

The Pliensbachian-Toarcian boundary event (Early Jurassic): new paleoenvironmental interpretations based on calcareous nannofossil data

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Many investigations that deal with Early Jurassic calcareous nannofossils have focused on their response to the Toarcian anoxic event (T-OAE). However, studies performed on carbon and oxygen isotopes point to a significant perturbation before the T-OAE, namely at the Pliensbachian-Toarcian boundary (PI/Toa). Here, we present a high-resolution study from two sections: La Almunia de Doña Godina in central Spain and Anse St. Nicolas in western France. These two sections are located at a key position to investigate the boundary between the northern and the southern margin of the western Tethys Ocean. The two sites, which contain no apparent discontinuities, are ideal for documenting the PI/Toa. This contrasts significantly with most known localities, which show a large hiatus in this interval. The new data were compared to others from the literature and to the new

boundary stratotype in Peniche (Portugal). The investigation of relative abundances and nannofossil fluxes showed both differences and similarities. The late Pliensbachian and early Toarcian were times when many species of calcareous nannofossils first appeared. The first occurrences of *Biscutum intermedium* and *Zeugrhabdotus erectus* are well documented at both sites across the PI/Toa. Although the two localities were paleogeographically close during the Early Jurassic, differences in the nannofossil assemblages, such as a high abundance of *Bussonius* at Anse St. Nicolas and high proportions of *Mitrolithus jansae* at La Almunia, suggest that the paleoenvironments were quite different. We conclude that the PI/Toa event represented the onset of profound paleoenvironmental perturbations that culminated with the T-OAE.