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COMPONENTS OF FOREST SOIL CO₂ EFFLUX AS ESTIMATED FROM $\delta^{14}\text{C}$ VALUES OF SOIL ORGANIC MATTER

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The partitioning of the total soil CO₂ efflux into its two main components: respiration from roots (and root-associated organisms) and microbial respiration (by means of soil organic matter (SOM) and litter decomposition), is a major need in soil carbon dynamics studies in order to predict the net response of soil carbon stores to climate change. In this study, SOM-derived CO₂ efflux was estimated for eleven forest sites as the sum of the ratios between the carbon stocks of different SOM pools and previously published ($\delta^{14}\text{C}$ derived) turnover times. The fraction of soil CO₂ efflux derived from recently fixed carbon, including root and root-associated respiration, was calculated by subtracting the SOM-derived respiration component from total soil chamber measured CO₂ efflux. Results suggested that, on average, ~ 50 % of total soil CO₂ efflux derived from the respiration of the living roots, ~ 40 % from decomposition of the litter layers and less than 10 % from decomposition of belowground SOM;. Estimates of SOM-derived soil CO₂ efflux in the current study were rather low compared with other two partitioning datasets However a major problem in the comparison could have been the high spatial variability of soil carbon and related variables.