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## Diurnal and seasonal variations in carbon fluxes in bamboo forests during the growing season in Zhejiang province, China

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Bamboo forest is an important forest type in subtropical China and is characterized by fast growth and high carbon sequestration capacity. However, the dynamics of carbon fluxes during the fast growing period of bamboo shoots and their correlation with environment factors are poorly understood. We measured carbon dioxide exchange and climate variables using open-path eddy covariance methods during the 2011 growing season in a Moso bamboo forest (MB, *Phyllostachys edulis*) and a Lei bamboo forest (LB, *Phyllostachys violascens*) in Zhejiang province, China. The bamboo forests were carbon sinks during the growing season. The minimum diurnal net ecosystem exchange (NEE) at MB and LB sites were  $-0.64$  and  $-0.66$  mg C m<sup>-2</sup> s<sup>-1</sup>, respectively. The minimum monthly NEE, ecosystem respiration (RE), and gross ecosystem exchange (GEE) were  $-99.3 \pm 4.03$ ,  $76.2 \pm 2.46$ , and  $-191.5 \pm 4.98$  g C m<sup>-2</sup> month<sup>-1</sup>, respectively, at MB site, compared with  $-31.8 \pm 3.44$ ,  $70.4 \pm 1.41$ , and  $-157.9 \pm 4.86$  g C m<sup>-2</sup> month<sup>-1</sup>, respectively, at LB site. Maximum RE was  $92.1 \pm 1.32$  g C m<sup>-2</sup> month<sup>-1</sup> at MB site and  $151.0 \pm 2.38$  g C m<sup>-2</sup> month<sup>-1</sup> at LB site. Key control factors varied by month during the growing season, but across the whole growing season, NEE and GEE at both sites showed similar trends in sensitivities to photosynthetic active radiation and vapor pressure deficit, and air temperature had the strongest correlation with RE at both sites. Carbon fluxes at LB site were more sensitive to soil water content compared to those at MB site. Both on-year (years when many new shoots are produced) and off-year (years when none or few new shoots are produced) should be studied in bamboo forests to better understand their role in global carbon cycling.