Population modelling of Acartia spp. in a water column ecosystem model for the southern Baltic Sea

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This paper describes numerical simulations of the seasonal dynamics of Acartia spp. in the southern Baltic Sea. The studies were carried out using a structured zooplankton population model adapted to Acartia spp. The population model with state variables for eggs, nauplii, five copepodites stages and adults was coupled with a marine ecosystem model. Four state variables for the carbon cycle represent the functional units of phytoplankton, pelagic detritus, benthic detritus, and bulk zooplankton, which represent all zooplankton other than the structured population. The annual cycle simulated for 2000 under realistic weather and hydrographic conditions was studied with the coupled ecosystem–zooplankton model applied to a water column in the Gdańsk Gulf (southern Baltic Sea). The vertical profiles of selected state variables were compared to the physical forcing to study differences between bulk and structured zooplankton biomass. The simulated population dynamics of Acartia spp. and zooplankton as one biomass state variable were compared with observations in the Gdańsk Gulf. Simulated generation times are more affected by temperature than food conditions except during the spring phytoplankton bloom. The numerical studies are a following step in understanding how the population dynamics of a dominant species in the southern Baltic Sea interact with the environment. This work was carried out in support of grant (the Polish state Committee of Scientific Research).