XIIth Jurassica Conference

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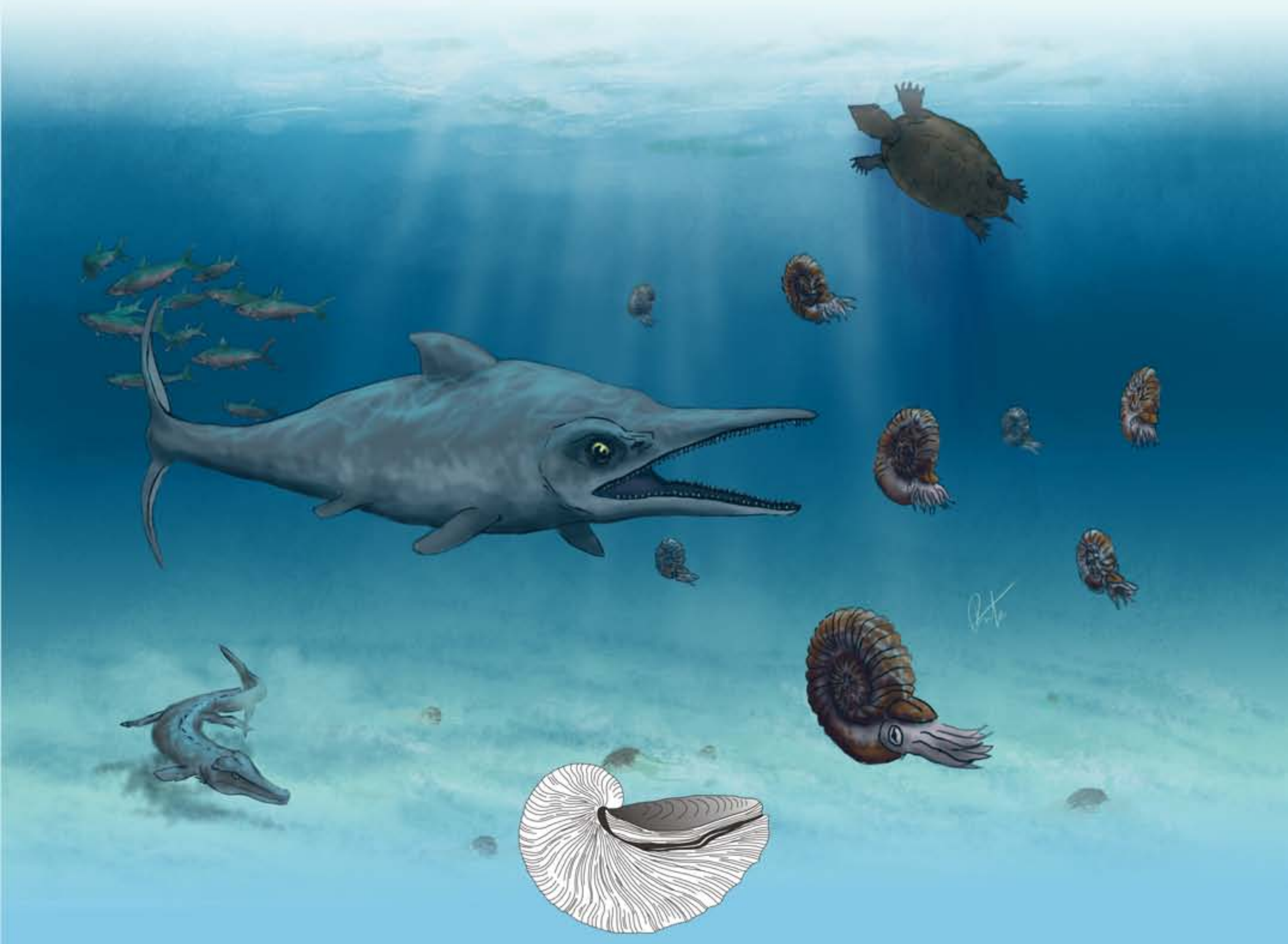
Field Trip Guide and Abstracts Book



Smolenice, Slovakia, April 19–23, 2016

Earth Science Institute, Slovak Academy of Sciences
Bratislava
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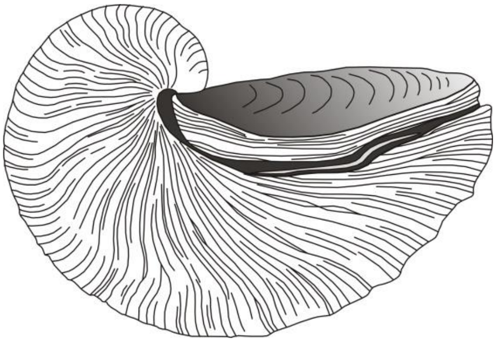

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Organic carbon-rich shales within coarse-grained lithofacies of Jurassic–Cretaceous transition at the Russian Platform

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Organic carbon-rich shale, intercalating with sandy sediment are uncommon and can not be explained by traditional models, based on anoxia appearance. In the Central Russia very thin but extremely carbon-rich shale horizons are present within shallow-water coarse-grain Middle Volgian – Ryazanian sequence (6-7 m). This transitional Jurassic–Cretaceous interval is quite representative in Mar'evka and Kashpir sections, located in Ul'anovsk and Samara regions (Rogov et al., 2015).

In both sections the sequence is built of fine-grained sandstone lithofacies, commonly muddy and containing glauconite or siliceous sponge spicules. The dominance of the components is observed at the certain intervals, so glauconitic sandstone composes Middle Volgian Virgatus and Nikitini Zones, while spiculites and gaize-like glauconite-quartzose sandstone, cemented with chalcedony or calcite, are common within Upper Volgian and Ryazanian intervals. Lamination is not well preserved in the sandstone due to bioturbation, but incomplete mixing of constituents, observed in thin sections, apparently point to it. Numerous levels of reworked phosphorites, belemnites or shells condensation are the typical for the sequence. The deposition of upper Middle Volgian – Ryazanian lithofacies took place in the nearshore shelf environments, below fair-weather wave base, but storm currents were the important processes. The low thickness of stratigraphical units (from 0,3-0,5 to 1,5-2 м for the one Zone), combined with almost complete ammonite record, indicates a strong stratigraphical and sedimentological condensation, caused by general siliciclastic starvation and partial removing of sediment during a hydrodynamic events.

Two distinct black shale horizons were found within the sequence. The lower one is about 2-5 cm in thickness, located in glauconitic sandstone of Mar'evka section and corresponded to Nikitini Zone. The thicker black shale horizon (10-12 cm), enriched in silica components (spicules and, probably, radiolarians) is lying within gaize-like sandstone at the base of Ryazanyan interval, detected in Kashpir section. Previously it has been suggested as of fresh-water origin (Braduchan et al., 1989), however, occurrence of ammonites (but quite rare) clearly point to marine environments.

Both shale horizons have sharp bases, and its tops are deeply truncated by Planolites burrows, filled by sandy material. Such characteristics are indicative for breaks in sedimentation with a possible removal of sediment. This is consistent with limited lateral extension of studied black shale horizons and its pinching at relatively close distance. However, the presence of similar sandstone above and below of the black shales, as well as a distinct contamination of shale tops by scattered sandy material, suggest that a nearshore deposition of coarse-grained material continued to be a background.

Rock-Eval parameters of black shale are quite similar and show a low maturity and high source potential (Tab. 1).

In terms of sequence stratigraphy, the models of transgressive black shale (BT) and black shale at the maximum flooding (MT) are commonly involved (Wignall, 1991; Wignall and Newton, 2001, Tyson, 2005, etc.). Testifying them for the coarse-grained sequence of Jurassic–Cretaceous transition, its limited applicability can be concluded. The improved transgressive model, exclusively proposed for nearshore black shale varieties (TN), based on case study of Kimmeridgian-Tithonian sandy sequence in Buolonnais, northern France (Wignall, Newton, 2001) seems to be more appropriate.

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Sample	S1	S2	Tmax	HI	OI	TOC
Black shale of Nikitini Zone in Mar’evka – lower	4.01	184.33	402	444	58	41.53
–upper	1.38	78.74	406	399	56	19.72
Black shale at the base of Ryazanian interval in Kashpir section – lower	1.66	46.7	421	278	132	16.81
–upper	0.86	14.39	422	163	159	8.8

Tab. 1. Rock-Eval parameters of black shale.

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Time averaging of Holocene cephalopod assemblages in condensed sediments and implications for the fossil record

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Shells of chambered cephalopods tend to be prone to significant postmortem transport and biostratigraphic condensation. However, direct estimates of spatial and temporal resolution of death and fossil cephalopod assemblages are absent. We show that amino acid racemization they are time-averaged at centennial scales in bathyal environments characterized by extremely reduced sedimentation rates off New Caledonia. The few shells that are thousands of years old are represented by highly degraded relicts. Therefore, although temporal resolution of nautiloid assemblages is too coarse for fine-scale paleoecological analyses, it is sufficiently high relative to the time scale of cephalopod evolutionary turnover. Dead shells occur in sediments at water depths (300 to 400 m) that are close to