

BayCEER Kolloquium

Lectures in Ecology and
Environmental Research

WS 2017/18



UNIVERSITÄT
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12:00 in H6, GEO

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Silicon in biogeochemistry

Silicon (Si) is the second most abundant element in the Earth's crust and involved in physiological processes of many organisms. For marine systems a clear interdependency between Si and both phosphorus (P) and carbon (C) cycling was shown, but for terrestrial systems less is known. A large number of terrestrial (e.g. trees and grasses) and aquatic plants (i.e. emergent and submerged macrophytes) accumulate substantial amounts of Si in their tissues. Si is well known to have positive effects on plant performance and stress tolerance e.g. from drought, toxicants, pathogens or herbivores. We found a strong decrease in Si availability with weathering and large differences in tree Si concentrations between species. We could show that Si availability in soils affects P availability and thus the plant P status. In an experiment estimating Si effects on carbon and nutrient release in peatlands we found a strong mobilization of nutrients and mineralization of organic material by increased Si availability. This strong effect of Si on both P mobilization from mineral binding sites and respiration of organic material was confirmed by our recent experiment for permafrost soils. Our results indicate a change in iron mineralogy by Si mobilizing P from strong binding to iron. In conclusion, Si is a main factor for plant and ecosystem performance in terrestrial systems by increasing P availability and C turnover.