



Relationship between Phytoplankton, Sea Surface Temperature and River Discharge in Bay of Bengal

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Phytoplankton is responsible for proper functioning of marine ecosystems by providing half of the global primary production and controlling biogeochemical cycle. Using chlorophyll as a surrogate variable for phytoplankton, several studies from various ocean basins across the globe, suggest an inverse relationship between phytoplankton and sea surface temperature (SST), implying that colder ocean waters have more phytoplankton and vice versa. In the Bay of Bengal (BoB), however, a positive relationship between chlorophyll and SST is observed. This apparently contradictory relationship between SST and chlorophyll has led to assertion that in a warming climate scenario, with increased SST a consequent increase in phytoplankton would lead to increase in cholera outbreaks in various regions of the globe. This paper seeks to address this apparent controversy by examining fresh water discharge into BoB from the Ganges and the Brahmaputra rivers. We will empirically demonstrate that freshwater discharge during high river discharge months alters the usually observed inverse relationship between chlorophyll and SST whereas during low discharge months the inverse relationship between SST and chlorophyll re-emerges. Our results indicate that increase in chlorophyll concentration in coastal areas of BoB is primarily driven by terrestrial nutrients and does not imply that warmer SST will lead to an increase in chlorophyll concentration and consequently phytoplankton abundance.