Clouds 2

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Clouds 1

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The following paper outlines the processes and procedures used to capture and image of a lower cumulus cloud and upper cirrus cloud and the weather associate with each. Weather charts and Skew-T diagrams are analyzed and compared to what is seen in the image. It then goes into detail of the editing performed to after the image was created.

Table of Contents

I. Introduction 1
II. Image Circumstances 1
III. Cloud Description 1
IV. Photographic Technique 2
V. Conclusion 4
VI. References 4
VII. Acknowledgements 4

I. Introduction

This image was taken to satisfy the requirements of the "Clouds 2" assignment of MCEN 4151 Flow Visualization taught by Professor Jean Hertzberg. It was intended to capture the dominant cumulus cloud in the lower atmosphere with the cirrus cloud in the upper atmosphere. This image is unique in that it captures an unstable lower atmosphere with a stable upper atmosphere which indicates the lower atmosphere is stratified.

II. Image Circumstances

The image was taken along Interstate 15 between Cedar City, UT and Beaver, UT facing East on March 30, 2013 at 17:27 UTC. As very few fellow passengers were interested in stopping to take pictures of clouds, the image was taken through an open window while driving down the interstate. This made the image difficult to frame and capture as the camera was always moving. A cannon PowerShot G9 was used to capture the image. No additional lenses or filters were used other than the factory lens.

III. Cloud Description

The image shows cumulus clouds dominating the image below some upper cirrus clouds. Viewing the clouds and comparing the image to the Skew-T diagram presented in Figure 1 reveals some interesting weather phenomena. Inspection of the Skew-T indicates little moisture in the lower atmosphere, which explains the under-development of the cumulus clouds. However, the Skew-T also shows a high level of moisture in the upper altitudes, above 500 mb (~18,000 ft), which explains the upper cirrus clouds.

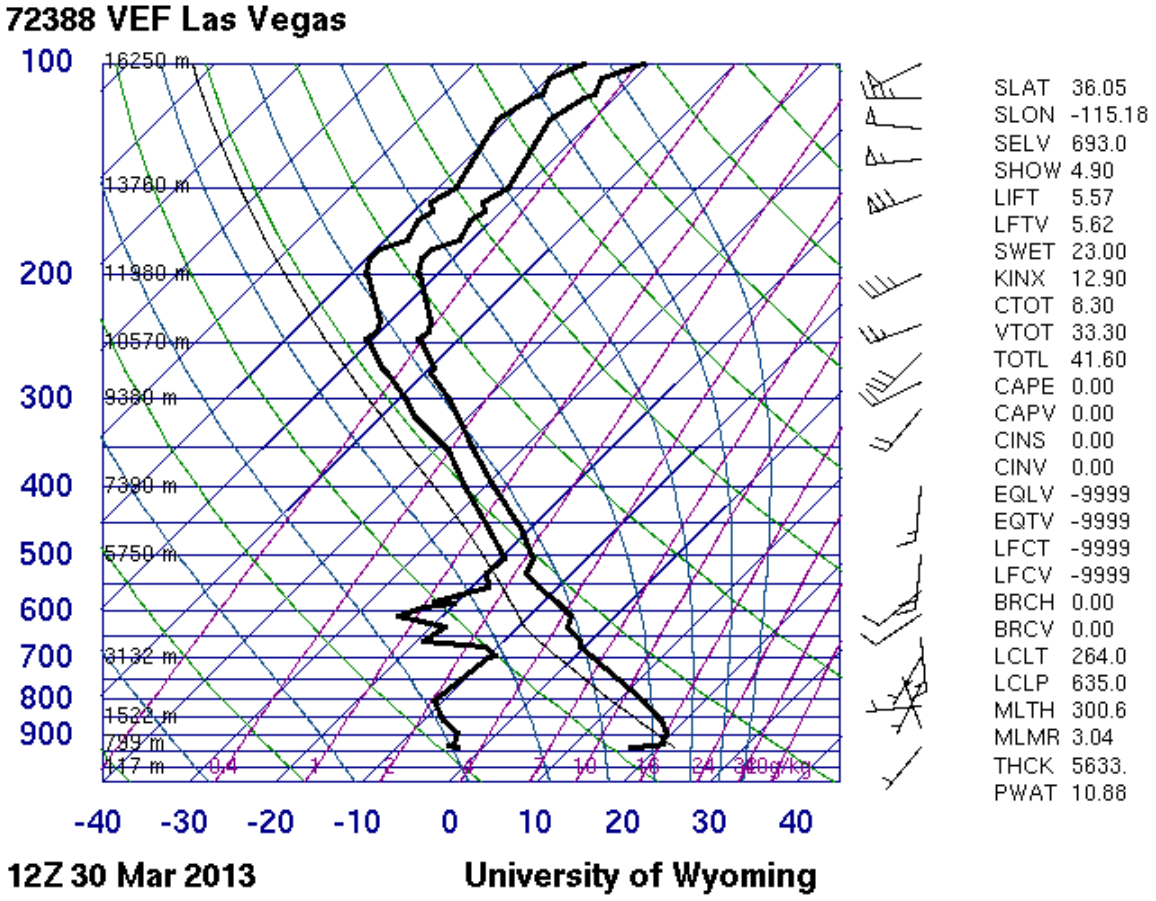

Figure 1: Skew-T Diagram (Wyoming, 2013)

As mentioned previously, the lower cumulus clouds tend to indicate an unstable atmosphere but the upper cirrus clouds indicate a stable atmosphere. This indicates the lower atmosphere is stratified and has layers of instability as well as layers of stability. This is also likely the cause of the lack of development of the cumulus clouds with cut-off tops.

At the time of image capture the weather was sunny with scattered clouds. No precipitation was experienced previously in the day or later in the evening. According to Figure 2 the picture was captured just at the edge of a front.

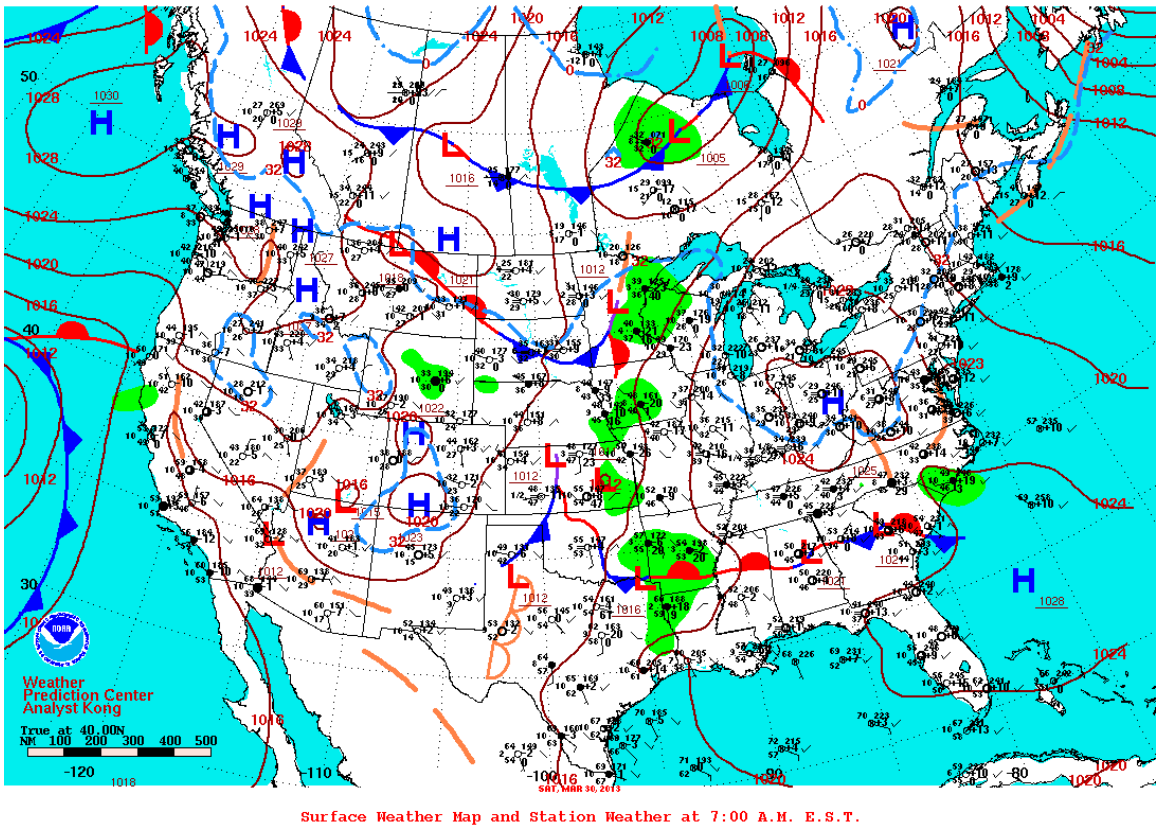

Figure 2: Surface Weather Chart (National Centers for Environmental Prediction, 2013)

IV. Photographic Technique

The images were taken with a Cannon PowerShot G9 camera with no lens attachments. The aperture was set to its maximum f/8.0 to provide the best depth of field. The focal length was focused to infinity at 7.4 mm. The ISO was set to 100 for high sensitivity, which resulted in a shutter speed of 1/500 seconds. The final image's dimensions were 3797 x 1395 pixels, which is reduced from 4000 x 3000 in the original image. Figure 3 shows a comparison of the original and final images.

Figure 3: Original (Top) and Final (Bottom) Image

The primary adjustment made to the image was cropping. The bottom part of the image was removed leaving only the mountaintops for effect. After cropping the contrast curves were adjusted slightly to bring out the details in the clouds. Overall, very little editing was performed on the image.

V. Conclusion

In conclusion, the image was able to capture many cloud formations and weather phenomena and allowed for some interesting comparisons with weather data. If the image were to be recreated it would be interesting to attempt to take pictures of the same cloud over a period of time in order to visualize the changes. This was impossible as the image was taken along the side of the road and it was not possible to stay in the same place for an extended period of time.

VI. References

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VII. Acknowledgements

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