

Soil organic carbon and its water-extractable fraction in volcanic ash soils in a Japanese temperate forest: relations to phosphate absorption coefficient and their implication

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Soil organic carbon (SOC) is a key component in global carbon cycling, while water-extractable organic carbon (WEOC) in soils is a proxy of soil carbon available to the living microbial community. Volcanic ash soils, a soil type dominant in Japan, are known to have a very high ability to stabilize soil carbon, and SOC content often correlates with phosphate absorption coefficients (PAC) in soils. In this study, we compared the SOC-PAC relationship and the WEOC-PAC relationships using 42 volcanic ash soils (0-6 cm depth) collected from a Japanese temperate forest. SOC showed a very strong correlation with PAC ($r = 0.72$). Correlation between SOC and WEOC was also strong ($r = 0.84$). Correlation between WEOC and PAC was, however, weak ($r = 0.42$). Thus, water destabilized carbon likely originated from residual carbon sources other than the primary carbon that is highly stabilized in volcanic ash soils.

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