

Abstract template for the conference “A century of national forest inventories – informing past, present and future decisions”

Dear author. This is a two-page template that in the first page will ask for information on presenter name, topic, and preferred presentation form.

On page two, you are asked to fill in your abstract in the format and font size indicated. Please remember to include authors affiliation information in the footer section of page two. The length of the abstract may not be more than one page including references.

Abstract title:		XDM project, a new method for improving the quantification and mapping of the forest biomass
Take-home message:		<i>The XDM project aims to improve the accuracy of forest biomass calculation and mapping, and to better understand the environmental drivers of the forests biomass increments.</i>
Presenter name:		Jean-Michel Leban
Presenter contact info:		jean-michel.leban@inra.fr
General topic, see website: <small>(please double click on the check box and activate the relevant one)</small>	<input type="checkbox"/>	Improving future NFIs by learning from the past
	<input checked="" type="checkbox"/>	NFIs today and in the future
	<input type="checkbox"/>	Cutting edge and futuristic inventory techniques and technologies
Preferred presentation form:	<input checked="" type="checkbox"/>	Oral presentation
	<input type="checkbox"/>	Poster
<i>Abstracts will be reviewed by members of our scientific committee and you will be given information on decisions in due time after the submission deadline has passed.</i>		

A method for the measurement of the French forests biomass

*Jean-Michel Leban^{1,2}, Jean-Christophe Hervé¹, Baptiste Kerfriden²,
Lucile Savagner², Jean-Daniel Bontemps¹, Vincent Dauffy³, Cédric Duprez³,
François Morneau³, Stéphanie Wurpillot³*

Introduction

The forests, by their ability to provide renewable products, have and will have an increasing contribution to the emerging bioeconomy, as soon as they are managed in a sustainable way in the coming age of climate change. As a consequence, there is an increasing demand on the monitoring of the forest resources, on forests statistics, and on projections of future forest resource availability especially in terms of biomass (Leban & Bontemps, 2016). In this context we developed a new method to enrich the forest information produced by the French National French Inventory by the measurement of the wood density.

Materials and methods

This method is based upon a technological innovation that permits the fast and reliable measurement of the wood density on unprepared increments cores collected in the forests by the NFI staff. The cores are now stored in alveolar boxes and sent by post to the laboratory, dried, and passed through a medical Xray scanner. The tomographic images are then processed with a software for extracting a wood density profile along each individual core (Jacquin et al., 2018). Since 2015, about thirty thousand cores were sampled each year. At the end of this project, in November 2019 we will have a novel data base with wood density measurements on more than one hundred thousand increment cores. As the dried increment cores are stored into a xylotheque, it is possible to perform other measurements such as the wood shrinkage, the bark thickness, the wood anatomical properties, mineral content etc.

Results

Based upon the consolidated and validated measurements from the two first annual campaigns, we will depict several preliminary results that illustrate the different ways to enrich forest information, e.g. (i) the reassessment of the total standing biomass for several main forest species and (ii) the huge variability ranges of the wood density, preliminary results for the radial shrinkages and bark thickness measurements.

Conclusion

We will present and discuss the perspective for the analysis and the sharing of this new data base that combines at the national scale level wood density and the usual forest inventory measurements such as DBH, height, age etc. Such data base pave the avenue for a better understanding of the biomass production along different climatic and trophic gradients.

References:

- Hervé J.-C., 2016. France, pp 385-404, in “*National forest inventories: Assessment of wood availability and use*” Vidal, C., Alberdi, I., Hernández, L., Redmond, J.J. (Eds.) Springer
- Jacquin, P., Mothe F., Longuetaud, F., Billard A., Kerfriden B., Leban JM., 2018. CarDen: A software for fast measurement of wood density on increment cores by CT scanning. Computer and Electronics in Agriculture. In press
- Leban, JM., & Bontemps, J.-D., 2016. Editorial: “Forest Inventories at the European level”. *Annals of Forest Science*, 73(4), pp 1–4.

1. LIF-IGN, Nancy, France, 2.BEF-INRA, Champenoux, France, 3.SIFE-IGN, Nogent/Vernisson, France.

Corresponding authors email address: jean-michel.leban@inra.fr, baptiste.kerfriden@inra.fr, luccile.savagner@inra.fr, jean-daniel.bontemps@ign.fr, vincent.dauffy@ign.fr, cedric.duprez@ign.fr, francois.morneau@ign.fr, stephanie.wurpillot@ign.fr