Paper Number: 3295

First stratigraphically complete Coniacian-Santonian boundary record from the Ruvuma Basin (southern Tanzania, East Africa): planktonic foraminiferal, geochemical and paleoceanographic patterns

Petrizzo, M.R.[1], Jiménez Berrocoso, A.[2], Falzoni, F.[1], Huber, B.T.[3], MacLeod, K.G.[4]

[1]Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano, via Mangiagalli 34, 20133 Milano, Italy, e-mail: mrose.petrizzo@unimi.it

[2]Repsol Services Company, 2455 Technology Forest Blvd., Bldg. 5, The Woodlands, TX 77381, USA

[3] Department of Paleobiology, MRC 121, Smithsonian Museum of Natural History, Washington, DC 20013, USA

[4]Department of Geological Sciences, University of Missouri-Columbia, 101 Geological Sciences Bldg., Columbia, MO 65211, USA

A 101-m-thick stratigraphically complete late Coniacian - early Santonian (89-83 Ma) sedimentary sequence drilled in Tanzania allows examination, for the first time, of the planktonic foraminiferal biostratigraphy, foraminiferal evolution, depositional history and geochemical patterns from the subtropical-tropical Indian Ocean spanning this interval. Planktonic foraminifera at Tanzania Drilling Project (TDP) Site 39 are diverse and the occurrences of Tethyan marker species enable application of the tropical biozonation. The topmost 70.18 m of the section are assigned to the *Dicarinella asymetrica* Zone, while the underlying sediments belong to the *Dicarinella concavata* Zone. In addition, TDP 39 is proposed as reference section for the Coniacian/Santonian boundary in the Indian Ocean with the boundary placed at the lowest occurrence of *Globotruncana linneiana* in agreement with the sequence of events defined at the GSSP stratotype section in Spain.

The sedimentary record at TDP 39 was deposited in an outer shelf to upper slope setting dominated by calcareous clayey siltstones and mudstones and, thus, provides a unique opportunity to document the planktonic foraminiferal evolution in a subtropical marginal sea environment. Specifically, the Coniacian-Santonian interval represents a key-period in the evolutionary history of planktonic foraminifera during which deep dwelling taxa underwent a major radiation (originations outnumbered extinctions) that has been related to a series of climatic and oceanographic changes.

Combined documentation of lithological and geochemical data from TDP 39 reveal a paleoceanographic history influenced first by a high transfer of continental-derived nutrients to surface waters in the *D. concavata* Zone that shifts to higher carbonate production and reduced surface water primary productivity in the overlying *D. asymetrica* Zone. Planktonic foraminiferal assemblage changes mirror the depositional and geochemical trends and indicate a progressive change from a more eutrophic to a more oligotrophic regime associated with both a well-defined mixed layer and a stable thermocline. At the local scale, this paleoceanographic scenario is consistent with the deepening of coastal Tanzania in response to the widespread, Late Cretaceous marine transgression registered on the passive margin along southeastern Tanzania after the separation of Madagascar from India at ~93 Ma. Epicontinental invasion of oligotrophic waters during the high sea-level stand may have provided increased opportunities for planktonic foraminifera to exploit new ecological niches. Because the tectonic evolution and sea-level rise along the East Africa continental margin is superimposed on the global long-term sea-level high documented for the Coniacian-Campanian time interval, we hypothesize that the epicontinental invasion of blue water may have favoured the evolution of new lineages within the deep-dwelling taxa.