

**Ichtnological analysis of lateral environmental heterogeneity within the Bonarelli
Level (uppermost Cenomanian) in the classical localities near Gubbio, Central
Apennines, Italy**

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ABSTRACT

Dark, pelagic sediments of the uppermost Cenomanian Bonarelli Level (OAE2 event) interval, in two classical sections Contessa and Bottaccione in the Central Apennines, contain unbioturbated and bioturbated beds suggesting fluctuations in pore water oxygenation from anoxic to oxic or dysoxic conditions. The oxic and dysoxic improvement events prior to, during, and after the event are marked by biogenic structures showing an increase in the diversity of the trace fossils (*Chondrites*, *Planolites*, *Thalassinoides*, *Trichichnus*, and *Zoophycos*) from none to five ichnotaxa in individual beds. The number of anoxic events differs in the Contessa and Bottaccione sections, even though they are only 2.5 km apart. Comparison with sections from the Carpathians (Poland) and the Betic Cordillera (Spain), reveals that minor anoxic events below and above the Bonarelli Level are absent in the studied Apennine sections. Moreover, the diversity and density of trace fossils in the Apennine sections are lower than those from other studied sections in the Tethys, most likely indicating a comparatively lower availability of food in the Gubbio area as a result of its paleogeographic location. The preservation of trace fossils, controlled by the consistency of sediments and diagenetic processes, can mask diversity and density in some beds.