

Project Overview

Study Summary:

The coral reef structure analysis aims to measure the impact of global change on different species of Caribbean coral. Researchers sampled *S. siderea*, *P. strigosa*, and *P. astreoides* from two distinct reef environments under different acidification and warming conditions. They measured protein, carbohydrate, and lipid energy reserves as well as the physiology of the algal symbiont (cell density, chlorophyll a concentration, coral color intensity). The coral samples were then placed in treatments to replicate different pCO₂ levels and temperatures to simulate different global change conditions.

In their analysis, researchers used Principal Component Analysis (PCA) to identify the patterns in the parameters studied and treatments and measured the relationships between parameters, calculating the correlation coefficients and graphing on scatterplots. Using all principal components, they measured plasticity (the potential to adapt to stress) as the distance between a control and experimental coral fragment from one colony. Plasticity by treatment and environment was then assessed with a linear mixed effects model, choosing the best fit with AIC for each species. Importantly, they linked their GitHub repository in the methods section of the paper.

Project Goals:

The GitHub repository contains raw data files, figures, and all code used in the study. The project will attempt to bring the code and data into RStudio to replicate the figures and calculations used in the paper. All functions used will be those in the CustomFunctions document.

Because some calculations were done with bootstrapped, the code will be used to ensure the procedure is replicable, and then the values obtained by the study will be substituted in, to make any additional calculations verifiable.

Reproducibility:

Reproducibility holds papers accountable and under more scrutiny. By taking steps to ensure anyone can access the exact procedures used by researchers, the study gains validity, under the knowledge that if someone chose to repeat the experiment/analysis under the exact conditions of the study, and obtained different results, then it might become invalid. As such, it is of great importance for authors to clearly lay out their methods and provide as much documentation as possible to bring this accountability. Linking a GitHub repository as this study has is a good place to start, allowing anyone with the necessary software to repeat the analysis.