Ecosystem function recovery and benthic community recovery was investigated after experimentally induced depleted oxygen bottom water concentrations in a tidally mixed (Mullumburra, Western-shore estuary). Microalgal recovery developed through different succession stages and was structured by facilitator and inhibitor interactions: early colonizers had a positive effect on subsequent colonizers, while later successional species negatively affected the stable conditions created by the early-colonizing tube-builders. Therefore between different stages were related to changes in environmental characteristics and biotico-ecosystemic interaction (e.g. exploitation competition for food). Nematode community- and biogeochemical recovery were related to macrofouling succession. Dense polychaete tube aggregations and the development of a fresh diatom bloom, as a result of the low grazing pressure by substrate deposits forming macrofauna during the first stage, stabilized the sediment and thereby enhanced macrofaunal and nematode recruitment success. Restoration impact of later succession species increased oxygen input in the sediment, resulting in an enhanced mineralization, denitrification and energy use.

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THE EFFECT OF LAND USE CHANGES ON SILICA TRANSPORT THROUGH RIVER BASINS

The role of dissolved silica in the eutrophication problem is well recognised. Nonetheless, so far, almost all studies of eutrophication and nutrient fluxes towards the coastal zone have considered silica mobilisation as independent of land use. In the USGS-project (Land use and silica fluxes through the Scheldt river basin), we investigate the effect of land use on terrestrial silica mobilisation on a regional scale as well as on habitats scale and by local experiments, taking into account surface run off, subsurface drainage and storage and cycling through vegetation. Our results show that land use and especially the conversion from forested or urban land cover towards agricultural crops, has a significant impact on silica concentrations in adjacent waters. With increased agricultural, more silica is mobilised, both in dissolved (DSi) and particulate amorphous (ASi) form. The use of different tillage techniques had an effect on silica mobilisation, e.g. conventional ploughing resulting in higher DSi mobilisation than direct sowing. These new insights are important for the eutrophication debate as the relevance status of which extrarabi and coastal eutrophication has been quantified in the past may have to be fundamentally reconsidered.

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RIISING CO2 LEVELS AND THE IMPCAT OF CN STOICHIOMETRY ON TONR PRODUCI0N BY HARMFUL CYANOBACTERIA

It is commonly argued that global warming is likely to promote harmful cyanobacterial blooms in eutrophic lakes. Microcystis is a common bloom-forming cyanobacteria which can produce a family of hepatotoxins known as microcystins. The microcystin variants are composed of different amino acids, and thereby differ in their carbon:nitrogen (C:N) ratio. We studied how the availability of dissolved inorganic carbon (DIC) and dissolved inorganic nitrogen (DIN) affect the microcystin production of Microcystis in chemostat experiments and in lake samples. Chemostat experiments showed that rising CO2 levels cause a shift to high cellular C:N ratios under nitrogen-limited conditions, but a shift to low cellular C:N ratios under nitrogen-rich conditions. Interestingly, the nitrogen-limited microcystin variant, microcystin-BF, showed a strong negative correlation with the cellular C:N ratio in both the chemostat experiments and in lake samples. In total, our results indicate that rising CO2 levels can strongly affect cyanobacterial C:N stoichiometry and can lead to shifts in the cellular toxin composition of cyanobacteria.