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

Abstract title:		Integrating the risk of natural disturbances in forest management using NFI data
Take-home message:		*NFI data can be used to* integrate the risk of natural disturbances in forest management
Presenter name:		Olalla Díaz-Yáñez
Presenter contact info:		olalla.diaz@uef.fi
General topic, see website: (please double click on the check box and activate the relevant one)	☐	Improving future NFIs by learning from the past
	☐X	NFIs today and in the future
	☐	Cutting edge and futuristic inventory techniques and technologies
Preferred presentation form:	X☐	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.		

Integrating the risk of natural disturbances in forest management using NFI data in Norway

*Olalla Díaz-Yáñez[*1], Blas Mola-Yudego[1], José Ramón González-Olabarria[2], Timo Pukkala[1]*

Introduction: Forest management can influence how natural disturbances affect forests both by providing more realistic estimation of ecosystem services and by reducing the negative impacts of disturbances. Long term analysis enhances the understanding of disturbances, allowing their characterization and creation of models to predict their probability of occurrence and damage. National Forest Inventories (NFIs) provide extensive empirical data, with broad spatial and time coverage, both providing information of the forest before and after the disturbance happened. The aim of this study is to identify which variables are the main drivers of forest damage from snow and wind agents as well as their influence on forest ecosystem services and products in a spruce dominated stand.

Materials and methods: We use 20 years of NFI data from Norway, covering the whole country except for the northernmost region Finmark. We develop two different models, the first one to predict damage occurrence using a Boosted Regression Tree approach. The second models predicts the probability of a tree to be uprooted or broken when that stand was damaged by snow and wind, for this second model we used a Generalized Linear Models with a binomial distribution.

Results: The results show that the most important variables when predicting snow and wind damage occurrence include stand density, structure, mean diameter and height, but also site-related variables, such as latitude or altitude. The model predicting damage (uprooted and broken trees) use covariates, such as stand basal area, height, diameter and slenderness. The simulation and optimization of the spruce dominated stand show that and optimal damage considering risk leave lower volumes towards the end of the rotation and shorten the rotation length.

Conclusion: This study provides relevant information that can be used by managers in considering the risk of natural disturbances in forest management and planning and that can be easily expanded to further understand spatial considerations of risk or interactions between different ecosystem services such as carbon and biodiversity.

* olalla.diaz@uef.fi
1 School of Forest Sciences, University of Eastern Finland, PO Box 111, 80101 Joensuu (Finland).
2 Forest Sciences Centre of Catalonia (CTFC-CEMFOR), Ctra. de St. Llorenç de Morunys, km 2, 25280 Solsona, Spain