



1 The influence of hydrodynamic factors on nutrient supply for phytoplankton growth in Narva Bay, the Gulf of Finland

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A complex interaction of physical and biological factors influence phytoplankton dynamics in coastal marine systems. In coastal areas of the Gulf of Finland phytoplankton growth is affected by both nutrient input from rivers and from open sea. Three-dimensional hydrodynamic – eutrophication model was applied to analyze phytoplankton dynamics in Narva Bay. The model domain covered central and eastern parts of the Gulf of Finland and modelling period spanned one biologically active season. The both hydrodynamic and eutrophication model results were validated for Narva Bay.

The results showed that variations of phytoplankton biomass in Narva Bay as a whole were mainly affected by nutrient supply from deep layers of the open gulf. Direct impact of river nutrient discharge on phytoplankton growth was mainly restricted to the cross-shore distance of 10 km and propagated in both directions alongshore from the river mouth. Seasonal variations of phytoplankton biomass were similar both to the right and to the left from river mouth. Analysis of short-term variability of phytoplankton biomass showed significant differences. The variability at the right coast was mainly due to transport of river-discharged nutrients. Phytoplankton growth at the left coast was correlated to upwelling events, which brought nutrients from the deeper layers of the gulf.