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Titel
Testing hypotheses on interlinks between silicon and organic matter cycling in rice ecosystems

Abstract
Recent studies demonstrated that sufficient Si supply enhances the resistance of rice plants against biotic and abiotic stresses. The mechanisms by which Si supports the stress resistance are still under debate. One hypothesis assumes that phytoliths exert similar eco-physiological functions as organic structural compounds. The formation of amorphous Si oxide bodies (`phytoliths`) within the plant tissue, therefore, represents an energy-saving alternative to synthesis of organic structural compounds, such as cellulose and lignin. Hence, Si availability may interact with the recycling of organic matter because rates of plant litter decomposition are regulated by contents of structural organic compounds. We currently test the hypothesis using a large set of rice straw samples collected at 70 paddy fields in Vietnam and the Philippines. Due to the differing portions of weatherable silicate minerals in soil, Si availability varies largely between the fields; the Si concentrations in the straw samples, thus, range from 1.6 to 10.7%. The Si concentrations are significantly negatively related to carbon concentrations, which range from 31.1 to 42.5% (the R^2 of the linear relationship is 0.83). In turn, no relationships between Si and nitrogen concentrations were found. These findings support the assumption that Si substitutes N-poor structural compounds in rice plants. Currently, we apply cupric oxide oxidation analysis to the straw samples in order to test for relationships between concentrations Si and lignin. The results will be included into the proposed presentation.