

Late Pleistocene evolution of the coastal barriers from the Western Black Sea shows a higher global sea-level position during MIS3 highstand, which requires a reappraisal of the existing reconstructions

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This work presents the multi-proxy results obtained on a deep drill (MID core, 52 m) carried on the Midia coastal barrier closing the Taşaul Lyman, the end-member of Casimcea river valley. Casimcea river is one of the oldest Black Sea tributaries, draining a large part of the Paleozoic Casimcea plateau. Sequence stratigraphy intercepted by MID core (which did not reach the bedrock) reveals a remarkable deep valley cut into the lowest sector due to its long-lasting shaping activity under the stress of major sea-level oscillations.

We used a multi-proxy methodology combining sedimentology (grain-size parameters, organic matter and inorganic carbonates, magnetic susceptibility), geomorphology (morphometric analysis of the Casimcea plateau maritime facade), geochemistry (XRF, oxygen isotope data) and paleo-ecology (meiofauna and macrofauna, pollen analysis) which altogether allowed the identification and description of the facies associations' succession along the 52-m drill. The newly obtained data were compared with the results from another regional deep drill, MAM drill (of 52 m) positioned ca 8 km to the south, on Mamaia coastal barrier (Caraivan et al., 2012). The compared analyses of the two data sets revealed a longshore regional stratigraphic sequence that captured most of the paleoenvironmental changes that affected the western Black Sea coast during MIS 4 – Holocene interval.

Here, we present the Black Sea level evolution during the MIS3 time interval (60-29 ka), which is acknowledged as the most unstable stage of the (Late) Quaternary. It is generally characterized by extremely fast and intense climatic and eustatic changes that control the environmental history and the human dispersal in Europe and Asia. Despite its importance, MIS3 is still poorly known due to the rapid changes that frequently left contradictory or no

imprints in different geological archives. One of the major controversies concerns the sea-level reconstruction where most of the direct (sedimentary) evidence of the paleo-coastline did not fit the sea-level reconstructions based on oxygen isotope data from deep-sea cores (which have been widely applied as sea-level proxies), the latter ones generally producing sea levels no higher than 75-40 m below the current level. The results obtained on the two coastal barriers of the Black sea (MID and MAM drills) show a considerably higher position of the sea level during the highstand of the MIS3, placed between ca. 20-25 m b.s.l. However, the newly reconstructed sea-level fits evidence from different coasts either ignored or considered to be tectonically or isostatically raised. In our case, the two drills belong to the same geologic formation – the old Casimcea Plateau – which at least on its eastern façade is a stable unit as proved by our morphometric analysis of the marine terraces (only MIS 5e terraces are present at the 3-6 m elevation asl). Moreover, the meio- and macrofauna show an increased salinity during this period (MIS3 highstand), whilst the presence of several Mediterranean species proves the Black Sea connection to the World Ocean. Therefore, a global higher position of the sea level indicates the climate was considerably warmer than previously modelled, although for a short timespan.