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CLIMATE CHANGE AND PALAEOENVIRONMENTAL EVENTS IN THE BULGARIAN BLACK SEA ZONE DURING THE LATE PLEISTOCENE

Abstract: The climatic and sea-level fluctuations during the Late Pleistocene are one of the most significant paleogeographic events in the geological history of Black Sea, (Yanina, 2014).The climate changes is controling glacial-interglacial phases in the Ponto-Caspian region, wich determinate transgressive-regressive cycles of the Quaternary evolution of the Black Sea.The sediments of Black Sea basin, are deposited during the Late Pleistocene epoch, are of such a kind, that contain Caspian type molluscan fauna, marking the connection witn Caspian Sea (Lower Karangatian stage and Upper Neweuxinian stage) and deposits , wich contain Mediterranean mollusks species and prouve the Mediterranean invasion (Middle and Upper Karangaian stage).

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Methodology. The climatic and sea-level fluctuations of the Bulgarian Black Sea zone during the Late Pleistocene have been traced on the basis of the analysis of the transgressive-regressive cycles, the correlation between the terrace complexes along the coastline and shelf area.This paper represent a complex lithological and biostratigraphical research of Late Pleistocene (Karangatian) sediments recovered in a 30 m deep borehole in Yrii Godin structure-YG (fig.1) on the Bulgarian Black sea shelf. The borehole is located in the peripheral area of the shelf and within area of Low Kamchia depression at a sea depth of 85 m.The correlation of the Karangatian sediments from the shelf and terrace complex like the Karangatian terrace of Varna and the firth of Fandakliiska river, is made.The existence of the Neweuxinian sediments on the North Bulgarian shelf in the structures Samotino-Sea and Samotino-East,categorically prouved by lithological and biostratigraphical research the high amplitude of the Postkarangatian regression.

Results.The Karangatian transgressive stage is the most important palaeogeographical event during the Pleistocene, wich results in an increase of the sea level higher than the contemporary one.According to (Svitoch, 1998), the Karangatian sea level has reached +6 -+8 m one during the maximal phase of the transgression.The sediments of the Karangatian regional stage reconstruct a change in the palaeogeographical environmental. The soft warm spell and the increase of the saltiness wich have begin during the Uzunlarian age reach their maximum in the culmination of the Karangatian transgresstion. The established molluscan fauna is the most thermophilic and the most halophilic in the geological evolution of Black sea during the Quaternary. The influx of Mediterranean waters also research its maximum. The Mediterranean influence is proved by the one-sided migration of an eurohalinous and stenohalinous fauna. The Karangatian waters are warm and with high salt content –to 30 ‰ (Nevesskaya, 1965)wich proved by the rich diversity of species. The studed sections of the shelf and of the fluvial firth on the Bulgarian coast established different climatic climatic conditions.The eastablished Karangatian sediments on the Yrii Godin structure , their geostructural position prove that the Karangatian basin has been located on the entire contemporary shelf.The biostratigraphical analysys proves their Early Karangatian age:*Corbula gibba* (Ol.), *Eulimella pointeli*

(M.), *Cardium paucicostatum* Sow., *Nucula nucleus* (Linne), *Retusa sp.*They correlate by age to the studied Early Karangatian terraces on the coast like the Karangatian terrace of Varna, the valley of Fundukliiska river (Krastev at al., 1990), wich mark the early phase of the Karangatian transgression.These terraces are genetically related to the early Karangatian sediments of the shelf because they are result from the same palaeogeographical event- the transressive phase with the highest amplitude in the Early Karangatian centure.In the coastal sections the monodominant presence of the euryhaline taxon *Corbula gibba* (Ol.), is also established.The frigophilic celtic species reconstruct relatively fresh and cold waters of the Early Karangatian basin.The analysis of pollen spectra of the terraces of Varna and firth of Fundukliiska river establishes mostly a pollen of grassy vegetation typical of dry and colder climates.The radiocarbon data of shells of *Corbula gibba* (Ol.),determines an age of 23 880±BP (Krastev at al., 1990).The paleomagnetic analysis determines a positive magnetic polarity with low valus of magnetic declination(j≈31) (Krastev at al., 1990).It is important to mention that the comparison in age between the Karangatian sediments of the shelf and coast and Early Karangatian (tobetchikski) sediments from Russian Black sea coast marks an inversion comparable to the magnetic episode Blake (Tchepalyga, 1989).

The beginning of the Neweuxinian epoch is marked by a deep regressive phase of the basin`development.The Neweuxinian regression in the Late Pleistocene coincides with the Wurm icing.The relict Postkarangatian refreshed basin existed as an isolated lake-sea and the sea level lowered to-90 -100m, the connection with the Mediterranean and Caspian sea was broken.The presented in this paper Neweuxinian sediments on the Bulgarian shelf differ lithofacially from sea coastal type of terrigenous shell sediments from the peripheral area of the shelf, described by Dimitrov and Govberg, 1978.Here, the Neweuxinian silty sediments, marking a deeper facies in the sections of North Bulgarian shelf- Aprilska and North structures.In the sea continuation of Low Kamchia depression , the Neweuxinian muds lie down directly on Pliocenian clays (Samotino-Sea structure-SS-C-3) or directly on Tschaudinian sediments (Samotino-East structure-SE-C-6).The high amplitude of the Postkarangatian outwash is proved by significant stratigraphic hiatus of the washed away Oldeuxinian, Uzunlarian and Karangatian sediments.The morphologically well expressed on the shelf Batova and Kamchia firth are formed on Post karangatian incisions, formed in the first half of the Neweuxinian epoch.As a result, the fluvial firths fill at first with alluvial type of sediments and later, with sea sediments.During the Neweuxinian transgressive phase a Caspian type of molluscan fauna dominates: *Dreissena rostriformis distincta* (Andrus.), *Dreissena polymorpha regularis* (Andrus.).Poor in species diversity, but rich in quantity, it mark a fresh-water influx of Caspian waters (Hristova, 2015).

Conclusions.A complete palaeogeographical reconstruction of the Late Pleistocene evolution on the Bulgarian Black sea zone is made. The correlation of the Karangatian sediments from the shelf and terrace complex reconstruct the different palaeogeographical conditions.We can reach to a conclusion that the examined Karangatian sediments do not mark the height of Karangatian transgression.In the Bulgarian part of the Black sea basin , the Karangatian transgression has developed in two phases: Early Karangatian and Late Karangatian (Fedorov, 2000).The biostratigraphical analysis of the sediments,, allows them to be related to the Early karangatian epoch, i.e.this is not apogee of the Karangatian transgression but its early phase. The palaeomagnetic analysis shows a positive magnetic polarity of the sediments.

On the Bulgarian Black sea shelf, in the sea continuation of Low Kamchia depression, the beginning of the Neweuxinian transressive epoch is marked by a deep regressive phase of the basin`s development (Hristova, 2007).The high amplitude of the Postkarangatian regression is prouved by the significant stratigraphic hiatus – Oldeuxinian, Uzunlarian and Karangatian sediments are missing totally due to erosion. The morphologically well exspressed on the shelf Batova and Kamchia firth were formed along inherited Postkarangatian relief in the first half of the Neweuxinian epoch.As a result, the fluvial firths were first filled with alluvial type of sediments and later on with sea sediments.

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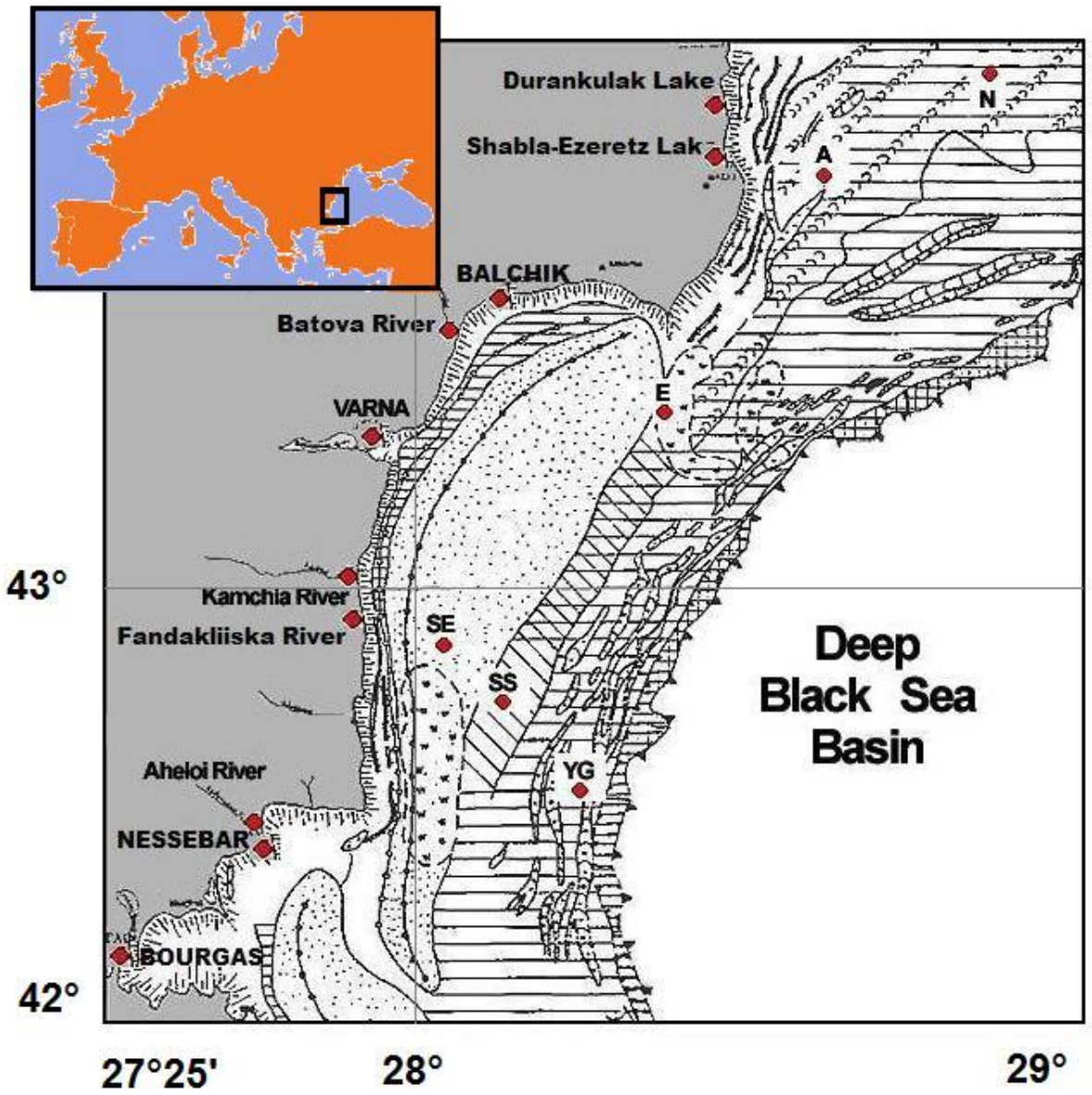

Fig.1.Geomorphological sheme of the Bulgarian black sea shelf and coast.The rhomboid black data points represent the locations where the cores were extracted. Abbreviation of geological structures: (N) Northern; (A)Aprilska; (E) Elizavetinska; (SE) Samotino East; (SS) Samotino Sea; (YG) Yurij Godin.