

Stem respiration of trees in a subtropical evergreen broadleaf forest in Okinawa, Japan

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We measured the stem respiration of five tree species in a subtropical mature evergreen broadleaf forest in northern Okinawa Island. In August and September 2017, we measured stem respiration at 50 points on 23 trees and examined the differences along the circumference, among individuals, and among species. No significant circumferential variation in stem respiration was found in the two major species: *Castanopsis sieboldii* and *Schima wallichii*. In these species, although no significant difference was found among individuals within the same species, there was a positive correlation between stem respiration and individual radial stem growth in *Castanopsis sieboldii*. The inter-species difference in stem respiration was not significant. The average stem respiration at all measurement points in the summer was $1.5 \mu\text{mol m}^{-2} \text{s}^{-1}$. We estimated the total stem and branch respiration on a whole-tree scale by multiplying the average stem respiration per unit stem surface area by the total surface area of the stem and branches, estimated from forest inventory data assessed in 2016. The stand-scale stem and branch respiration per unit ground area calculated by integrating the individual whole-tree values was $3.7 \mu\text{mol m}^{-2} \text{s}^{-1}$. After the summer measurements, we continued to make monthly measurements for fewer trees. The stem respiration decreased toward winter depending on the air temperature and was 18% of the summer value in January.

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