Identifying Nutrient Sources Driving Algal Blooms in Florida Bay: A Causal Modelling Approach

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Over the past century, Florida Bay has experienced a number of disturbances, both presses and pulses, which have significantly altered ecosystem structure, function and the provisioning of services. These major anthropogenic and natural disturbances include the chronic reduction of freshwater inputs from water management practices, large-scale seagrass die-offs, and a number of hurricanes and tropical storms. The loss of seagrass coupled with strong storms has led to s shift from a clear water state to one dominated by sediment plumes and algal blooms. The bloom we are presently experiencing has increased in size and intensity each year after the 2015 seagrass die-off and have been hypothesized to be driven by a combination of factors such as rainfall and a shift in water chemistry. However, the sources of nutrients causing these blooms have yet to be identified. Using Empirical Dynamic Modelling (EDM), our research aims to determine the cause of the northcentral Florida Bay algal blooms by leveraging long-term data collected in northcentral Florida Bay along with 1 year of new data collection (water and sediment stable isotope and nutrient data along with algal identification). The results of this research will provide managers and policy makers with crucial information on the cause of algal blooms in Florida Bay with the goal of reducing blooms in the future.