

Sensitivity of marine copepods to bottom-up and top-down forcing

Rubao Ji

Marine copepod populations are influenced by both bottom-up (through changes in physical environment and/or food resource) and top-down (through changes in predation) forcing. Evaluating the sensitivity of copepod populations to the bottom-up and top-down forcing is an essential step towards the prediction of future marine planktonic ecosystem changes. Most of previous studies are based on statistical analyses that correlate zooplankton with both preys of zooplankton (e.g. phytoplankton) and predators of zooplankton (fish or invertebrate predators). Very few studies have conducted quantitative assessment based on dynamic models. In this presentation, a review of existing studies will be provided. Additionally, a case study in the Gulf of Maine will be presented, with a coupled hydrodynamics/food-web/population-dynamics model to identify the key processes controlling the observed seasonality and distributional patterns of key copepod species, including *Pseudocalanus* spp. and *Centropages typicus*. Numerical experiments are conducted to assess the sensitivity of the modeled species to changes in phytoplankton biomass and bloom timing, as well as the changes in mortality regime. The relative importance of bottom-up and top-down controls will be quantified. A comparison with other marine systems in the North Atlantic region will also be presented.

Keywords: plankton; copepods; modeling; top-down; bottom-up

Contact author: Rubao Ji, Woods Hole Oceanographic Institution, rji@whoi.edu