

Clouds Assignment 2



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November 29, 2007

The Image:

After a 30 minute hike to the top of Flagstaff, I was finally in a position to capture an image of one of the many clouds on a calm winter 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 stratocumulus. When covering an area, these clouds tend to appear gray and dismal. But when taken from further away and at the same level, they appear wistful and full of life. In this image, the stratocumulus clouds are isolated which often indicates the beginning or end of a storm front.

Image Details:

Direction: East

Location: Flagstaff Road

Time: 9:00 AM

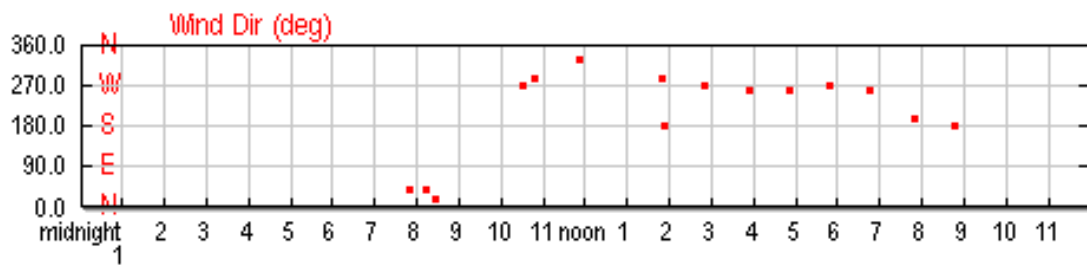
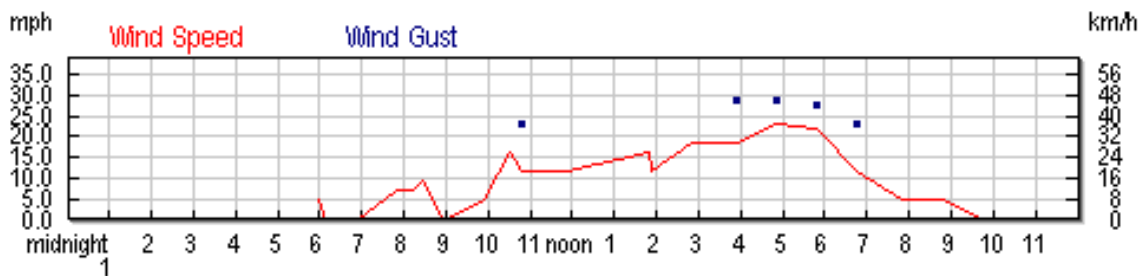
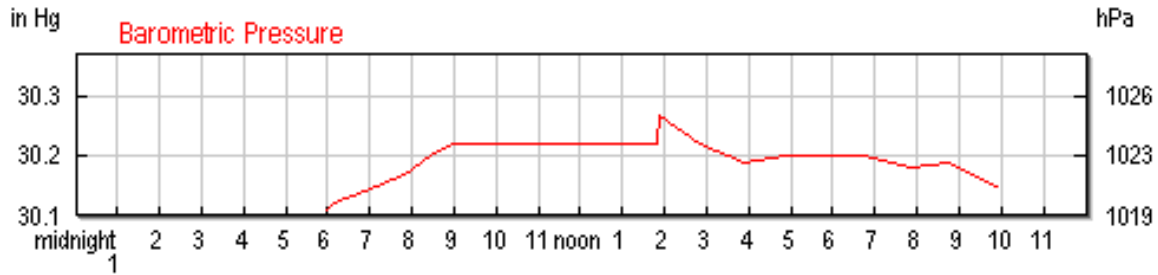
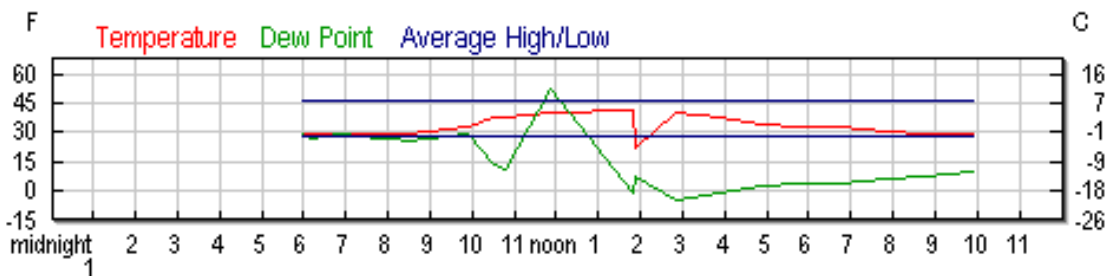
Date: November 28, 2007

Archived Surface Data:

The following archived data is from Boulder at 8:58 AM on November 28, 2007 (1):

Time	Temp	Dew Point	Humidity	Seal	Visibilit y	Wind	Wind Speed	Conditions
				Level Pressure		Direction		
8:58 AM	30.2 F	26.6 F	86%	30.22 in	8 miles	Calm	Calm	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 (1).

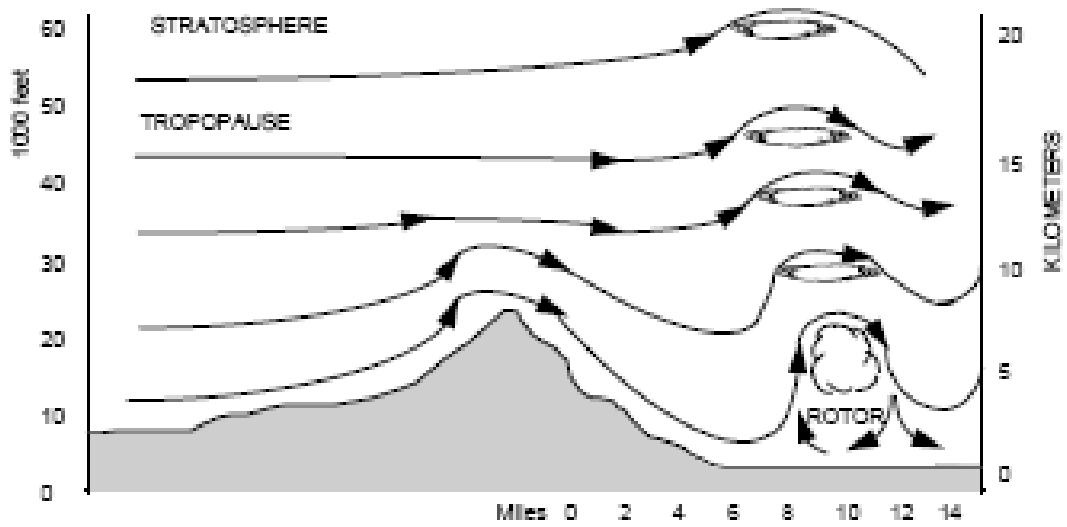


Height:

From the above data, an estimated height and temperature of the cloud can be calculated to be (2) :

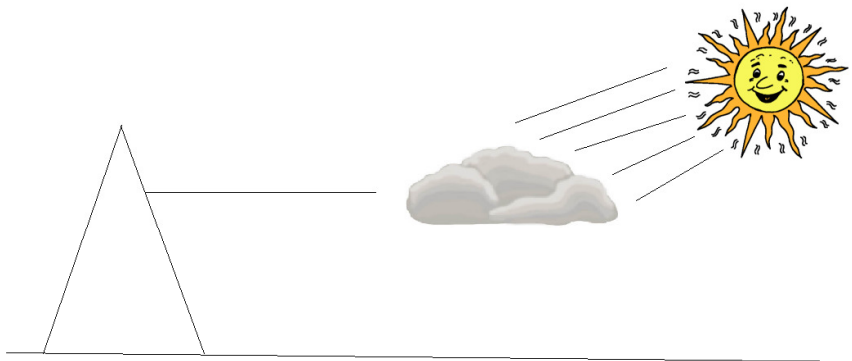
Cloud Altitude Calculator		
	Select a Temperature Unit: Degrees F	
	Select a distance unit: Feet	
1.	Enter the Air Temperature (A)	30.2
2.	Enter the Dew Point (D)	26.6
3.	Estimated cloud altitude	818.204
4.	Estimated cloud temperature	25.783

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 6,218 feet. Stratocumulus clouds generally appear at around 6,500 feet, so this approximation seems correct. Stratocumulus clouds are usually the lowest of the low level clouds and usually appear gray from the bottom. They form when a large mass of air rises slowly and the water vapor condenses as the air becomes cooler. The picture below displays the formation of the stratocumulus cloud over the front range.



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 horizontal. 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 several miles away. 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:	17.44 mm
Aperture:	f/14
Shutter Speed:	1/160 sec
ISO Setting:	80
Photoshop:	Darkened picture
Flash:	none
width X height pixels:	2592 X 1404

Conclusion:

I find this image very appealing for several reasons. Normally, this stratocumulus cloud would cause me to feel gloomy if it was right over head. Instead, when at the same height of the cloud, you can see there is more to the gloominess bottom of the cloud. The top is full of energy and sunlight.

I think that my image could have more detail and be a little more creative with the sunlight. Later in the afternoon, the clouds were further away, but the sunlight lit them much better. My intent for this project was fulfilled because everyday when I see new clouds, I know what is occurring in the atmosphere.

References:

http://www.wunderground.com/history/airport/KBJC/2007/11/28/DailyHistory.html?req_city=Boulder&req_state=CO&req_statename=Colorado

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