Orbitally controlled depositional changes in the Pliensbachian and Toarcian western Tethys (La Cerradura, Subbetic, Spain)

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The Early Jurassic is marked by the transition from cooler (possibly icehouse) conditions in the Late Pliensbachian to the hothouse conditions of the Early Toarcian (~188–181 Ma). Climatic and environmental change at that time is interpreted to be linked to massive and abrupt carbon release into the atmosphere and oceans which, through positive and negative climatic feedback processes resulted in widespread oxygen-stressed conditions in many marginal marine basins, and the associated sequestration of carbon into sediments. Combined, greenhouse-gas release and widespread organic-carbon burial let to major perturbations in the Pliensbachian–Toarcian carbon cycle.

Within the context of the Early Toarcian record in Europe, the La Cerradura section from the Betic Cordillera stands out due its low organic carbon content, persistent oxygenation, and position, bordering the southern Tethyan palaeo-margin. In this study, we present geochemical data from over 200 rock samples from the Upper Pliensbachian–Lower Toarcian at La Cerradura. Elemental geochemistry and $\delta^{13}C_{TOC}$ were used to constrain changes in deposition, paleo-ocean chemistry, and paleoclimate in the study area, and was used to obtain a cyclostratigraphic framework for the studied succession. The objectives are to (1) constrain the timing of global carbon cycle change and (2) improve our understanding of palaeoclimatic and palaeoceanographic processes that operated during major climate change events in the Pliensbachian–Toarcian time interval.

Mots-Clés : sedimentology, geochemistry, astrocronology, Pliensbachian–Toarcian, Betic Cordillera, Spain

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