

Episodes of anoxic ferruginous conditions in the Coniacian–Campanian on the Eastern Russian Platform

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OAE 3 was identified as a long-time event in the organic-rich Coniacian–Santonian successions of the low- to mid-latitude part of the Atlantic, the Maracaibo Basin, and the Western Interior Basin (WAGREICH, 2012). At the same time, most of the Tethys was characterized by oxic deep-water conditions and the deposition of red to brownish or light grey deep water sediments (WAGREICH, 2012). During the Late Cretaceous the Boreal basin on the Eastern Russian Platform has been a part of the North-Eastern Peri-Tethys which was connected with the Turonian Platform by the Turgai strait and with the West Siberian Basin by a system of small Uralian straits (BARABOSHKIN et al., 2003). Mainly carbonate sedimentation prevailed but at times siliceous sedimentation dominated in the basin.

The Coniacian–Campanian succession has been studied in the western part of the Uljanovsk-Saratov meridional depression by XRD, SEM, microprobe, and geochemical analyses. The Coniacian and Lower Santonian deposits are presented mostly by light gray carbonate gaizes and dark gray zeolitic clays, the Campanian consists dominantly of light gray marls. The section was divided into biostratigraphical zones (OLFER'EV et al., 2008) and correlated with the GTS 2012 (GRADSTEIN et al., 2012). XRD analysis of the Coniacian light greenish-gray siliceous clays revealed essential quantities of siderite and haematite (1–2 %), besides main rock-forming components (illite, smectite, opal-CT, calcite, etc.). Lower Campanian light gray calcareous gaizes contain siderite (2 %) as well. SEM studies revealed that highly calcareous, clayey, and siliceous sediments are rich in spherical and octahedral bacteria-like structures composed of siderite. There is also strong geochemical evidence for episodic anoxic ferruginous conditions (CLARKSON et al., 2016) in the Coniacian and Early Campanian in contrast the general oxic conditions during the Coniacian–early Santonian and Campanian. Two intervals characterized by elevated values of siderite and hematite which consist of a highly reacted Fe, and negative anomalies of $\delta^{13}\text{C}_{\text{bulk}}$ demonstrate that anoxic intervals on the Eastern Russian Platform were ferruginous, with no evidence for the pyrite enrichments that would be prevalent under euxinic conditions (CLARKSON et al., 2016). Remarkably, there are no black shales in the section.

Consequently, we infer at least two short-lived ferruginous episodes in the Coniacian and Lower Campanian on the Eastern Russian Platform which could probably correspond with OAE 3 or another unexplored anoxic event.

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