

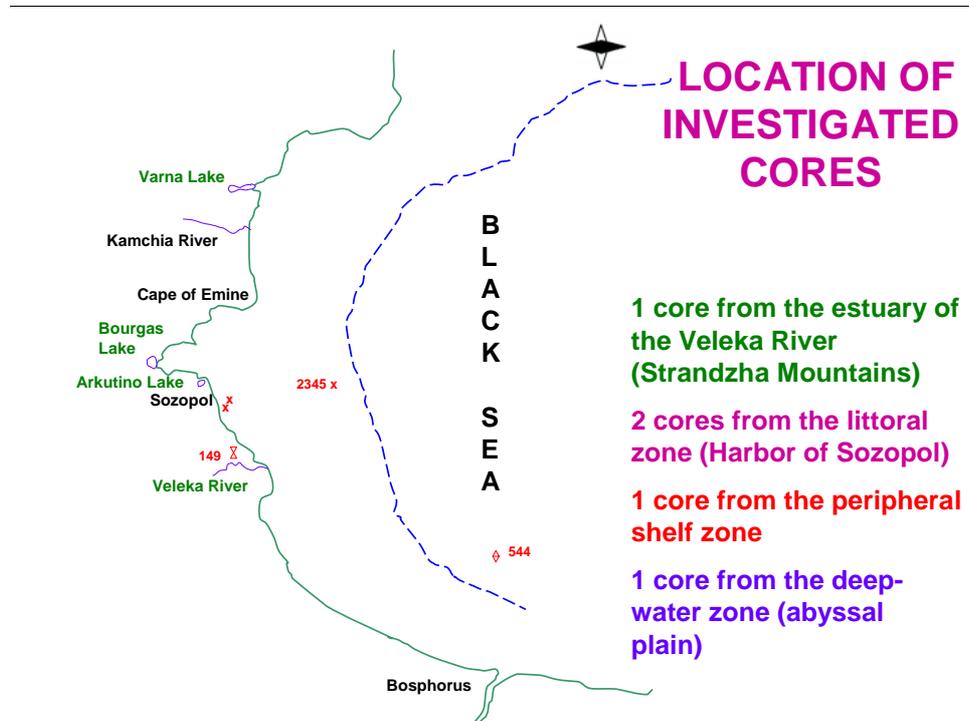
LATE QUATERNARY PALAEOENVIRONMENTAL RECORDS FROM THE SOUTHERN BULGARIAN BLACK SEA COAST

Mariana FILIPOVA-MARINOVA

Museum of Natural History – Varna, 41 Maria Louisa Blvd., 9000 Varna (Bulgaria)

E-mail: marianafilipova@yahoo.com

Cores of Late Pleistocene and Holocene sediments collected from the Veleka River estuary, South Bulgarian Black Sea shelf and deep-water zone were subjected for complex biostratigraphic investigations. The methods of spore-pollen, dinoflagellate cysts and molluscan fauna analysis were employed to reconstruct the vegetation dynamics, changes in continental and marine environment. Radiocarbon dating indicated that the analyzed sediments had accumulated during the last 29 000 years.



According to pollen record open steppe communities dominated by cold resistant and heliophilous taxa such as *Artemisia*, *Chenopodiaceae* and *Poaceae* prevailed during the Pleniglacial (29000 to ca. 15000 uncal. yr BP) and during the Stadials of Late Glacial (15000 to 10000 uncal. yr BP). Climate was the main factor for vegetation development during that period (Neoeuxinian). It must have been cold and dry. Only during the Bølling/Allerød Interstadials of the Late Glacial (ca.13000 to 11000 BP) the increase of *Pinus diploxylon* indicates certain improvement of climate, most probably increase of humidity. Maximum presence of cysts of stenohaline dinoflagellate species (*Tectatodinium psilatium* and *Spiniferites cruciformis*) that inhabit cold fresh waters and brackish waters with salinity under 7‰, and shells of Caspian type molluscan species such as *Dreissena rostriformis distincta*, *Dreissena polymorpha regularis*, *Monodacna caspia*, and *Cleissiniola variabilis* confirmed the aridity of climate, low salinity and the isolation of the basin. Ancient coasts of a Neoeuxinian Black Sea lay at elevations down to 90-130 m below the present sea level. In the peripheral shelf zone, the Neoeuxinian deposits are represented by shell-detritus, aleuritic and clayey silts, and form clearly defined accumulative bodies of coastal or barrier type.

At the beginning of the Holocene first single cysts of euryhalinuous dinoflagellate species *Lingulodinium machaerophorum* and acritarchs *Cymatiosphaera globulosa* appeared at about 8550±70 BP while in the shelf sediments they appeared at about 6880±240 BP. However, stenohalinuous dinoflagellate species *Spiniferites cruciformis* and *Tectatodinium psilatium* continued to be the dominant during the whole Neoeuxinian. Most probably, ingress of ecologically insignificant volumes of the Mediterranean Sea water occurred proved by the finds of single specimens of the euryhalinuous Gastropod species *Hydrobia ventrosa*, and molluscan species *Cardium edule* and *Mytilaster lineatus*.

At about 6880±240 BP a complete change of the sedimentation environment occurred. Complete disappearance of stenohalinuous dinoflagellate species (*Spiniferites cruciformis* and *Tectatodinium psilatium*) and the appearance of euryhalinuous marine dinoflagellate species *Lingulodinium machaerophorum*, *Spiniferites ramosus* and acritarchs *Cymatiosphaera globulosa* and euryhalinuous Mediterranean molluscan species such as *Mytilus galloprovincialis*, *Cardium papillosum*, *Cardium exiguum*, *Cardium edule*, and *Hydrobia ventrosa* suggested an apparently abrupt salinity change from 6-7‰ to 10-12‰ or up to 18‰. It could be also explained



with the low temperature tolerance of these taxa. Although an abrupt climatic change could result in such a pattern, it can also result from an unconformity in the sediments, indicating a hiatus. The established regional erosion affects mainly the sediment layers deposited near the Pleistocene/Holocene boundary and correspond to the drastic change in the hydrological regime during the fast sea-level rising and establishing the connection with the Mediterranean. This hiatus shows that the shelf of terrestrial sediments was exposed and eroded at the time of low sea-level and that it was then flooded by sea-water at some time before 6880 BP.

The pollen record indicates an abrupt change in the character of the vegetation and a period of rapid expansion of deciduous trees from their Late Glacial refugia. The maximum distribution of the balanced mixed deciduous forests dominated by different *Quercus* species and accompanied by *Ulmus*, *Carpinus betulus* and *Tilia* occur during the Atlantic climatic optimum. Indicators of anthropogenic activities such as *Cerealia*-type and components of meadows and pastures (*Plantago lanceolata*, *Polygonum aviculare*, *Centaurea cyanus*, *Urtica*) were registered from 6880±260 BP and show the development of agriculture and stockbreeding in the area during the Late Eneolithic and after a Transitional period (when the sea-level exceeded 3.8 m above its present values) during the Early Bronze Ages. The pollen record suggests a trend towards an increased presence of *Carpinus betulus* in the mixed oak forests during the Subboreal. An increase of the *Fagus* curve and the presence of pollen of temperate moisture-loving tree species such as *Ulmus*, *Alnus*, *Acer*, and *Fraxinus excelsior* are dated to 3780 BP. This could be explained by the formation of the contemporary flooded (riparian) forests along the rivers draining into the Black Sea, due to climatic cooling and an increase in humidity during the Subatlantic.

In conclusions, the significant environmental changes occurring in the Black Sea about 7000 years ago represent a critical stage in the Post Glacial history of the Black Sea, its most recent salinification and an invasion by marine organisms by the Mediterranean Sea.

