

Tagungsnummer

V131

Thema

Kommission III: Bodenbiologie und Bodenökologie
Umwelteinflüsse auf Funktion und Diversität von Bodenorganismen

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Titel

Deadwood as "pedogenic hotspots" in forest ecosystems

Abstract

Removing forest biomass is an ecological disturbance both in the physical event itself and the counterfactual state that there is less bio- and necromass in present and future states. Such removal is known to affect forest ecosystems and their nutrient cycles, but how such removal affects soil functioning is unclear. Consequently how deadwood can be considered in soil and forest ecosystems remains underdeveloped. In our case study, we sampled 32 pairs of Deadwood-Control points in eight *Fagus sylvatica* (L.) stands in Southwest Germany. Dissolved metabolites and particulate organic matter from deadwood influenced the composition and distribution of soil organic matter within soil pores, aggregates, and on mineral surfaces. Correlated changes in soil pH, cation exchange capacity, phosphorus availability, and pore size distribution were also found. The extent these soil properties were influenced by deadwood also depended on site and deadwood characteristics, namely state of decay, forest floor type, and underlying bedrock. These results suggest that the input and incorporation of decayed organic matter from deadwood can contribute to nutrient exchange, aggregation, mineral weathering, and horizon differentiation both directly and indirectly through biological networks at meter and sub-meter scales. Those dynamics and cycles indicate deadwood is spatially defined and transient centers of concentrated biogeochemical and –physical processes that influence soil development and functioning within forests. As such deadwood warrants the designation as "pedogenic hotspots" that can better inform current research and forest soil management.