

The role of vegetation in the Okavango Delta silica sink

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Abstract

We assessed the role of vegetation and hydrology in the Si cycle in the Okavango Delta. Our results show a large storage of biogenic Si (BSi) in vegetation and the sediments. The biological storage is among the highest observed so far for any ecosystem worldwide. Floodplain vegetation accumulates similar amounts of BSi in both the temporary floodplains and the permanent floodplains, with most values observed between 20 and 100 g Si m⁻². This vegetation Si, after litterfall, contributes to a large biogenic Si storage in the sediments. In temporary floodplains, sediments contain less BSi (375–1950 g Si m⁻² in the top 5 cm) than in the permanent floodplains (1950–3600 g Si m⁻² in the top 5 cm). BSi concentrations in the floodplain sediments decline exponentially indicating rapid dissolution. In the occasional and seasonal floodplains, unidirectional solute transfer from floodplains to the islands will remove Si from the riverine systems. Our work clearly emphasizes the crucial role of floodplains and wetlands in Si transport through tropical rivers, and the potential interference of hydrology with this role.