



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

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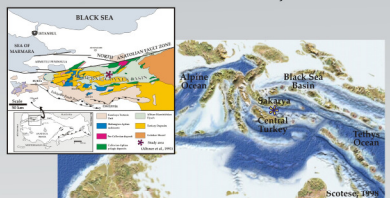
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## Introduction

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,  $\delta^{13}\text{C}$  -  $\delta^{18}\text{O}$  ratios, calcareous nannofossils and dinoflagellate cysts.

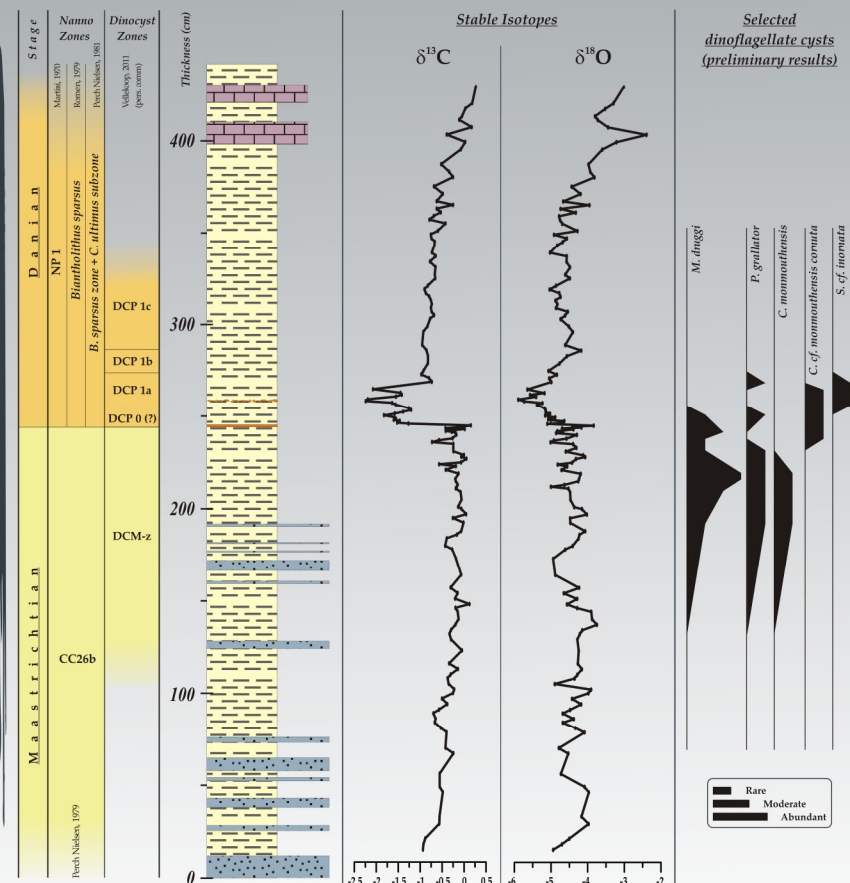
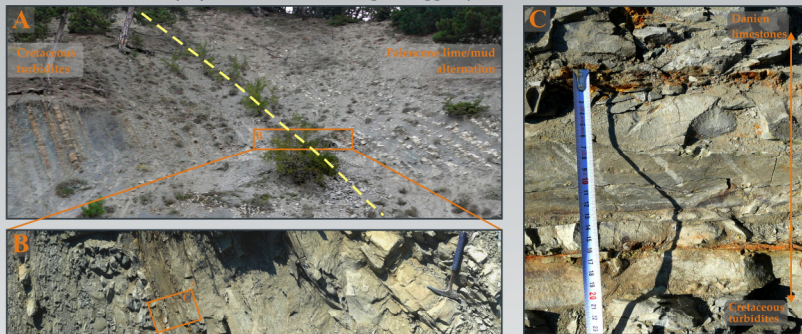
The study area is located in the Central Sakarya Region, NW Turkey, within the Mudurnu - Goynuk Basin. The basin was tectonically active during the Late Cretaceous. Subduction affected the basin during the Turonian - Santonian and ended in the Maastrichtian with the start of the major collision.



## The Okçular Section

In the southern and middle part of the Central Sakarya Basin, the Campanian – Maastrichtian intervals represented by biostratigraphically dated thick, continuous deep marine, pelagic 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.

The section starts with 2 m thick basinal muds, with intercalated turbidites, that continues with 2,2 m mudstone and ends with 50 cm limestone/marl alternations, that continue further in the Paleogene. Detailed field investigations demonstrated that the 2,2 m thick siliciclastic-free muddy part of the section contains two thin (ca. 2 mm) 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 nannoplankton 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.



## Conclusions

- ◆ In summary, 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.

## Questions and Next steps...

A distinct second rusty layer is not common in K-Pg sites. "Reworking of the first layer" or "record of another impact" could explain this second occurrence. An additional impact was recorded in Ukraine (Boltys), 100-200 ka before the Chicxulub impact. Is the first layer representing Boltys and second the Chicxulub, or is the second layer a result of reworking? The intermittent appearance could point to reworking, however the distinctness of the second layer is hard to explain by reworking. The continuous section and good outcrop conditions offer a promising new site to investigate K-Pg Boundary in detail and could give further insight into the K-Pg event.

Further research on this section is still ongoing. Quantitative studies on the calcareous nannofossils and dinocysts are under progress. 10 samples will be analyzed soon for Ir and PGEs. Comparison of our data with other well known sections (El Kef, Agost, Stevens Klint, Tetri-tsarko etc) will also help us to understand more about the events and effects of it to this basin.

## References

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