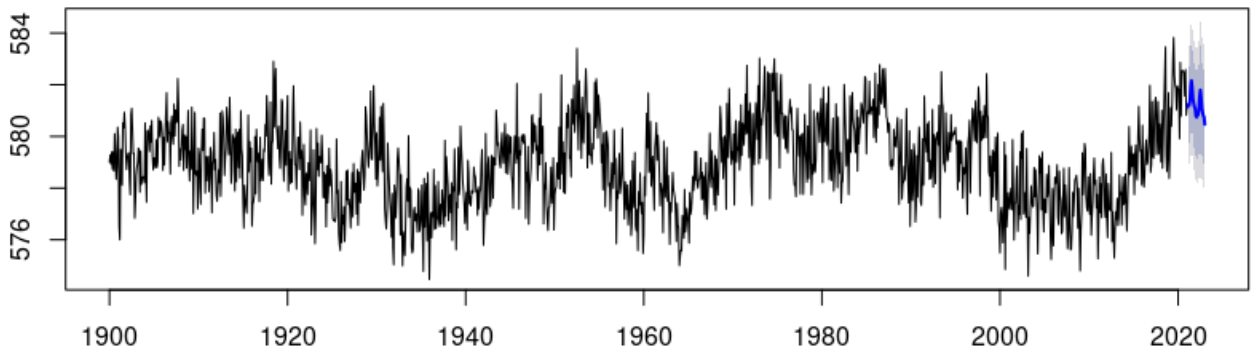


Analysis and forecast of Harbor Beach levels
Executive Summary
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Forecasts from ARIMA(1,0,2)(0,1,1)[12]



This studio involves the analysis of the levels data of Harbor beach obtained from National OceanService to forecast them for the next 24 months. A model that explains the behavior of the past data is estimated and used to predict future observations based on characteristic patterns such as trend, Seasonality, and auto-correlation.

The minimum value of the level was reached in December of 1935, and similar levels have been reached over the years 1960 and 1980.

The seasonality of the data is shown moves on yearly cycles, the months with the highest values are June, July, and August and the lowest are January, February, and March. Making the most of this cyclical pattern the model involves the use of a seasonal model. The fact that the future values are correlated to past values depending on their distance on time is used adding an autoregressive part into the model. The model involves the dependence on white noise covered by the moving average component of the model.

In the next two years, It is expected with a 95% of probability that the value of the figure will not be higher than 579.7688, a value that could be reached in July of 2021 with an expected value of 582.1570. Also with 95% of probability the lowest possible value to reach for this figure will be 577.66 with an expected value of 580.4668. On the plot, we can appreciate the blue line which corresponds to the expected values for every future month. The blue line is inside a dark gray and light gray region which correspond to the 80% probability interval and the 95% probability interval respectively.

An ARIMA model based on past data has been presented, and the forecast for the next two years displayed, the future depends on future conditions that are susceptible to changes and can't be captured for this model. However, it is presented as a model that captures relevant past patterns on this data and it is expected to have a good forecasting performance.