

Objective

The primary purpose of this project was to study the physics of cloud formation. Many types of cloud can exist in the sky in the span of one day depending on the weather of that day. To understand the cloud phenomena, first, a picture of cloud will be captured. Then I will combine this picture along with the Skew T Plot and other cloud knowledge to interpret the meaning of the cloud.

Image Details

The cloud image was taken on April 9th, 2010 at 3:54 PM in Westminster, Colorado. The weather on that day was around 59 F with a low of 32 F. The wind speed was around 28 mph and the average sky cover was approximately 30 percent (1). When I took this picture, the sun was out and the sky was clear. Therefore, no camera flash needed to enhance the contrast of the image.

Discussion



Figure 1: Cumulus Mediocris, taken on 4-09-2010

Figure 1 shows the cloud picture that I have taken. According to the Cloud Spotter's Guide, the cloud type is cumulus due to its puffy appearance (2). In addition, the upper part of this cloud resembles cauliflowers or broccoli vegetable and the base is flat. The cloud species is mediocris because its vertical height is somewhat large and the top is protruded into the sky above. As such, the final name for this cloud is cumulus mediocris.

The cumulus mediocris cloud is formed due to surface heating. When the sun heats up the surface of the earth, the air parcel at the surface begins to rise because that air parcel is less dense than the surrounding air. As the air parcel rises, it gets cooler and eventually leads to condensation. Condensation leads to water droplets and if there are enough water droplets in the sky then cloud will form (3). Hence, cumulus mediocris are "fair-weather clouds" since they only can be formed during a hot and sunny day.

Figure 2 shows a diagram of Skew-T plot (4). This Skew T plot also confirms my analysis on cumulus mediocris. The plot indicates that the weather on April 9th was fairly stable due to the fact that the

slope of air parcel is always less than or equal to the adiabatic saturation line (5). In addition, the CAPE value of 0.00 also represents stable atmospheric conditions.

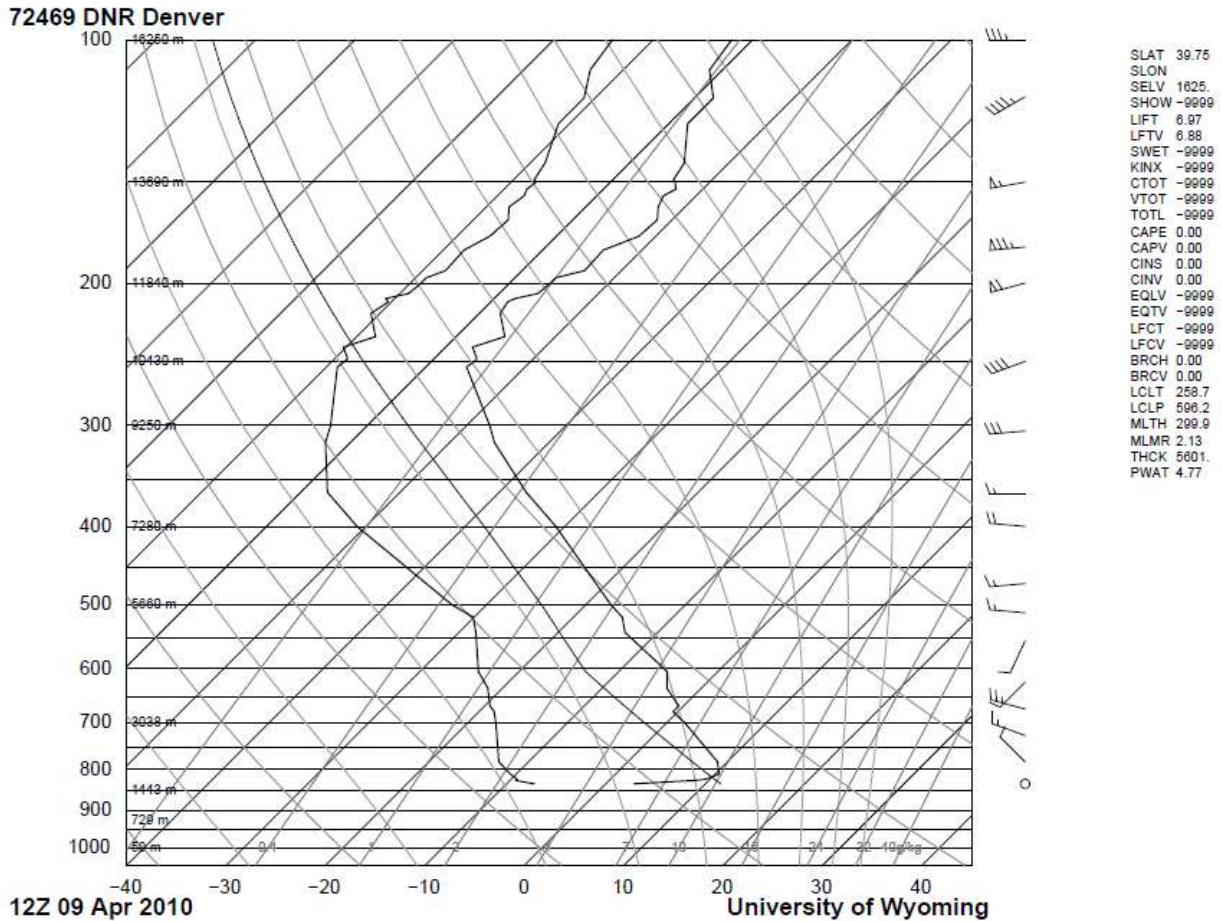


Figure 2: Skew T Plot

In addition to being “fair-stable clouds”, cumulus mediocris are also good to have in our atmosphere because they enhance the diffusion of solar radiation which can warm the earth up at a faster rate on a cold day (6).

Visualization Technique

The image was taken during the day in order to use sunlight to maximize the quality of the image. The camera was facing east during the capturing time and the bottom of the camera was perpendicular to the ground level. The field of view was approximately 50 by 50 ft.

Photographic Technique

The Canon model of PowerShot SD 1200 IS camera was used to take the cloud picture. The following table presents the camera data on this image.

Table 1: Camera Information

Shutter Speed	1/800 s
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F-Stop	f/4.9
Aperture Value	f/4.8
Max Aperture Value	f/4.9
ISO Speed Ratings	80
Focal Length	18.6 mm
Dimensions	3648x1059
Resolution	180

Conclusion

Overall, I am content with my cloud image because it clearly resembles the cumulus type of cloud. This project also helps me understand how clouds are formed. Basically, the types of cloud that are formed in the sky is depended on whether the earth is warming up or cooling down. I also think that my image has a great brightness and contrast, therefore, making all the cloud details visible.

Works Cited

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6. *Cumulus Clouds and Reflected Sunlight from Landsat ETM+*. **G. Wen, L. Oreopoulos**. Atlanta : s.n., 2001, Eleventh ARM Science Team Meeting Proceedings, Atlanta, Georgia March 19-23.