Can Dominant Canopy Species Leaf Litter Determine Soil Nutrient Heterogeneity? A Case Study in a Tropical Rainforest in Southwest China

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Litterfall significantly contributes to the fine-scale (defined here as < 1 ha) soil nutrient heterogeneity in the tropical forest ecosystem. However, the relationship between species-specific litter and spatial pattern of soil nutrients remains unclear. Therefore, our main aim is to test the hypothesis that dominant species-specific leaf litter contributes significantly to the fine-scale soil nutrient heterogeneity. In a *Parashorea chinensis*–dominated tropical rainforest in Southwest China, we selected a 1-ha plot, conducted intensive soil sampling (99 ha^{-1}), litter trapping (99 ha^{-1}), and top 5 species' leaf litter sorting. We then analyzed the spatial variation patterns and correlations of soil nutrients with top 5 species litter nutrient fluxes using scale-wise wavelet analysis. Our results suggested that the fine-scale spatial variability of soil nutrients was not influenced by nutrient fluxes of dominant species leaf litter, whereas total litterfall nutrient fluxes depicted clear correlations with soil nutrients in studied forest and scale. This study did not detect the signature of dominant tree species-specific leaf litter on the fine-scale soil nutrient heterogeneity. In contrast, total litterfall distinctly modified soil nutrient heterogeneity at fine-scale. Our results highlight the potential importance of whole community litter and non-leaf litter on the regulation and maintenance of fine-scale soil nutrient heterogeneity in hyper-diverse tropical rainforests.