

Autotrophic and heterotrophic contributions to soil respiration in a subtropical camphor tree forest

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Abstract

Understanding the contributions of autotrophic respiration (Ra) and heterotrophic respiration (Rh) to total soil respiration (Rs) is necessary for accurate prediction of global carbon balance and net ecosystem production under environmental change. In this research, annual Rs and Rh and estimated were investigated by using a root trenching experiment in a Camphor tree (*Cinnamomum camphora*) forest in subtropical China for two years to qualify the relative contribution of Ra and Rh components to Rs, and to determine the environmental factors that control the seasonal changes in Ra, Rh and Rs. The results showed that annual mean Rs was 405 ± 219 gC m⁻² year⁻¹ in the studied forests, of which Rh and Ra were 240 ± 120 gC m⁻² year⁻¹ and 164 ± 102 gC m⁻² year⁻¹, respectively. The contribution of Rh to Rs averaged 58.1%, ranging from 45 to 81%. The seasonal changes in Rs and Rh were highly correlated with soil temperature, but not to soil water content. Our results suggest microbial community and activity make a primary contribution to carbon flux released from soil to atmosphere in the studied forest ecosystems.

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