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:		EFISCEN Space – a high-resolution, empirically-based forest simulator for Europe
Take-home message:		*We report on the development and application of a new European simulator, EFISCEN-Space. EFISCEN-Space is able to simulate NFI plot development anywhere in Europe, using increment, mortality and management models that are derived from a large set of repeated NFI observations.*
Presenter name:		Mart-Jan Schelhaas
Presenter contact info:		Wageningen University and Research Droevendaalsesteeg 3 6700 AA Wageningen, the Netherlands martjan.schelhaas@wur.nl
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
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.		

EFISCEN Space – a high-resolution, empirically-based forest simulator for Europe

Gert-Jan Nabuurs[1], Mart-Jan Schelhaas[1], Geerten M. Hengeveld[1]

Introduction: Many countries have developed systems for projecting forest resources and wood availability, usually tailor-made on the data delivered by their National Forest Inventories. Although studies using these tools are helpful for developing national policies, they cannot provide a consistent assessment for larger regions such as the European Union or Europe as a whole. For that purpose, several European simulators have been developed over the last decades. When the first European-scale forest resource models were developed, the approach chosen matched best with the predominant forest management approach in Europe (mostly even-aged management), the data availability (only aggregated data available), the issues to be addressed (large-scale resource availability, Member State level carbon sequestration) and the computing power available. In the meantime, the situation has changed drastically. Forestry is now increasingly incorporating natural processes taking into account effects of climate change on growth as well as the fulfilment of forest functions other than wood production. Furthermore, forests are becoming more heterogeneous in species composition and structure and a larger range of management options need to be considered. At the same time, NFI data policies are becoming more open and the computing power has increased dramatically, opening up possibilities for more advanced simulation approaches at large scale. We report on the development and application of a new European simulator, EFISCEN-Space.

Materials and methods: EFISCEN-Space models the evolution of the diameter distribution of a collection of stands over time. Increment is estimated from European-wide individual tree growth models that explicitly take into account tree size and stand structure, as well as a range of abiotic predictors. These models were developed on a set of data containing repeated DBH measurements or increment cores of individual trees from 10 European NFIs (Schelhaas et al. 2018). Mortality and management are implemented based on observed probabilities of tree removal based on repeated observations from National Forest Inventories (NFIs) (Schelhaas et al. in review).

Results & Conclusion: EFISCEN-Space is thus able to simulate forest stand development anywhere in Europe, given the current species and diameter structure, usually as derived from NFI plot data. The model has been applied to study the potential for increased wood mobilisation in a range of case study regions in Europe (Schelhaas & Nabuurs 2017), and is currently being applied for greenhouse gas verification purposes.

References:

Schelhaas & Nabuurs, 2017, In: Orazio, Kies & Edwards. Handbook for wood mobilisation in Europe. Measures for increasing wood supply from sustainable managed forests. European Forest Institute, Joensuu Finland.

Schelhaas et al., 2018, Species-specific, pan-European diameter increment models based on data of 2.3 million trees. Forest Ecosystems 5:21 https://doi.org/10.1186/s40663-018-0133-3

Schelhaas et al., in review, European forest harvesting intensity by region, tree species and owner based on 700,000 trees measured in National Forest Inventories. PLOS ONE

1. Wageningen University and Research
martjan.schelhaas@wur.nl