

## Evaluating the mid Miocene paleoclimate of Lower Carinthia (Austria) based on high resolution palynological studies from the Lavanttal Basin

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Köppen signatures (Denk et al. 2013, Grímsson et al. 2015) can be used to generalize the climatic niche occupied by potential modern analogues (PMA) of fossil plants (here: palynological) assemblages. The Köppen climate system distinguishes climate zones by certain abiotic parameters or combinations thereof and represents them in a three letter code referring to the general climate types (first letter), the seasonal distribution of precipitation (second letter) and the seasonal distribution or general level of warmth (third letter). Based on their Köppen signatures PMAs can be categorized as arctic-alpine, boreal, nemoral, meridio-nemoral, tropical-meridional, tropical, eurytropical, and/or semihumid meridional vegetation elements (see also Denk et al. 2013, Velitzelos et al. 2014, Grímsson et al. 2015). Based on the climatic preferences of their PMAs, the Fagales and Rosales lineages present at the Lavanttal site rule out tropical (A-)climates and climates with pronounced (summer) draught (B-, Cs-, Ds-climates). The same holds for boreal/subarctic climates with short but humid summers (Cfc, Dfc, Dfd, Dwc). The Fagales are represented by 23 lineages at the Lavanttal site including genera that are today composed (predominately or exclusively) of nemoral and meridio-nemoral elements. This points to climate conditions not unlike those found today in the lowlands and adjacent mountain regions of the (south-)eastern United States, the humid-meridional region of western Eurasia (e.g. northern Italy, Black Sea region, western Caucasus), central and southern China, or Honshu (Japan). These regions are characterised by subtropical conditions at lower elevations (Cfa-, Cwa-climates) and subsequent altitudinal successions: Cfa→Cfb/Dfa→Dfb in eastern United States, western Eurasia, central China and Japan, or Cwa→Cwb→Dwb in southern China. The climax vegetation in these areas are mixed mesophytic forests and various mixed evergreen/deciduous broad-leaved forests, characteristic for the humid and semi-humid, summer-rain areas of the meridional and nemoral zone. (Co-)Dominant genera in these forests are the various members of the northern hemispheric Fagales. Important indicator taxa include *Fagus*, one of the most common and widespread genera in temperate, mixed mesophytic forests of North America, China and Japan, and *Quercus* Group Ilex, a co-dominant group in the East Asian monsoon influenced, winter-dry or fully humid southern foothills of the Himalayas and montane regions of south-western and central China. Equally informative is *Corylus*, and the co-occurrence of *Carya*, *Juglans*, *Pterocarya* and Engelhardioideae, pinpointing towards forests as today found in south-western China and the warm subtropical parts of the southeastern United States.

### References:

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