

From the village back to the forest: timber use highlighted by dendrotypology

A. Billamboz, S. Million, M. Schneider, M. Soller
Landesamt für Denkmalpflege
Baden-Württemberg D-Hemmenhofen

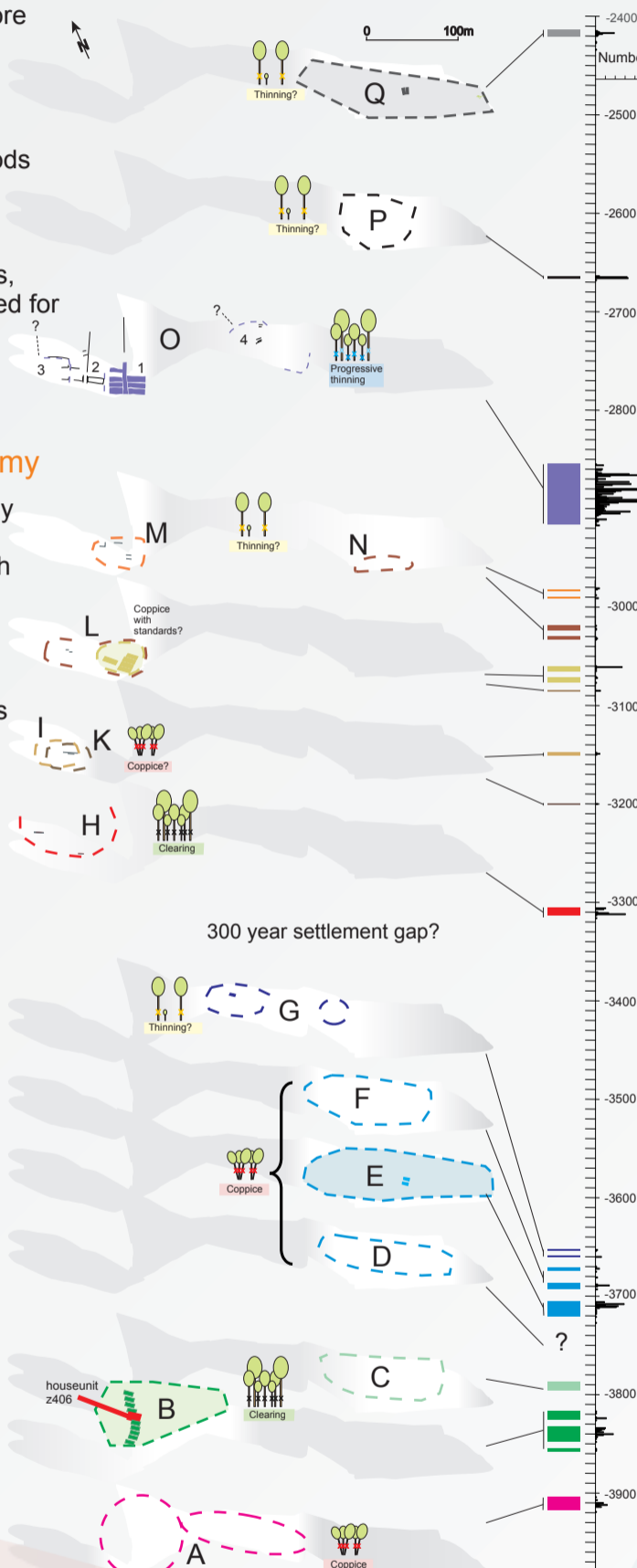


Introduction

For systematic tree-ring investigations as in the case of large-scale excavations in pile-dwelling research, an approach centred on dendrotypology has been developed since the 1980's. Taking into account the high variability in age and growth of the trees used for timber, this method played first a key role in the dating process, chronology building and definition of architectural structures. Further development led to the socio-economic aspects of timber supply and woodland management. Nowadays, dendrotypology is the background of the ecological evaluation, and even of the regional reconstruction of climate. The different topics of this approach are illustrated in the "Settlement dynamics and socio-economy of the lake-shore site Sipplingen-Osthafen" (supported by the German Research Foundation, coordination H. Schlichtherle).

Settlement phases of prehistoric Sipplingen

On the Northern side of Lake Constance, the lake-shore site of Sipplingen-Osthafen attests several settlement waves during the Neolithic period between 3920 and 2400 BC. On the basis of 3600 oak samples, occupation phases is already dated. Reliable chronostratigraphy are supported by cross-dating woods embedded in the archaeological layers. As shown in the plan, these occupations are accompanied by settlement relocations, demographic fluctuations and architectural adaptations. Enclosed in geological faults, the amphitheatre-like hinterland of the bay is well suited for site catchment and evaluation of timber sources (e.g. ecological gradient of oak stands on the transect between riparian forest and upper slopes).

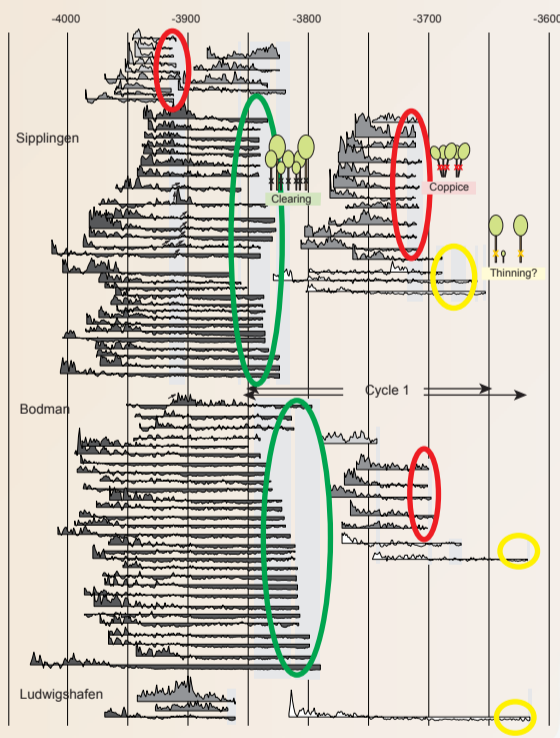


Dendrotypology: from the classes of wood to the structure of stands

Basically, dendrotypology is an attempt at sorting large sets of timber with respect to wood anatomy, tree-ring analysis and techno-morphology. The method was initiated first for a better integration of young wood in the dating process. In this process, grouping tree-ring series according to cambial age and growth trend is the main assignment. From these assemblages, dendrotypological models have been derived, which allow an insight into the structure and dynamics of the exploited stands with reference to the historical woodland practices. Woodland use in former times is often characterised by long cycles showing an alternation of clearing and thinning activities with intermediate phases of coppice.

From woodland management to socio-economy

In the first half of the 4th millenium BC, dendrotypology enhances a long cycle of exploitation from initial clearings (B, C) to the final forest degradation (G), with intermediate coppice formations (A, D-F) underlining flourishing settlement activities. A comparison with neighbouring sites point out the same development on a regional scale. After 3600 BC, there is no evidence of settlement continuity and probably settlers abandoned the locality.



Building structures with dendrotypical design

A special focus of dendrotypology is the identification of timber derived from the same stem. During the Neolithic period, usual timber supply was performed stem-wise by one household, thus this fact makes the identification of the housing units easier.

Ecology: cockchafer fingerprints

Evidence of synchronous flights of the common cockchafer (*Melolontha melolontha* L.) in tree-rings of young (Hornstaad) and old oaks (Sipplingen, Bodman). Population development according to the three known flight systems for the common cockchafer on the Swiss plateau (A: Basel, B: Bern, C: Uri) as reproduced as middle frequency signal in tree-rings. Secondary effects of cockchafer flights on wood production have been generally observed in tree-ring series of old oak trees. Running calculations in shorter time windows have newly enhanced three superimposed, 1-year shifted middle frequency signals on both, old and young trees. Consequently, population development patterns can be used as support for dating short tree-ring sequences and also for the question of dendroprovenancing, particularly. Additionally, outbreaks and slight shifts of cockchafer populations can be evaluated from an ecological perspective, with respect to human clearing activities and short term evolution of climate.

Dendroecology as reference

In a tentative classification of former forest stands, dendrotypology is supported by dendroecology, especially through the investigation of stands attesting the subsistence of ancient silvicultural practices (e.g. abandoned oak coppice stands in the French Jura Mountains, study in cooperation with O. Girardclos, Chrono-Environment, F Besançon).



Literature:
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-N. Bleicher, *Altes Holz in neuem Licht. Archäologische und dendrochronologische Untersuchungen an spätneolithischen Feuchtbodensiedlungen Oberschwabens. Materialhefte zur Archäologie in Baden-Württemberg 83 (Stuttgart 2009).*