

MID-CRETACEOUS ANOXIC EVENTS IN THE EASTERN CAUCASUS, RUSSIA

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The mid-Cretaceous time interval was characterized by occurrence of a number of Oceanic Anoxic Events (OAEs). They were accompanied by vigorous perturbations in the global carbon cycle, oceanic hydrological regime, chemical and nutrient composition of the water. These changes significantly affected marine biota that caused sedimentary variations manifested in wide occurrence of the TOC-rich sediments.

In the mid-Cretaceous (Aptian-Turonian) succession of the NE Perithetys, a sequence of sediments rich in TOC occurs which might be the display of different episodes of OAEs. Aimaki section (Dagestan, E Caucasus) shows a continuous sedimentary succession with gradual transition from terrigenous Barremian sediments to Turonian limestones. The most part of Aptian sequence is made up of claystones (TOC <1%, Ca CO₃ <5%) with sandy and siltstone interbeds. In the upper part of the sequence, CaCO₃ content increases up to 20-35% and various nannofossil assemblage of NC7C zone with significant part of eutrophic (*Zeugrhabdotus erectus*, *Z. diplogrammus*) and warm-water (*Rhagodiscus* spp.) species appear. A single 0.5 m thick bed rich in TOC (3-4%) evidently corresponded to OAE1b Jacob Level occurs in the uppermost part of this interval. Upsection, a short hiatus (NC8A and base of NC8B) is marked by interlayer with reworked macrofaunal

detritus. Aptian/Albian transition corresponds to substantial change in sedimentary regime. The Albian sequence (55 m) represents rhythmic alteration of dark marls (CaCO_3 up to 50%, several decimeters to several meters thick) and compact pale limestones (0.1-0.4 m). The interval of NC8C-NC9 zones contains two black shale layers (TOC 2-6%) in which higher content of *Braarudosphaera regularis* and eutrophic *Biscutum* spp. is marked. Another two black shale layers (TOC 2.8 and 2.1%) occur in the base and top of upper Albian NC10A subzone. They evidently correspond to OAE1c and OAE1d.

The Albian/Cenomanian transition is marked by sharp increase in frequency and thickness of limestone beds. Cenomanian sequence (~80 m, NC10B-NC12) is characterized by higher CaCO_3 content (up to 70-80%) of the dark beds. Generally, TOC content is low, but increases in discrete beds up to 2-3%. Higher *Biscutum* concentrations remain in the dark beds. The Cenomanian/Turonian boundary transition has non-homogenous structure: TOC fluctuates from 0.8 to 8% in different parts of the dark grey to black bed, 1 m thick. Thin lamination, fish scales, and abundant pyrite concretions are featured for this bed. Significant values of siliceous material (radiolarians?) appear in the embedded sediments. Below the black shale, boreal species *Rucinolithus terebrodentarius* is found in remarkable amount, although it was absolutely absent in the underlying sequences. At the same time, usually frequent *Rhagodiscus* spp. sharply decrease in content. Possibly, it could be evidence of occurrence of the connection to Boreal realm. The mid-Cretaceous deposits are culminated by 40 m thick Turonian limestones which get red color at the upper part.

The general geochemical feature of the studied black shales is higher concentrations of the V, Ni, Co, Mo, Se, S, a.o., while Mn values decrease.

Evidently, the mid-Cretaceous succession of the E Caucasus comprises both global and regional anoxic events that were caused by specific character of relatively shallow eutrophic basin.