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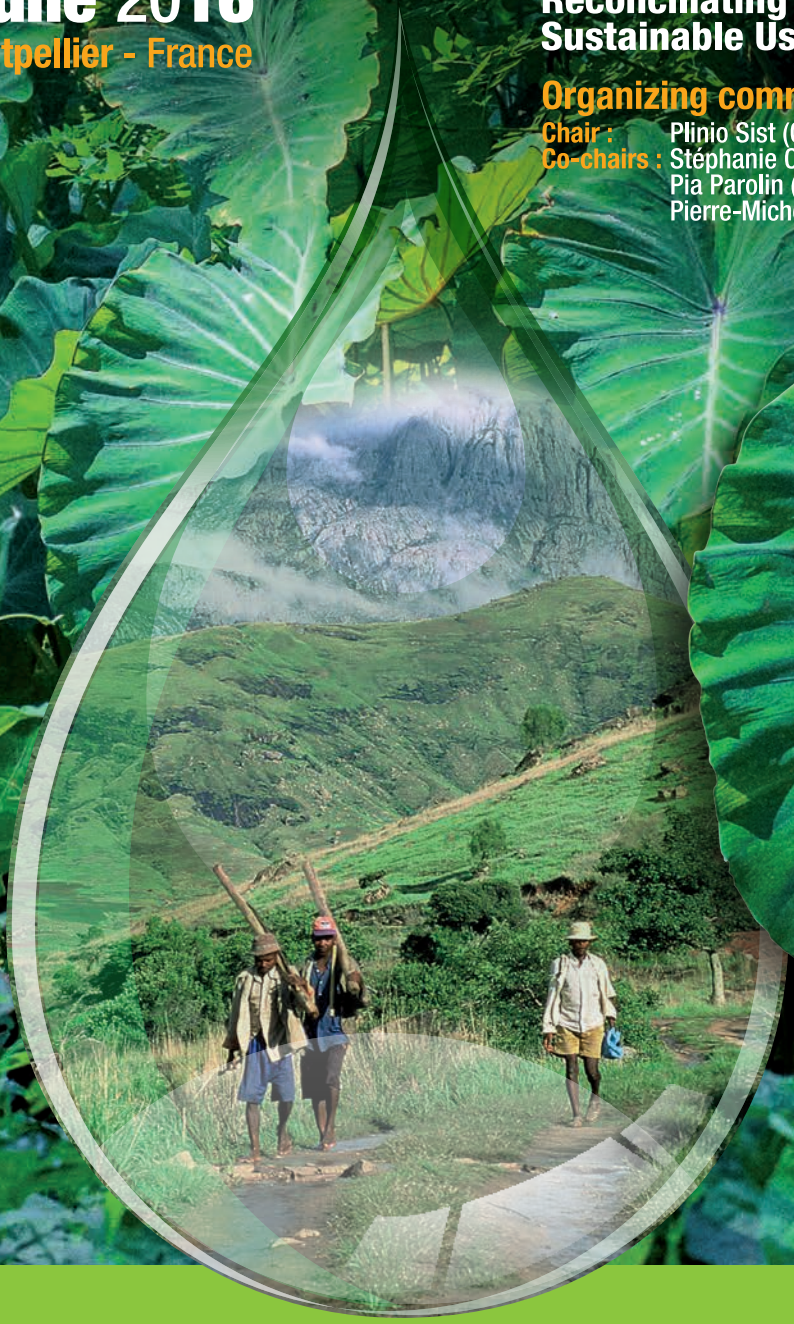

PROGRAM & ABSTRACTS

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O56-04 – S56 *Towards refined carbon budgets of managed forests*
Thursday 23 June / 14:30-17:00 – Einstein

Deadwood in logged-over Dipterocarp forests of Borneo

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Deadwood is an important stock of carbon in logged-over Dipterocarp forests but still remains poorly studied. Here we present the study of deadwood in logged-over Dipterocarp forests using two common approaches: plot-based approach and line-intersect-based approach.
We conducted our research in three sites which are forest logged in 2003, 2007, and 2010 within Hutansanggam Labanan Lestari (HLL) forest, a certified forest concessionaire in Indonesia. We established 1,500 m of transect line (broken down in 50 m section) for each site. As a reference, we established 47 10 m x 10 m subplot for three sites. All fallen deadwood with diameter > 10 cm were recorded. Our results shows that the mass of fallen deadwood resulted by line-intersect-based method was much higher in compare to plot-based method. The mass of fallen deadwood in plot-based study (44.563 ± 9.155 Mg/ha) was significantly different with the mass of fallen deadwood in line-intersect-based study (69.587 ± 8.079 Mg/ha). Furthermore, for the variability of deadwood, both methods show consistence results which is the variability in 2003 was lower than that in 2007 and 2010.
Based on our data, in order to get coefficient of variation of 10%, we recommend the use of minimum 40 plots of 20 m x 20 m to estimate deadwood in logged-over Dipterocarp forests.

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Effects of disturbance intensity and tree diversity on the biomass recovery of a managed tropical forest

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Sustainable forest management requires that forest ecosystem properties and processes can recover between major management-related disturbances to permit long-term ecosystem functioning. It remains, however, unclear how disturbance regimes and tree community properties influence the resilience of diverse tropical forests. In this study, we investigated how management-related disturbance intensity, remaining tree species diversity and community-mean trait composition affect recovery rates, measured as the annual increment of aboveground biomass, as a proxy for resilience. The study was conducted in a long-term experiment established in 1981 to study the effects of different management intensities and interventions on forest dynamics. The experimental site is located in the Tapajós National Forest, Pará, Brazil. Interventions comprised logging (1982), damage to trees not harvested (i.e., trees that died as an indirect result of logging) and thinning (1993 to 1994). We considered two recovery periods: post-logging (1983-1989) and post-thinning (1995-2012). Trees with diameter at breast height greater than or equal to 10 cm were measured on eight occasions in 41 plots of 0.25 ha. Remaining diversity and community-weighted mean trait values were calculated for the post-intervention censuses (i.e., 1983 and 1995). Predictors were related to biomass recovery rates using structural equation modelling. In both periods, biomass recovery rates of surviving trees increased with basal area remaining, and recovery rates of recruit trees increased with disturbance intensity. We found a weak signal for positive effects of remaining diversity and community-weighted mean trait values on recovery rates. Biomass recovery was strongly determined by disturbance intensity regarding the proportion of basal area remaining. Consequently, strong harvesting and thinning interventions should be avoided to reduce negative effects on productivity and carbon sequestration, as well as on other ecosystem functions which have not been investigated here.