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Neolithic forest use and dynamics around Lake Mondsee, Austria, revealed by palynological analyses at decadal resolution

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Abstract

Our comprehension of past ecosystem changes lies on palaeoecological studies. The vegetation is a major component and one of the main descriptors for an ecosystem. Palynological analyses can reliably reconstruct past vegetations. However, they are time consuming, and high resolution is rarely achieved. We achieved such a resolution with contiguous sampling for the Neolithic Period of well-dated sediment cores from Lake Mondsee, Austria. Our continuous record of 166 1-cm thick sediment samples runs from 4600 to 1950 BC, covering the archaeologically defined, so-called *Mondsee Culture*. Each sample contained the pollen signal of 2 to a maximum of 35 years of the surrounding vegetation (median 14 years). Sequences of higher pollen amounts of *Corylus avellana*, *Betula sect. alba*, *Fraxinus excelsior*, and *Fagus sylvatica* were regularly found along the record. Assuming that they derive from secondary vegetation succession, we questioned possible triggers for these successions. Three origins are plausible: stochastic, climatic, or anthropogenic. To address this question, we compared the palynological signal of these forest cycles with possible erosion and flooding events provided by μ -XRF analyses, with climatic data, and with archaeological evidence. Finally, we compare the forest vegetation dynamics with fire events through the micro-charcoal signal, using cross-correlations. These comparisons suggest that the *Mondsee Culture* populations may have practised a particular forest management, using fire to open the landscape, and that their practises were the main (if not the only) driver of vegetation change in the area, leading to secondary forest successions during periods of lower anthropogenic and livestock pressure.