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Influence of the parameterization of water optical properties on the sea surface temperature and phytoplankton modeling in the Baltic Sea

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The issue of light propagation in the water column requires further improvements in the Baltic ecosystem models. The estimations based on simple exponential vertical distribution of the total downward irradiance in the visible spectral range (PAR, photosynthetically available radiation) should be replaced by a more detailed parameterization reflecting spectral dependence of light attenuation. In recent years extensive regional in-situ optical data sets have become available for the Baltic Sea, which can be used for this purpose. We have compared selected optical parameterizations used in the Baltic ecosystem models in the past with a new parameterization according to the spectral DESAMBEM algorithm. In our calculations we have used a one-dimensional ocean model (POM) coupled with the optical models. Our results show that the choice of optical parameterization has significant effects on the modeled sea surface temperature, water column stratification, and phytoplankton component of the model.