



Effects of complex Landscape on Flux Measurements above a Rainforest in Central Sulawesi, Indonesia

O. Panferov (1), A. Sogachev (2), H. Kreilein (1), A. Ibrom (3), G. Gravenhorst (1)

(1) Institute of Bioclimatology, University of Goettingen, Buesgenweg 2, D-37077, Goettingen, Germany, opanfyo@gwdg.de/FAX: +49 551 3912115, (2) Department of Physics Division of Atmospheric Sciences and Geophysics, University of Helsinki, Finland, (3) Biosystems Department, Risø National Laboratory, Denmark, Technical University of Denmark

Closed-canopy rainforest in Central Sulawesi is present at higher elevations only. Measurements of turbulent fluxes above the elevated rainforest regions are complicated by a heterogeneous terrain. To assess the effect of complex terrain on the fluxes and possible contributions of horizontal and/or vertical advective terms, three towers were equipped with vertically distributed standard micrometeorological instruments and eddy-covariance systems. The site, Bariri, is part of the Lore Lindu National Park, Central Sulawesi, Indonesia. These measurements, however, are still point based and their correct interpretation requires additional information on airflow structure over the complex terrain. The 3D atmospheric boundary layer model SCADIS employing a two equation closure approach ($E-\omega$ closure) and taking into account the flow dynamics within a plant canopy (Sogachev and Panferov, 2006) was used to describe the airflow over heterogeneous topography. To discriminate the vegetation influence, horizontal homogeneity of both, plant cover and of flux source strength was assumed. The vertical distribution of leaf area density was taken from measurements. Neutral atmospheric stratification was investigated in details for 8 main wind directions. The comparison between results of numeric experiments for idealized flat terrain and for the real one allowed to obtain the 3d distributions of “correction factors” for the main wind directions. It is shown that due to relief induced distortion of air flow the flux measured above the forest could differ the real one up to 1.5 times depending on wind direction. Results show a good agreement with estimations derived from tower mea-

surements.

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References

Sogachev, A., and O. Panferov, 2006, Modification of two-equation models to account for plant drag, *Boundary-Layer Meteorology* 121:229–266