

## **PALAEOECOLOGICAL CHANGES OF THE BULGARIAN BLACK SEA ZONE DURING THE LATE QUATERNARY**

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### **ABSTRACT**

Pollen analysis and radiocarbon dating were performed on marine sediments from three new cores from the shelf, continental slope and deep-water zone of the Black Sea in order to provide a detailed reconstruction of the vegetation development during the Late Pleistocene and Holocene. The sedimentation started during the Late Pleniglacial that is characterized by steppe vegetation dominated by cold-resistant and heliophyllous taxa such as *Artemisia* and *Chenopodiaceae* and stands of *Pinus* and *Quercus*. Around 15500 cal. yrs BP an open *Pinus-Quercus* forests expanded at the same time as red-brown clay sediments started to be deposited, marking the first interstadial warming phase (Bolling). Between 14500 and 14000 cal. yrs BP sharp decrease of *Pinus* and increase of *Artemisia* and *Chenopodiaceae* pollen reflect the vegetation response to the cooling during Older Dryas stadial. Between 14000 and 13250 cal. yrs. BP the forest composition shows rather warm climate oscillation that may probably correspond to Allerod interstadial. Between 13250 and 10500 cal. yrs BP a revival of steppe vegetation occurred and light-gray clay was deposited indicating return to significant colder conditions which may correspond to the Younger Dryas stadial. After 10500 cal. yrs BP, *Quercus* and other temperate deciduous taxa such as *Ulmus*, *Corylus*, *Tilia* and *Alnus* responded to the temperature increase, characteristic for the beginning of the Holocene (Preboreal). The abrupt climatic change "8200 yrs BP cold event" is confirmed by the rapid significant reduction in arboreal pollen. After 7500 cal. yrs forest vegetation was already relatively stable. Dense mixed oak forests, dominated by *Quercus*, *Ulmus*, *Corylus*, *Tilia*, *Fraxinus excelsior* and *Acer* expanded as the same time as organic-rich sapropel sediments started to be deposited. The high occurrence of *Corylus* is a response to the optimal climate conditions (high humidity and increase of mean annual temperature) during the Atlantic. After 5500 cal. yrs BP at the end of Atlantic and beginning of Subboreal, *Carpinus betulus* and *Fagus* expanded simultaneously and became more important components of the forest vegetation, while *Quercus*, *Corylus*, *Ulmus* and *Tilia* diminished probably due to some climate oscillations, human activities and/or interspecies concurrence. From about 2900 cal. yrs BP onwards the increase of *Alnus* and *Fraxinus excelsior* along with some lianas such as *Hedera*, *Vitis* and *Humulus/Cannabis* was a response to climate cooling and humidity increase during the Subatlantic. Mixed oak forests remain abundant, but are influenced by human impact as it is marked by the relatively high rates of anthropophytes.

**Keywords:** Paleoecology, Black Sea, Pollen analysis, radiocarbon dating, climate oscillation