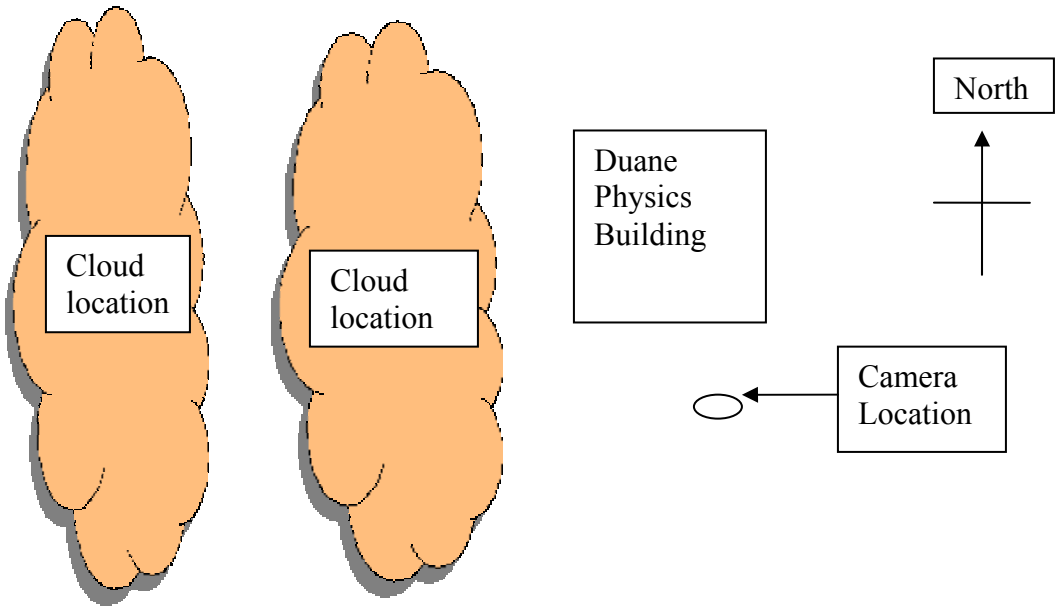
Katina Butler
Flow Visualization
Due 11/17/04

# Clouds II

This photograph is the third individual project, "Clouds II." The purpose of the project is to get students to photograph any cloud and attempt to analyze the air instability. In this particular photograph (refer to attached image), the air instability creates a cloud that reacts to the conditions around it.

The clouds (assumed mountain wave) are west of where the picture was taken (refer to diagram). The mountain wave cloud is formed when air is pushed up on the west side of the mountain, becomes too dense to keep rising, so it starts to fall again. The air keeps falling until it gets to light and then it starts to rise. Every time the air goes above its equilibrium line, it forms a cloud. Other names for these clouds are stratocumulus cloud streets[1], or altocumulus undulatus[2]. From the angle of the picture, the clouds are most likely altolenticulus undulatus dissipating to individual altocumulus clouds[3]. The topmost part of the picture is where the wave cloud is starting to dissipate. The lenticulus cloud is an indication of a stable atmosphere[4] while the cumulus cloud is indicative of an unstable atmosphere. This implies that as the air oscillates towards the east, it becomes more unstable.



The visualization technique used to obtain the picture was just a cloud seen in Boulder, Colorado at sunset. Natural light from the west at approximately 6:30 pm in early fall (Oct. 14) was used. There was no use of any flash or other form of artificial light. This photo has not been touched up.

The field of view of the photograph is quite large. The distance from the cloud directly above the camera to the lens is (what seemed about) two to three miles. The lens focal length is 75mm on a 75-300mm 4.0:5.6 aperture lens. The picture was taken with a Cannon Rebel 2000 film camera. The aperture was 5.6 and the shutter speed was 125. The film used was Kodak High Definition ISO400 film. Film was developed at Happy Hour Photo. The digital version of the photo is 1650 by 1180 pixels and has not been altered; it was scanned using one of the Hewlett-Packard scanners in the ITLL.

The image shows how atmospheric instability creates clouds. I like how the sunlight highlights the bottom parts of the clouds. I also like the orange color of the clouds as well as the blue of the sky. The aspect that I would like to improve is having more of the orange color in the photo, this most likely would have been easiest to remedy by taking the photograph about five minutes earlier than when I had taken it (taken at 6:30pm on October 14, 2004).

Sources:


1. handout: Cloud Dynamics, by Robert A Houze, Jr.
   ISBN 0-12-356881-1. Academic Press 1993.
2. http://www.srh.noaa.gov/lzk/html/stamps0804-nf.htm
3. http://vortex.plymouth.edu/clouds.html
4. http://www.pilotfriend.com/safety/mountain%20flying/mountain%20wave1.htm