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Soil microbial communities and their feedbacks to simulated climate change: comparisons among terrestrial montane ecosystems

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Microorganisms are well known to be more sensitive to changes in environmental conditions than to other soil chemical and physical parameters. However, the consequences of the on-going warming of montane ecosystems on microorganisms and the processes they mediate are still not well understood. In addition, different terrestrial ecosystems comprise different microbial communities, and their responses to changing environmental conditions require consideration of the complex interactions that occur between microorganisms and other site-specific biotic and abiotic factors.

Here, using phospholipid fatty acids (PLFAs) analysis, we investigated short- to medium-term changes in microbial communities among three different montane ecosystems (i.e. temperate limestone alps (forest and grassland), temperate silicate alpine grasslands, and tropical silicate forest) in response to two years of experimental field warming (+ 1.5 to 3°C) simulated by high-to-low elevation soil translocation. We found that changes in substrate quantity and quality in the course of the decomposition (in the temperate limestone alps) affected the microbial community composition and its substrate utilization less than the prevailing environmental site conditions, to which the microbial community adapted quickly upon change.

Results from the temperate grassland and tropical forest sites will be presented and discussed in view of multifactorial interactions as well as their importance in feedback responses to climate change.