

## Current states and future prospects of modeling studies for lower trophic level marine ecosystem.

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Historically large scale ecosystem models for lower trophic level have been developed for understanding of global biogeochemical cycles such as global carbon budget. For this purpose, a concept of Plankton Functional Types (PFT), in which plankton are categorized into several types depending on their roles on biogeochemical cycles, have been employed as one of effective representations of marine ecosystem. Even now this approach of PFT modeling is the main force for a large scale modeling represented by earth system model. On the other hand, the demand on ecosystem modeling have been expanding and diversifying. Namely interest in understanding of ecosystem itself being heightened (e.g., future impact of climate change on ecosystem roles and diversity). As a results, modeling approach for explicit representations of plankton physiological response and ecological interaction have been attracting attention in recent years. Large scale ecosystem modeling also being in transition. In this presentation, based on internal activities of CMIP (Coupled Model Inter Comparison Project) and MAREMIP (MARine Ecosystem Model Intercomparison Project), we review the current state of PFT modeling and discuss future prospects of lower trophic level modeling.