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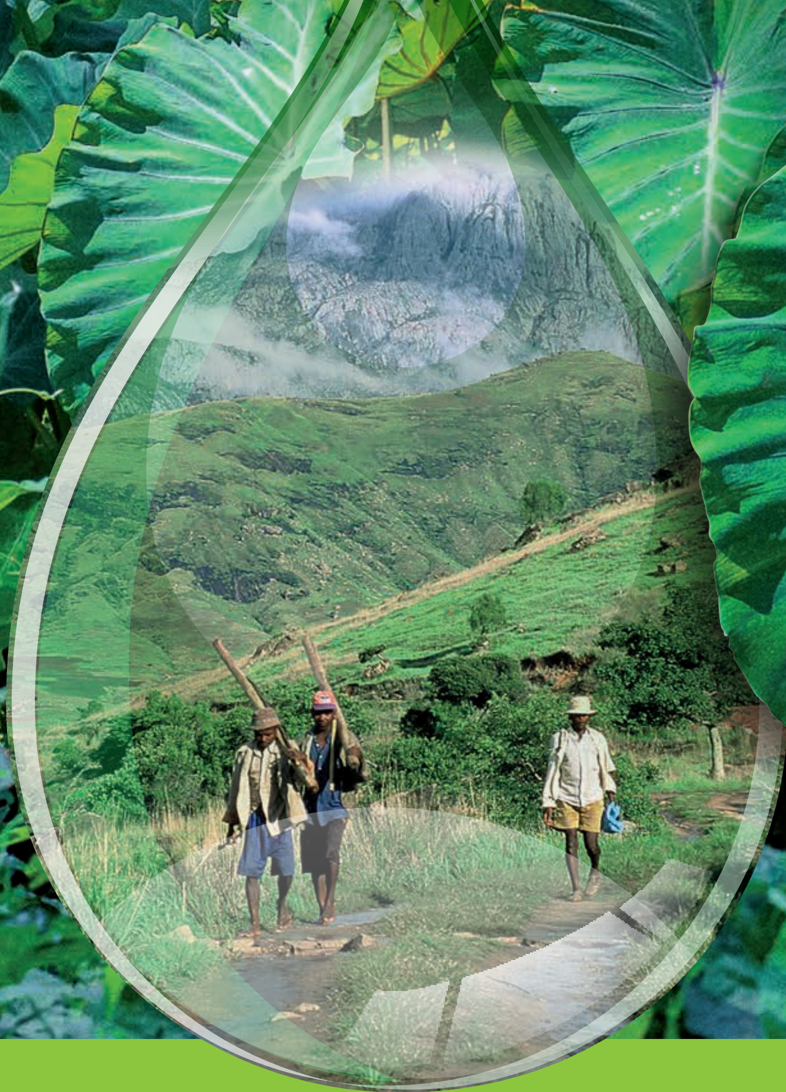

PROGRAM & ABSTRACTS

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P59-01 – S59 *Mapping and monitoring tropical forest degradation with remote sensing*
17:30 – 18:30 – Joffre Area (Level 1)

Kilimanjaro forest landscapes assessed from LiDAR point clouds: is there bias in field studies of forest structure?

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Field inventory plots which usually have small sizes of around one hectare can only represent a fraction of the much larger surrounding forest landscape. The small size of such plots is the consequence of a trade-off between very detailed and still feasible quantities of data collection and often the chosen location of setting up a plot is affected by topographical constraints and local accessibility. These constraints may particularly affect the selection of inventory plots on tall mountains such as the Kilimanjaro in Tanzania because this ancient volcano has considerable slopes and also numerous steep gorges and valleys. Based on light detection and ranging (LiDAR) data it has been shown for tropical forests that the bias in the selection of small inventory plots may severely hamper extrapolation of structural forest attributes to landscape and regional scales. For example, mean biases in forest canopy structure (height, gaps, and layers) and aboveground biomass in both lowland Amazonian and montane Andean landscapes may reach as much as 9-98% (Marvin et al. 2014). Such biases may cause difficulties especially when the goal is to assess and simulate carbon stocks and fluxes with computer models for larger scales (Fischer et al. 2015).
We therefore conduct here a LiDAR study on tropical montane forest in equatorial East Africa and evaluate the representativeness of chosen inventory plots with respect to key structural attributes such as top-of-canopy height, standard deviation and coefficient of variation of height, gap fraction, and standing biomass. We show that these attributes may considerably differ between LiDAR measures derived from landscape grid plots and small inventory field plots. These results will be discussed with respect to topographical constraints and also potential anthropogenic influences.
References: Marvin DC, Asner GP, Knapp DE, Anderson C, Martin RE, Sinca F, & Tupayachi R. (2014). Amazonian landscapes and the bias in field studies of forest structure and biomass. Proceedings of the National Academy of Sciences, 111, E5224-E5232.
Fischer R, Ensslin A, Rutten G, Fischer M, Schellenberger Costa D, Kleyer M, Hemp A, Paulick S, & Huth A. (2015). Simulating carbon stocks and fluxes of an African tropical montane forest with an individual-based forest model. PLoS ONE 10: e0123300.

P59-02 – S59 *Mapping and monitoring tropical forest degradation with remote sensing*
17:30 – 18:30 – Joffre Area (Level 1)

A typology of forest degradation un the eastern amazon using remote sensing

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The Amazonian pioneer front region is a mosaic of different forests types and agricultural landscapes resulting from the colonization of the region through forest conversion into pasture and agricultural lands. Fearnside and Guimaraes (1996) showed that 47% of the deforested area is rapidly abandoned. It also appears that logged forests surface is equivalent to deforested areas (Asner et al., 2005). Consequently a degradation gradient exists from low-impacted logged forests (depending of the logging intensity) to young secondary (regrowth) forests. To obtain more accurate estimation of carbon stocks, it is important today to take into account the degraded forest gradient including all degraded forest stages between mature intact forests and non-forest areas. The first main challenge is to identify and to characterize the various stages.
The identification of forest degradation is still a complex and expansive problem even if it has been focused until now only on logged tropical rainforest (Asner, 2009; Gond and Guitet, 2009; Desclées et al., 2006; Asner et al., 2005; Souza et al., 2003). In parallel estimation of biomass loss in the degraded forest is little-studied. Within temperate and boreal forests some estimation are made by Solberg et al., (2013). The combination of optical remotely sensed data (Landsat-8), radar (Terra-Sar-X) and Lidar (IceSat) have to be studied to analyze the potential of the multi-sensors techniques to characterize the tropical rainforest degradation (Betbeder et al., 2014).
The study presents the first results obtained during the field work at Paragominas (Pará, Brazil) on different forest degradation intensities (Bérenguer et al., 2014). This field database is then compared with multi-sensors remote sensing to better understand multiple interactions and to establish a forest degradation typology.