

# Clouds Assignment



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October 11, 2007

## The Image:

After a 30 minute hike to the top of Chitaqua Park, I was finally in a position to capture an image of one of the few clouds on a perfect, sunny day. The intent of the image is to interpret the movement of the atmosphere by interpreting the movement of the clouds. The appearance of clouds in the atmosphere is regulated by complicated fluid mechanics and thermodynamics. Yet, a picture of a cloud can bring beauty to one's eye and also a wealth of information about the atmosphere. The cloud in the image is a Cirrus Fibratus. The Latin translation for cirrus is "curl of hair" and fibratus is "feather" (1). The translation for cirrus is fitting because most cirrus clouds tend to be wispy. In this image, the cirrus clouds are isolated which often indicates a stable atmospheric situation and does not bring precipitation.

## Image Details:

**Direction:** East

**Location:** Above Chitaqua Park

**Time:** 2:00 PM

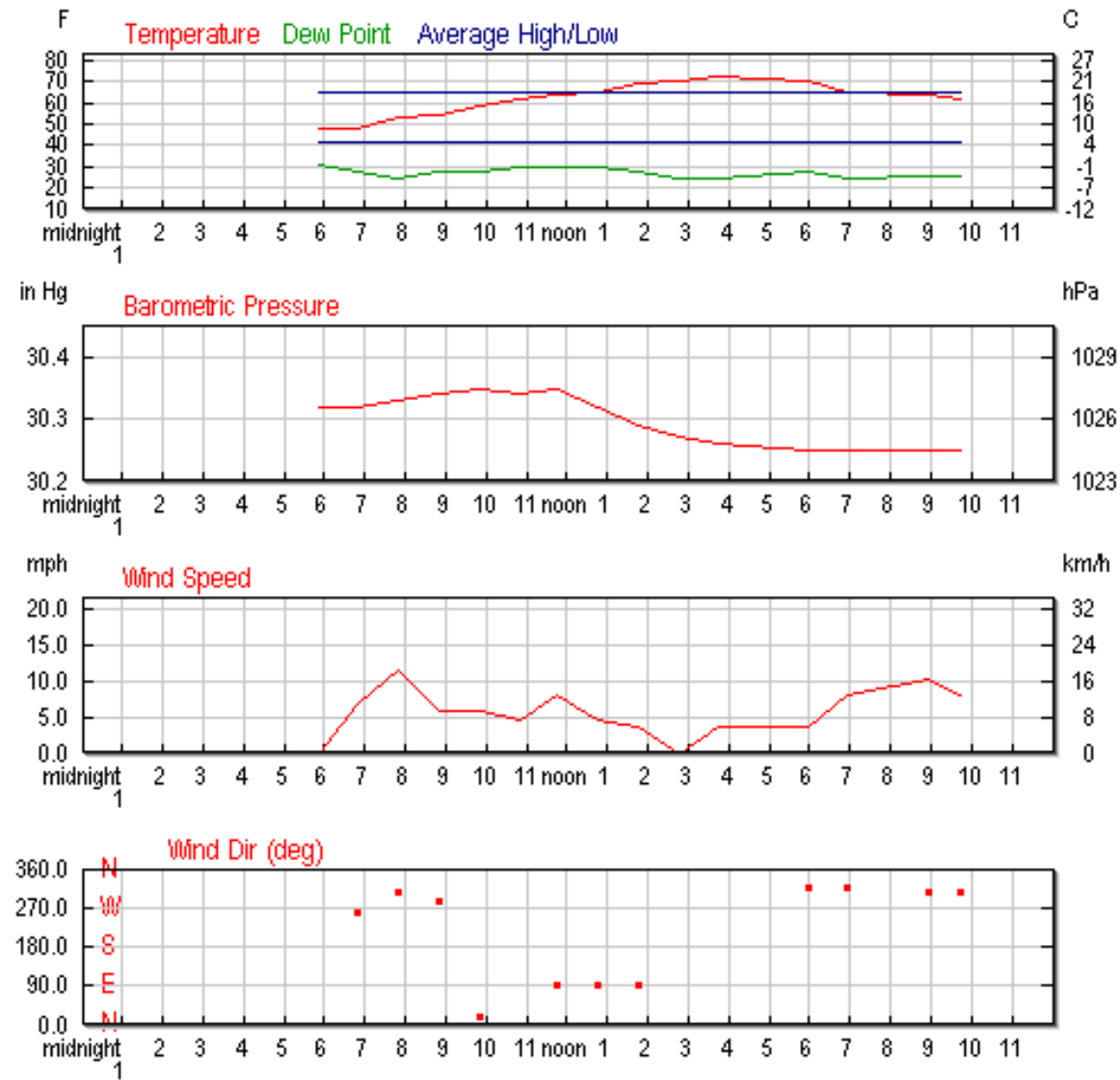
**Date:** October 9, 2007

### Archived Surface Data:

The following archived data is from Boulder at 2:48 PM on October 9, 2007 (2):

Time	Temp	Dew Point	Humidity	Sea Level Pressure	Visibility	Wind		Precipitation	Conditions
						Direction	Speed		
2:48 PM	71.6 F	24.8 F	17%	30.29 in	50.0 miles	East	3.5 mph	N/A	Scattered Clouds

The graphs below show the change in temperature, barometric pressure, wind speed, and wind direction over the course of the day on the day the picture was taken (2).

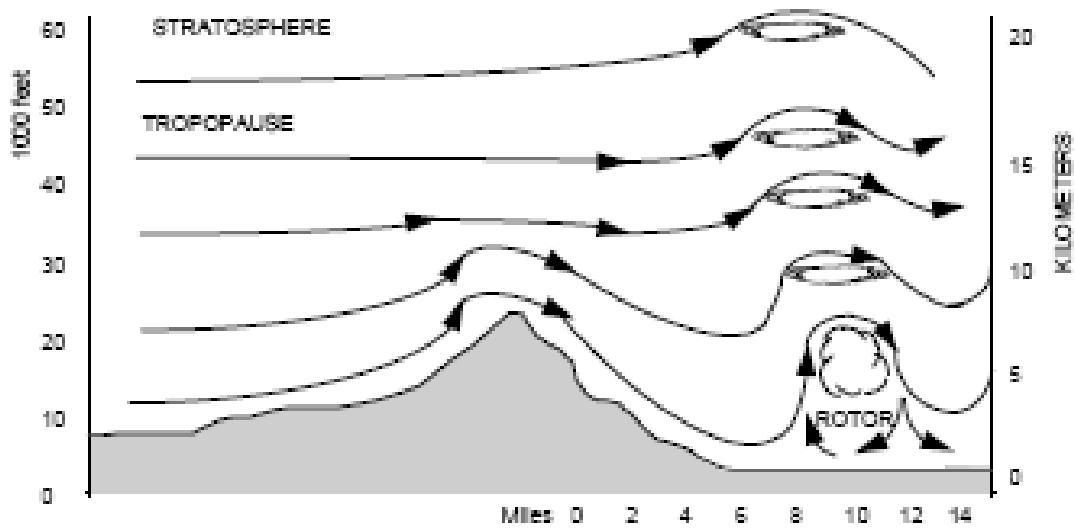


## Height:

From the above data, an estimated height and temperature of the cloud can be calculated to be (3) :

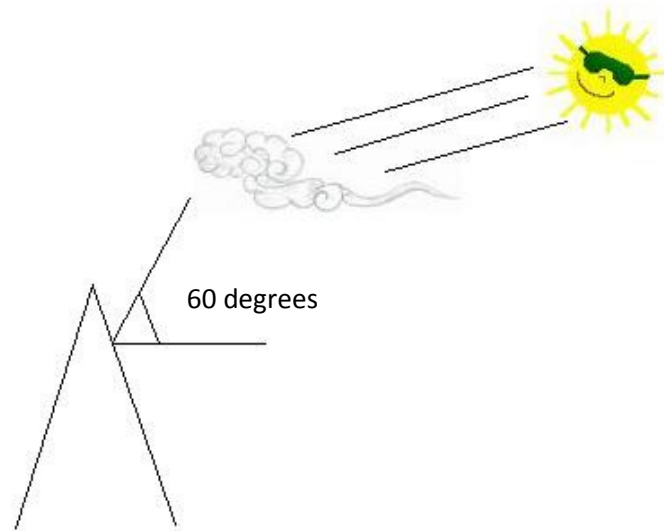
Cloud Altitude Calculator	
Select a Temperature Unit:	Degrees C
Select a distance unit:	Feet
1. Enter the Air Temperature (A)	71.6
2. Enter the Dew Point (D)	24.8
3. Estimated cloud altitude	10454
4. Estimated cloud temperature	14.561

This calculator is based on the assumption that the air temperature drops 9.84 degrees C per 1000 m of altitude and the dew point drops 1.82 degrees C per 1000 meters altitude. Boulder's elevation is approximately 5,400 feet so this height must be added to the estimated height which gives almost 16,000 feet. This height is about 4,000 feet shorter in which Cirrus Fibratus normally form. But if the conditions are right, they are known to form at this height. The image below shows that the cirrus clouds that form at this height are relatively stable.



**Visualization Technique:**

The camera used for this image was set to daylight with no flash. The lighting was supplied by the sun and the angle the image was taken is approximately 60 degrees. The figure below better illustrates the visualization technique.



## **Photographic Technique:**

The size of the field of view was quite large and therefore hard to determine. The spatial resolution is the minimum distance that two objects can be recognized from each other and this image has very poor spatial resolution because the cloud is about 16,000 feet away and semi-transparent. Yet the temporal resolution is excellent because of the distance of the clouds and the low speed of the clouds.

Type of Camera:	Canon PowerShot SD750
Lens focal length:	8.5 mm
Aperture:	f/10.0
Shutter Speed:	1/100 sec
ISO Setting:	80
Photoshop:	none
Flash:	none
width X height pixels:	2592 X 1944

## **Conclusion:**

The aspect of this image that I find most appealing is the contrail in the lower right hand side of the image. Contrails are artificial cirrus clouds made by the exhaust of aircraft engines. So not only does this image capture the atmosphere in action, it also captures the beauty of the sky when man interferes with it.

I think that my image could have more detail and be a little more creative with the sunlight. Later in the evening when the sun was setting, the clouds were much more beautiful but I had already returned the borrowed camera. My intent for this project was fulfilled because everyday when I see new clouds, I know what is occurring in the atmosphere.

## References:

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<http://www.tranexp.com:2000/Translate/result.shtml>

[http://www.wunderground.com/history/airport/KBJC/2007/10/9/DailyHistory.html?req\\_city=Boulder&req\\_state=CO&req\\_statename=Colorado](http://www.wunderground.com/history/airport/KBJC/2007/10/9/DailyHistory.html?req_city=Boulder&req_state=CO&req_statename=Colorado)

<http://www.vivoscuola.it/us/rsigpp3202/umidita/copie/cloud.htm>