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Abstract

We developed a numerical model of ecosystem dynamics to explore how the behavior of plankton influences the coastal ecosystems with a system dynamics tool, which is named MSFTM (Marine Stoichiometric, Functional Type Model). This model takes stoichiometry of nutrients and plankton functional type into account so that it can handle elemental cycle and biological processes. MSFTM is mainly composed of nutrients (DIN, DIP, DSi), phytoplankton, zooplankton and detritus. Two types of algal functional type, namely Diatom and Flagellates were considered. The Diatom takes DSi as well as DIN, DIP and plays important role on biological pumping. The Flagellates, which generically represents non-diatom (non-siliceous) algae and small contribution to biological pumping. We tested the performance of MSFTM and showed how different behaviors of two algae influence the system in terms of siliceous (therefore fast sinking) or non-siliceous (therefore slow sinking). These results suggest that the numerical model with system dynamics could contribute to efficient analysis for pelagic ecosystem by integrating various biological processes.