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Bodenerosion

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Spatial patterns of common trees canopies in subtropical Chinese forests and its influence on soil erosion processes

Abstract

The hilly red soil regions in Southeastern China are still suffering from considerable soil erosion; despite long-lasting afforestation projects have been established to counteract soil losses. Even if a high number of studies on water erosion were conducted in this region, few is known about how different tree species and functional traits, such as crown cover, affect throughfall kinetic energy and thus splash erosion. In this study, a Terrestrial Laser Scanner (TLS) has been used to retrieve canopy structural patterns and spatial distribution of conifers and broadleaved trees and to investigate limitations for soil erosion control. Six different tree species in monocultures and different species mixtures were scanned within BEF China; a large forest Biodiversity and Ecosystem Functioning (BEF) experiment in Jiangxi Province, PR China. Based on the point cloud data from TLS, tree height, base diameter, first branch height, vegetation fractional coverage (VFC) and leaf area index (LAI) were quantified. The results showed that, in the earlier stage of afforestation, different species differed significantly in most tree parameters. Conifers and evergreen broadleaved trees with lower first branch height had higher LAI and VFC than broadleaved deciduous trees, which may reduce rainfall erosivity. Based on the established model between LAI and sediment concentration, deciduous broadleaved trees were predicted to have the highest sediment concentration. Further analyses will now be conducted on the dataset and presented at the conference in Göttingen.