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The Tendaguru formation of southeastern Tanzania, East Africa: An alternating Late Jurassic to Early Cretaceous palaeoenvironment of exceptional status

B. Sames

Department of Palaeontology, University of Vienna, Geozentrum, Althanstrasse 14, 1090 Vienna, AUSTRIA
(benjamin.sames@univie.ac.at)

Dinosaur remains have inspired considerable scientific interest in the Tendaguru formation of southeastern Tanzania during the 20th century; however, this formation is exceptional in many other respects. The Late Jurassic to Early Cretaceous deposits of the Tendaguru formation in the southwestern Tethys are unique because they represent a marginal marine palaeoenvironment with nonmarine faunal and floral content. It is a threefold succession of marginal marine to terrestrial, carbonate-siliciclastic sediments with cyclic character, consisting of three transgressive-regressive cycles. Revisitation of the type locality (the Tendaguru, a hill approximately 60km northwest of the town of Lindi) by a German-Tanzanian expedition in summer 2000 (Heinrich et al., 2001) resulted in a new standard section (hitherto unpublished, the informal terminology is indicated by the use of lower case in Tendaguru formation), a refined environmental model (Aberhan et al., 2002) and many new insights towards its geology (with evidence of event-sedimentation, Bussert and Aberhan, 2004), biostratigraphy and a better understanding of the Tendaguru palaeo-ecosystems and the palaeoclimate.

Within the scope of the designation of a new standard section at the type locality, calcareous microfossils (ostracods, charophytes) have been described to supplement the ongoing discussion about the age and palaeoecology of the Tendaguru formation (Sames, 2008). Although only a few unevenly distributed layers across the section produced calcareous microfossils, the results are very promising. A total of 40 ostracode and 2 charophyte taxa could be distinguished. The non-marine part of the ostracod fauna provides an important contribution to the documentation of Purbeck/Wealden-type nonmarine palaeoenvironments and its microfaunas and –floras previously unknown from East Africa. The marine faunal part belongs to a relatively endemic southern (Gondwana) fauna.

Together with other fossil groups, the palaeoecological analysis of microfaunal and –floral assemblages confirms that the former subdivision of the Tendaguru formation into three non-marine intercalated with three marine layers should be recognised as generally only, because the formation is much more complex in detail. Application of calcareous microfossils has been demonstrated to make an important contribution to the interpretation of the Tendaguru formation's palaeoenvironment and is considered highly developable in the future.

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