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Clouds report 2
MCEN 4151
12/6/2021

It's a bird, it's a plane, no it's just clouds

Introduction

For our last assignment of the year, our teacher decided to give us the option to choose between another image/video post or another cloud image. Initially, I was going to choose the image/video post but on November 28th, at 4:42 I saw one of the most beautiful arrangements of clouds that I have seen in a long time. The clouds had a variety of colors, shapes and contrasts that immediately made me run outside and capture all of its glory. In this report I will be breaking down the phenomena of clouds and the steps that I took in order to capture this masterpiece of an image.

Picture Details

For my image, I took this photo in the comfort of my backyard in Erie, Colorado. At approximately 4:42 PM on November 28th, I happened to look outside and saw the fluffy clouds and vibrant colors that the sunset created. I took out my phone and angled it up about 15 degrees from the horizon. When I took this photo I was facing the South making sure I encapsulated

Indepth Analysis

From this photo there are few things that we can draw from it and the skew-T diagram to better understand the photo and the clouds. The type of cloud can give us an understanding of why they look the way they do. Then the skew-T diagram can give us more information about the weather patterns for that day and the following day.
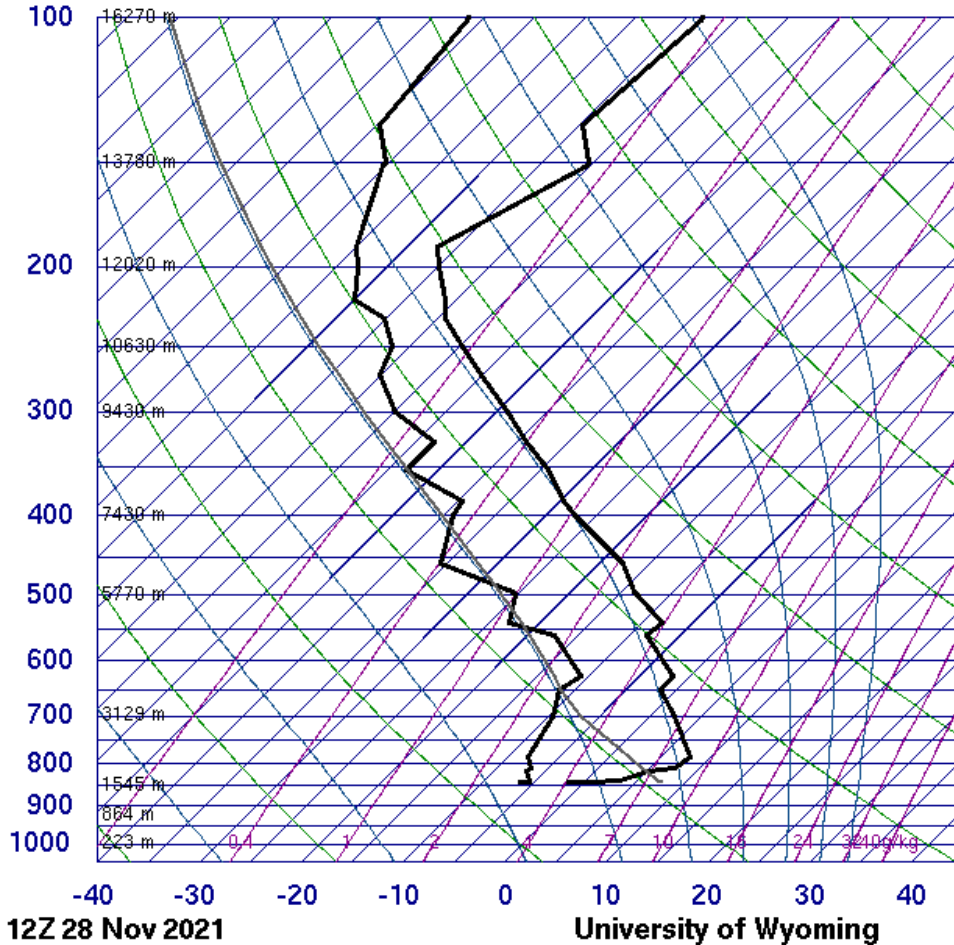
To start us off, I would like to talk about the actual types of clouds in the picture. I identified statocumulus and stratus clouds. I identified the types of clouds by referring to the following image (via. sciencefacts.net).
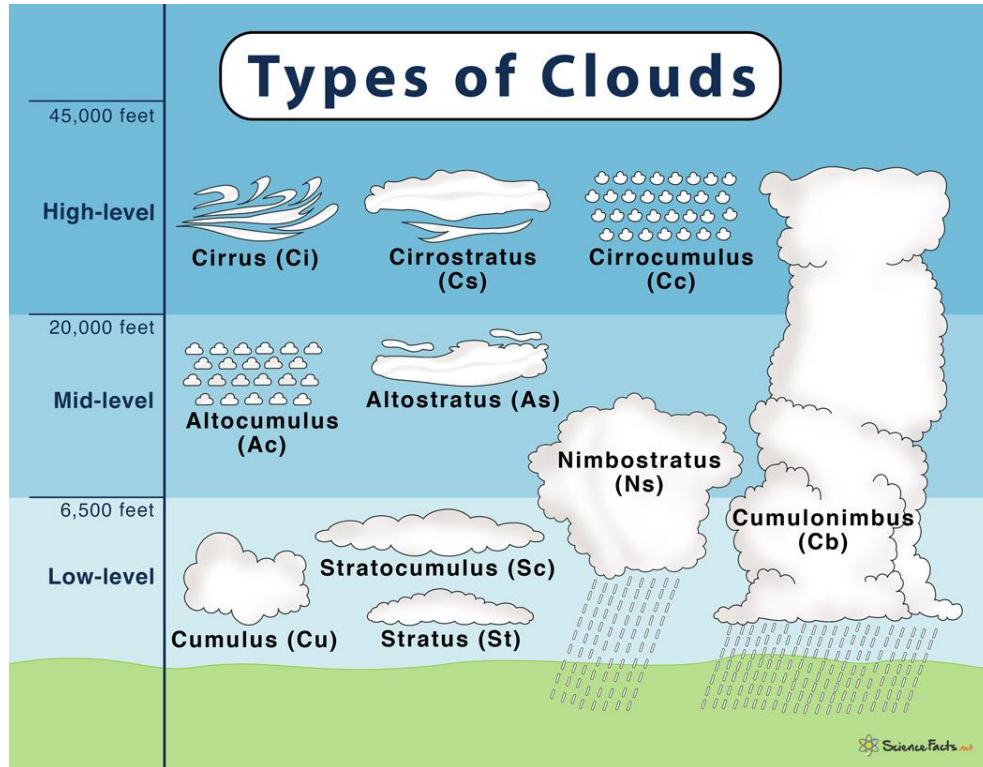
I came to the conclusion that the clouds depicted in my photo were stratocumulus and stratus purely from my knowledge of the day, the photo and the image above. If I remember clearly, the day was a beautiful sunny Sunday with low flying clouds. The low flying clouds were long and puffy as seen in the photo. This brings me to think that they were in the 6,500 ft level. Since the clouds did not show any signs of rain or snow, it brings me to the conclusion that it was the stratocumulus and stratus cloud formations. Then if I also look back to the prior days before the picture was captured, I remember there was no signs of moisture build up. This means that by recollection of my memory the clouds on November 28th were stable.

Which leads me to my final point; how can we tell if it is going to rain and our atmosphere is unstable? We can easily come to this conclusion by referring to the skew-t diagram (provided to us by the University of Wyoming). Using the following skew-t graph from a near by station in Denver, Colorado, we can come to the conclusion about the atmosphere and its stability.

72469 DNR Denver

(Skew-T log-P diagram, 12Z 28 Nov 2021, University of Wyoming)

Pressure levels (hPa): 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000
Heights labeled: 16270 m, 13780 m, 12020 m, 10630 m, 9430 m, 7430 m, 5770 m, 3129 m, 1545 m, 864 m, 223 m
Temperature axis: -40, -30, -20, -10, 0, 10, 20, 30, 40

SLAT	39.77
SLON	-104.87
SELV	1611.
SHOW	-9999
LIFT	13.33
LFTV	13.36
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	264.3
LCLP	682.4
LCLE	303.7
MLTH	294.8
MLMR	2.90
THCK	5547.
PWAT	8.91

12Z 28 Nov 2021   **University of Wyoming**

The CAPE value or the convective available potential energy is all we need to know to determine if the atmosphere is stable or unstable. If we were to look at the CAPE value for any cloud formation and see that it is anything other than zero, our atmosphere would be unstable. This is because there is enough moisture in the atmosphere and enough potential energy to create an updraft in storms that allow for rain and condensation to form. Now looking at our skew-T graph for this particular day and time, we can see that the CAPE value is zero. This confirms my observation of the clouds and atmosphere and tells us that the atmosphere is stable.

Photographic Tecniques

As for the camera details and setup, I decided to go with an iPhone 13 pro max camera and took the photo in the portrait orientation to encapsulate as much of the clouds physically possible. For the settings of the camera, the iPhone has limited variability so I used the default settings of the phone (settings of which are not very clear). This photo was taken with the iPhone 13's 12 MP telephoto camera with a $f/2.8$ aperture.

As for post processing of the photo, I slightly used the editing feature of the iPhone to bring out a little bit more colors and brighten the photo. I truly believed that the photo did not

need any post processing but decided to make sure the colors really popped. I wanted to make sure of this just because the colors are what make the photo beautiful. A table of all the editing numerical values I used to enhance the photo can be seen below.

Setting:	Value:
Exposure	4
Brilliance	34
Highlights	-7
Shadows	6
Contrast	5
Brightness	2
Black Point	5
Saturation	4
Vibrance	5

By using these post processing values, I was able to change the photo as depicted below:

Original	Post processed

By looking closely at the photos we can see that there are slight chances. The brightness is turned up and the oranges, pinks and blues are more vibrant than the original post.

Conclusion:

In conclusion, I think this may be one of my best pictures I have ever been able to capture. The colors and deep contrast that the clouds portrait are some of the most beautiful things in this world. The funny thing about the photo is that no matter what kind of camera or post processing you use, nothing could compare to the real life experience that I encountered that day.

If I was to change anything about my photo, I think I would have tried to cut out any unnecessary objects in the photo. Though the fence posts and field add a nice aspect to the photo, I think if I were to position the camera in a way that took them out of the photo it would put more focus on the colors and vibrancy of the clouds.

Overall, I think I was able to capture the experience that I felt that day to the best of my abilities. Though the position of the camera was off and no camera could compare to the human eye I think I was able to capture a sense of the feeling that I experienced that day. A photo like this is one of those life moments that you just put away your phone and soak in the true natural beauty of clouds.

References

- **"Types of Clouds: Their Formation & Meaning Explained with Diagram."** *Science Facts*, **18 Nov. 2020, https://www.sciencefacts.net/types-of-clouds.html.**
- *Atmospheric Soundings*, **http://weather.uwyo.edu/upperair/sounding.html.**
- **"Types of Clouds: Their Formation & Meaning Explained with Diagram."** *Science Facts*, **18 Nov. 2020, https://www.sciencefacts.net/types-of-clouds.html.**