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# Soil respiration in tropical seasonal forest of Southern Vietnam

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Soil respiration was monitored as a part of a complex research of carbon balance in Nam Cat Tien National Park in Southern Vietnam (NCT site in AsiaFlux index). The study area is described as a tropical monsoon valley tall-stand forest at altitude about 156 m above sea level, mean annual air temperature is 26.2°C, with fluctuations of monthly averaged temperatures within 4°C; mean annual precipitation is 2470 mm with a distinct alternation of wet and dry seasons (Dong Phu weather station, 1976-1990). Measurements were made every 10-15 days during year 2012 at 6 plots that differ in soil and forest type, mostly in Lagerstroemia- or Dipterocarpus-dominated tree stands. Five chambers Ø162 mm were installed at each plot. $CO_2$ concentration was defined with LI-820 gas analyser and 20 ml syringes (three syringes/samples per chamber) up to August 2012, and by means of closed-loop continuous field analysis from August on.

Our studies have shown significant temporal and spatial variability of soil respiration in tropical rainforest. Namely, highest annual $CO_2$ efflux rates were calculated for cambisols under lagerstroemia-dominated tree stand and for light sandy fluvisols under dipterocarpus-dominated tree stand (1694.3±546.0 and 1628.1±442.7 gC•m-2•y-1 respectively). Noteworthy is that the content of organic carbon in these soils varies utterly. Lowest annual $CO_2$ efflux rate was calculated for clay-slate leptosols under dipterocarpus-dominated tree stand (972.7±716.5 gC•m-2•y-1). We also observed a significant impact of termites activity on site-scale spatial variability of soil respiration. Seasonal patterns of soil respiration rates were conformed for all plots except one on sandy soils. The beginning of rainy season in April did not result in higher soil respiration rates, but rates did rise in August – October, at the end of rainy season. Apparently this pattern is related to the accumulation of decomposed organic matter in soil and to the deficient aeration caused by high water table at the peak of wet season. On sandy fluvisols $CO_2$ efflux rates were high throughout the whole length of rainy season.