

THE ART AND PHYSICS OF CLOUDS FLOW VISUALIZATION FALL 2016

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ABSTRACT

This paper describes the art and physics of clouds observed on August 30, 2016 at 1913 hours facing west in Boulder, CO. During the course of the Fall 2016 semester at the University of Colorado at Boulder, several types of clouds were observed under differing atmospheric conditions. The clouds observed on August 30 artistically produced the most visually appealing image used for Cloud Assignment One.

Using data from the University of Wyoming atmospheric soundings [Ref 3], it was determined that the clouds shown in the image are stratocumulus. The atmospheric conditions were stable with a Cape Value of 0.00 and conditions showing cloud formation at approximately 1,886 ft altitude. The atmospheric temperature was approximately 18 F.

The image was taken using a LG Stylo 2 camera. The focal length was 3.62 mm. The ISO was 50, and the exposure is 1/120th. Post-processing was accomplished using Photoshop and included rotation, cropping, saturation and color adjustments, and editing to remove white border edges.

INTRODUCTION

The image was taken in Boulder, CO facing west, as shown by the Flat Irons range at an elevation of approximately 5,430 ft. The image was taken at 1913 hours on August 30, 2016. The camera had no tilt, and the image was taken parallel from the ground at a standard 90 degree angle. The panoramic mode was used to capture the image which introduced a curvature to the image composition.

Cloud Type and Formation

The clouds observed are Stratocumulus [Ref 2]. The Skew-T plot (Figure 1) shows a stable atmosphere with a Cape value of 0.00. Originally, the Skew-T plot for August 31, 2016 was used (Figure 2), per standard methods, however, the clouds observed did not correlate to that specific Skew-T plot which was taken the morning following the date the image was taken. The panoramic view captured the majority of the clouds and other cloud formations observed in the rest of the sky were similar in formation. Weather observed included precipitation of 0.17 inches and temperatures of 81 F and 57 F [Ref 4]. Winds were negligible. The altitude of the clouds was approximately 1,886 ft, which is consistent with the cloud heights expected.

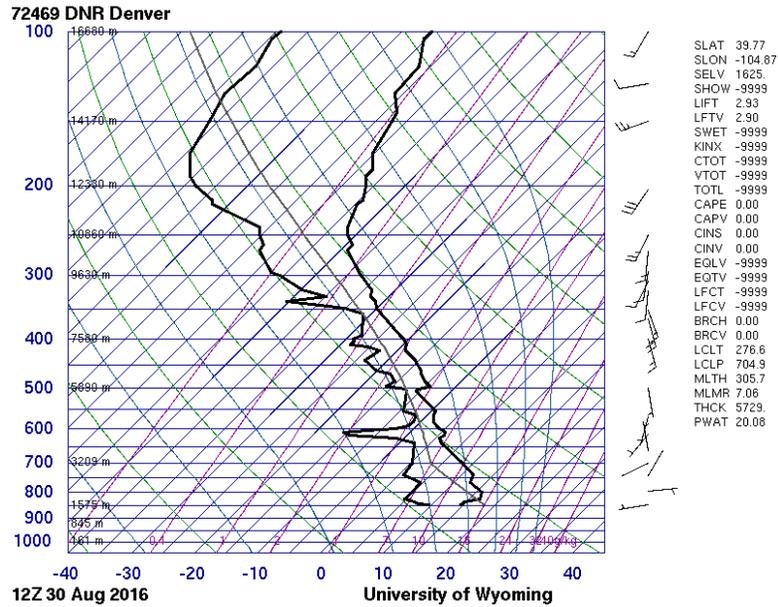


Figure 1: Skew-T Diagram August 30, 2016, 12Z [Ref 3]

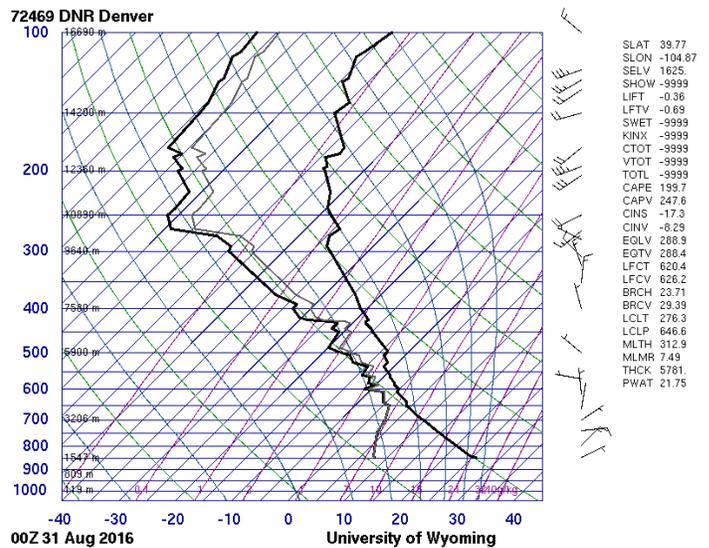


Figure 2: Skew-T August 31, 2016, 00Z [Ref 3]

The physics of the clouds were determined using the University Corporation for Atmospheric Research (UCAR) [Ref 2]. It was determined that the clouds observed visually appear to be stratocumulus, which occur at altitudes below 6,000 ft and are lumpy and gray (Figure 3). Light rain falls from stratocumulus clouds, which is consistent with the

weather August 30, 2016. The clouds were also visually approximately the size of a fist- another distinguishing technique for determining cloud type.

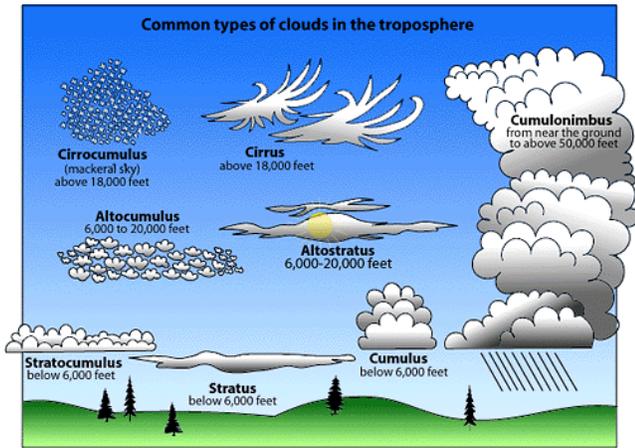


Figure 3: Common Types of Clouds [Ref 2]

Photographic Technique

The photographic technique included the following equipment:

-LG Stylo 2 Camera Phone

The photographic settings used for the original image were:

-Focal Length: 3.62 mm

-ISO: 50

-Exposure: 1/120

-Mode: Panoramic



Figure 4: Original Image

Post-processing included: rotation, cropping, saturation, and color adjustments and use of editing tools to remove white border edges (Figure 5)



Figure 5: Edited Image

REFERENCES

- [1] Flowvis.org. [Online]. [Accessed: 21- Oct- 2016].
- [2] UCAR.com. [Online]. [Accessed: 05- Oct- 2016].
- [3] Weather.uwyo.edu. [Online]. [Accessed: 21- Oct- 2016].
- [4] Weather.com. [Online]. [Accessed: 21- Oct- 2016].