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# European Holocene landscape change: a comparison of pollen-based approaches to reconstructing land use shifts and forest decline

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Europe's primaeval forests have been progressively cleared and fragmented since the first appearance of Neolithic farming activities around 6000 years ago. Understanding spatial and temporal changes in forest cover is valuable to researchers interested in past human-environment interactions. Here we present a comparison of reconstructed Holocene forest cover across Europe from three different transformed fossil pollen-based datasets, an extensive modern surface pollen data set, and modern forest cover from remote sensing. The REVEALS approach (Trondman et al., 2015) provides a quantified and validated reconstruction of vegetation incorporating plant productivity estimates, but is currently only available for a limited number of grid cells in mid-latitude and northern Europe for a limited number of time windows. The pseudobiomization (PBM) (Fyfe et al., 2015) and plant functional type (PFT) (Davis et al., 2015) based approaches provide continuous semi-quantitative records of land use change for temperate and Northern Europe spanning the Holocene, but do not provide truly quantified vegetation reconstructions. Estimated modern forest cover based on the various approaches ranges between ∼29 and 54%. However, the Holocene estimates of vegetation change show broadly similar trends, with a forest maximum from ∼8.2 to ∼6 ka BP, and a decline in forest cover after 6 ka BP, accelerating after ∼1.2 ka BP. The reconstructions, when broadly disaggregated into northern and mid-latitude Europe, confirm that mid-latitude forest cover has declined more than that in northern Europe over the last 6 ka. The continuous record provided by the PBM has been used to establish a 'half forest loss' date for each grid cell in temperate and northern Europe, which has identified that the timing of forest loss varied spatially with certain regions remaining forested for longer.

References

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