

Clouds 1

The Physics and Art of Fluid Flow

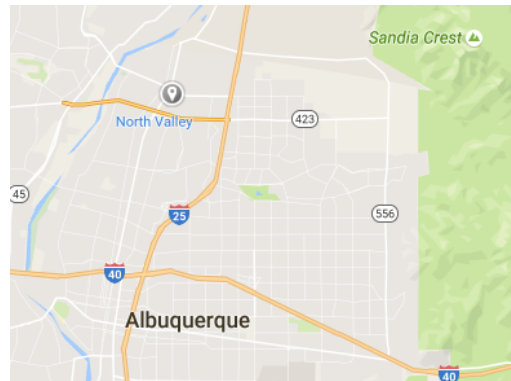


Introduction

This project, “Clouds 1,” is designed to get students to take beautiful cloud images while understand the fluid flow. The photo was taken during the 2016 Balloon Fiesta in Albuquerque, New Mexico. The purpose of this image was to capture different types of clouds with hot air balloons to demonstrate flow. The clouds in this image appear to be altocumulus and cumulus in unstable atmosphere. This image was captured facing due east using a Nikon camera.

Image Circumstances

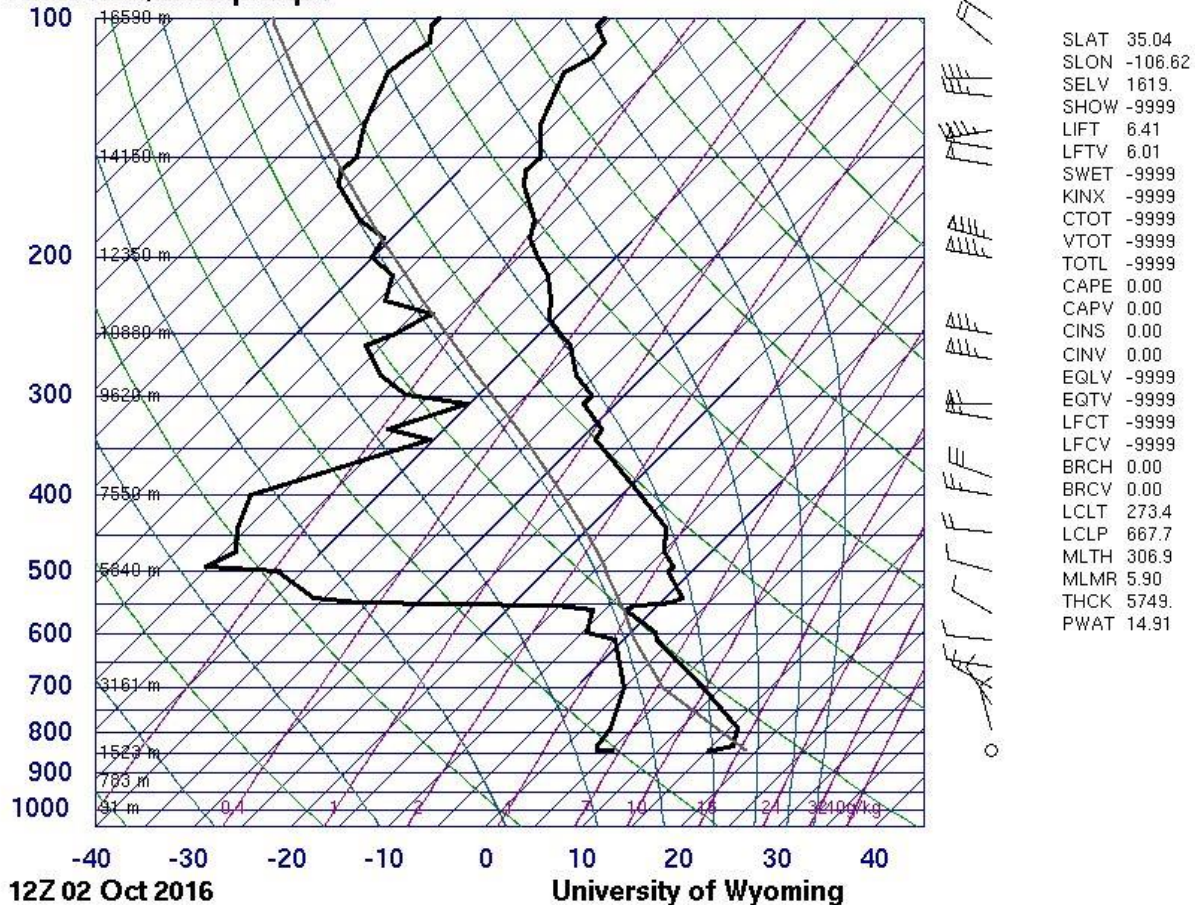
The direction of the camera was facing about 20 degrees north of east, and the wind was blowing in the southwest direction. The camera was held at an angle about 10 to 15 degrees above the horizontal at no visible tilt. The image was taken at early in the morning at 8:15 on October 2nd 2016. The location was Las Arboletas Park in Albuquerque, New Mexico with the GPS coordinates of 35.19 Latitude, -106.6 Longitude, and 1523 m above sea level (Map Coordinates)



Cloud Description

There are two visible types of clouds shown in the image. The two clouds are altocumulus and cumulus clouds. This can be confirmed visually with the cloud type diagrams shown in class lecture (Lecture 14). This means that the atmosphere at this time is unstable. The cumulus clouds occur at around 1600m and the altocumulus clouds occur at around 6400m. The altitude difference can be clearly seen in the image from the different level of clouds. The cumulus clouds can be seen closer to the mountains and the altocumulus clouds are spread out much above the mountains. By looking at the skewed-t diagram (University of Wyoming), the clouds forming at those altitudes seem to be appearing correctly. An hour prior to capturing the image, there were no signs of neither altocumulus nor cumulus clouds. This also proves that the atmosphere was stable earlier in the morning as the CAPE value from the skewed-t diagram is zero. The wind was blowing the clouds from the mountains at about the speed of 6mph. This can be seen throughout the morning as the clouds traveled and spread out across the sky as shown in the image.

72365 ABQ Albuquerque



The Photography

Capturing the image proved to be difficult as the sun was shining directly into the camera as it rose from the mountains. By setting the ISO to 5000, it is the only way to capture both the balloons and the definition needed for the image. The f-stop was f/7.1 and exposure time of 1/4000 seconds. The image came out with a bright background and a dark foreground. To counterbalance this, shadows were removed and the trees were cropped out a bit. The trees should have been cropped out all the way to remove all distractions from the image. To increase definition on the hot air balloons, they were selectively brightened and contrasted. For this image, there are two light sources. The sunlight coming in from behind the mountains and the light emitting from the fire used in the hot air balloons

Conclusion

The image turned out to be quite beautiful. The clouds are well contrasted and give the image an aesthetically pleasing effect. The hot air balloons can be seen starting to rise in the distance on the left. They then slowly drift towards the camera, which adds visual effects to the direction that the wind is blowing. The balloons also heighten the contrast and add decoration to the image.

The final image definitely has revealed both the physics and the art. However, some improvements can be made. The contrast of the picture can be further increased to thoroughly define the cloud shape and depth. The ISO of the image is a bit too high and it could be lowered to help with the image quality. The blue color was extremely prominent in the image and could be removed with the help of an image editor.

Setting up the camera to take pictures of the clouds and the hot air balloons at the same time was difficult. In order to perfectly achieve definition in both the clouds and the balloons, some photo editing had to be used. Overall, this was a learning experience that allowed me to take interesting pictures of clouds. Upon completion of this project, I have learned the physics behind how clouds form and what different types of clouds look like.

References

Lecture 14. Clouds 1. <http://www.flowvis.org/media/course/Lecture2016/14.Clouds1.pdf>

Map Coordinates. <http://www.mapcoordinates.net/en>

University of Wyoming. Atmospheric Sounding.
<http://weather.uwyo.edu/upperair/sounding.html>