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:		Simulation of Forest Reference Level under current management practice – A Suisse case study for the Greenhouse Gas Inventory
Take-home message:		*The Swiss approach to model current management practices for the forest reference level (Paris Agreement) is based on single-tree probabilities of harvesting. We present and discuss the Swiss approach implemented in the individual-tree growth simulator Massimo.*
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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
	☐	Cutting edge and futuristic inventory techniques and technologies
Preferred presentation form:	☒	Oral presentation
	☐	Poster
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Simulation of Forest Reference Level under current management practice – A Suisse case study for the Greenhouse Gas Inventory

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Introduction: The EU decided that in the Reference Period of the Paris Agreement (2020-2030), accounting of carbon sinks and sources in forests will be based on a so called Forest Reference Level (FRL). This level should reflect the continuation of current forest management practice and intensity (CMP; Grassi et al. 2018). Implemented and simulated in a forest development model, such a level ensures that harvesting as part of the continuation of the CMP will not be accounted as a loss of carbon.

Forest development models are often built on the representative and long-term database of the European NFIs. However, the empirical formulation of a CMP and its implementation in a forest development model is challenging. In practice, many European forests are not managed with fixed thinning intervals and rotation periods, and the type of felling often depends on managers decisions and forest type (e.g. even-aged vs. uneven-aged). In Switzerland, for example, final cuts are often performed as shelter-wood cuts over several decades, while clear-cuts are rarely applied.

The aim of this study is to present an alternative approach to model harvesting based on empirical single tree probabilities. We will introduce the Swiss approach, show its implementation in the individual-tree growth simulator Massimo and discuss advantages and challenges compared to classical approaches.

Materials and methods: Based on NFI data, remote sensing data and other GIS information, we fitted single tree probabilities of being harvested. As explanatory variables we considered site information (e.g. elevation, exposition, climate data and owner), stand data (e.g. basal area larger than the actual tree, stand density), and single tree values (e.g. diameter at breast height, tree species). The resulting harvesting models were implemented in the climate sensitive, individual-tree growth simulator Massimo (Temperli et al. 2017).

Results: Current management practices were successfully implemented in the forest growth simulator Massimo to simulate a forest reference level for the years 2020 to 2030. The results indicate that in forests featuring a large diversity in tree ages, structure and gradients, forest management and current management practice cannot fully be characterized by traditional forest management prescriptions. Single-tree harvesting probabilities represent an alternative solution.

Conclusion: Compared to traditional forest management prescriptions, single-tree harvesting models offer an alternative to simulate current management practices in forest growth models. This study may serve as Reference Level for the calculation of carbon gains and losses in the Swiss forests for the Paris Agreement.

References:

Temperli C et al., 2017 Eur. J. For. Res.

Grassi G et al., 2018 Carbon Balance Manage

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