

Cloud Report-2

MCEN 4151 - Joel Carlson 12/11/2021

I. Introduction

I took this photo on October 14th, 2021 at the National Renewable Energy Laboratory (NREL) in South Boulder at 10:00 A.M. The goal for this photo was to capture an image of the beautiful clouds while also highlighting the massive 53 meter blade Siemens Gamesa wind turbine. I got the opportunity to do this because of my Senior Design project, we are working with Siemens Gamesa and got to tour NREL. It just so happened to be a beautiful day with beautiful clouds. I really could not have asked for a better setup for this photo. The sun was positioned perfectly to be in the image and illuminate the clouds while silhouetting the turbine. There were also some clouds in front of the sun which was perfect because it reduced lens flare and created a more interesting photo.

II. Cloud Analysis

72469 DNR Denver

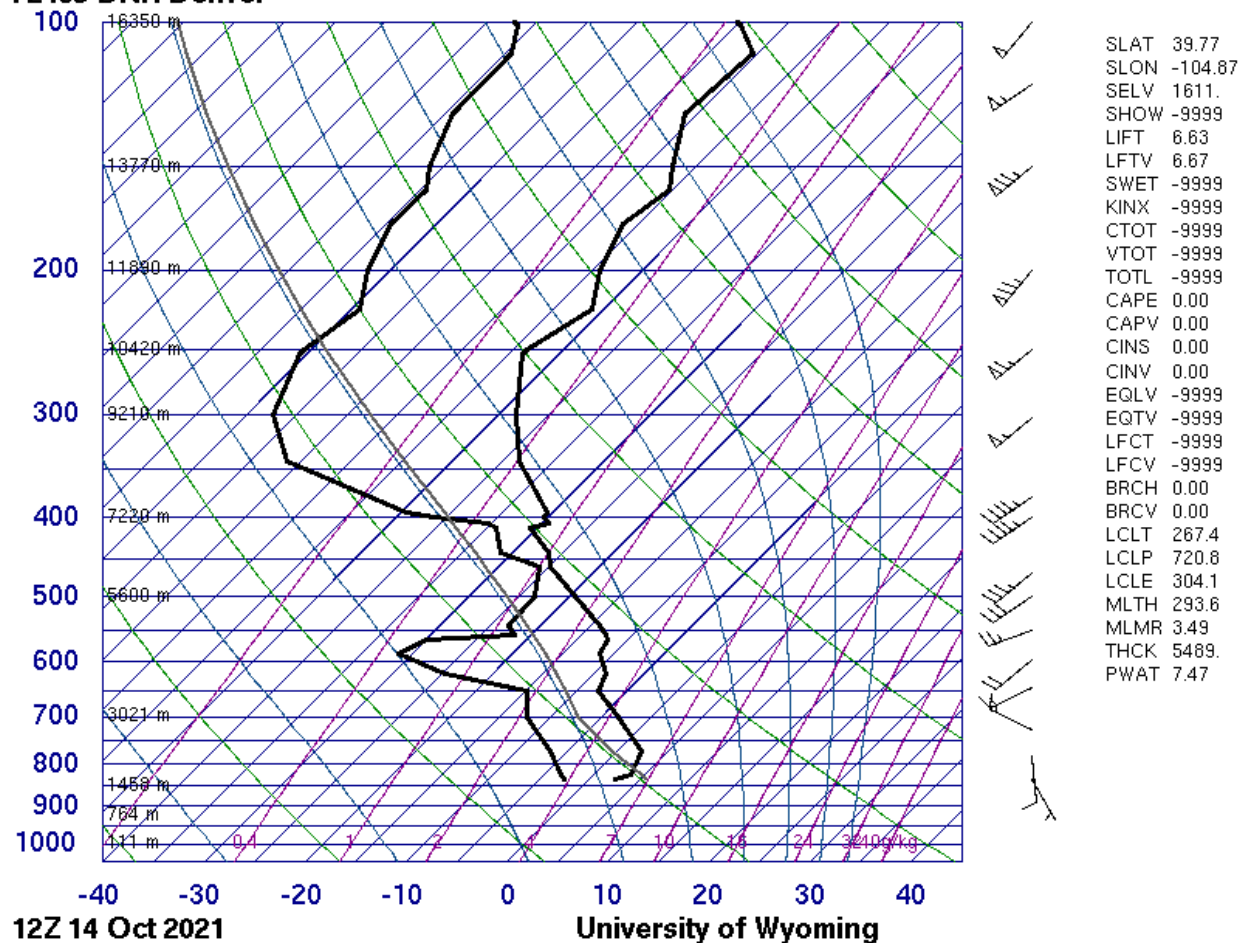


Figure 1: Skew-T Diagram

The clouds I photographed are likely a mix of altocumulus and cirrus clouds. The altocumulus clouds are fluffy little clouds and they are fairly high up, likely between 4 and 7 kilometers, while Boulder is at about 1.6 kilometers. The cirrus clouds are longer wispy clouds, likely even higher up at altitudes around 5 to 15 kilometers. Figure-1 shows the Skew-T diagram at 5:00 A.M. on October 14th, 2021. The CAPE from the Skew-T reports 0.00 meaning a stable atmosphere. A stable atmosphere means that air is not experiencing significant temperature changes so it will neither rise nor sink. However, since there is a 5 hour difference between the SKEW-T and when the actual photo was taken I think the CAPE may have been slightly unstable (greater than 0) at this time for these clouds to form. Nothing over a CAPE of 500 though, a CAPE of over 500 means thunderstorms.

III. Photographic Technique



Figure- 2: The Original Image



Figure-3: The Final Image

For this photo I used my iPhone 7 with default settings. The dimensions of the original photo are 3024x4032 pixels. The exposure was 1/16129 seconds and the camera used auto white-balance. For the post processing I used GIMP and made minor adjustments to the colors and saturations as well as cropping the image. I'm not sure that I actually like the post processed more or not. I think the original is already really good. I couldn't quite get the colors to look exactly how I wanted.

IV. Image Remarks

I thought this was an awesome photo and I got really lucky to have the opportunity to take it. Getting this close to a wind turbine is not something anyone can do. The one thing I wish I could have changed would have been having a nicer camera. My iPhone 7 did an okay job but I am curious what a high quality camera could have done for the image.