

High temporal resolution monitoring of harmful algal bloom dynamics in a eutrophic shallow bay of Lake Champlain

Over the past several decades shallow temperate lakes have experienced increasingly frequent blooms of toxic cyanobacteria, threatening human and ecosystem health and impacting local economies. Efforts to understand the drivers of these blooms in natural systems have often been hampered by the low temporal resolution of most field datasets. This makes it difficult to identify the triggers of individual bloom events and the mechanisms governing growth dynamics, particularly in complex systems where many possible explanatory variables covary. To address this problem, an automated monitoring platform was deployed in Missisquoi Bay, Lake Champlain collecting hourly data samples at multiple depths for several physical, chemical, and meteorological parameters, along with continuous time-series water samples every 8 hours for nutrient analysis and weekly samples for phytoplankton, nutrient speciation, and suspended solids. These data reveal important trends at diurnal as well as seasonal scales, while also capturing the effects of discrete disturbance events (i.e. storms) on system dynamics.