



Investigating land use change impact on carbon cycle in tropical peat soils of Borneo

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Tropical peatlands in their natural state are important reservoirs of biodiversity, carbon and water. They are a large terrestrial carbon reservoir, with latest estimations of 88.6 Gt, including 68.5 Gt in Southeast Asia, which account for 11–14% of global peat carbon pool (Page et al., 2011). However, they are rapidly vanishing due to agricultural conversion (mainly to oil palms), logging, drainage and fire. Peat swamp forests have an important contribution to global and regional biodiversity (Posa et al., 2011). In our site in Brunei, they are host to *Shorea Albida* trees (Anderson, 1983). This valuable timber specie is collected in logging concessions. In other places, peatlands are drained in order to convert land for habitat or culture.

The study area is located in the Balait district in Brunei Darussalam in Borneo Island. Brunei is perhaps the best of the regional guardians of peat forest systems; potentially irreversible damage to peat forest ecosystems has been widespread elsewhere. Two sites, one pristine dome and a logging concession, are being investigated. The results are compared to a drained peatland located in the same area. Then, different land uses can be compared with the pristine site. Change of land use can induce modification of the carbon cycle in soils of peatlands, in relation with change of hydrology and microbial activity.

In order to investigate the impact of land use on carbon cycle in tropical peatlands, pore water and soil chemistry were investigated in the different sites. Soil ash content, elemental concentrations of C, H, and N and major elements were analyzed along transect in the domes. Soil organic matter was characterized by FTIR analysis. Pore-water was sampled from surface to two-meter depth and analyzed for pH, conductivity, dissolved oxygen, concentration of major nutrients, as well as organic carbon content and characteristics. Significant change in carbon concentrations were observed between the different sites.

References:

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