



EUROPEAN | PARIS
CONFERENCE OF | 26-29 MARCH
TROPICAL ECOLOGY | 2018

ANNUAL MEETING OF THE SOCIETY FOR TROPICAL ECOLOGY (GTÖ)



**CHALLENGES IN
TROPICAL ECOLOGY AND CONSERVATION -
GLOBAL PERSPECTIVES**





EUROPEAN | PARIS CONFERENCE OF 26-29 MARCH **TROPICAL ECOLOGY** | 2018

ANNUAL MEETING OF THE SOCIETY FOR TROPICAL ECOLOGY (GTÖ)



IMPRINT

Editors

Pierre-Michel Forget – Muséum National d'Histoire Naturelle

Catherine Reeb – Sorbonne Université

Jérémy Migliore – Université Libre de Bruxelles

Heike Kuhlmann – KCS Kuhlmann Convention Service

Concept, Layout and Cover

roman.tschirf@gmail.com

This book is available at www.gtoe.de

ISBN: 978-3-00-059300-0

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

Printed on 100% recycled paper



THE IMPORTANCE OF TREE ALLOMETRY FOR LOCAL-SCALE VARIATION IN ABOVEGROUND BIOMASS

Grace Jopaul Loubota Panzou¹, Ted Feldpausch², Sylvie Gourlet-Fleury³, Eric Forni³, Jean-Louis Doucet¹, Joël Loumeto⁴, Adeline Fayolle (speaker)¹

¹Gembloux Agro-Bio Tech, Gembloux, BE, adeline.fayolle@uliege.be

²University of Exeter, Exeter, UK

³CIRAD, Montpellier, FR

⁴University of Marien Ngouabi, Brazzaville, CG



Aboveground biomass (AGB) plays a critical role in determining the long-term dynamics of carbon in tropical forests. Consequently, understanding what factors are important in controlling AGB in tropical forests has major implications for projecting the terrestrial carbon stocks, in the context of an increasingly uncertain future.

In this study, we aimed to explore the local-scale AGB variation in two forest sites in northern Congo, representative of contrasted forest types under the same climate but growing on vastly different soils and parent material (quartzite substrate for CIB and sandstone substrate for Mokabi). Tree diameter was measured in 36 permanent forest plots of 1-ha in each site, and tree allometry (total tree height, height of the first branch and crown dimensions) was measured on a subsample of 18 plots of 1-ha in each site. Allometric data were available for a total of 2202 trees (1040 for CIB and 1162 for Mokabi) covering a large range of diameters (10-200 cm). We first developed site-specific allometric models that were used to estimate AGB at plot level. We then explore the determinants of AGB variation at plot level using multiple regressions and mixed linear models.

For a given diameter, trees tended to be taller and to have deeper crown in the *Celtis* forest of the CIB (rich soils), while they tended to have larger crown in the *Manilkara* forest of the Mokabi (sandy soils). Similar trends were reported within species for the sixteen species shared by both sites, suggesting an environmental control of tree allometry. We found that AGB strongly varied between the two forest sites, with greater AGB per hectare in the *Celtis* forest of the CIB site. Within-site AGB variation was positively related to basal area, though between-site AGB variation was determined by tree allometry (height-diameter and crown allometries). These results have strong implications for forest biomass and carbon monitoring.