

## Clouds 1

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### Image Intent:

The purpose of this image is to capture an artistic image of a cloud. Clouds in many ways can show the physics of a fluid flow and some of the physics of weather. The image captured is actually very interesting because it shows two different types of clouds. Using atmospheric sounding data and comparing the image to pictures of known clouds the type of cloud can also be determined.

### Cloud Image Location:

This image was taken near Table Mountain in Golden, Colorado. The image was captured at 5:30 pm on February 24, 2009. The image was taken facing the North East. This location was chosen because the sky could be seen from an elevated position so there was little blocking the image of the clouds. The time of day also provided some very interesting colors that make the image more appealing because the sun was setting.

### Photographic Technique:

The photograph was taken using a Samsung S860 digital, 8.1 megapixel, camera. The lens on this camera is a Samsung Lens Zoom 8.3-18.9 mm. The focal length for the lens taking this shot is 6.3 mm. This image was taken using an autofocus camera. The shutter speed was 1/90 of a second and the F Number was set at 2.8. The maximum lens aperture was 2.97. The image is 3264x2448 pixels (8 megapixels). The lighting was provided by the setting sun which is coming from the west, while the clouds are in the North East. The image was cropped to a size of 3249x1278 pixels. Other than cropping, the picture was slightly darkened, but no other modifications were made to the original image.

### Cloud Physics:

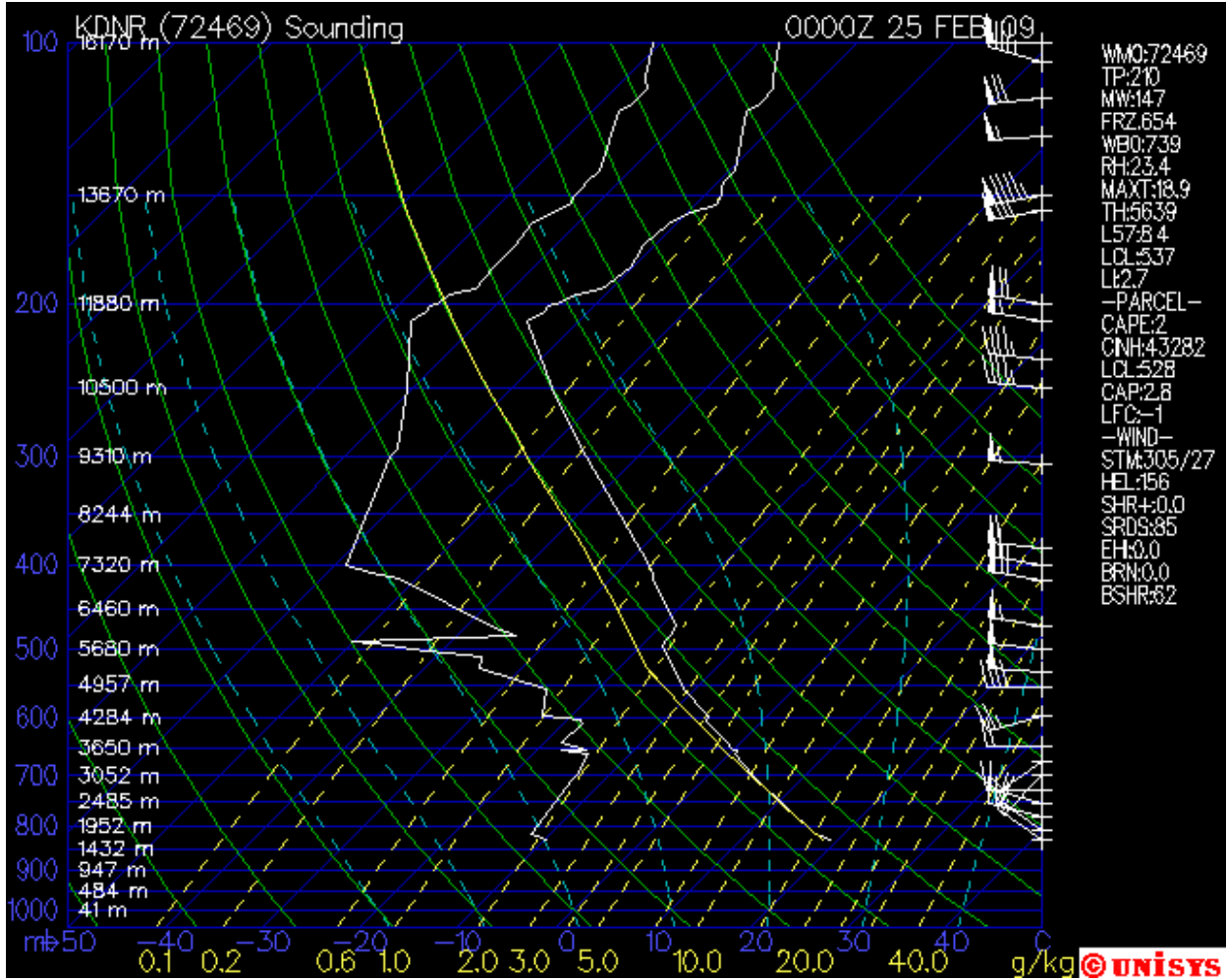
The clouds shown in the foreground of the image are cumulus fractus. Cumulus clouds generally form when there is an unstable region in the atmosphere. Unstable regions occur at altitudes where the temperature is decreasing faster with increasing altitude than an adiabatic reference. This is because warmer air is less dense and will rise and the adiabatic reference is warmer so the air will be moving up and causing "puffy" clouds like cumulus clouds.

Seen in the background, the image also shows some altocumulus clouds, which are the result of a stable atmosphere. Stable atmospheres occur when the temperature is decreasing slower with increasing altitude than an adiabatic reference. This information for the location can be determined using a Skew-T chart, which is included for the approximate location and time on Page 3. The line furthest to the right is the temperature line and the line in the middle is the adiabatic reference. These

lines appear to have similar slopes which would indicate a conditional stability which can explain the presence of both the cumulus clouds and the stratus clouds.

#### Future Work:

In the future I would like to image clouds using a camera that does not force one to autofocus. I found that of the many images I took of clouds, very few of them are very well focused. The camera used was a simple point and shoot camera that doesn't allow any fancy manipulation of the focusing. This led to the camera focusing often on trees and other objects also in the image, but too close in the foreground for the picture to come out well. I believe that the problem is that autofocus doesn't have any distinct lines to use for focusing on.



References:

“Current Skew T Plot for Denver CO (DNR-72469)” Unisys. Online available:  
[http://weather.unisys.com/upper\\_air/skew/skew\\_KDNR.html](http://weather.unisys.com/upper_air/skew/skew_KDNR.html). June 23, 2002.

Day, John A. “The book of Clouds”, Silver Lining Books. 2003. New York NY.