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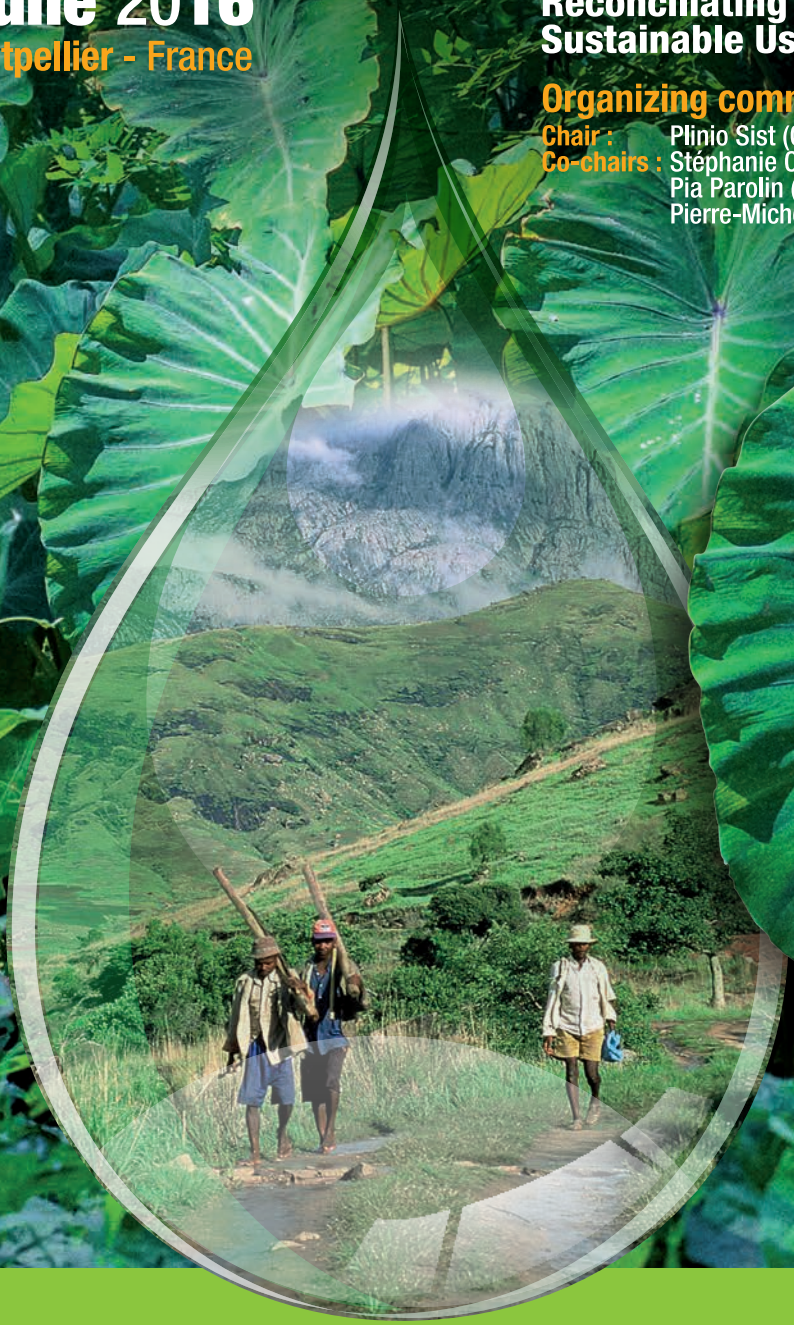

PROGRAM & ABSTRACTS

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O64-05 – S64 *Towards an unified vision of the central african forests*
Thursday 23 June / 08:00-10:00 – Antigone3

Can we predict forest composition across space and time in Central Africa

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Background. Predicting the current and future natural distributions of species is challenging, especially in the tropics where large remote areas remain poorly known. Such challenge can only be met with an in-depth understanding of the drivers of species distribution, a well-designed and extensive survey and appropriate statistical models.
Method. In this study, we use a large dataset of forest inventories from logging companies, which provides information on the abundance of 123 tree genera, in 140,000 plots spread over four Central African countries. In order to predict the current and future distribution of these tree genera, we use a set of bioclimatic, geological and anthropogenic variables. We rely on a recently published methodology, called Supervised Component Generalized Linear Regression (SCGLR), which identifies the most predictive dimensions among a large set of predictors.
Result. Using a calibration and validation scheme, we show that the distribution of most tree genera can be well predicted over the whole study area at the present time. At the community level, the floristic and functional composition of tree genera is also inferred with a good accuracy. Finally, using spatially explicit null models, we show that species-climate association are in most cases not better than chance, thus challenging our ability to predict how forest composition will be affected by climatic changes.
Conclusion. Overall, our study shows that tropical tree distributions can be predicted with good accuracy at the present time, offering new perspectives to manage tropical forests at large spatial scales, but that predicting shifts in species distribution under climate change scenarios is challenging.

O64-06 – S64 *Towards an unified vision of the central african forests*
Thursday 23 June / 08:00-10:00 – Antigone3

Functional shifts within Central African rainforests

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Background: Understanding the reaction of ecosystems to climate change and anthropogenic pressure is a central question in ecology and environmental sciences. In the terrestrial tropics, theoretical and empirical works suggest that once external disturbances have reached a given threshold, forest-savanna systems can switch from one state to another. Considering the multiplicity of the tropical forest systems, we make the assumption that numerous shifts may actually occur within the forest itself, without changes in forest cover but with risks of critical modifications in forest functioning.
Methods: To test this hypothesis, we used a finite mixture of regression models aiming at simultaneously predicting and grouping forest functional profiles at the stand level with respect to anthropogenic pressure, climate and soil. The model is built on a dataset of more than 140 000 plots of 0.5-ha each gathered from Central African forest companies. Forest stand functions are analyzed through two key functional traits: the successional status - pioneer vs. non-pioneer trees- and the leaf phenology - evergreen vs. deciduous trees.
Results: Our model captured a significant part of variation in the functional composition over the study area and revealed how anthropogenic pressure, climate change, soils or their combination lead to profound modifications within the forests. In particular, we showed that shifts from evergreen to deciduous stands can be mediated both by anthropogenic pressure or climate change.
Discussion: This work shows for the first time how external forcing may jointly lead to multiple shifts in the functional composition of tropical forests. Our model allowed to predict directional changes in forest functioning according to anthropogenic pressure and climate thus opening new perspectives in theoretical ecology, global vegetation modelling and in the understanding of the vulnerability of tropical forests to global changes.