Sunset Beach - Clouds Report 1

Sean Barton / MCEN 4151 / Professor Wieland / 24 October 2021

I. INTRODUCTION

The purpose of this image was to capture an example of complex cloud formation that was also visually pleasing. The goal was to take advantage of the unique conditions that exist where the ocean converges with land which results in the production of extremely unique cloud patterns. This image was taken while on Sunset Beach in North Carolina, and exemplifies why it is named as such.

II. WEATHER ANALYSIS

The final image was taken on 25 September at 6:05 pm EST. The elevation of Sunset Beach, North Carolina is 10 ft above sea level and the direction of the image was 225° SW. The closest sounding stations were Charleston, South Carolina and Newport, North Carolina. The Skew-T data was taken from Charleston since it was slightly closer. The Skew-T diagram can be seen in **Figure 1**.

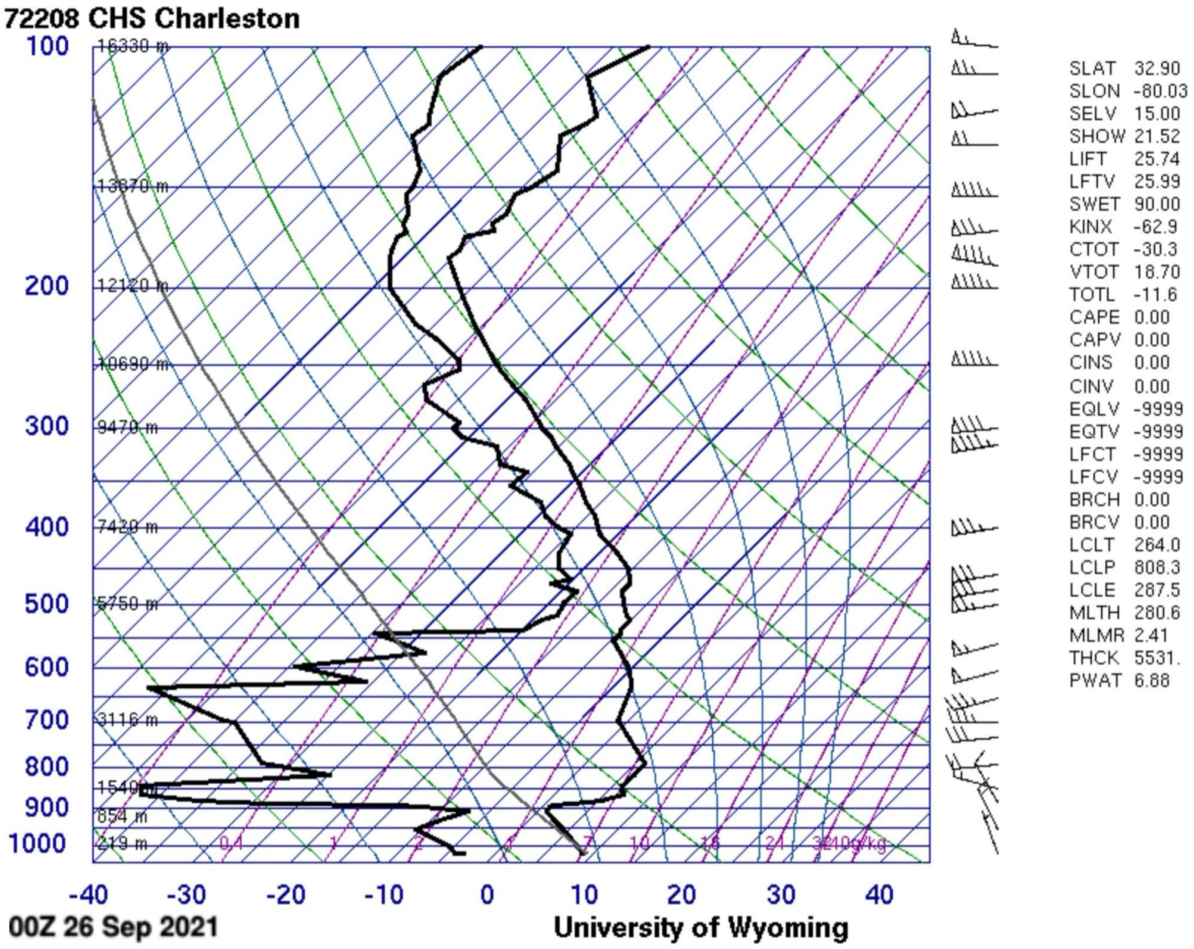

Figure 1. Skew-T Diagram from 00Z 26 Sep 2021 for sounding station CHS Charleston

From the diagram above, multiple observations can be made about the cloud formation and the potential altitude of the clouds. First, the Convective Available Potential Energy (CAPE)

can be used to determine whether the atmosphere was stable at the time the photo was taken. If CAPE value is greater than zero, then the atmosphere is unstable, which means there is a high potential for cumulus and cumulonimbus clouds which can lead to thunderstorm formation. In this case, the CAPE was 0, meaning the atmosphere was stable. When the environmental temperature (black right line) is close to the environmental dewpoint (black left line) there is a high probability for cloud formation at that specific altitude. Looking at the chart above, the lines come close together at roughly 5,750 m (18,860 ft) and continue through 7,420 m (24,323 ft), remaining somewhat parallel until almost 12,120 m (39,800 ft). From inspection and from the Skew-T altitudes, it can be asserted that altostratus, cirrostratus, and cirrus clouds are present in the photo. The clouds start at a high altitude of 18,860 ft and this climbs past 20,000ft, which are indicators of altostratus and cirrostratus. They also have that longer drawn out shape of stratus clouds in comparison to the puffy lumpy characteristics you see with cumulus clouds. Cirrus clouds form above 20,000 ft, which can be seen near the top of the photo.

III. POST-PROCESSING & IMAGE SPECIFICATIONS

Similar to the last project, this image was a very opportunistic capture. As such, the image was captured on an iPhone 11 Pro Max. The specifications of the camera were 3024 x 4032 pixels with a focal length of 52mm. The original and final images can be seen below in **Figure 2**.

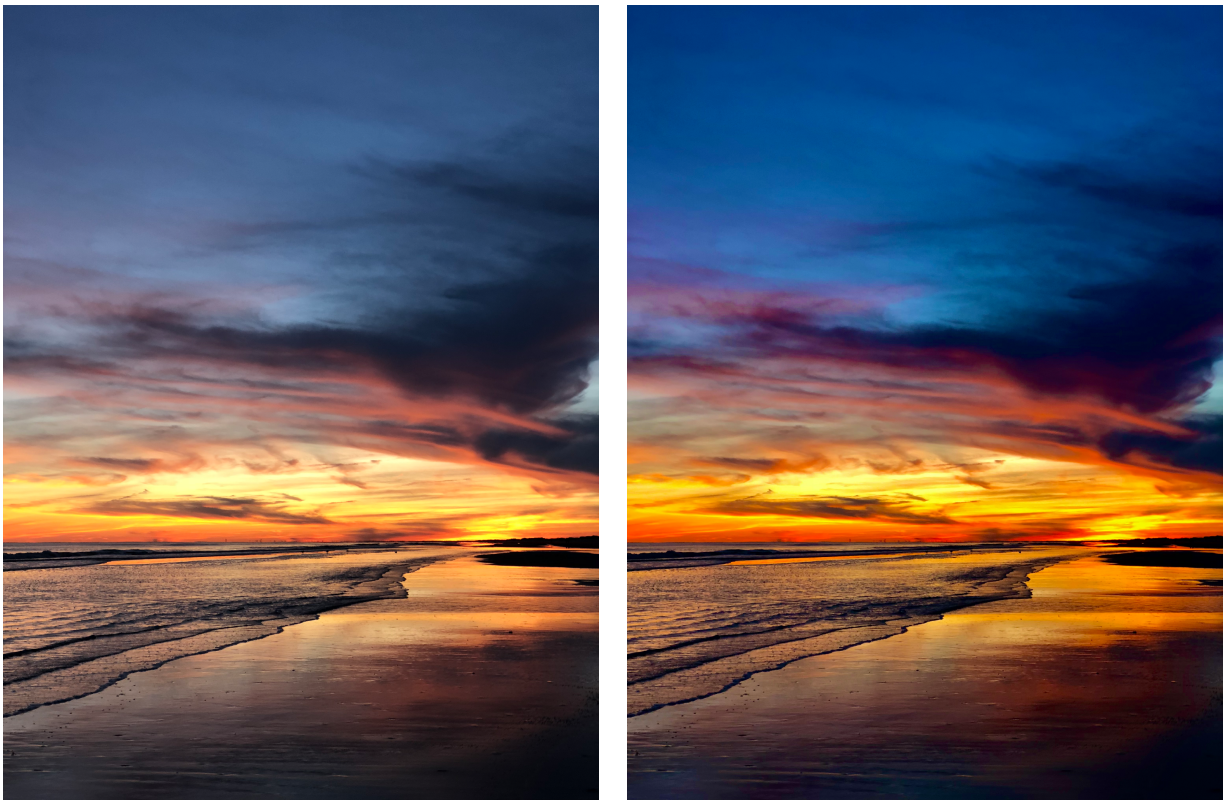

Figure 2. Original photo vs. Final photo with processing

For post processing, the brilliance, highlights, contrast, and saturation were turned up. This helped brighten the orange color of the sunset and darkened the blue sky. This contrast helps bring out almost a purple hue on the clouds as well. The wet sand on the shore also creates a nice reflection of the sunset and the clouds, creating an even more visually pleasing photo.

IV. CONCLUSION

Overall, this was a very successful cloud capture project. I was hoping to capture something that was visually appealing while also encompassing the fluid mechanics of cloud formation. All cloud photos are very unique and I feel the addition of the ocean sunset made it even more uncommon. If I were to improve this in the future I would have taken the photo in a landscape orientation, which would have prevented me from having to pad the sides of the vertical photo. Additionally, I would utilize a high resolution digital camera instead to capture the image. While the iPhone did a great job of capturing the essence of the sunset, I do think that a nicer camera would have allowed me to capture a better representation of the beauty that is only viewable by the naked eye.