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Image 2: Clouds
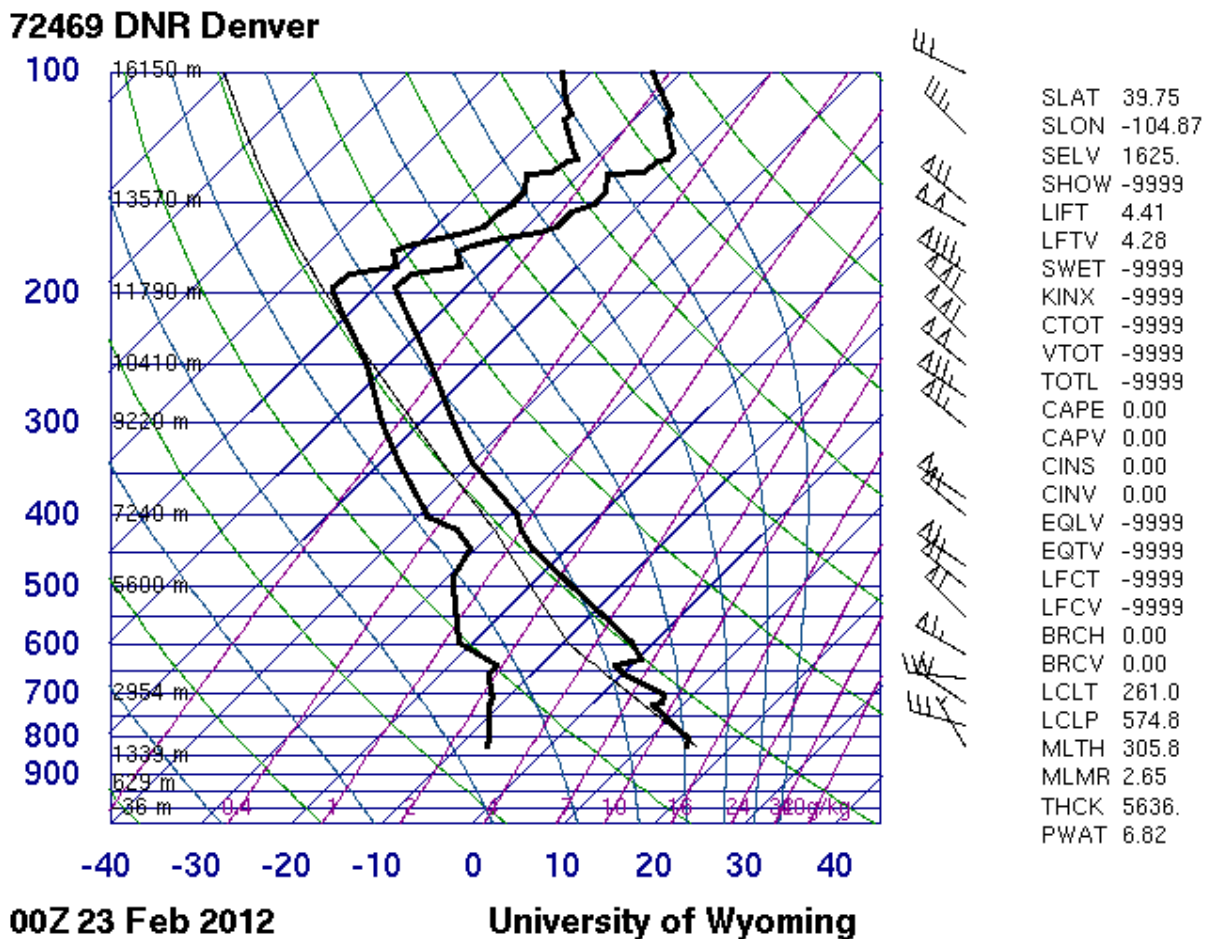
MCEN 4151

High Wind Clouds

Clouds present an interesting example of flow visualization, as the earth's atmosphere is one of the largest and complex systems available for immediate analysis. The many different clouds that are produced as a result of such a complex system provide insight to the state of the local atmosphere, and sometimes a looming prediction of weather patterns that are yet to arrive. The premise of this image is the capturing of various cloud types, and analyzing how they formed.

The mass of clouds captured in this image represents the weather of an extraordinarily windy day. Boulder on February 22, 2012 experienced 63 MPH winds with gusts up to 77 MPH throughout the day (Weather History). The photo, taken at approximately 5 PM on that blustery day, shows a perspective of the high wind produced clouds from the University of Colorado's Integrated Teaching and Learning Laboratory (ITLL). Winds that day were blowing from the west to east direction. When the south facing direction of the image is considered, the result is wind blowing from the right to left across the sky. A rough estimate of the angle at which the camera was facing while capturing the image produces a range of 35°-40° from the horizon.

As previously stated, the weather greatly impacted Boulder on February 22, 2012, as high winds swept through the city from the 21st to the 23rd. Clouds were scarce the 21st, especially compared to the mass of clouds captured in the image from the 22nd. There was no precipitation throughout that week, and this is confirmed when examining the SkewT plot below.

72469 DNR Denver

SLAT 39.75
SLON -104.87
SELV 1625.
SHOW -9999
LIFT 4.41
LFTV 4.28
SWET -9999
KINX -9999
CTOT -9999
VTOT -9999
TOTL -9999
CAPE 0.00
CAPV 0.00
CINS 0.00
CINV 0.00
EQLV -9999
EQTV -9999
LFCT -9999
LFCV -9999
BRCH 0.00
BRCV 0.00
LCLT 261.0
LCLP 574.8
MLTH 305.8
MLMR 2.65
THCK 5636.
PWAT 6.82

00Z 23 Feb 2012   University of Wyoming

The SkewT from the time nearest to the capturing of the image indicates stable clouds. These clouds may be of the stratocumulus type, sitting around 7,000 meters in altitude. This can be seen by the dry and wet bulb

temperatures nearing each other around 450 mbar, indicating a cloudy region. It is interesting to note the dry adiabatic lapse rate trend that is followed in the right line around the 3,000 to 7,000 meter altitude range. This indicates the rising of an unsaturated parcel of air, which can also be seen in the image; especially in the lower left corner. This area reveals parcels of air sweeping upwards into the sky, seen as wisps of the cloud.

The observation of clouds requires one to be continuously viewing the sky. This requires access to a camera at all times, and luckily the camera iPhone 4s provides excellent quality and accessibility. A major shortcoming, however, is the ability to control many aspects of photography via a simple point and shoot interface. However, for images of very large and distant objects, especially clouds, the resulting hindrance experienced while capturing the image was minimal. An ISO of 64, as well as an f value of f/2.4 was used to capture this cloud image. Also, the exposure time was 1/1004 s, as the light from outside was very bright. Post-processing of the image resulted in cropping out distracting objects to focus the viewer's attention on the clouds. The contrast and saturation of the image was increased slightly to bring out the vivid blue and bright white colors. After the final editing process was completed, the image had a final dimension of 2892 pixels wide by 2118 pixels tall.

This image provides an excellent perspective of a highly photographed cloud formation that was popular with the class. The high winds that day

proved to make interesting clouds that were great for analysis. This picture
could be improved had it been captured at a higher altitude; e.g. the rooftop
of the ITLL building would have given a wider view of the cloud formation
with less distracting objects in the way. The mountains near Boulder,
Colorado make for great cloud formations, and it will be interesting to see
the different clouds of spring in the next few months.

Original Image

Edited Image

Citation:

"Weather History." *History : Weather Underground*. 22 Feb. 2012. Web. 06
     Mar. 2012. <http://www.wunderground.com/history/airport/KBJC/
     2012/2/22/MonthlyHistory.html?req_city=NA>.