



## Observation-based quantification of forest management in Europe

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Forests in Europe have been modified by centuries of intensive land use, substantially influencing forest dynamics and biomass stocks, as well as forest interactions with climate. This makes the accounting for forest management crucial in any large-scale analysis of forest ecosystems, including the estimation of the forest carbon sink dynamics. However, the realistic representation of management in projection models is still hindered by the availability of data. To fill this gap, we analyzed recent forest harvest information in permanent plots of national forest and landscape inventories in several European countries. We used the harvest status information of individual trees between two measurements to characterize probability of different types of harvest events (partial cut vs removal of all trees), harvest intensity and characteristics of harvested trees on a plot level. These results were aggregated to a spatial grid, catching variations on sub-national scale. We then quantified the relationships of harvest events and their properties with potential predictors, including pre-harvest status of the forest (e.g., stand basal area, species and size structure of trees) and climatic, abiotic and socio-economic variables. The results reveal the variation in how forests are currently managed across the continent, with the differences stemming from different climatic and ecological conditions as well as different histories, priorities and goals of forest use and management. For example, the prevalence of even-aged rotation forestry with clear cuts in northern Europe is captured in the results as higher intensities of harvest events and higher probabilities for removing all trees. The results provide a realistic quantification of the current forest harvesting regimes across Europe, providing much needed detail in our understanding of contemporary management practices and a finer spatial resolution

compared to existing data sources, such as national-level harvest statistics.