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Potential effects of global change on estuarine nutrient fluxes**E. Struyf, S. Van Damme and P. Meire***Ecosystem Management Research Group, Department of Biology, University of Antwerp*

One of the major worldwide problems in densely populated estuarine areas is the eutrophication of coastal waters. Studies, both observational and theoretical, addressing the issue of material fluxes to coastal zones under changing external forcing conditions, have a critical international importance. In contrast to N and P, the silica concentration in estuaries is hardly influenced by human pollution. Increased N-concentrations can lead to succession of diatom communities to phytoplankton communities with less favorable properties.

Global change models predict effects of climate change on hydrological regimes at the continental scale in Europe. Schelde freshwater discharges could increase up to 28 %. Strongly increasing freshwater discharges over the period 1996-2000 in the upper Schelde estuary could be an example for future changes in estuarine and coastal response to excessive nutrient loading due to human impact on the global climate.

Effects in the upper estuarine areas were totally different to effects at the mouth of the estuary. In winter, when discharge increase was highest, dilution resulted in lower concentrations of NH_4^+ , PO_4^{3-} and total nitrogen in the upper and brackish parts of the estuary. Nitrate and oxygen concentrations increased. Significant regressions were observed between trends and discharge regime. In summer, when discharge increases were not as high as in winter, no dilution was observed. Moreover, lower residence times in the freshwater due to higher discharges, have a negative effect on water quality in the brackish estuary in summer, as more unprocessed NH_4^+ is transported downstream, which results in very low oxygen conditions. In summer, high discharges result in the complete flushing of entire diatom communities in the freshwater reach of the estuary, which resulted in much higher dissolved Si concentrations.

Total discharged loads of nitrogen, phosphorus and silica increased spectacularly over the study period. Nitrate and silica concentrations in the coastal waters, the two main actors in coastal eutrophication, were significantly correlated to total yearly discharges observed upstream. Effective measurements against non-point pollution and insight in the role of intertidal areas in regulating non-point nutrient fluxes become more important than ever in the light of increasing discharges.