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Kiln Site Anthracology and Fuel Wood Ecology in Western Central Europe

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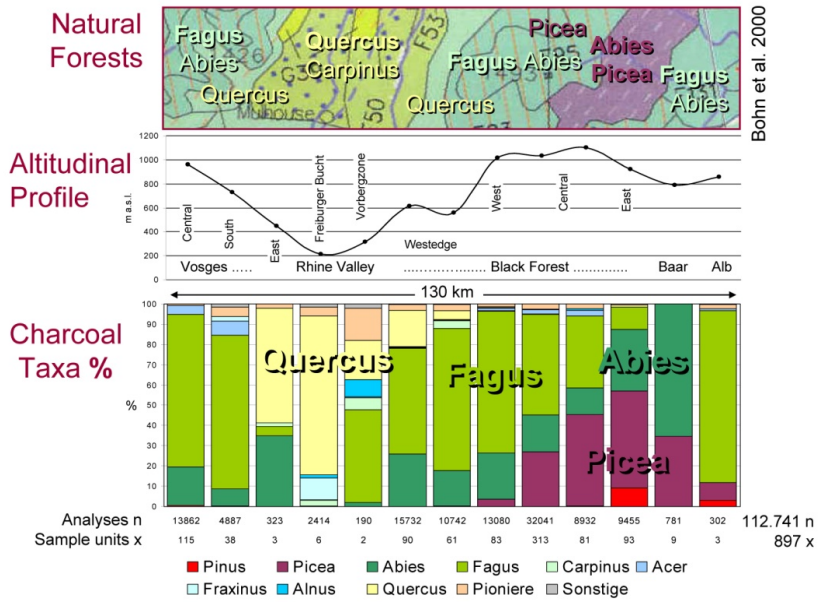
Selected anthracological studies in western Central Europe are highlighted, with special regard to historical sites of charcoal burning and mining. The main topic is how analyses of archaeological macrocharcoals from kiln sites (kiln site anthracology) can provide answers to questions of vegetation history and vegetation ecology at the landscape level (fuel wood ecology). In Central Europe remnants of traditional charcoal burning are widespread. Thousands of kiln sites are known. Their analysis offers us unique opportunities to obtain results with fine spatial resolution (regional to local), providing new and unexpected results for vegetation science.

A synthesis of anthracological studies is given for a large diversified pilot area, with special regard to the natural diversity of growth conditions and forest vegetation. This includes analyses of more than 100,000 charcoal fragments of 899 historical sample sites and charcoal soil layers from the Black Forest, the Vosges and neighbouring regions. Most samples have been selected from postmedieval charcoal burning in the southern parts of the Black Forest and the Vosges. Furthermore, the method and the interpretations of the anthracological results were verified by studies of recent charcoal burning and by analyses of experimental kilns (Ludemann, 2006a; 2008; in prep.).

Several important general conclusions can be drawn. Generally, no selection of distinct wood species for charcoal production was found. All of the tree taxa to be expected for the natural conditions were exploited in the past and the frequencies of the taxa exploited often reflect a natural situation (Tab. 1). The tree species of the climax vegetation were mainly used and all other species were quantitatively unimportant. The individual sample sites show considerable differences in tree taxa composition and frequency (Tab. 1), from which regular spatial patterns of the past tree species distribution have been deduced at different spatial scales, local to regional (Fig. 1 and 2; Ludemann, 1994; 2001; 2002a; 2002b; 2003; 2006b; 2007; 2009; Ludemann & Britsch, 1997; Ludemann & Nelle, 2002; Ludemann et al., 2004). These patterns can be explained by regional and local differences in the ecological site conditions of the forests exploited in the vicinity of the sites studied. A pronounced dependency of the fuel wood use on the natural distribution of the tree species is discernible. The local natural availability of wood and the restricted possibilities of wood transport were important criteria for past fuel wood exploitation.

Fig. 1: Regional scale pattern of fuel wood taxa exploited and ecological growth conditions. Anthracological results and natural forest vegetation on a 130 km landscape profile from the Vosges to the Swabian Alb in western Central Europe, based on analyses of 112,741 wood charcoal macro-remains of 897 sample units/sites. At the top are the predominant tree taxa of the natural forest vegetation after Bohn et al. (2000; map modified); at the bottom the tree taxa compositions of the charcoal samples of historical mining, archaeometallurgy and charcoal burning sites, according to region / landscape unit. n, number of analyses; x, number of samples). Ludemann 2006b, 2007, modified.

Fig. 2: Local scale pattern of fuel wood taxa exploited and ecological site conditions. Anthracological results and relief features (summit plateau, steep slope area, valley floor; altitude) of a one-square-km pilot area in the Southern Black Forest, western Central Europe, based on analyses of 3,103 wood charcoal macro-remains of 34 postmedieval kiln sites (Ludemann, 1994, modified).



Bohm et al. 2000

Fig. 1

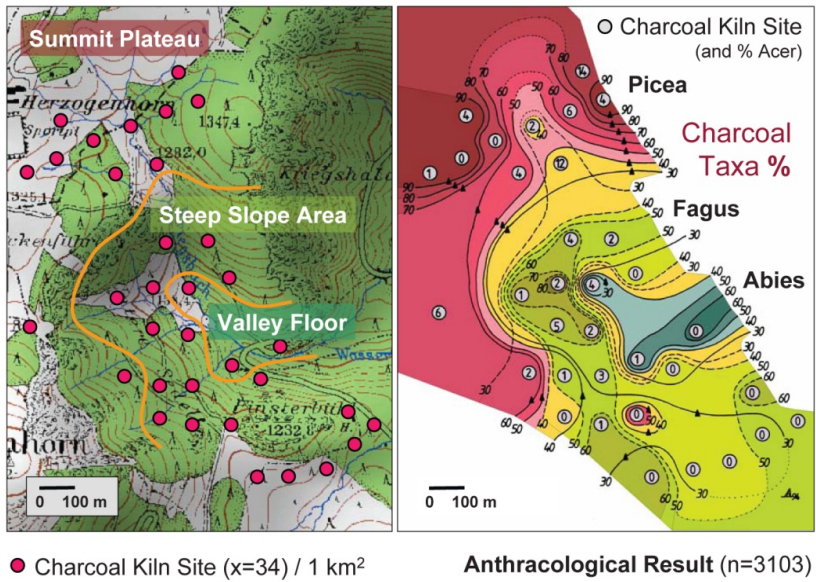


Fig. 2

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