



Isotopic and Paleontological Investigation of the K-Pg Boundary Section from the Central Sakarya Region (NW Turkey)

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Although the K-Pg boundary has a crucial importance for worldwide correlation of basins and better understanding of the conditions in this time span of Earth's history, it has not been studied enough detail in Anatolia. In this study we aim to fill up this gap by investigating a Late Cretaceous – Early Paleogene marine succession from NW Turkey in terms of sedimentological features, $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ ratios, nanoplankton and planktic foraminifera.

In the southern and middle part of the Central Sakarya Basin, the Campanian – Maastrichtian are represented by biostratigraphically dated thick, complete, deep marine, mainly siliciclastic succession. From the Early Paleocene onward, echinoderm bearing sequence of alternating lime-mudstone and marls with organic rich clay intervals become dominant. A 4,7 m thick section within the transition from siliciclastics to carbonates, containing the K-Pg boundary, was measured, sampled and studied in detail.

The section starts with 2 meter thick basinal muds, with intercalated turbidites, that continues with 2,2 meter mudstone and ends with 50 cm limestone/marl alternations, that continue further in the Paleogene. Detailed field investigations demonstrated that the 2,2 meter thick siliciclastic-free muddy part of the section contains two thin (ca. 2 mm thick), reddish, iron rich, clay levels with 13 cm brownish mudstone in between. The lower reddish layer is laterally continuous with a constant thickness of 2 mm; the upper one is discontinuous with a maximum thicknesses of 3 mm. Preliminary nanoplankton investigations showed that the Cretaceous species abruptly disappear about 30 cm below the lower rusty layer and the first Danian species appear just above the second one.

The $\delta^{13}\text{C}$ values of the bulk rock samples gradually increase from bottom of the section to the lower reddish clay layer, while $\delta^{18}\text{O}$ values remain almost constant. At the lower reddish clay layer, both curves show abrupt negative shifts; $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ decreases about 1,5 ‰ and 1,2 ‰ respectively. Afterward, both proxies stay at negative values in between the two reddish layers. Above the upper reddish layer, $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ curves gradually return to the values recorded before the K-Pg boundary.

In summary, we believe that the Central Sakarya Region succession contains remarkably complete K-Pg boundary record. The stable isotope data indicate that the lowermost 2 mm thick continuous, reddish layer may be attributed to the worldwide K-Pg ejecta layer. The bottom of the red layer marks the Cretaceous – Paleogene boundary in the basin, consistent with the K-Pg boundary, as defined in el Kef in Tunisia.