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Lessons from the Ocean

7/23/19

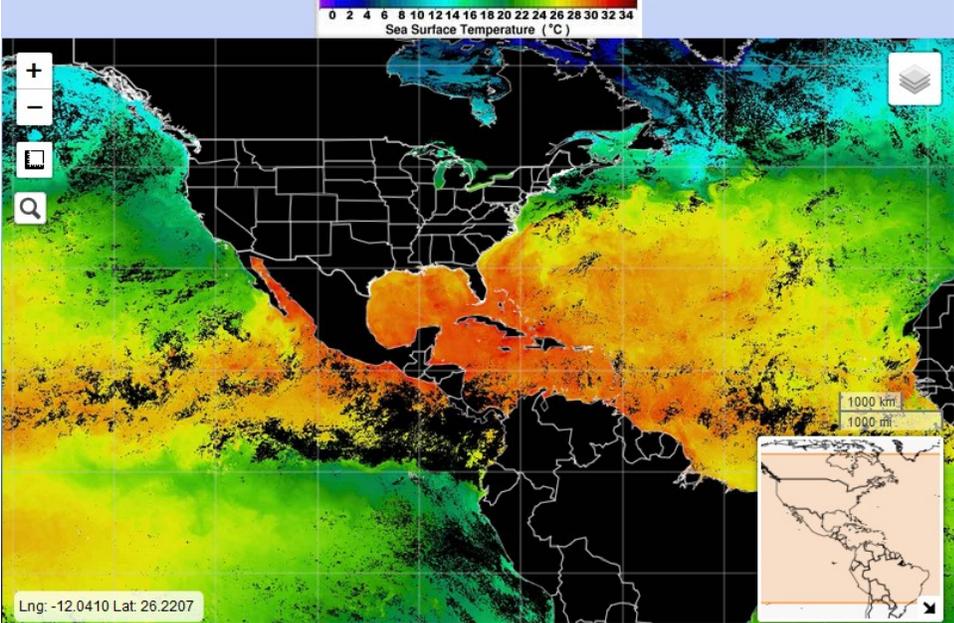
## Hurricane Maria

Hurricanes are tropical storms which can also be called typhoons or cyclones depending on their location. They are formed by warm ocean waters near 80 degrees Fahrenheit. As warm air rises the low-pressure area falls below, soon it becomes warmed from the previous air and then joins together. As the system grows, the air begins to swirl with all the moist air from the heated temperatures from the ocean. The speed of the storm forms an eye in the center with very low pressure (NASA, 2019).

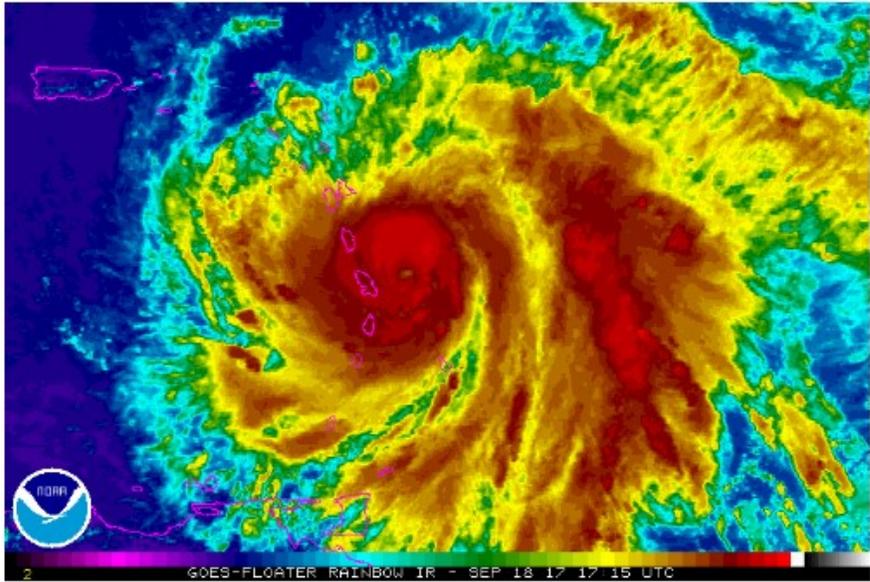
A very devastating hurricane that took place was Hurricane Maria back in 2017. It started as a Category 3 storm in Sept 18 but grew rapidly the next day with wind speeds up to 175mph. It hit Puerto Rico as a Category 4 which caused massive destruction along with floods. (Huber et la. , 2019)

The data for hurricanes is mostly collected by NOAA aircraft but also wind field analyses. I used the Sea Surface Temperature from Signals of Spring because the warmth of the water can help track a chance for a hurricane to form. The NOAA also uses dropsonde and HURDAT reanalysis to monitor and compare hurricane data (Pasch et la. ,2018). I also used charts of wind speed in order to see when speeds started to double and to compare with the SST map in order to see the warning signs of a hurricane. I also looked at the air pressure because in order for a hurricane to form, low air pressure and warm air pressure must travel near each other in order to start the spiral to grow.

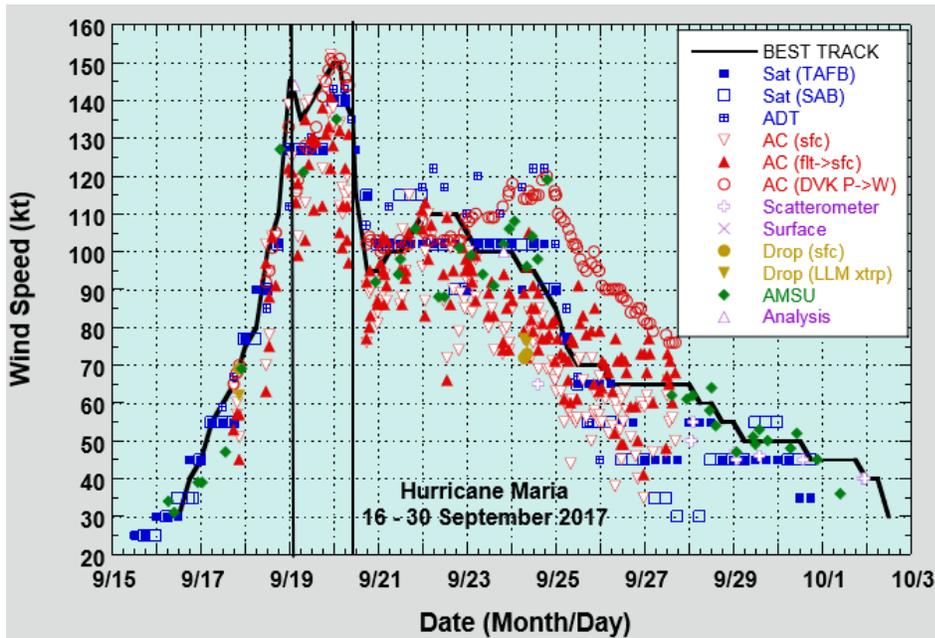
Map 1: Data shows sea surface temperatures near the U.S. and Puerto Rico on September 21, 2017 (U.S. Satellite Laboratory, 2019)



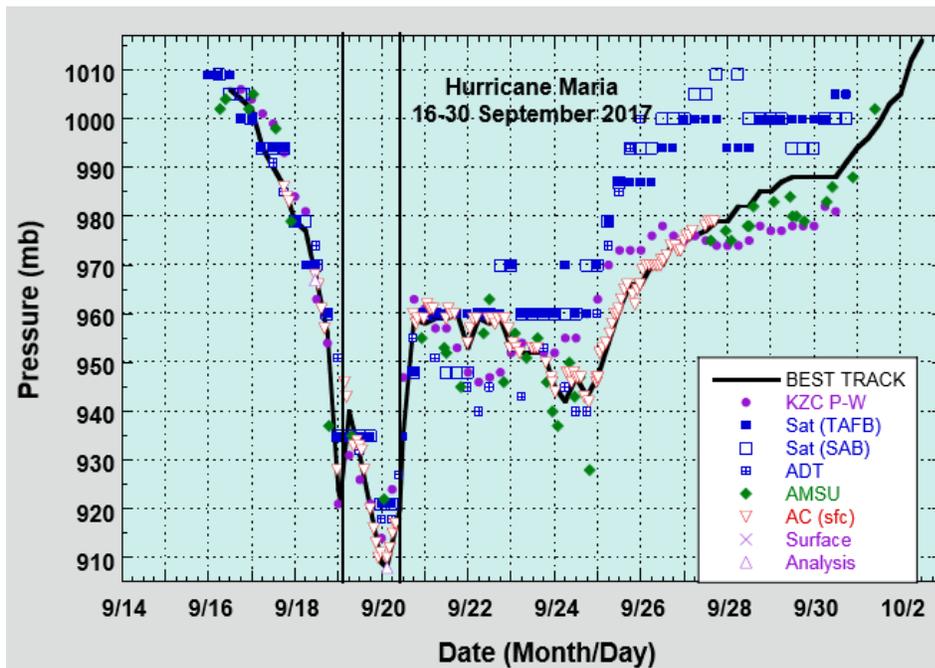
Map 2: Below shows level of warmth in the air pressure with Puerto Rico outlined in pink. (Huber et la. , 2019)



Map 3: Shows the wind speed during the hurricane (Pasch et al., 2018)



Map 4: Shows the air pressure during the hurricane (Pasch et al., 2018)



Map 5: Shows the time, date, and wind speed increases before and during the hurricane. (Pasch et al., 2018)

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)
16 / 1200	12.2	49.7	1006	30
16 / 1800	12.2	51.7	1004	40
17 / 0000	12.4	53.1	1002	45
17 / 0600	12.8	54.4	994	55
17 / 1200	13.3	55.7	990	60
17 / 1800	13.6	57.0	986	65
18 / 0000	14.0	58.0	979	75
18 / 0600	14.3	59.0	977	80
18 / 1200	14.5	59.7	967	100
18 / 1800	14.9	60.4	956	110
19 / 0000	15.3	61.1	924	145
19 / 0115	15.4	61.3	922	145

In my findings, I noticed that the sea surface of the ocean on September 20<sup>th</sup> till the beginning of October stayed around 30 degrees Celsius. I also compared the air pressure and wind speed which showed that the pressure at its lowest had a very high wind speed on September 19<sup>th</sup> to the 20<sup>th</sup>. The wind speed chart also shows the drastic change the moment the wind pressure came above warm waters. On 9/16 wind speed was at 30 but watching its location it doubled its speed the following day and continued.

Overall, hurricanes are very dangerous and being aware of the data helps to be prepared for the next one. I believe this is significant because when monitoring the SST the higher it rises, the more moisture from the ocean goes into the air cause higher air temperatures. The ocean helps feed these tropical storms. A question I would like to investigate in the future is how to predict this much faster knowing the correlation between the ocean and warm air temperatures.

## References

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- U.S. Satellite Laboratory. (2019). ACES-Signals of Spring. Retrieved April 20, 2019, from <http://www.signalsofspring.net/aces/>