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The Middle Jurassic *Watznaueria* (coccolith-type algae) diversification impact on carbon cycle and bulk carbonate composition

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Today, coccolithophores are one of the major carbonate producers in the ocean and therefore play an important role in modern carbon cycle. These green-brown algae produce micrometric carbonate platelets called coccoliths, abundantly documented in the fossil record. However, their influence on the carbon cycle back in time is still elusive. During the Early Bajocian (Middle Jurassic, $\sim$-170 Ma) the coccolith-type nannofossil genus *Watznaueria* underwent significant diversification, rapidly becoming the major pelagic carbonate producers and so for 80 Ma. This diversification is synchronous with a δ^{13}C positive excursion recorded in the bulk carbonate from different localities in Europe suggesting a strong reorganization of the carbon cycle. This work tests the hypothesis of a causal link between the diversification of *Watznaueria* and the positive δ^{13}C excursion. We have chosen as support for our test the Early Bajocian section of Cabo Mondego (Portugal), a carbonate-rich outcrop that is the GSSP of the Aalenian/Bajocian boundary. By coupling quantification of absolute abundance of coccoliths, biometrical analysis and isotope geochemistry, we show that the global pelagic carbonate production increased by 15% during the Early Bajocian. Conversely, we calculated the δ^{13}C values of the four main carbonate producers – i.e. coccoliths $s.l$, *Watznaueria* spp., *Schizosphaerella* (*incertae sedis*) and unidentified carbonate – by least square regression of a simple mass balance calculation. Our results suggest that both the diversification of *Watznaueria*gnd the increase in pelagic carbonate production cannot account for the positivegδ^{13}C excursion recorded in bulk carbonate.