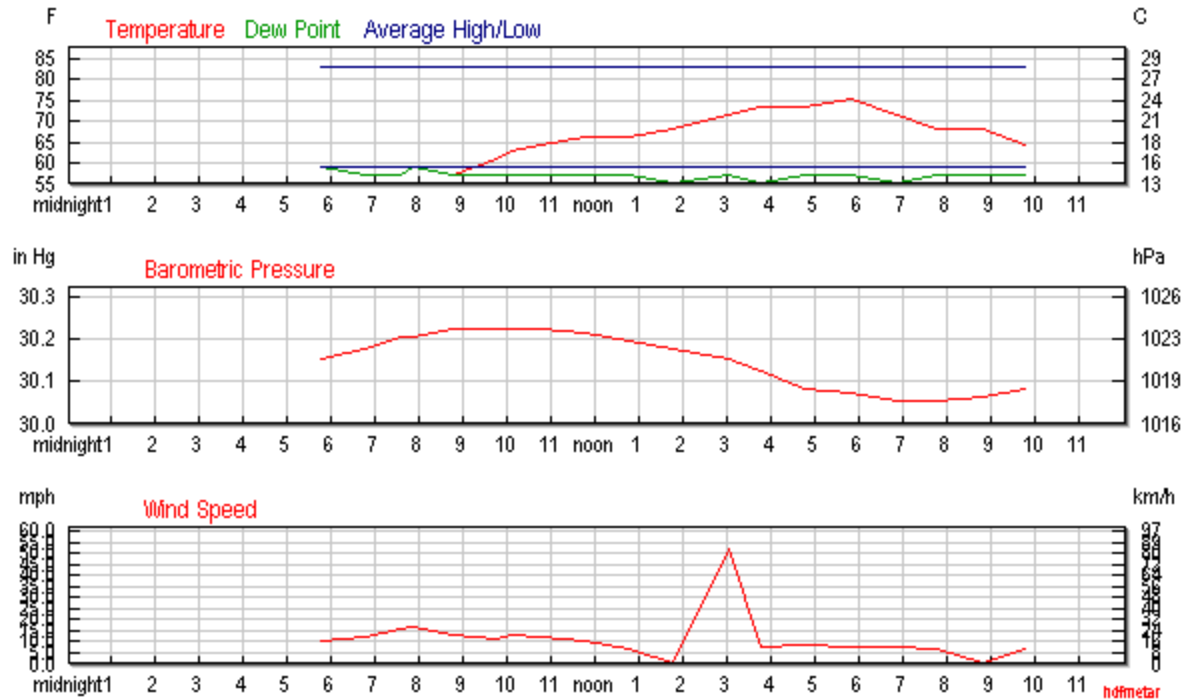
August 12, 2005

**Archived surface data:**

The following Archived data is from Broomfield Colorado at 6:50 pm on the day the photo was taken: [3]

Time(MST)	Temperature	Dew Point	Humidity	Visibility	Wind Direction	Wind Speed	Gust Speed	Precipitation	Conditions
6:50 PM	71.0 °F / 22.0 °C	55.4 °F / 13.0 °C	57%	15.0 miles / 24.1 kilometers	SSW	6.9 mph / 11.1 km/h	-----	N/A	Mostly Cloudy

Although Broomfield is not the exact location at which the photo was taken it is close enough to give reasonable data for Upper Dream Canyon. The graphs below show the change in temperature, barometric pressure and wind speed from 6am to 10pm on August 12, 2005: [3]



**Height:**

From the above data an estimated height and temperature of the cloud can be calculated to be: [4]

<b>Select a Temperature Unit:</b> Degrees F	
<b>Select a distance unit:</b> Feet	
1. <b>Enter the Air Temperature (A)</b>	71
2. <b>Enter the Dew Point (D)</b>	55.4
3. Estimated cloud altitude	3545.553
4. Estimated cloud temperature	51.86

This calculation is based on the assumption that there is a linear relationship between cloud height and cloud temp. The linear relations used are listed below:

$$\text{cloudTemp} = - 0.00984 * \text{cloudHeight} + \text{airTemp} [4]$$

$$\text{cloudTemp} = - 0.00182 * \text{cloudHeight} + \text{dewPoint} [4]$$

This calculated elevation of 3545 feet falls into the range where Stratocumulus cloud formations occur.

**Stable or Unstable:**

Cumulus clouds develop in an unstable atmosphere this is why they grow vertically. The unstable warmer air pushes up through the bottom of the cloud pulling some of the frozen water crystals and air with it. This in turn creates an even larger cloud. Cloud forms depend on the strength of the uplift and the stability of the atmosphere. I was unable to obtain a Skew T diagram for this particular day. This diagram would have helped in determining the stability of the cloud.

### **Visualization Technique:**

My camera was set to landscape so that the best focus of the distant cloud would be achieved. The lighting for the subject was supplied by the sun in front of me setting behind the mountains. No flash was used for it would have had no effect on lighting the cloud or far away objects. There were no buildings or objects around that would have reflected light back at the camera and thus the sun was the only light source. The entire sky was filled with this cloud which produced diffused lighting from the sky.

### **Photographic Technique:**

The minimum distance that two object can be recognized from each other is called spatial resolution. Photography of clouds has very poor spatial resolution because the clouds are so far away and so large. Another difficulty that affects spatial resolution is the difficulty of a camera to focus on a three dimensional semi transparent object. Conversely, the temporal resolution of cloud photograph is excellent due to the distance from and the low speeds of the cloud.

#### **Lens focal length and other lens specs:**

18.00 mm at f3.5

#### **Type of camera:**

Kodak CX7330 Zoom digital camera

#### **Exposure specs:**

Normal Program, shutter speed: 1/64 sec., ISO speed: 100

#### **Photoshop processing:**

None, photo was only slightly cropped

### **What the Image Reveals:**

What I like most about the image is the dramatic colors produced by the sun and cloud combination. It was only by the coincidence of excellent timing that I was able to capture this image; ten minutes after the photo was taken there was no sun left. This image reveals the vast variety of colors that can be produced by a setting sun and some diffusion through clouds and water crystals. What I dislike about this image is that I only had my 3 mega pixel digital camera with me at the time the photo was taken. I wish a higher resolution camera was present so that the photo could be seen in more detail. My intent was fulfilled in this project and I find that even when not taking photos of clouds I spend more time inspecting and investigating them for signs of the changes in the atmosphere. If I were to redo this project the direction that I wish to take next would be

to take several different photos at this same location but in different seasons. This would create a very interesting contrast when displayed next to each other.

**References:**

- 1) <http://www.worldofquotes.com/topic/Clouds/1/index.html>
- 2) <http://www.answers.com/topic/cloud>
- 3) [http://www.wunderground.com/history/airport/KBJC/2006/2/25/DailyHistory.html?req\\_city=NA&req\\_state=NA&req\\_statename=NA](http://www.wunderground.com/history/airport/KBJC/2006/2/25/DailyHistory.html?req_city=NA&req_state=NA&req_statename=NA)
- 4) <http://www.vivoscuola.it/us/rsigpp3202/umidita/copie/cloud.htm>