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Biogeosciences Discussions

Interactive comment on "Vegetation and proximity to the river control amorphous silica storage in a riparian wetland (Biebrza National Park, Poland)" *by* E. Struyf et al.

Anonymous Referee #1

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The importance of silica as an essential nutrient is finally being recognised and this group are foremost in the promotion of its study. Theoretical considerations demonstrate the vital role of silica in other biogeochemical cycles yet the empirical underpinning of these conjectures is rudimentary. Previous studies have tended to be of forested ecosystems yet it is well known that grasses and sedges have a high requirement for silica and may actively seek to accumulate this element as a structural component. The focus on wetlands is particularly important since these provide the conduits for silica export from terrestrial environments to river systems and oceans. Better understanding of the way that wetlands recycle amorphous silica will greatly enhance our knowledge of changing silica export and the global silica cycle.

When viewed in the context of recent publications on N and P it appears rudimentary, yet that reflects the state of knowledge of the silica cycle. This is a deceptively simple paper, but nevertheless an important one. The authors relate amorphous silica from short soil cores to vegetation and distance from the river system. They show that riparian soils have the highest amorphous silica concentrations and that these result in high DSi levels in porewater that can be transported to the river system. Sites dominated by grasses and sedges accumulate more amorphous silica in the soils. The authors also show that the harvesting of grasses can lead to a reduction in amorphous silica accumulation as biomass is removed which has interesting implications for the influence of management on the silica cycle.

I like the hypothesis that ASi is reinforced through a positive feedback with porewater DSi levels that might reinforce grasses dominant position (P14). However, this is only one element in the competitive interactions between species and it would be hard to evaluate its importance relative to other factors. Perhaps species level data would show this aspect most strongly once other habitat criteria can be partialled-out of the analysis.

The empirical approach and statistical treatment of the data is sound. It is a pity that vegetation was not expressed as biomass/area as this would have fed more directly into the relationship with accumulation. Composition is obviously important but weighting it by biomass would have been stronger.

Overall an important paper.

Interactive comment on Biogeosciences Discuss., 6, 895, 2009.