Morphometric analyses of *Eprolithus floralis* from Oceanic Anoxic Event 2 in the Eastbourne section

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Oceanic Anoxic Event 2 (OAE2) (Cenomanian/Turonian boundary interval, CTBI; ~94 Ma) is regarded as one of the most extreme paleoenvironmental stressors that is characterized by global warming, accelerated hydrological cycle, enhanced production and burial of organic matter, very high concentrations of volcanically produced CO_2, and altered chemistry and structure of the oceans. During OAE2, calcareous nannoplankton were forced to face anomalous oceanographic and climatic conditions that induced both extinctions and originations, as well as changes in abundance and calcification patterns. Previous studies documented fluctuations in the size of a few taxa and specifically "dwarfism" of *Biscutum constans* at the core of the OAE2 perturbation.

The Eastbourne section is one of the reference records of OAE2 because of its completeness and high-resolution chronostratigraphic framework. This section has one of the thickest CTBI records in the Anglo-Paris Basin and consists of epicontinental pelagic deposits of the English Chalk. A large, high-resolution, multiproxy dataset reveals an interval of cooling, a phenomenon known as the Plenus Cold Event, during OAE2. We performed abundance and morphometric analyses of *Eprolithus floralis* on 44 samples from the Eastbourne section to assess its adaptation to varying paleotemperatures and ocean chemistry, particularly at the onset of OAE2, across the Plenus Cold Event, and during the recovery phase after OAE2.

The results show an increase in relative abundance of *E. floralis* from the base section, reaching highest values within the OAE2 stratigraphic interval, and decreasing after it. Morphometric analyses revealed larger total diameter and dominance of specimens with rays with a spiky outline before and after OAE2, whereas within OAE2, specimens with smaller total diameter and rays with a rounded outline are dominant (~70%). The diaphragm average diameter shows relatively lower values before and after OAE2, whereas larger dimensions are registered during OAE2, except for the chemostratigraphic peak B, which is characterized by *E. floralis* specimens with the smallest diaphragm diameter of the section. The total diameter displays an ~7% and 10% reduction within OAE2 relative to the intervals preceding and following the perturbation, respectively. Conversely, the diaphragm increases by ~1.3% during OAE2, although a minimum occurs during the chemostratigraphic peak B coeval with the total diameter minimum.

Our findings indicate that although *E. floralis* is usually interpreted as a cold-water species, its abundance and morphometric fluctuations are unrelated to temperature fluctuations across OAE2. It is worth noting that the size fluctuations of *E. floralis* can be correlated with those documented for *B. constans* and, in particular, a synchronous minimum size is detected for both taxa in correspondence to the chemostratigraphic peak B, which is considered the interval of greatest environmental disturbance. This similarity suggests that the main environmental stressors affecting *B. constans* size during the early phase of OAE2 also influenced *E. floralis* morphometry.