

Oceanic Anoxic Events in the Tethyan region

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The Cretaceous sediments distributed in the southern France recorded the mid-Cretaceous Oceanic Anoxic Events (OAE) that are named as the Goguel, Fallot, Jacob, Kilian, Paquier, Leenhardt, Brestroffer, Thomel in ascending order. Among them, the Paquire event is correlated with the OAE 1b event that occurred between the Aptian/Albian boundary. The total thickness of black shales of the Paquire event is about 250 cm and the continuous laminated layers are about 170cm in thickness. Three lithological layers of strongly laminated, faint laminated and massive are recognized within the Paquire shales from a degree of development and preservation of laminations. We divide into six lithological subunits using associations of these three lithological characteristics. The total duration of major black shale event is estimated to 40-50 kyr.. The duration of each subunit ranges from 1.1 to 12.9 kyr.. The laminations of black shales consist of alternating layers of microfossils and black amorphous organic matters.

High-resolution sedimentological, micropaleontological and geochemical records (1-cm-interval) are presented for the Paquire black shales. Total abundance of planktic foraminifera is extremely high in the laminated layers, and decreases within massive layers. Nannofossil abundance decreases from massive mudstone within the Paquire interval. However, nannoconids (*Nannoconus* spp.) bloomed within the laminated layers. Radiolarians, plant fragments and quartz grains are abundant within the laminated layers, particularly basal part of each unit, suggesting the riverine input from epicontinental areas. Organic carbon isotope fluctuations represent no large excursion rather than other OAE events (OAE1a and OAE2). These features are very similar to those of the Plio-Pleistocene sapropels, implying surface productivity model could be applicable to the Paquire black shales. However, nannofossils and dinoflagellate decrease within the black shales. A primary producer that supported high productivity of zooplankton may change from these taxa to other algae or bacterias (for example, non thermophilic archaea or cyanobacteria).