Group 18: Pivers Island Coastal Observatory
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Data+

Background

With ten years of oceanographic time-series data collected by the PICO data collection team, this project aims to understand the effects of climate change on coastal marine ecosystems. The dataset includes 619 variables, including both chemical and biological components such as pH and chlorophyll, respectively.
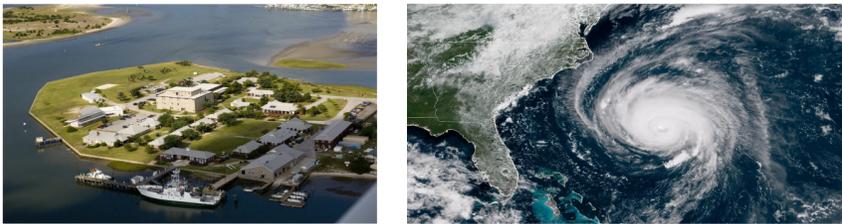
In this project, we hope to:

- Use time-series analysis to uncover possible trends on key variables such as pH, DIC, Salinity, and Turbidity
- Examine the impact of storms on the aforementioned variables

GITHUB LINK: https://github.com/zijgit/PICO

Discussion

Conclusions:
- Significant trends in several of the variables
- Impact of named storm events on different variables
  - Determined number of days after that they took to return to their average values
- Strong correlations were found between DIC and salinity as well as turbidity and chlorophyll

Limitations:
- Inconsistent time between measurements
- Data not available for variables immediately after a storm due to safety concerns

Future Steps:
- Continue data collection, as ten years is a relatively short amount of time for a climate related time series
- Find a method of recording more comprehensive measurements during the event of a named storm

Time-Series Analysis

Methods:
- Seasonal Mann-Kendall tests to determine if the time-series data had significant trends
- ARIMA models to forecast the time series data
- Sens slope to find direction and magnitude of trend

Observations:
- Seasonal Mann-Kendall p-values indicate that trends are present in DIC, pH, turbidity, chlorophyll, and salinity
- The sens slope and Kendall score show a negative trend, meaning that these variables are decreasing over time
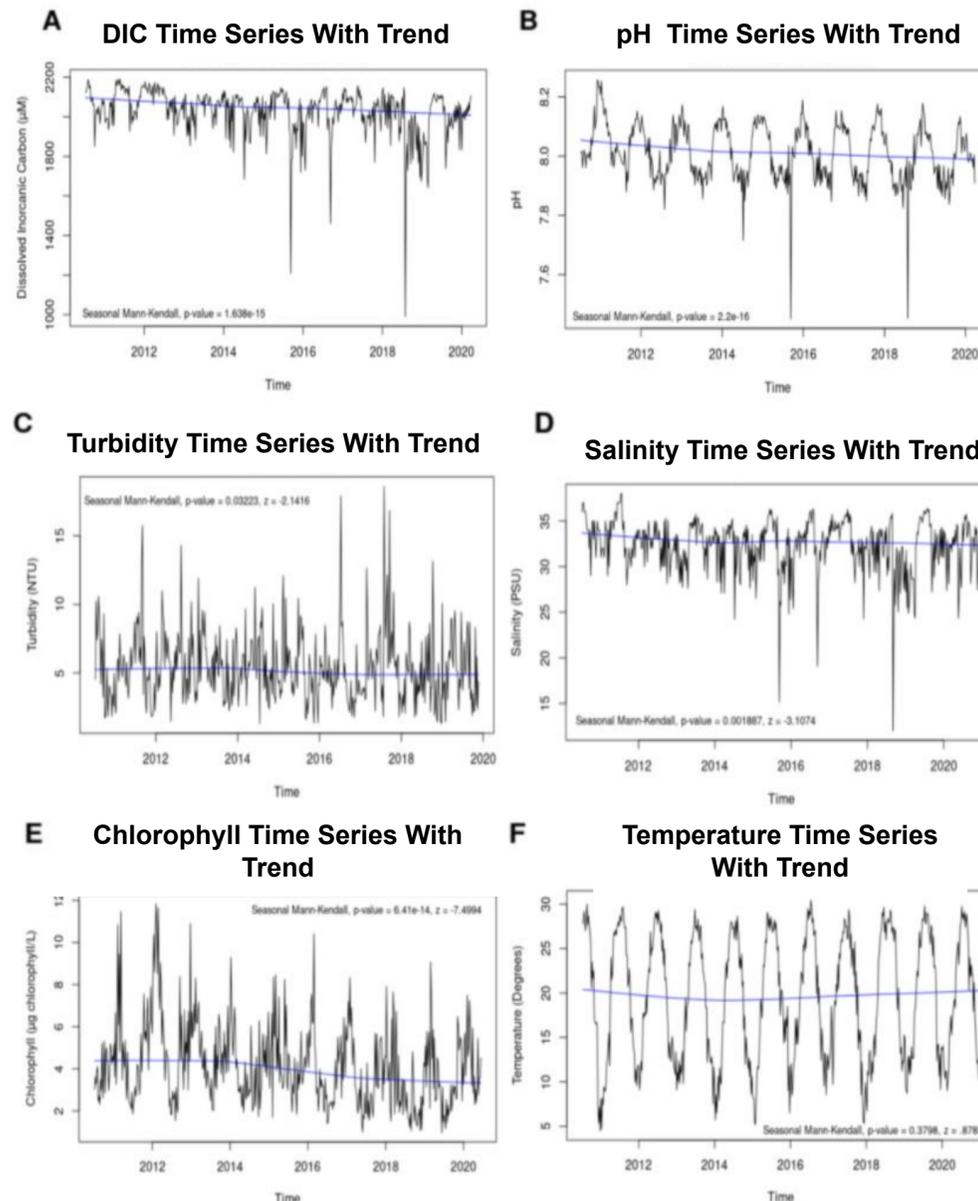
Examining the Impact of Storms
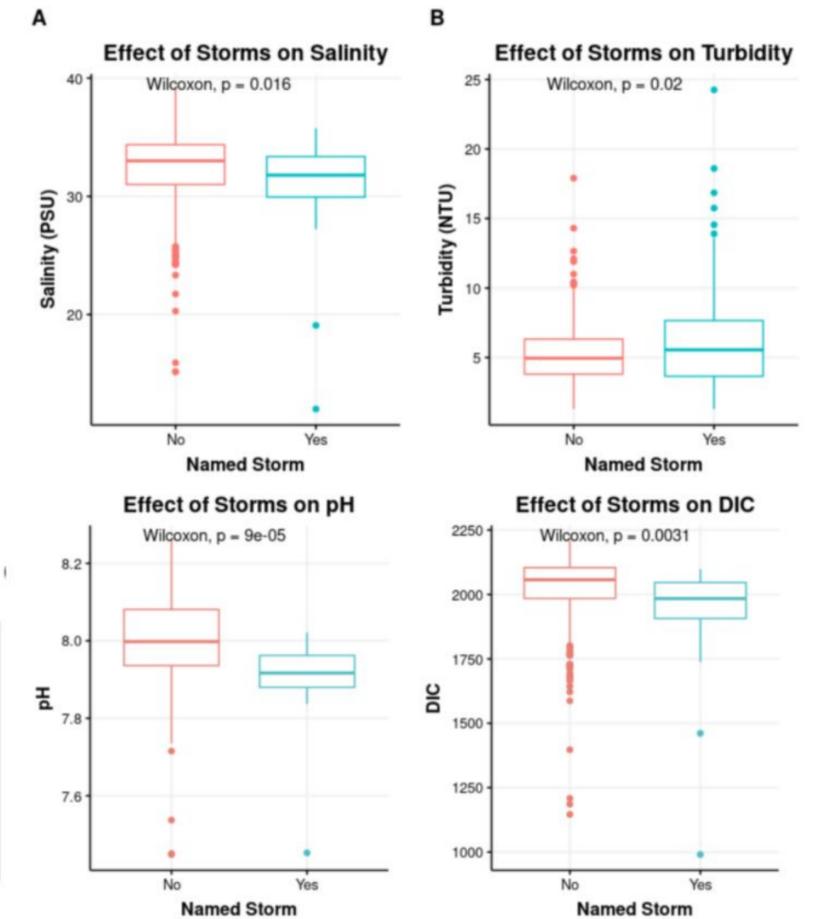
Methods:
- Pairwise Wilcoxon Rank Sum tests to look at the difference in means when there was a named storm event vs. when there wasn't one

Observations:
- Significant p-values indicate a difference in the mean value of salinity, turbidity, pH, and DIC in the event of a named storm

Implications

- Trends are consistent with an increase in urbanization and runoff
  - Could also be impacted by recent efforts to create buffer zones
- Severe implications due to increase in frequency and severity of storm events