RESILIENCE OF TROPICAL ECOSYSTEMS – FUTURE CHALLENGES AND OPPORTUNITIES

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Editors
Chris J Kettle and Ainhoa Magrach
Ecosystem Management
Department of Environmental System Science
Universitaetstrasse 16, CHN G75.1
ETH Zurich
8092 Zurich Switzerland

The respective authors are solely responsible for the contents of their contributions in this book.

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Concept & Layout
roman.tschirf@gmail.com

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SESSION 2-O1 - SCENARIOS OF BIODIVERSITY FOR THE CONGO BASIN

PREDICTING FOREST COMPOSITION ACROSS SPACE AND TIME IN CENTRAL AFRICAN FORESTS

Maxime Réjou-Méchain¹,²,³, Frédéric Mortier², Fabrice Bénédet², Xavier Bry⁵, Jérôme Chave⁶, Guillaume Cornu², Jean-Louis Doucet⁴, Adeline Fayolle⁴, Sylvie Gourlet-Fleury², Raphaël Péliissier³, Catherine Trottier⁵

¹French Institute of Pondicherry, Pondicherry, IN, maxime.rejou@gmail.com
²UPR BSEF, CIRAD, Montpellier, FR, maxime.rejou@gmail.com
³IRD, UMR AMAP, Montpellier, FR, maxime.rejou@gmail.com
⁴Unité de gestion des ressources forestières et des milieux naturels (GRFMN), Gembloux, BE
⁵Université Montpellier 2, Montpellier, FR
⁶Laboratoire EDB, Toulouse, FR

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. In this study, we use a large dataset of forest inventories from logging companies, which provides information on the abundance of 215 tree genera, in more than 115,000 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. 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 community level, the floristic and functional composition of tree genera is inferred with a high accuracy. Finally, using climatic and anthropogenic scenarios we predict the expected change in functional and phylogenetic structure of tree communities over the western part of the Congo Basin. Overall, our study provides useful ecological insights and shows that tropical tree distributions can be predicted with good accuracy, offering new perspectives to manage tropical forests at large spatial scales.