Dynamics of the Particulate Organic Carbon in the southern Baltic Sea.

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This paper presents a one-dimensional Particulate Organic Carbon Dynamic Model 1D-POCD. The particulate organic carbon concentration is determined as the sum of phytoplankton, zooplankton and dead organic matter (detritus) concentrations. Mathematically, the pelagic variables of 1D-POCD model are described by a second-order partial differential equation of the diffusion type with biogeochemical sources and sinks. The temporal changes in the phytoplankton biomass are caused by primary production, respiration, mortality, grazing by zooplankton and sinking. The zooplankton biomass is affected by ingestion, excretion, respiration, fecal production, mortality, and carnivorous grazing. The changes in the pelagic detritus concentration are determined by input of: dead phytoplankton and zooplankton, natural mortality of predators, fecal pellets, and sinks: sedimentation, zooplankton grazing and decomposition. The 1D-POCD model was used to simulate the seasonal dynamics of particulate organic carbon fluxes in the southern Baltic Sea (Gdańsk Deep, Bornholm Deep and Gotland Deep). The results of the simulations were compared with the mean concentrations of particulate organic carbon recorded in situ at station situated at the Gdańsk Deep. Generally good agreement between the measured and modeled POC concentration was obtained.