Climate and human impacts on the vegetation in NW Turkey: palynological insights from Lake Iznik since the Last Glacial

Andrea Miebach1*, Phoebe Niestrath1, Patricia A. Roeser1 & Thomas Litt1

Objectives

• Reconstruction of the vegetation development in the Marmara region for the last 31,000 years based on palynological investigations

• Detection of climate impacts on the vegetation: rapid climate changes are expected to be registered in the pollen assemblage, because Lake Iznik is located between different climate and vegetation zones

• Detection of human impacts on the vegetation: the eastern Marmara region has a long occupation history and archaeological settlements are in close proximity to Lake Iznik (e.g., Roodenberg & Rodenberg 2008)

• Pollen analysis as an independent proxy for palaeoclimatic reconstructions: geochemical and mineralogical investigations already registered climate related changes of the lake level and the lake mixing during the last 31,000 years (Roeser 2014)

Regional setting

Figure 1: a) Vegetation map of northwestern Turkey after Zohary (1973). Today, the catchment of Lake Iznik is situated in a transitional area between I) (sub-) Euxinian mesic deciduous and mixed forests dominated by deciduous oak (Quercus) and beech (Fagus), and II) Mediterranean woodland characterized by a high number of drought-resistant and evergreen elements. b) Lake Iznik with coring locations and bathymetric curves in 5 m intervals after Roeser et al. (2012). The alkaline freshwater lake has a surface area of 313 km², a maximal water depth of 80 m, and is situated 85 m above present mean sea level (Wester 1989).

Results and discussion

Figure 2: Pollen diagrams inferred from Lake Iznik sediments (analysis: Niestrath & Miebach) with a chronology after Roeser (2014) and Ülgen et al. (2012). a) Overview pollen diagram with climate-induced vegetation changes (DO = Dansgaard-Oeschger event; LGM = Last Glacial Maximum; YD = Younger Dryas). b) Close-up of the last 5,000 years with human-induced vegetation changes.

Conclusions

• The vegetation changed generally between steppe during glacial conditions, steppe-forest during interstadial conditions, and oak dominated mesic forest during interglacial conditions

• The vegetation was sensitive enough to reflect also rapid climate changes like interstadials corresponding to Dansgaard-Oeschger events

• Human-induced vegetation changes are clearly visible in the pollen record since the Early Bronze Age: different stages of anthropogenic exploitations are apparent

References


* Corresponding author: a.miebach@uni-bonn.de

Contact

Steinmann-Institut für Geologie, Mineralogie, und Paläontologie, University of Bonn, Nussallee 5, 53115 Bonn, Germany

1 Steinmann-Institut für Geologie, Mineralogie, und Paläontologie, University of Bonn, Nussallee 5, 53115 Bonn, Germany

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