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:		Utilizing remote sensing data in Germany's national forest inventory
Take-home message:		The integration of auxiliary data from multiple sources into the reporting system of our NFI gives us the possibility to react to growing information demands. Of importance are here in particular the improved confidence in statistical estimates for smaller spatial units and the spatially explicit availability of target variables.
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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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Utilizing remote sensing data in Germany's national forest inventory

Sebastian Schnell[1], Thomas Riedel[1]

Introduction: Following growing information demands, expressed in the wish to provide statistically sound estimates of target variables for smaller spatial units such as rural districts or even municipalities, we tested the suitability of remote sensing data for fulfilling such demands.

Materials and methods: We chose the federal state of Thuringia as a pilot study area. The state is located in central Germany and has a total area of about 17,000 km^2 and a forest cover of 33%. To predict specific forestry related target variables, three types of remote sensing data were used: (1) Sentinel-1 RADAR data for forest area, (2) Sentinel-2 optical satellite data for tree species classification, and (3) airborne laser scanning data to describe forest structure (height, roughness, density). Together with field data from the third German NFI (2011-12), the derived remote sensing products were used to produce wall-to-wall maps of target variables, such as stand height, growing stock volume and aboveground biomass. For producing estimates, model-based and model-assisted estimation frameworks were applied.

Results: The impact of integrating remote sensing data into the estimation framework is depicted in Figure 1. The model-assisted estimator produced narrower confidence intervals for all rural districts of Thuringia, when compared to pure field-based estimates.

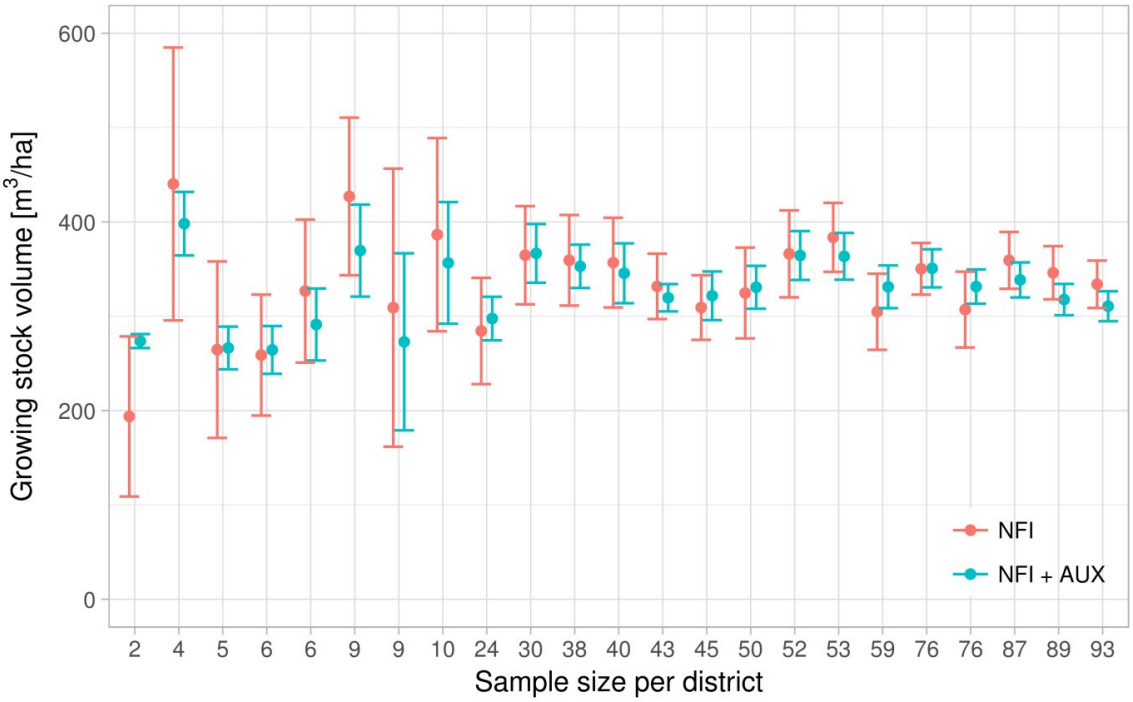

Figure 1: Avergae growing stock volume as estimated from field data alone (NFI) and from a combination of field and auxiiary data (NFI + AUX). Provided are estimates for the rural districts of Thuringia, where each entry on the x-axis corresponds to one district. The dots indicate the point estimate, while the error bars give the lower and upper margins of the 95% confidence intervall.

Conclusion: Remote sensing has the ability to add further value to the reporting of some target variables in the sense that it provides access to smaller spatial units and by that possibly also to new user groups. However, delivering these new estimates on a routinely basis is still an institutional and technical challenge.

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