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The offline validation of minimal advanced treatments of surface interaction and runoff (MATSIRO) on surface fluxes and conditions over tropical deciduous forest in Thailand

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Within a climate model, the element that simulates initial effect of land-cover change (LCC) is the land surface model (LSM) (Pitman, 2003). The project for intercomparison of land-surface parameterization schemes (PILPS; Henderson-Sellers et al, 1993) is designed to improve the parameterization of the continental surface, especially the hydrological, energy, momentum and carbon exchange with the atmosphere. In PILPS phase 2, observational data are being used both for input and for evaluation of offline simulation (Henserson-Sellers et al, 1995). So far the PIPLS phase 2(a) to 2(e) has been implemented in USA, Europe. However there was no such experiment in South-Eastern Asia. We've carried out long term measurement of surface heat, water and CO_2 fluxes at Tak flux measurement (TFM) site over tropical deciduous forest since in 2002 (Kim et al, 2003). In recent years, the large area of forests was burned to transform into corn and cassava filed (i.e., LCC) around TFM site. The MATSIRO (Takata et al, 2003) is one of the new generation LSMs designed for coupling with CCSR/NIES AGCM. The purpose of this study is the 1D-offline validation of MATSIRO on surface fluxes and conditions at TFM site for improving simulation in tropical monsoon area.

There is clear seasonal variation of rainfall that is divided into dry season and rainy season. During dry season the surface soil moisture was less than 10% by observation while it was about 30% by simulation. This large discrepancy of soil moisture affects the partitioning of available energy between sensible (H) and latent heat (LE) flux. Indeed, the simulated LE was about 70% larger than that observed LE. The observed CO_2 flux was positive (source) while the simulated CO_2 flux was negative (sink) during dry season. This is likely to be related the LAI used for simulation. For the rainy season, we are now under the preparation. The filed survey of root distribution and soil property will be helpful for better parameterization.

Keywords: LSM, tropical bush, tropical deciduous forest

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