



Coniacian - Santonian planktonic foraminifera and stable isotope records from Tanzania and identification of the base of the Santonian Stage

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The stratigraphically complete and expanded Coniacian-Santonian sequence drilled for the first time in Tanzania provides one of the world's best records of calcareous plankton evolution during this time interval. The highly diversified planktonic foraminiferal assemblages at Tanzania Drilling Project (TDP) Site 39 are particularly suitable for characterizing evolutionary changes and reconstructing the phylogenetic history of the planktonic taxa. Understanding the ancestor-descendant relationships among species is of overall importance in biostratigraphy, and especially required for documenting the stratigraphic occurrences of marker species and their reliability for regional and global correlations.

Following the Tethyan planktonic foraminifera biozonation, the assemblages at TDP Site 39 from the base of the borehole (100.75 m) to 70.68 m below surface is included in the Coniacian-Santonian *Dicarinella concavata* Zone because of the absence of *Dicarinella asymetrica* and the presence of common marginotruncanids and dicarinellids. The overlying stratigraphic interval is assigned to the Santonian *Dicarinella asymetrica* Zone based on the presence of the nominate taxon together with abundant and large-sized marginotruncanids (*Marginotruncana sinuosa*, *M. tarfayensis*, *M. schneegansi*, *M. coronata*, *M. pseudolinneiana*).

Planktonic foraminifera at TDP Site 39 are very abundant and show a high rate of diversification with the appearance of several genera and species including *Globotruncanita stuartiformis*, *G. elevata*, *Contusotruncana morozovae*, *Sigalia deflaensis*, *S. decoratissima*, *Globotruncana linneiana*, and *Ventilabrella eggeri*. In addition, we commonly observe transitional forms with morphological features that place them between existing genera and/or species; some of these forms could be regarded as new species because they show relative stability and consistent stratigraphic ranges. Our findings and observations allow us to derive a more accurate series of bioevents that are correlatable throughout tropical and subtropical localities, thus promising for the improvement of the planktonic foraminiferal biozonation.

Carbon isotope values across the Coniacian-Santonian interval vary by a maximum of 3‰ and show significant increasing and decreasing trends, while oxygen isotopes only vary by 1‰ with no major excursions observed. The carbon isotope values peak at 1.7‰ at the base of the borehole in the *Dicarinella concavata* Zone, followed by a gradual decline that reaches a minimum value of -2.4‰ near the base of the *Dicarinella asymetrica* Zone and includes a number of short positive and negative excursions of about 1 to 2‰. Above this minimum there is a progressive increase in carbon isotope values that reach a maximum close to 1‰ at the occurrence level of the single keeled globotruncanids. Towards the top of TDP Site 39, carbon isotope values decrease only by 0.5‰ with some minor fluctuations.

Finally, the planktonic foraminiferal bioevents integrated with chemostratigraphic data are compared with the sequence of events observed across the Coniacian-Santonian transition at Olazagutia (Basque-Cantabrian Region, northern Spain), the candidate Global Boundary Stratotype Section and Point (GSSP) for the base of the Santonian Stage.