



Gas flux measurements at leaf level in a tropical natural rain forest of Indonesia

M. G. Rakkibu (1), A. Ibrom (2), G. Gravenhorst (1)

(1) Institute for Bioclimatology, University of Goettingen, Goettingen, Germany, Fax: +49 551 399619, golamrakkibu@yahoo.co.uk, (2) Bio Systems Department (BIO-309), Risø National Laboratory, Roskilde, Denmark, fax +45 46774160, andreas.ibrom@risoe.dk

Photosynthesis variables of leaves of tropical natural rainforest have been measured to estimate photosynthesis parameters at leaf level with an objective to scale it up to canopy level. To achieve this objective the study was designed to measure at different heights (up to 24m height) covering sun and shade leaves while attached to the trees. The study has been conducted in a natural rain forest of Sulawesi, Indonesia for six months during March 2004 to August 2004 on five dominant tree species, namely *Vernonia arborea*, *Lithocarpus havilandii*, *Castanopsis buruana*, *Gracinia dulcis* and *Phaleria coccinea* that represents different storey of the canopy. Licor-6400 gas exchange device was used to measure carboxylation velocity (A_{Ci}), light response (AQ) and dark respiration (RD) at different controlled microclimate conditions. For A_{Ci} measurements light was kept at a very high level ($PAR = 1500 \mu\text{mol.m}^{-2}\text{s}^{-1}$) and CO_2 concentrations were varied as 400 250 200 150 50 400 600 800 900 1000 1100 1200 ppm. For AQ measurements CO_2 was kept at a very high level (ca = 1000 ppm) and light were varied as 1500 1300 1000 800 600 400 200 100 60 40 10 5 0 $\mu\text{mol.m}^{-2}\text{s}^{-1}$. RD measurements were carried out at 400 ppm CO_2 concentration in the absence of light. From each species five sun leaves and five shade leaves were measured. Leaves were collected and measured for optical properties, leaf N-content, leaf P-content and specific leaf area. With these measurements we estimate the gross primary productivity for an upland tropical rainforest in South-East Asia and thus quantify part of net ecosystem exchange rate and the overall effect on CO_2 uptake and release. The present study was supported by DFG, SFB 552 "STORMA".