

Phytoplankton response to environmental changes in the Scheldt estuary

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Because of their short generation times, phytoplankton is among the first to respond to environmental stress as well as restoration measures. Although these responses have been intensely studied in lakes, much less information is available for highly complex and dynamic estuarine ecosystems. Here we present a synthesis of phytoplankton dynamics in the freshwater tidal Scheldt estuary based on monitoring data since 1996.

Throughout the study period, diatoms have been the dominant group of algae in the estuary, followed by green algae. Phytoplankton mean summer biomass has increased since 2003 and shows a gradual upstream shift in population maxima in more recent years. However, changes in species composition have been more dramatic than the changes in productivity, in particular among diatoms.

Based on statistical analyses of field data and laboratory experiments, we attempt to identify the main drivers of these floristic changes. Interspecific differences in ammonium tolerance, susceptibility to parasites and zooplankton grazers emerged as important processes influencing species turnover among phytoplankton in the Scheldt estuary, next to physical forcing by hydrological conditions and underwater light regime.