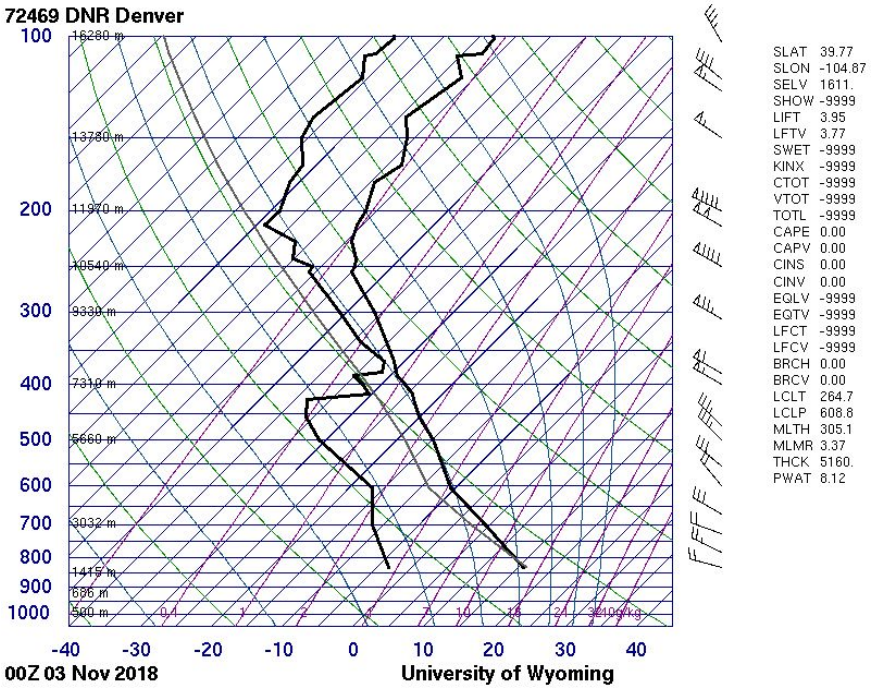
Duncan Lowery - 11/2/2018
FILM 4200-001 - Clouds Second Visualization Report

My Clouds Second submission is a collection of time lapse shots taken between 4:30 and 6:00 PM on November 2nd, 2018, in Henderson, Colorado. The intent behind these images was to document the formation and and proliferation of several cloud types over a period of time, and they were captured for the Clouds Second assignment of the Flow Visualization course.

My camera was set up at the Mile High Flea Market in Henderson. For each shot, I reframed the camera towards a different section of the sky (North, Southeast, West and Northwest), and my camera angle from the ground was always between 10 and 30 degrees.

The camera used was a Blackmagic Pocket Cinema Camera, a mirrorless video camera with timelapse functionality built in. The lens attached was an Albinar 80mm-200mm variable zoom lens, which I set to 200mm for all of my shots. As the sun set, I needed to open the aperture more and more to get a well-exposed image. I started at f/11 and worked my way down to f/5.6, as any lower caused the edges of the clouds to blur. My shutter angle was set to 360 degrees, which at 24 frames per second gave me a shutter speed of 1/24th second. My reason for choosing the highest shutter speed possible was to allow the most light into the camera as my light source, the Sun, rapidly disappeared. The first timelapse setting I chose was one frame recorded every two seconds, but upon reviewing my first capture, I decided to reduce the time to one frame every second, as I felt the first setting showed the motion too quickly.

At the time of recording, Denver sounding data from the University of Wyoming shows that the atmosphere was in a stable state, indicated by the 0.00 CAPE value. The lifting condensation level from this chart puts the bottom-most cloud formation elevation at around 4346 meters above sea level. The clips in my video show cirrocumulus, altocumulus lenticularis, and altocumulus clouds. According to *The Cloudspotter's Guide*, these clouds are middle to high level clouds that gain their distinctive shapes from the wind that surrounds them. Cirrocumulus clouds are sheets of little, separated clouds that are formed by shear force from fast, high-elevation winds. I was able to determine that these clouds were in fact cirrocumulus because the individual cloud elements appeared smaller than a fingernail at arm's length. Altocumulus lenticularis clouds, on the other hand, have formed from winds that have been forced up the side of a mountain, forming standing waves that result in disc-shaped and layered clouds. The other altocumulus clouds were also susceptible to high winds, as they moved rather quickly - each time lapse was around only 15 minutes or so. The weather had been much less stable in the



days leading up to the 2nd, and I recalled seeing a surplus of cirrostratus clouds in the days before.

Because of high winds at my location on November 2nd, I decided to put my tripod and camera inside of my car in the parking lot, shooting through a side window. Because the window was tinted, a portion of the light that fell onto my camera's sensor was cut out. In the future, I will be more aware of the winds at ground level, and the places that I could shield my camera without affecting the image.

References:

1. Pretor-Pinney, Gavin, and Bill Sanderson. *The Cloudspotters Guide: The Science, History, and Culture of Clouds*. New York: Perigee Book, 2007.