EDA

Plot 1: The height of the significant wave heights over time. This graph shows the average of the top 3rd of recorded waves in the given 30 minute time period.

Plot 2: This graph shows the changes of sea temperature over time. Sea temperatures are measured per the sensors on the bottoms of buoys and averaged over the 30 minute time periods

Plot 3: The height of the Maximum wave height over time in meters.

Plot 4: This histogram shows the relationship between the maximum wave heights of 2017 and 2018.

Plot 5: This histogram shows the relationship between the Sea temperatures of 2017 and 2018.

Plot 6: This histogram shows the relationship between the significant wave height of 2017 and 2018.

Plot 7: This is the autocorrelation plot for maximum wave height over time. This shows the correlation between different max wave height values over time.

Plot 8: This is the rolling mean and rolling variance of the maximum wave height. This means that at every data point the average and variance is recalculated with the next value added.

Plot 9: This plot shows a scatter graph of Maximum Wave height and surface temperature

Plot 10: This plot shows the direction of the waves (in degrees from true north).

Plot 11: This plot shows a scatter graph of Maximum Wave height and Peak Energy

Plot 12: This plot shows a scatter graph of Maximum Wave height and zero upcrossing point

MODEL:

mplot 1: This graph shows the autocorrelation of the residuals. This is the correlation between the residuals of certain values as time goes on.

Mplot2: This graph shows a holt-winters forecast. The green line shows predicted wave height from this forecasting method

Mplot3: This is a plot that shows the residuals on the test set of the data.

Mplot4: This is a graph that shows the fitted predicted values of our test set.

Conclusion: With an Adjusted R^2 of nearly 0.95, our regression model performs admirably at accurately predicting maximum wave heights in the future. Though the sea temperature is rising, we do not see evidence of wave height climbing dangerously higher from this forecast. This regression model performs well because of the stationarity of the dataset and shows that the maximum wave height is not showing signs of climbing higher than previous peaks.