

Offsets in the early Danian recovery phase in carbon isotopes: evidence from the biometrics and phylogeny of the Cruciplacolithus lineage

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Changes in the size and in the shape of the cross of the early Danian Cruciplacolithus primus to Cruciplacolithus tenuis lineage have been studied along with bulk carbon isotope data at two reference Cretaceous-Paleogene boundary sections: Bidart, SW France (Basque Basin) and Elles, central Tunisia (SW Tethys). Our study documents the progressive increase in the size of this lineage in the early Danian and allows for the definition of a new sub-species Cruciplacolithus intermedius robustus present in the two sections. Successive first occurrences in the Cruciplacolithus lineage and similar characteristic maxima in the size of the genus can be correlated between the two sections. The correlation of the carbon isotope curves and evolutionary events between Elles and Bidart shows an offset in the rising limb of the carbon isotopes following the Cretaceous-Paleogene boundary negative excursion. The onset of the progressive increase in carbon isotopes is recorded later at Elles, suggesting that the recovery phase in the southwestern Tethys was delayed as compared to the Basque Basin. The earlier recovery in carbon isotopes at the Bidart section was likely favored by the development of an upwelling zone in the Basque basin at that time.