Inter-estuarine comparison as a tool to derive holistic management priorities

Stefan Van Damme and Patrick Meire

University of Antwerpen, Faculteit Wetenschappen; Departement Biologie, Onderzoeksgroep Ecosysteembeheer (ECOBE), Campus Drie Eiken, Gebouw C, Universiteitsplein 1, 2610 Antwerpen, Belgium
E-mail: stefan.vandamme@uantwerpen.be

Comparing systems can offer more knowledge for each individual system than studies of individual systems. As an example, there is a local debate going on in France whether the food web in the Seine estuary has become impoverished or not. The ecological functioning of the Seine was therefore compared with the Scheldt estuary. Nutrient concentrations, light climate, or morphology were in both estuaries favorable for allowing primary production. Yet, chlorophyll a concentrations in the Seine were critically low and even still showed a decreasing trend, while in the Scheldt, phytoplankton is actually booming.

The comparison showed that the residence time was most likely the factor explaining the difference for primary production between the estuaries. In the Seine Bay, depletion of dissolved silica could be related with discharge, indicating that Seine blooms were mainly restricted to dry periods, while the Seine estuary hardly showed depletion at all. Although average discharge has not changed, there is evidence that the minimal summer discharge values have increased over time, reducing further the primary production hence the base of the food web. It is shown why the comparative aspect is determining for the diagnosis, and how the holistic approach offers a variety of possible restauration measures, taking into account factors that could explain the increase of summer discharges.