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Peter Stassen, Christian Dupuis, Etienne Steurbaut, Johan Yans ...+4 more authors

Institutions: Katholieke Universiteit Leuven, Faculté polytechnique de Mons, Royal Belgian Institute of Natural Sciences, University of Liège ...+1 more institutions

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Unraveling the Paleocene-Eocene thermal maximum in shallow marine Tethyan environments: the Tunisian stratigraphic record

Peter Stassen[1]*, Christian Dupuis[2], Etienne Steurbaut[1, 3], Johan Yans[4], Jean-Yves Storme[4], Abdel-Mohsen Morsi[5], Paola Iacumin[6], and Robert P. Speijer[1]

With 7 figures, 1 plate and 4 tables

Abstract. Despite the increasing understanding of the Paleocene-Eocene thermal maximum (PETM) in open marine environments, shallow marine settings remain relatively unexplored. We investigated an upper Paleocene to lower Eocene shallow-water sequence near Kalaat Senan in Tunisia (Sidi Nasseur and Wadi Mezaz sections) in order to generate a stratigraphic framework of the PETM in a shallow marine fine-grained siliciclastic setting of the Southern Tethys. These sections expose the top part of the El Haria Formation (Fm.), the Chouabine Fm. and the lower part of the limestone bearing El Garia Fm., covering the upper Paleocene-lower Eocene (NP9a to NP11). The PETM interval is situated near the top of the El Haria Fm. and the regional stratigraphy is compared to the well-known Egyptian setting. The isotope record of total organic carbon ($\delta^{13}C_{org}$) reveals the characteristic negative carbon isotope excursion (CIE), comparable to the $\delta^{13}C_{org}$ record of the Global Boundary Stratotype Section and Point of the Eocene at Dababiya (Egypt). Although the Tunisian PETM interval is quite expanded, no anomalous beds are observed and only the CIE "core" is partly represented as the top part of the PETM is truncated. In addition to a well-expressed CIE, the position of the Paleocene-Eocene boundary is supported by the appearance of nannoplankton (*Discoaster araneus*) and foraminiferal (e. g. *Acarinina multicamerata*) marker taxa. Furthermore, ostracode and benthic foraminiferal turnovers coincide with the onset of the PETM and are characterized by the disappearance of many common Paleocene taxa (e. g. *Frondicularia* aff. *phosphatica*) in this area. The lowest occurrences of *Alocopocythere attitogonensis* and *Buntonia*? *tunisiensis* (ostracodes), *Reophax* sp. 1 (benthic foraminifera) and *Fasciculithus tonii* (calcareous nannoplankton) may be applicable for regional correlation. These results indicate that characteristic PETM taxa evolved and/or dispersed immediately after the main $\delta^{13}C_{org}$ shift.

Key words. Tunisia, PETM, shallow marine, stratigraphy, Sidi Nasseur, Wadi Mezaz

Authors' addresses:
[1] Department of Earth and Environmental Sciences, KU Leuven, Celestijnenlaan 200E, B-3001 Leuven, Belgium. E-Mail: Peter.Stassen@ees.kuleuven.be, Robert.Speijer@ees.kuleuven.be
[2] Faculté Polytechnique de Mons, Université de Mons, Rue de Houdain 9, B-7000 Mons, Belgium. E-Mail: Christian.Dupuis@umons.ac.be
[3] Department of Paleontology, Royal Belgian Institute of Natural Sciences, Vautierstraat 29, B-1000 Brussels, Belgium. E-Mail: Etienne.Steurbaut@naturalsciences.be
[4] Department of Geology, FUNDP, UCL-Namur, Rue de Bruxelles 61, B-5000 Namur, Belgium, jyans@fundp.ac.be, jean-yves.storme@fundp.ac.be
[5] Department of Geology, Faculty of Science, Ain Shams University, 11566 Cairo, Egypt. E-Mail: ammorsi@hotmail.com
[6] Department of Earth Sciences, Parma University, Viale G. P. Usberti 157/A, 43100 Parma, Italy. E-Mail: Paola.iacumin@unipr.it
* **Corresponding author:** Peter Stassen, Biogeology Research Group, Department of Earth and Environmental Sciences, KU Leuven, Celestijnenlaan 200E, B-3001 Leuven, Belgium. E-Mail: Peter.Stassen@ees.kuleuven.be