

## Conclusion

Beyond what has already been discussed in the methodology as well as in analyzing the data and its ramifications, a major limitation of this study is its scope. While the dataset is highly comprehensive geographically, helping in part to rectify past limitations induced by data unavailability, there are still severe spatiotemporal limitations. As mentioned, all parametric data lacked any provision of spatiotemporal attributes. Moreover, due to the lack of direct quantifications of phytoplankton dynamics, the singular dynamic of primary production had to be indirectly assessed using total oceanic chlorophyll concentrations. This led to the data only being assessed

Nonetheless, the ideas behind the computational framework applied in this study are still viable. Having a system wherein data is provided and the changes in phytoplankton dynamics, including with their causes and effects, can be assessed is highly powerful. Many aspects of this apparatus were achieved through this study. Data was attained from WOD18, known for being one of the most comprehensive sources for oceanographic metrics. In creating numerous time series models, a potential forecasting tool was provided for scientists and policymakers alike to predict future levels of oceanographic metrics, and in turn make potential research and policy decisions. However, further iterations making use of a variety of regression models is needed. In performing linear regression on total oceanic chlorophyll concentrations, phytoplankton primary productions could be analyzed, albeit indirectly. Within this process, ecological and climatic impacts were assessed. Future work may be bolstered by using exact models for these metrics. For example, using neural networks to model food chain interactions given changing phytoplankton dynamics, or, climatically, using the Coupled Model Intercomparison Project or other models, as done in the past (Hague & Vichi, 2018). Driving parameters and inter-parameters relationships were characterized using PCA and covariance matrices, respectively. However, due inadequate variance capture of the principal components generated and analyzed, the resulting conclusions were limited in scope. Future data investigation should be performed, and it should be endeavored to increase variance coverage. Overall, a viable and applicable apparatus for studying phytoplankton dynamics has been provided and applied. However, future iterations will improve model fitness and result applicability.