

Carbon redistribution during interrill erosion in subtropical forests: Effects of leaf litter diversity and soil fauna

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Soil erosion is crucial for degradation of carbon (C) from their pools in the soil. If C of the eroded sediment and runoff are not only related to soil pools but also resulting additively from decomposition of litter cover, the system gets more complex. The role of these amounts for C cycling in a forest environment is not yet known properly and thus, the aim of this study was to investigate the role of leaf litter diversity, litter cover and soil fauna on C redistribution during interrill erosion.

We established 96 runoff plots that were deployed with seven domestic leaf litter species resulting in none species (bare ground), 1-species, 2-species and 4-species mixtures. Every second runoff plot was equipped with a fauna extinction feature to investigate the role of soil meso- and macrofauna. Erosion processes were initiated using a rainfall simulator at two time steps (summer 2012 and autumn 2012) to investigate the role of leaf litter decomposition on C redistribution.

C fluxes during 20 min rainfall simulation were $99.13 \pm 94.98 \text{ g/m}^2$. C fluxes and C contents both were affected by soil fauna. C fluxes were higher with presence of soil fauna due to loosening and slackening of the soil surface rather than due to faster decomposition of leaves. In contrast, C contents were higher in the absence of soil fauna possibly resulting from a missing dilution effect in the top soil layer. Leaf litter diversity did not affect C fluxes, but indirectly affected C contents as it increased the soil fauna effect with higher leaf litter diversity due to superior food supply. Initial C contents in the soil mainly determined those of the eroded sediment. For future research, it will be essential to introduce a long-term decomposition experiment to get further insights into the processes of C redistribution.