Background:

In the Swiss National Forest Inventory (NFI) the volume of the stem and of large (≥ 7cm in diameter) and small branches is estimated based on allometric functions. These functions were developed based on data collected within the permanent plot network of the Experimental Forest Management (EFM) sites at WSL. The stemwood dataset (N= 38'864) was converted from handwritten field recording forms to punchcards in the mid-1970s and later into a digital format. The dataset on branchwood contained information on 14'712 single trees. To obtain information on the origin of these data, the project "Validierung und Sicherstellung der bestehenden Datengrundlage für Biomassefunktionen" was carried out in 2018 to 2019. The project results were reviewed in 2021 and additional information was collected in 2022 (Didion et al. 2022). The main result of the work in 2022 was the origin of the digital datasets that are the basis of the allometric equations to estimate needle and leaf biomass in the NFI following Edgar Kaufmann (2001) and later (Herold et al. 2019). Further the work in 2022 demonstrated the link between the two digital datasets on section-wise stem diameter and branchwood volume.

Didion et al. (2022) identified limitations of the dataset including unexplained data on stem diameters, and additional data were digitized in 2023. In the course of the work in 2023 a digital dataset was discovered in the electronic EFM archive. This also included section-wise stem diameters but the format corresponded to the instructions of the initially in 1974 transferred handwritten data to punchcards, eg. it included the two cross-wise measured diameters. It also included data on more trees (N=40'079). 38'215 of the initially 38'864 records in the stemwood dataset available to Kaufmann and Herold could be unambiguously matched with records in the newly discovered dataset. After plausibility checks of the additional tree records in this dataset and additional digitized data, a new quality controlled dataset was created containing 40'349 records with detailed diameter and length measurements along the stem with empirically derived coarse (diameter >= 7 cm) and fine branch volume for 27'297 and 18'980, respectively, individual trees. This dataset was prepared for publication and is available here.

References

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