New insights on calcareous nannofossil biostratigraphy and paleoecology around the Pliensbachian/Toarcian boundary in the South Iberian paleomargin

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Calcareous nannofossils have proved to be one of the most useful tools for dating Mesozoic marine rocks, especially in those areas where ammonites are very scarce or absent. This is the case for two stratigraphic sections in the Betic External Zone: Sierra Pelada (PEL) in the median Subbetic and Guarrumbre (G) in the external Subbetic. The uppermost Pliensbachian–lower Toarcian, pre-Jenkyns Event materials from these sections have been dated with precision with calcareous nannofossils using the biostratigraphic scheme of Ferrerira et al. (2019) for the western Tethys. In the PEL section, the boundary between Subzones NJT5b and NJT5c was established based on the first occurrence (FO) of *Zeugrhabdotus erectus*, which also enabled the approximation of the Pliensbachian/Toarcian boundary. At the G section, Subzones NJT5a, NJT5b, NJT5c, and NJT6a were identified using the FOs of *Lotharingius crucicentralis* (latest Pliensbachian), *Z. erectus*, and *Carinolithus superbus* (early Toarcian).

The results of the quantitative analysis performed on calcareous nannofossils from the PEL and G sections can help us decipher their paleoecological affinities around the Pliensbachian/Toarcian boundary, a time interval marked by environmental and climatic changes with an increase in temperature and a negative carbon isotope excursion (CIE). Coinciding with the negative CIE, there was a decrease in the relative abundance of *Calcivascularis jansae*, which probably thrived under relatively cool temperatures and oligotrophic conditions (Fraguas et al., 2021) and can be observed in both sections. Furthermore, a sharp increase in the relative abundances of *Mitrolithus lenticularis* and *Crepidolithus crucifer*, which could thrive under warm and mesotrophic conditions, was noticed only at PEL, which was located in a more distal paleogeographic position than G with respect to the South Iberian paleomargin. According to Peti & Thibault (2022), these two species thrived predominantly in open-ocean settings. In both sections, the opportunistic taxon *Lotharingius hauffii*, together with other species of the genus *Lotharingius* and the recovered *C. jansae*, dominated the nannofossil assemblages above the negative CIE and the Pliensbachian/Toarcian boundary.

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