## Fine root lifetimes in five forests measured with radiocarbon. (S07-gaudinski115029-Oral)

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## Abstract:

Understanding root dynamics is a critical factor in accurately quantifying belowground net primary productivity. Unfortunately, there are almost no empirical data on belowground productivity or direct measurements of the lifespan of live root material. Recent radiocarbon (14C) measurements of fine root cellulose in three eastern temperate forests of the United States show that at least a portion of fine roots (< 2mm in diameter) are living for more than 10 years (Gaudinski et al., Oecologia 2001) and that lifespan likely varies as a function of both diameter and position on the root branch system. New investigations in additional temperate forest ecosystems, using 14C approaches, in some cases coupled with mini-rhizotron and other traditional approaches, show that (1) the carbon making up new roots is on average 1.5 years old; (2) mini-rhizotron and 14C lifespan estimates agree well when this age correction is made and when roots are sampled to account for position on the root branching system; and (3) the 14C signatures of roots sampled from soil cores tend to show slower cycling rates relative to those sampled by position on the root branch system.

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