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Improving the soil sub-model of the process-based terrestrial ecosystem model to apply tropical swamp forests

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We applied conventional model (Vegetation Integrative Simulator for Trace Gases; VISIT) to tropical peat forest data obtained from Palangkaraya (PDF) site in Kalimantan but it cannot simulate carbon balance accurately. Especially, ecosystem respiration (RE) showed opposite seasonal variation with observed RE because of misunderstanding of soil respiration process. Soil respiration process in conventional ecosystem model is controlled by only soil temperature and soil water content. In contrast, CO2 release from peat is regulated by not only these components but also water table. Soil respiration data obtained from PDF site shows that the response of soil respiration to wetness is also different from that in conventional model. In order to improve the response of soil respiration, we modify soil submodel of the model. Ground water level is simulated by tank model. We modify soil respiration function using the relationship between ground water level and soil respiration.

Keywords: carbon balance, ground water level, Central Kalimantan