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Influence of salinity and light climate on phytoplankton in the Schelde estuary

M. Lionard, K. Muylaert, D. Van Gansbeke and W. Vyverman

In this study, we tested the effects of light intensity and salinity on estuarine phytoplankton communities of the Schelde river and estuary. We used HPLC in order to identify and quantify the different phytoplankton pigments. In two experiments (summer-spring), water was collected in the river and at two locations in the estuary (freshwater tidal and brackish). The water was mixed with an equal amount of filtered water (GF/C filters) from the same or a different site and was exposed to different light levels to test for the effects of the chemical composition of the water (including salinity) and the light climate on phytoplankton growth.

In spring as well as in summer, diatoms dominated the phytoplankton community, while green algae were relatively more important in summer. A reduction in light intensity strongly reduced growth (as evaluated by changes in chl a concentration) of phytoplankton from the freshwater tidal estuary as well as the river. In spring, at high light intensity, a relative increase of green algae was observed although diatoms remain dominant (as evaluated by fuc/chl a and lut/chl a ratio's). In summer on the contrary, green algae were negatively influenced by the high light intensity. Exposure of phytoplankton from the river to water from the freshwater tidal estuary had no effect on phytoplankton biomass and community composition. Phytoplankton from the river as well as from the freshwater tidal estuary was negatively influenced by an increase in salinity. Phytoplankton from the brackish part of the estuary, on the other hand, was not significantly influenced by a decrease in salinity.