



## **Biostratigraphy and assemblage evolution in Planktic Foraminifera across the Cretaceous-Paleogene transition in low latitude, northern and southern Tethys realm: El Kef GSSP, Elles (Tunisia) and Agost, Caravaca (Betic Cordillera, Spain)**

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The detailed planktic foraminiferal biostratigraphic and quantitative study from the Cretaceous-Paleogene (K-Pg) transition interval of the most expanded and continuous sections located in Spanish (Agost, Caravaca) and Tunisian sections (El Kef and Ellès), allows us to establish the zonation and subzonation of this interval and to distinguish four Acme-stages across the K/Pg transition interval of these low latitude sections. The uppermost Maastrichtian in Tunisian and Spanish sections, is characterized by standard planktic foraminiferal zones: *Abathomphalus mayaroensis* subdivided into *Plummerita hantkeninoides* Subzones. This index species is absent at middle and high-latitude twice in Atlantic and Antarctic oceans. Consequently, this species is considered to be restricted to the tropical and subtropical deep seawater.

The lower Danian is characterized by *Guembelitria cretacea*, *Parvularugoglobigerina eugubina*, and *Parasubbotina pseudobulloides* biozones. The *Guembelitria cretacea* Zone was subdivided into the *Hedbergella holmdelensis* and *Parvularugoglobigerina longiapertura* Subzones; the *Parvularugoglobigerina eugubina* Zone into the *Parvularugoglobigerina sabina* and *Eoglobigerina simplicissima* Subzones; and the *Parasubbotina pseudobulloides* Zone into the *Eoglobigerina trivalis* and *Subbotina triloculinoides* Subzones. These zones and subzones are less expanded at the Caravaca and Agost sections than in Tunisian sections: El Kef (Global Stratotype Section and Point for the K/Pg) and Ellès, but it is sufficiently expanded to analyze correctly the planktic foraminiferal assemblage evolution across the K-Pg transition. Across this transition, at the Tethys area, we have identified four Acme-stages:

Acme-stage 0: is typical of the upper Maastrichtian interval is dominated by cosmopolitan species dwelling surface and intermediate seawater.

Acme-stage 1: is typical of the *G. cretacea* Zone and is dominated by *Guembelitria* species belonging to "Cretaceous survivors" species.

Acme-stage 2: spans the *Pv. eugubina* Zone dominated mainly by specimens belonging to *Palaeoglobigerina* and *Parvularugoglobigerina* genera.

Acme-stage 3: It spans the *Ps. pseudobulloides* Zone and dominated by biserial species belonging to *Chilogembelina* and *Woodringina* genera.

The turnover in Tethys realms after the K/Pg mass extinction, characterized the lower Danian interval and occurred in three episodes, recorded as planktic foraminiferal acme-stages (1 to 3). This succession of distinct Acme-stages is comparable with those recognized at Atlantic realms.