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

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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:		Continuous NFI as a monitoring system of CC impacts onto forest growth : an exploratory analysis on coniferous tree species in France
Take-home message:		
Presenter name:		Jean-Daniel Bontemps (may be substituted by C Ols depending on contract funding)
Presenter contact info:		jdbontemps.ign@gmail.com
General topic, see website: (please double click on the check box and activate the relevant one)	☐	Improving future NFIs by learning from the past
	☒	NFIs today and in the future (**may also be placed in session 1 with CC if it can help)**
	☐	Cutting edge and futuristic inventory techniques and technologies
Preferred presentation form:	☒	Oral presentation
	☐	Poster
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.		

Continuous NFI as a monitoring system of CC impacts onto forest growth: an exploratory analysis on coniferous tree species in France

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Introduction: European forests now face an increasingly warmer climatic regime, with an accumulation of temperature records over the early 21st century, raising the issue of how major tree species will react to these ongoing changes. NFI programs routinely measure tree growth, and are as such able to contribute to evaluate CC impacts onto forest growth (Charru et al., 2017). Also, continuous systematic NFI forms a rising trend in forest inventory, and is as such able to form real time monitoring tool of tree species growth, including time analysis and mapping (Charru et al., 2014). In France, the NFI design has turned continuous in 2005, and the growth of dominant trees is further measured at an annual resolution over 5 years, providing an opportunity for such developments.

Materials and methods: The purpose was to estimate annual chronologies of tree growth anomalies over wide forest domains for the period 2005-2015. We performed an exploratory analysis on coniferous trees species growing in France (Norway spruce, Silver fir, Scots pine, Maritime pine, Aleppo pine, Douglas fir and European larch). Growth samples were regionalized according to the NFI ecological regions, in order to form elevation and/or latitudinal gradients. Statistical models were developed to control for site factors, tree size and competition status, and stand density, and isolate the yearly anomalies. Attention was paid at the quantitative interpretation of this signal.

Results: Models developed showed a predictive accuracy ranging between 20 and 60% depending on tree species. Strongly contrasted trends were found, ranging from weakly negative in fast-growing species (Douglas fir, Norway spruce) to strongly positive in pine species, especially at their colder latitudinal or altitudinal margins. A negative correlation was found between species initial growth and temporal change. Ring positioning errors were detected on 5-year increment, requesting an inter-dating process that can make profit from the sample size as an original feature of NFI designs. Maps of yearly anomalies did not reveal temporal changes in their spatial patterns.

Conclusion: NFI are able to play a significant role in the monitoring of forest growth in the face of climate warming, especially continuous inventories. Significant trends were detected over a very short time period (10 years) owing to NFI sample size. They suggest that most European inventories may engage in such a direction, including the most recent ones.

References:

Charru et al., 2014, Trees 28:205-221

Charru et al., 2017, Annals of Forest Science 74 :33

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