P17.

Silica cycling in a freshwater tidal marsh

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Silica plays a major role in eutrophication of coastal waters around the world. Mechanisms controlling the production and fate of silica in estuarine systems are far from understood. Major indications have been reported that intertidal areas may be an important reservoir of silica in estuarine systems. This project intends to clarify the role of a freshwater marsh in the silica cycle within the Schelde estuary. Different silica pools in the marsh (vegetation, sediment, pore-water, groundwater and surface water) are quantified on a two-monthly basis in different vegetation types. Dissolved Si, taken up by plants, is stored as amorphous biogenic silica, and is unavailable to the estuarine ecosystem until these plants decompose. Although the monitoring has not yet been carried out over the intended full year period, Phragmites australis and Urtica dioica could already be identified as the major vegetation sinks for dissolved silica in the marsh. Biogenic silica in surface sediments in the marsh increased from winter to summer. In spring and summer, the marsh becomes a sink for BSi, as diatoms and decomposing material are imported into the marsh. Mass-balances carried out may-june 2002 confirmed this theory. BSi was netto imported into the marsh. In contrary, it was observed that dissolved Si was netto exported from the marsh. The marsh seems to act as a reactor, transforming imported BSi to DSi, and thus makes this silica again available to the estuarine ecosystem. In the future, mass-balances will be carried out in all four seasons, to further clarify this theory. Interactions between the different silica pools will be studied by decomposition and dissolution experiments, both *in situ* and *ex situ*. In the end, these major goals will allow to construct an integrated view of the role of freshwater tidal marshes in the silica cycle within an estuarine system, by focusing on retention and processing of silica within the marsh.