

## **“Marine phytoplankton –its various functions on the Earth”**

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The history of marine photosynthetic organism, in the form of cyanobacteria, started 36-35 hundred million years ago. Marine photosynthetic organisms have played various roles associated with the Earth evolution since then. During the Proterozoic, atmospheric composition became oxygen-rich caused by the production of marine photosynthetic organism. Production of the organic materials became major function of marine phytoplankton to support marine food web as a basement during Paleozoic, Mesozoic, and Cenozoic periods. It is widely believed that the marine phytoplanktons have also contributed to the evolution of higher trophic level organisms as prey and symbiont across these eras. During the Anthropocene, in the human-dominated epoch, marine phytoplankton also plays an important role as the most stable sink of atmospheric carbon dioxide (biological pump) as well as acts as the major primary producer of the globe. The strength of biological pump depends on the species composition controlled by light, temperature and nutrient conditions regulated by atmospheric and ocean dynamics. In this lecture, I will give an overview of ancient relationship between atmospheric and ocean dynamics and marine phytoplankton productivity, and the recent change in marine phytoplankton biomass connecting with the ongoing global warming.