BIOTIC CRISIS AND RED TIDES AT THE CENOMANIAN/TURONIAN AND CRETACEOUS/TERTIARY BOUNDARY

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Anoxic events are correlated with the Cenomanian/Turonian boundary and with the accumulation of so-called black shales, black band or sediments rich in organic matter (OM). What are the reasons for this event and the biotic crisis at this boundary?

The occurence of short-time transgressions and lake/bog landscapes during the previous sea-level lowstand supplied a considerable amount of plant material to the ocean basins. The input of dissolved biophile elements contributed to the "explosion" of zoo- and especially phytoplankton. This process promoted the formation of layers rich in organic matter. The predominance of pelagic or terrestrial OM depended on the sedimentological conditions in the specific basins. In some cases both types of organic matter are present. The abundance in OM resulted in the absence of oxidizing conditions in the upper part of the sediments and promoted chemical elements and their compounds (heavy metals) to penetrate into the upper part of the sediments. Toxic elements were accumulating in the sediments containing a great quantity of OM and H_2S appeared. These factors exerted the most important influence on the distribution of benthic fauna - only chondrites and some deep-water fishes appear. No benthic foraminifera (BF) and only very rare cosmopolitic forms such as *Lenticilina* or primitive agglutinated forms occur in the black shales at the Cenomanian/Turonian boundary. At the same time many planktonic foraminifers (PF), especially highly specialised taxa (*Rotalipora*, *Thalmanninella)* disappear. The disappearance of these forms can only be explained by processes in the euphotic zone. The disturbance of the whole bios structure was correlated with processes in the upper layers of the oceanic water masses. By the way, the death rate of marine invertebrates - ammonites, belemnites, echinids - at the Cenomanian/Turonian boundary is between 5.2% and 6.1% (Raup & Sepkoski 1982, Alekseev, 1989). The Cenomanian/Turonian anoxic event and the extinction of different groups of organisms can be explained by a phenomenon similiar to the modern "red tides". THis is a time of intensive Bloom of some groups of phyto- and bacterioplanktonic species. The bioproduction of these organisms was increased by the large quantity of variuos biophile elements, especially phosphor. In the "sluggish" Cretaceous ocean the red tides could cover grater surfaces and be longer compared to the modern ocean. (Naidin et al. 1986). The phenomenon of "red tides" can probably also explain the extinction of planktonic biota at the Cretaceous/Tertiary boundary. A more active hydrodynamic situation just above the bottom did not contribute to the accumulation of so-called black shales. The phenomenon similar t the "red tides" lasted tens of thousand years and spread over the world ocean from boreal to tethys regions. It caused a diminuation of the reproduction of zoo- and phytoplankton with the carbonate shells. This event is reflected in a sharp deacrease of the carbonate accumulation and in the formation of "boundary clays" or hardgrounds at the Cretaceous/Tertiary boundary. Late Creatceous foraminifers did not survive this stressing event. Only primitive species remained resembling their Jurassic ancestors.

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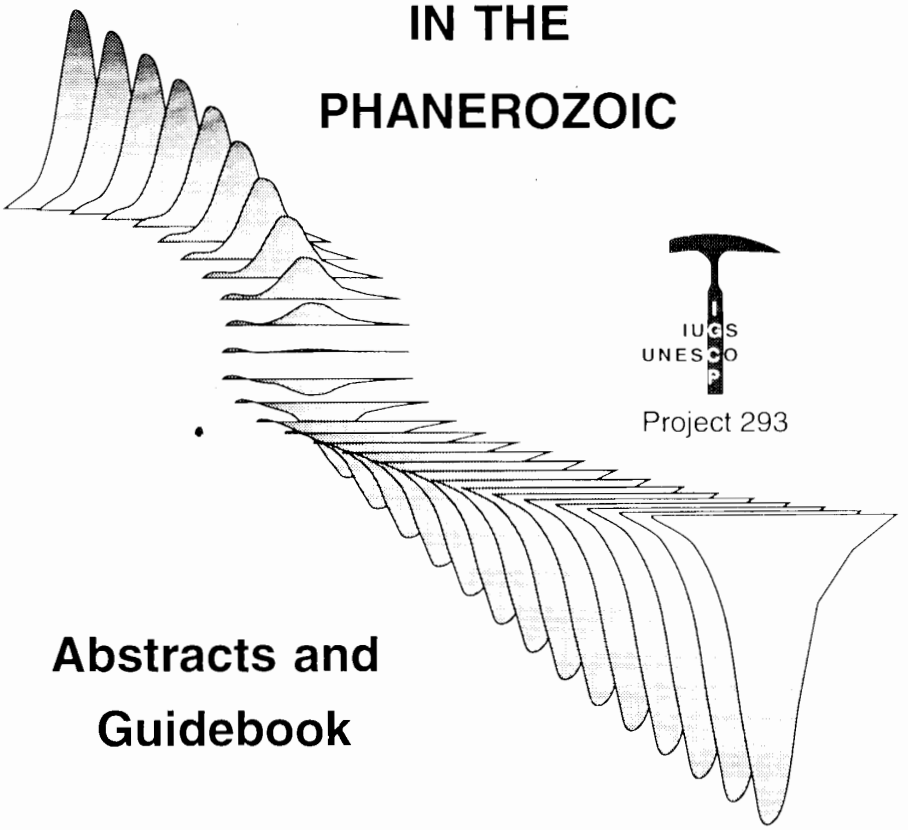

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