

**CO<sub>2</sub> and water fluxes over a rubber tree ecosystem**

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**Abstract :**

In Thailand, rubber is the major tree crop covering more than 2 millions hectares. Its impact on environment, and particularly CO<sub>2</sub> balance and water use, is a major issue.

A complete flux-measuring system has been installed in a 13 years old rubber plantation (clone RRIM 600) in eastern Thailand (Chachoengsao Rubber Research Center, RRIT-DOA) in 2006. Carbon fluxes of rubber plantation ecosystem are continuously measured by eddy-covariance method (CO<sub>2</sub> exchanges between the ecosystem and the atmosphere). Evapo-transpiration (ET) are measured by eddy-covariance and water balance together and partitioned between tree transpiration and soil evaporation. Sapflow is measured by heat dissipation method (Granier 1985, 1987) using home-made 20 mm-long radial probes, continuously heated (0.2 W). Meanwhile, amounts of C stored in the trees are evaluated by measuring biomass increment along the life cycle of the plantation, in combination with estimations of the carbon content of the different compartments. These measurements will provide the annual balance of C within plantations at different ages.

Results obtained at ecosystem scale by these methods will be compared to gas exchanges measured at the level of the different compartments (canopy, trunk, root system, soil...). Particularly, Farquhar's photosynthesis model (Farquhar et al. 1980) is parameterized across the canopy. Leaf water potential, sapflow and canopy transpiration are computed to calculate canopy conductivity.

Thereby, validated CO<sub>2</sub> and H<sub>2</sub>O fluxes will be used to model gas exchanges of rubber plantation ecosystem according to climate and other environmental parameters as well as crop management.

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