Vegetation dynamics of riparian forest in central Europe during the late Eocene

by

LUTZ KUNZMANN, ZLATKO KVAČEK, VASILIS TEOBRIDIS, CHRISTIAN MÜLLER and KAROLIN MORAVECK

With 1 plate, 3 text-figs and 2 tables

Abstract

The Cenozoic basins in Germany (Weißenster) and the Czech Republic (Cheb, Sokolov and Most) have an extensive fossil record of riparian vegetation traceable from the middle Eocene to the early Miocene. Within this paper we focus on its evolution and gradual changes between the late Bartonian and the Eocene-Oligocene turnover, a time interval of gradual global cooling. For most of the time span a certain stasis in the development of azonal regional vegetation was previously observed resulting in the establishment of the Zeitz floristic complex ("Florenkomplex") that covers ca. 3.0–3.5 Ma contradicting the suspected global climatic trend. Herein we summarize results of investigations of several fossil floras of the Weißenster Basin that were conducted over the last decade and allocate them into the modern lithostratigraphic concept for central Germany. Previously published floras from this basin that come from an unambiguous lithostratigraphic position are revisited. For comparison the floras from Northern Bohemia are included. Our results show that the Zeitz floristic complex cannot be maintained in its original circumscription but needs a subdivision into three floristic stages based on immigration and disappearance of key vegetation elements. Stage 1, representing the type horizon and flora of the Zeitz floristic complex, is characterized by the presence of typical 'subtropical' species persisting since the middle Eocene, e. g. Dolostrobus taxiformis, Laurophyllum syncarpifolium, Steinhausera subglobosa, and Rhodomyrtophyllum reticulosum. In stage 2 thermophilous deciduous elements such as Platanus neptuni and Taxodium dubium as well as new Lauraceae immigrate into the regional vegetation. The stage 3 is typified by the disappearance of the old 'subtropical' elements, whereas other evergreen warm-temperate or 'subtropical' elements such as Eotrigonobalanus furcinervis and Quasisequoia couttsiae persist. They were probably able to withstand significant climatic changes during the Eocene-Oligocene transition. A massive immigration of broad-leaved deciduous elements prior to the Eocene-Oligocene boundary, known from the Northern Bohemian flora of Roudníky has not been recognized in the Weißenster Basin.

Key words: riparian forests, floristic evolution, Zeitz floristic complex, palaeoclimate, late Eocene, Eocene-Oligocene boundary, central Europe.

Dedication

In addressing floristic complexes of central Europe we deal with the probably most sustainable research result of the late Dieter Hans Mai and the late Harald Walther. Our results appreciated their scientific legacies, but are also a consistent further development of this phyostratigraphic method in the Cenozoic.

Authors' addresses:

LUTZ KUNZMANN, CHRISTIAN MÜLLER, KAROLIN MORAVECK, Senckenberg Naturhistorische Sammlungen Dresden, Museum für Mineralogie und Geologie, Königsbrücker Landstraße 159, 01109 Dresden, Germany
Lutz.Kunzmann@senckenberg.de (corresponding author)
Christian.Mueller@senckenberg.de
Karolin.Moraweck@senckenberg.de

ZLATKO KVAČEK, VASILIS TEOBRIDIS, Faculty of Science, Charles University in Prague, Albertov, 6, 128 43 Prague 2, Czech Republic
kvacek@natur.cuni.cz
Vasile.Teodoridis@pedf.cuni.cz

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DOI:10.1127/palb/295/2016/69
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