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:		Toward a complete C balance of forests for GHG inventories – data requirements for National Forest Inventories
Take-home message:		*National Forest Inventory data are the primary data source for the estimation of the C fluxes in forests that are reported in national GHG inventories. Due to existing differences in national methods to obtain such estimates particularly for deadwood and litter C pools, there is a need for harmonizing methods to estimate changes in these C pools.*
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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
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.		

Toward a complete C balance of forests for GHG inventories – data requirements for National Forest Inventories

Markus Didion

Introduction: Criteria for Greenhouse Gas (GHG) reporting require for forest land the estimation of the C fluxes in above and below-ground biomass, deadwood, litter, and soil (IPCC 2006). The primary source of these data are National Forest Inventory data. Estimates of C stocks changes in living biomass are generally obtained directly from observed changes in growing stock between two inventories. In contrast, estimates of C fluxes from deadwood, litter, and soil are based on different approaches and methodological tiers. Several countries use models to estimate annual C fluxes from deadwood, litter, and soils to better account for annual variability in emissions and removals. Such models require estimates of the production of deadwood and litter in the forest. A recent project to enhance monitoring, reporting, and verification (MRV) in the EU showed that national differences exist in data availability and methodologies to obtain litter and deadwood production estimates (Hernández et al. 2017).

Materials and methods: Input data of national GHG inventories were reviewed to identify national differences in the availability of NFI data for obtaining accurate and complete, i.e. considering all sources, estimates for C stock changes in deadwood and litter in forests. Challenges in estimating deadwood and litter inputs are discussed based on a study applying the Yasso carbon cycling model (Tuomi et al. 2009, 2011) in, Austria, Estonia Finland, Romania, Spain, and Switzerland. Further, the methodology to report C fluxes from deadwood and litter of the Swiss GHG inventory is presented, in which the deadwood and litter production is estimated from the tree and understory herb layer litter production based on NFI data.

Results: For estimates of deadwood and litter, differences exist regarding the tree elements (e.g. stumps, smaller branches, or roots) that are included and their size. Also, methodological differences exist, either using the turnover rates or lifespan estimates to obtain values for litter and deadwood production. In the Swiss NFI, whole tree biomass and its respective C content are derived separately for each individual tree element, including stemwood, foliage, large and small branches, coarse and fine roots based on turnover estimates for short-lived elements such as foliage and lifespan for long-lived elements. Only the contribution of trees larger than the DBH threshold of 12 cm can be estimated as well as litter produced by understory herb vegetation.

Conclusion: Differences in data availability and methodology affect estimates of C fluxes from deadwood and litter in forests. Considering the IPCC reporting criteria for GHG inventories, i.e. transparency, accuracy, completeness, consistency, and comparability (IPCC 2006), there is a need for harmonizing methods to estimate changes in the deadwood and litter C pools to enhance the contribution of NFIs to meet social and economic policy challenges.

References:

Hernández et al., 2017, Sci. Total Environ. 599–600, 1171-1180

IPCC, 2006, 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Agriculture, Forestry and Other Land Use. IGES, Japan

Tuomi et al., 2009, Ecol. Model. 220:3362-3371

Tuomi et al., 2011, Ecol. Model. 222:709-718

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