



Patterns and drivers of Early Holocene vegetation dynamics in Central Europe

Martin Theuerkauf

University of Greifswald, Institute of Geography and Geology, Physical Geography, Greifswald, Germany
(martin.theuerkauf@uni-greifswald.de)

The rapid warming of the Holocene induced the rearrangement of vegetation across Europe, including the widely synchronous and rapid expansion of hazel (*Corylus avellana*) at around 10.6 ka BP (Giesecke et al., 2011). The simultaneity of the hazel expansion across large parts of Europe suggests that a climate shift has triggered that expansion. However, it remains poorly understood, which climate parameter has been effective (Huntley, 1993) because hazel expanded simultaneously in areas that today clearly differ in climate.

To better understand the causes we studied Early Holocene vegetation dynamics in NE Germany in high temporal and spatial resolution. Analysis combines pollen data from 60 sites, including high resolution data sets, with present-day site patterns of soil and relief using the extended downscaling approach. Using forward modeling of pollen deposition in each sample site the method seeks that vegetation composition on each site type that produces modeled pollen deposition most similar to empiric pollen deposition.

The results (Theuerkauf et al., 2014) indicate that first populations of hazel established soon after the Holocene warming at 11.2 ka. These populations were still small and possibly restricted to warm loving slopes, indicating that low summer warmth was the limiting factor. The widespread expansion of hazel started only after 10.8 ka, possibly following a shift to greater summer warmth. Hazel primarily expanded on sites that are today covered by gleyic soils, from which it largely expelled tree birch. Hazel thus obviously could only expand on sites that received additional wetness from ground- and stagnant water.

Giesecke T., Bennett K.D., Birks H.J.B., Bjune A.E., Bozilova E., Feurdean A., Finsinger W., Froyd C., Pokorný P., Rösch M., Seppä H., Tonkov S., Valsecchi V., & Wolters S. (2011) The pace of Holocene vegetation change – testing for synchronous developments. *Quaternary Science Reviews*, 30, 2805–2814.

Huntley B. (1993) Rapid early-Holocene migration and high abundance of hazel (*Corylus avellana* L.): alternative hypotheses. *Climate change and human impact on the landscape* (ed. by F.M. Chambers), pp. 205–215. Chapman and Hall, London.

Theuerkauf M., Bos J.A.A., Jahns S., Janke W., Kuparinen A., Stebich M., & Joosten H. (2014) *Corylus* expansion and persistent openness in the early Holocene vegetation of northern central Europe. *Quaternary Science Reviews*, 90, 183–198.