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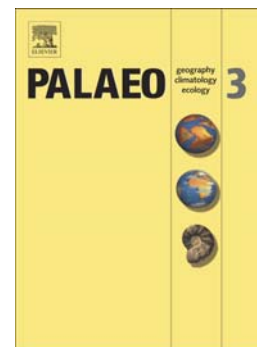
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Diversity and morphological evolution of Jurassic belemnites from South Germany

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Abstract: Belemnites are extinct cephalopods whose evolutionary history is representative of successful adaptive radiations during the Mesozoic. Nevertheless, a detailed understanding of the dynamics and palaeoenvironmental drivers of this evolution is still lacking. In order to fill this gap, we analyze the diversity and morphological disparity of Jurassic rostra from South Germany, and compare these patterns with other Euro-Boreal trends. We show that, after an early apparition of few dissimilar groups during the Hettangian-Sinemurian interval, belemnites experienced four periods of diversification (i.e., Early Pliensbachian, Middle-Late Toarcian, Early Bajocian, Oxfordian) marked by morphological disparifications of rostra towards forms potentially optimized for different hydrodynamic properties. These adaptive radiations were interrupted at regional scale by four biological crises corresponding to morphological bottlenecks (i.e., Pliensbachian-Toarcian, Aalenian, Late Bajocian, and Kimmeridgian). Most of them were morphoselective, except the random Aalenian extinction, which could be related to a prominent sea level fall. By comparing our results to palaeoenvironmental data, we show that warm temperate seawater temperatures might have favoured the diversification of belemnites, potentially by

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