# RESILIENCE OF TROPICAL ECOSYSTEMS – FUTURE CHALLENGES AND OPPORTUNITIES

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# PREDICTING FOREST COMPOSITION ACROSS SPACE AND TIME IN CENTRAL AFRICAN FORESTS

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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.