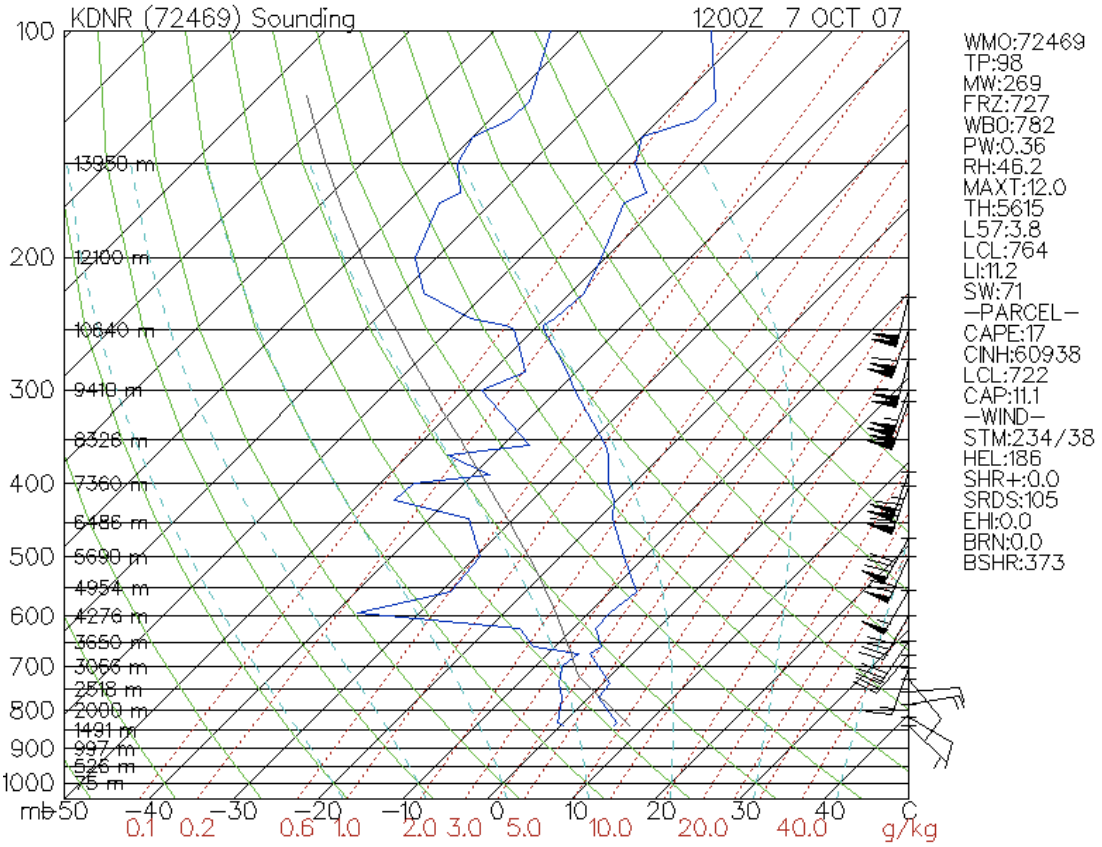
J. Chris Miller
Clouds Clouds Clouds

The purpose of this project is to observe different forms of clouds and document them through photography. I wanted to capture the 'wave", which is a cloud front that seems to park itself on the continental divide that is actually moving and dissipating. It looks like a giant wave that is engulfing the mountainous divide above Boulder. There is a perch above Boulder on Sugarloaf Mountain that has the Indian Peaks and the divide unobstructed as its view. I unfortunately could not make it up when the wave was present. Winter is kind of slow going this year, I am sure there will be more opportunities as temperatures cool. On October 7 there was a front moving in that was said to bring some snow. I got up for sunrise and photographed the "wave" clouds spilling over the divide. I also shot 30 minutes of video, condensed to 19 seconds. My aim was to capture the clouds spilling over the divide and dissipating in its fluid like manner. Wave clouds are formed by stable air flows over a mountain range that undergoes uplift and descent. The uplift pushes the airflow into cooler temperatures which causes it to saturate, thus forming clouds. On the descent the air mass warms, on this case is met by warm air from the front range, and evaporates. I took some shots of Longs Peak, which is the highest immediate peak rising 14259 ft from the flats in the Boulder/ Denver area. It shows the interaction between the air mass and the steep sided mountain walls.

The flow apparatus was a natural one of the Continental Divide. Longs Peak is not part of the of the divide, but is the highest obstruction in the field of view at 14259 ft. The continental divide visible is known as the Indian peaks which altitudes range from approximately 12000 ft to 13500. There is two photos showing the expanse about the front range. The photos and videos show the air mass saturating over the divide and spilling down the Eastern slope. On October 7th the sunrise was at 6:03 am. There were some clouds off in the East that obstructed some of the sunlight. So the actual time was a couple minutes after sunrise when the color was at its most brilliance. The sky was blue bird above Boulder. The Skew T plot for Denver that morning reveals the cloud level at about 3500 meters which is over 11500 ft. Rollins Pass is the local low point in the divide at 11680 ft which creates a natural spillway for the saturated air mass. The dew point and the Temperature do not actually touch on the skew T for it was probably clear where the weather balloon ascended the atmosphere and collected data. The temperature and dewpoint split the most dramatically at 4300 meters which is over 14 thousand feet, which happens to be the altitude of our front range center piece, Longs Peak. This is described in the photo as the clouds appear to stop right after they ramp off of Longs. The air higher than this altitude is dry and evaporates the clouds. Below 3000 meters the wind is coming from the Southeast, warm air pushing up from the flats. Above the mountains the air mass is traveling from the Southwest. This is similar when a hot breeze from the beach causes ocean waves to peak dramatically, in this case it kicks up the wave clouds. In the midst of this drama the skew T plot shows the lapse rate is between DALR and MALR, so a saturated air parcel at 3000m would be unstable.



There was low light for it was sunrise. The color was brilliant enough that I did not need a tripod, just a steady 'breathe and shoot'. The digital camcorder was set up on a tripod and was run for 30mins. The picture is purposely underexposed to highlight the contours and textures. I used the zoom lens as well, that flattens the image. The time elapse video has no zoom at all. As the crow flies I was 29 miles from longs peak in South Boulder, that has a difference from 5319ft up to 14259ft with a difference of 8940 ft gain. Because the object is distant the camera angel is barely 1 degree above the horizon. The field of view is several miles. I was taking pictures facing the Northwest, and the light was coming from the East(sunrise).

The camera was set to 100 ISO, aperture of F8, shutter speed of 1/80. I adjusted the midtones on the levels adjustment in Photoshop to match the tones of the two pictures. The Camera records the images in JPEG format. . The camera is a Sony Cyber Shot dsc-h5 7.2 mega pixel digital camera. It shoots 3072 pixels by 2304 pixels which amounts to 7077888 pixels. The camera does not have a RAW function, with the FINE setting being the highest and the one that I used. The time elapse footage was taken with a Sony DCR-HC28 MiniDV Handycam. The resolution of the movie is 680000 pixels. The shutter speed is automatic and ranges from 1/60 to 1/4000. I used IMovie to compress my 30 minute video down to 19 seconds.

The images and videos reveal the fluid movements of clouds. They are, after all, water in gas form. The continental divide is a great place to observe clouds for the clouds interact with the jagged peaks as water that flows down a rocky creek. I did fulfill my intent to some degree, but I would like something a little bit closer. I would like to put my camera up on Jones Pass while we are getting some early season turns(whenever that white fluffy stuff decides to fall this year) and capture weather

moving through. Jones Pass is a continuous ridgeline of the divide ranging from 12000-13000ft. It is situated in a way to capture storms and early season snow. The wind loads snow in its cirques and develops early season cornices. I think it would be a great lace to film for this project. I really enjoy observing weather and exited for these blue bird days to end and get some weather.