



New Evidence for opening of the Black Sea; U-Pb analysis of detrital zircons and paleocurrent measurements of the Early Cretaceous turbidites

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Shelf to submarine turbidite fan deposits of the Early Cretaceous crop out over a large area along the southern coast of the Black Sea. Early Cretaceous turbidites have a thickness of over 2000 meters in the Central Pontides. The shelf of this turbidite basin, represented by shallow marine clastics and carbonates, crops out along the Black Sea coast between Zonguldak and Amasra.

Paleocurrent directions in the Lower Cretaceous turbidites were measured in 90 localities using mostly flute and groove casts and to a lesser extent cross-beds. At the eastern part of the basin, the paleocurrents were from north to south. It is scattered in the west of the basin, however, the main paleocurrent directions were from the north.

Detrital zircons were analyzed using LA-ICP-MS in eleven samples from the turbiditic sandstones and two samples from the shelf sandstones. Four samples are from the western part (two samples from shelf sediments), four samples from the central part and five samples from the eastern part of the Lower Cretaceous basin. 1085 of 1348 zircon analyses are concordant with rates of 95-105% and the zircon ages range between 141 ± 4 Ma (Berriasian) and 3469 ± 8 Ma (Paleoarchean). 22% of the detrital zircon ages are Paleoproterozoic, 20% Archean, 16% Carboniferous, 13% Neoproterozoic, 8% Permian, 6% Triassic, 5% Mesoproterozoic and 11% other ages.

In the western part of the basin the Carboniferous zircons constitute the main population with a less dominant peak at Ordovician, Cambrian and Late Neoproterozoic. The zircons from the center of the basin show scattered distribution with dominant populations in the Triassic, Permian, Carboniferous, Silurian, Paleoproterozoic, Early Neoproterozoic-Late Mesoproterozoic, and minor peak at Late Neoarchean. On the other hand, zircons from the eastern most part of the basin, show dominant peaks in the Paleoproterozoic, Mesoarchean and Permian with minor peaks in Triassic, Carboniferous and Silurian.

Anatolia and the Balkans have a late Neoproterozoic basement, whereas the East European Platform (EEP) has a Paleoproterozoic-Archean basement. The zircon and the paleocurrent data indicate that the eastern and central part of the Early Cretaceous turbidite basin was mainly fed by EEP, whereas local sources were dominant in the western part of the basin and especially fed from a crystalline basement of the Istanbul zone. This in turn indicates that the Black Sea did not form a major barrier between the Pontides and the EEP and was probably not open during the Early Cretaceous.

Keywords: Central Pontides, Early Cretaceous, Paleocurrent, Provenance, U-Pb Detrital zircon.