Clouds Assignment #2

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MCEN 4151/ ARTF5200

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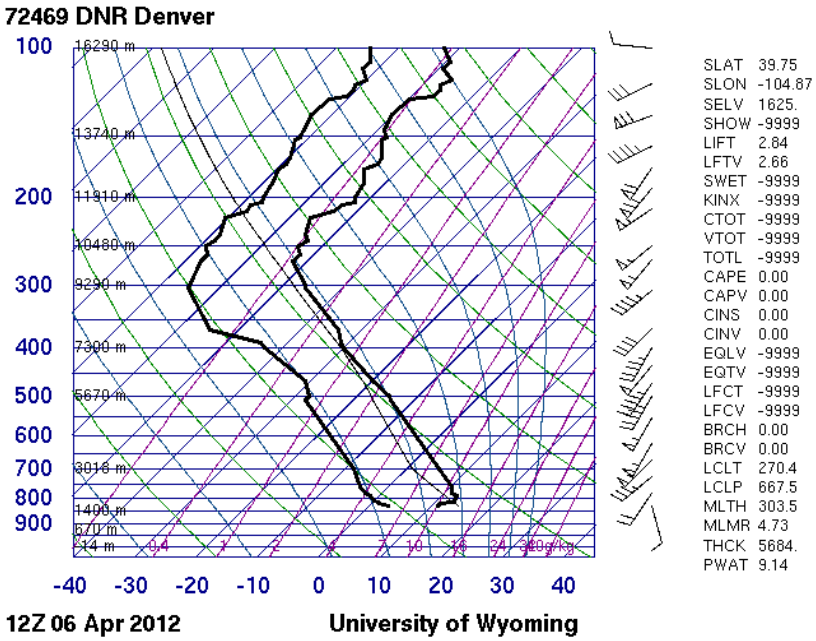
The image was taken to fulfill the requirements of the second cloud assignment in the Flow Visualization class. The image was shot at night using a long shutter to present a unique image of clouds that is not commonly captured. The intent was to capture an image that captured a much rarer view of clouds than many images had done, as well to capture a much more aesthetically pleasing image. The image was captured using a Nikon P100. No tripod was available so the camera was stabilized by using the foldout viewing screen.

The image was captured from an apartment balcony near campus. It was located approximately a ¼ mile south of the Wolf Law building. The location presented a challenge in capturing an image, as there were a number of nearby street lights that caused parts of the bottom of several images that were captured to become overexposed. The picture was taken facing southwest. There are no immediately recognizable landmarks in the image that provide a basis for determining exact orientation. The image was taken by hand without use of a tripod, so establishing an exact elevation angle is difficult. Based on the ground references visible in the image, and estimation of the angle while capturing the image the incline was approximately 45 degrees from horizontal. The image was captured on Thursday, April 5, 2012 at 10:29 PM. The cloud dispersed quickly after, and dissipated entirely less than twenty minutes after the picture was taken.

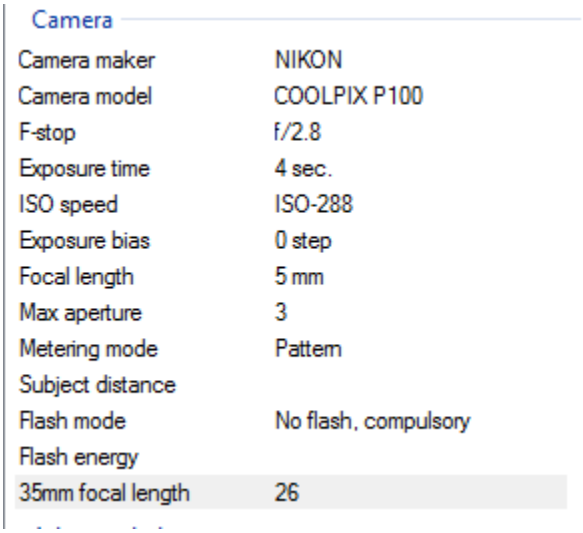


The image shows a large layer of quickly clearing overcast clouds. Based on the low altitude of the cloud and given that it formed after precipitation it is likely a stratus cloud. Its wispy nature would indicate that it is probably further classified as a stratus fractus, which can commonly form at the edge of mountain ranges[1]. The sky was overcast at the time that the image was taken, but it was rapidly clearing. It had been raining lightly but consistently for several days before the image was captured, and it was clear and warmer in the days that followed. It was very calm with only a light breeze when the image was taken. Based on the skew-T diagram, clouds would be not expected to form at the elevation they appeared to be at. The data from the graph does not contradict the observed results though, as the clouds were low and dissipated quickly, meaning that conditions could vary significantly between where and when the image was captured and the data that is available from DIA, where the balloons are launched from. However, the clouds appeared to be at or slightly below the elevation of the flatirons, which would mean they are at an elevation of approximately 8500 to 9000 feet. Based this they agree/disagree. The atmosphere is stable at the time of the image capture, and the rapid clearing of the clouds would tend to support this. The cloud is most likely formed by moisture left in the air from the earlier rains rising until they condensed, and their altitude is likely due to them being caught in turbulent air after it has crossed the mountains.

The field of view of the image is difficult to determine exactly, but may be estimated at around three miles across. The distance to the cloud from the lens an be estimated using the height of the cloud and the approximate angle of elevation of the camera. Assuming a cloud height of 9000 feet, and using an estimated angle of 45 degrees, an equation can be created of the form x=9000/tan(45). The result of the equation is 9000 feet, or approximately 1.7 miles. This estimate seems reasonable as the clouds appeared to be centered over Boulder, and were likely trapped by the surrounding hills. The image was captured with a Nikon P100 camera. The camera has 10.1 megapixel sensor. The original image size was 3264x2448 pixels, and the edited image was 3648x2736 pixels. The camera was used on manual mode to gain maximum control over the capture of the image. The shooting data shows a focal length of 26mm. The aperture setting was set at an f-stop of f/2.8 in an attempt to focus sharply on the clouds, while leaving foreground items slightly out of focus, as they were not the image subject. The shutter speed was set at 4 seconds in order to allow enough light in the low light conditions while being able to use a lower ISO. The ISO was set at low ISO-Auto, which allows it to automatically set within a range of 160 to 360, and the image had an ISO number of 288. The image was edited in several ways. The image was cropped to cut out several apartments that were visible in the bottom of the image. Contrast was slightly increased using the levels tool. The image was also darkened from the original slightly because the settings used for the shot created an image that was slightly brighter than desired.

The edited image loses some details in a several areas, but gains more details in others, and it was determined that the trade-off was worthwhile. The editing also creates the nighttime aesthetic that was desired, as in the original the image looks as though it could have been captured during the day. The image turned out to be more aesthetically pleasing than expected, and despite the long shutter time without use of a tripod, there is minimal blur in the image. Blur that is present is visible in the trees and was caused by the breeze. The intent of the image was to provide a unique look at a cloud while also attempting to capture the details within the cloud, and both goals were achieved. The idea could be improved and taken further in several ways including use of tripod or a time lapse as the clouds

dissipated. However a time lapse may not have provided as dramatic a result because images taken several minutes later where much less aesthetically pleasing.



Camera	
Camera maker	NIKON
Camera model	COOLPIX P100
F-stop	f/2.8
Exposure time	4 sec.
ISO speed	ISO-288
Exposure bias	0 step
Focal length	5 mm
Max aperture	3
Metering mode	Pattern
Subject distance	
Flash mode	No flash, compulsory
Flash energy	
35mm focal length	26

References

1. Pretor-Pinney, Gavin. *The Cloudspotter's Guide.* (Perigee Books, New York. 2001)