

Cloud's Second Report

Brandon Gushlaw

Flow Visualization MCEN 4151-001

11/24/18



The goal of the second cloud image was to capture a large scale perception of the atmosphere to see the transition into a snow storm. The objective was to capture the incoming storm front and identify the type of clouds. From the picture and the information used in this paper it is concluded that the main clouds observed are stratus and stratocummulus.

On November 15th, 2018 this photo was taken on an airplane leaving Colorado and flying to Pennsylvania. On Average planes fly between 25,000 to 35000 feet above sea level. The camera was stationed facing out of the window towards the north west. A slight angle towards ground level was used to see clouds from below and capture a large scale of depth. Since the photo was taken three hours after the plane took off it was most likely near Pennsylvania. After observing the Skew-T diagram of each state in the flight path it was narrow down between Illinois and Pennsylvania. The photo was approximately taken at 4 pm mountain time.

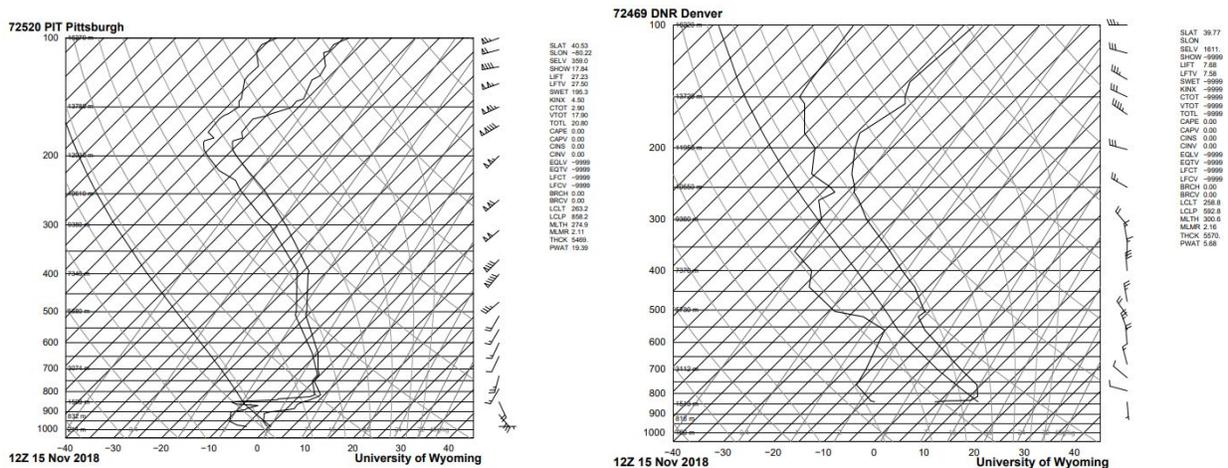


Fig 1. Skew-T of Pittsburgh (left) and Denver (right) for the University of Wyoming. This information is used to assess the transition of clouds observed in the photo.

Two skew-T diagrams assessed, Denver and Pittsburgh, are shown for clarification on atmosphere transition between the two state Colorado and Pennsylvania. In Colorado the skew-T does not show much possibility of clouds being observed. On November 15th, 2018 Denver, Colorado was observed to have no apparent clouds between 10am and 1pm. According to the skew-T for Colorado there was a stable atmosphere and not much possibility for cloud formation. Pennsylvania was reported to be cloudy and heavy snowfall near Philadelphia. The nearest skew-T in route of the plane's destination to the arriving location was Pittsburgh. The skew-T shows high chance of cloud formation around 5,000 ft due to the adiabatic and dewpoint temperature being relatively close to one another. Another interesting note was that the atmosphere presented stability.



Fig 2. This is the before image which was taken with an iPhone SE and is the raw (unedited) photo.

To capture the photo an iPhone SE was used. The phone's camera has a 12 megapixel capability and has an ISO range of 1/3s to 1/8000s. Unfortunately the aperture cannot be adjusted on the phone and the ISO information is restricted. The field of view is estimated to be 2 miles by 2 miles of depth and width. Before editing the raw image was 3024 by 4032 pixels. After editing the image was reduced to 1250 by 886 pixels. In addition to cropping, the photo enhanced the contrast and saturation to create the dark and positive color scheme. One unique technique used was saturation/hue selection or cropping. This allows the region of the earth shown in the section of no clouds to be over exaggerated as green and make the color stand out.

This image reveals information about the transition from a stratus, stratocumulus, and a cumulus cloud state. From the photo it can be seen that the far left region has clouds more alike stratus clouds which appear thinned out and more uniform in density across all of its volume. As the viewer translates their eyes to the right of the image it is seen that the clouds begin to become more dense in certain regions and appear to be slightly higher. This shows the transition from stratus to stratocumulus. If it is observed furthest to the right it can be seen that the clouds appear to be compressing into larger dense regions. The two main clouds captured in the image are stratus and stratocumulus. In the future the photo could have been enhanced with better camera equipment instead of the iPhone SE's limitations on camera control.

References

[1] Mitchell N Charity, 1998. http://www.vendian.org/mncharity/dir3/bodyruler_angle/ retrieved Oct 19th, 2018

[2] UCAR, 2012. <https://scied.ucar.edu/webweather/clouds/cloud-types> retrieved Oct 19th 2018