



## **Modelling carbon and nitrogen regulated growth of phytoplankton in the Sylt-Rømø Bight**

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An ecosystem model was set up for the Sylt-Rømø Bight (SRB), a shallow tidal basin in the wadden sea at the German/Danish border, and the adjacent North Sea. The model describes the cycling of carbon and nitrogen and consists of a quota-based physiological model for phytoplankton growth embedded in a simplified food web. The pelagic components in the SRB exchange with the pelagic system of the North Sea due to strong tidal currents between the two water masses that are represented in the model as periodic exchange between two homogeneously mixed boxes. Despite its simplicity, the model is able to reproduce the annual patterns of nutrient drawdown and chlorophyll reasonably. This depends critically on the existence of an active benthic component in the model and demonstrates the importance of benthic-pelagic coupling which becomes even more important in the shallow wadden sea. The productivity inside the bight is shown to be strongly dependent on suspended matter concentrations affecting the light regime, river runoff and the activity of filterfeeding animals. The physiology-based phytoplankton model allows for deviations from the Redfield ratio and hence for a decoupling of carbon and nitrogen cycling. The role of this decoupling for the carbon budget is discussed in the model runs and some results are shown of estimating ecosystem parameter values by means of inverse modelling. Nevertheless, the modelled budgets are still subject to some uncertainty because of the simple physical model structure.