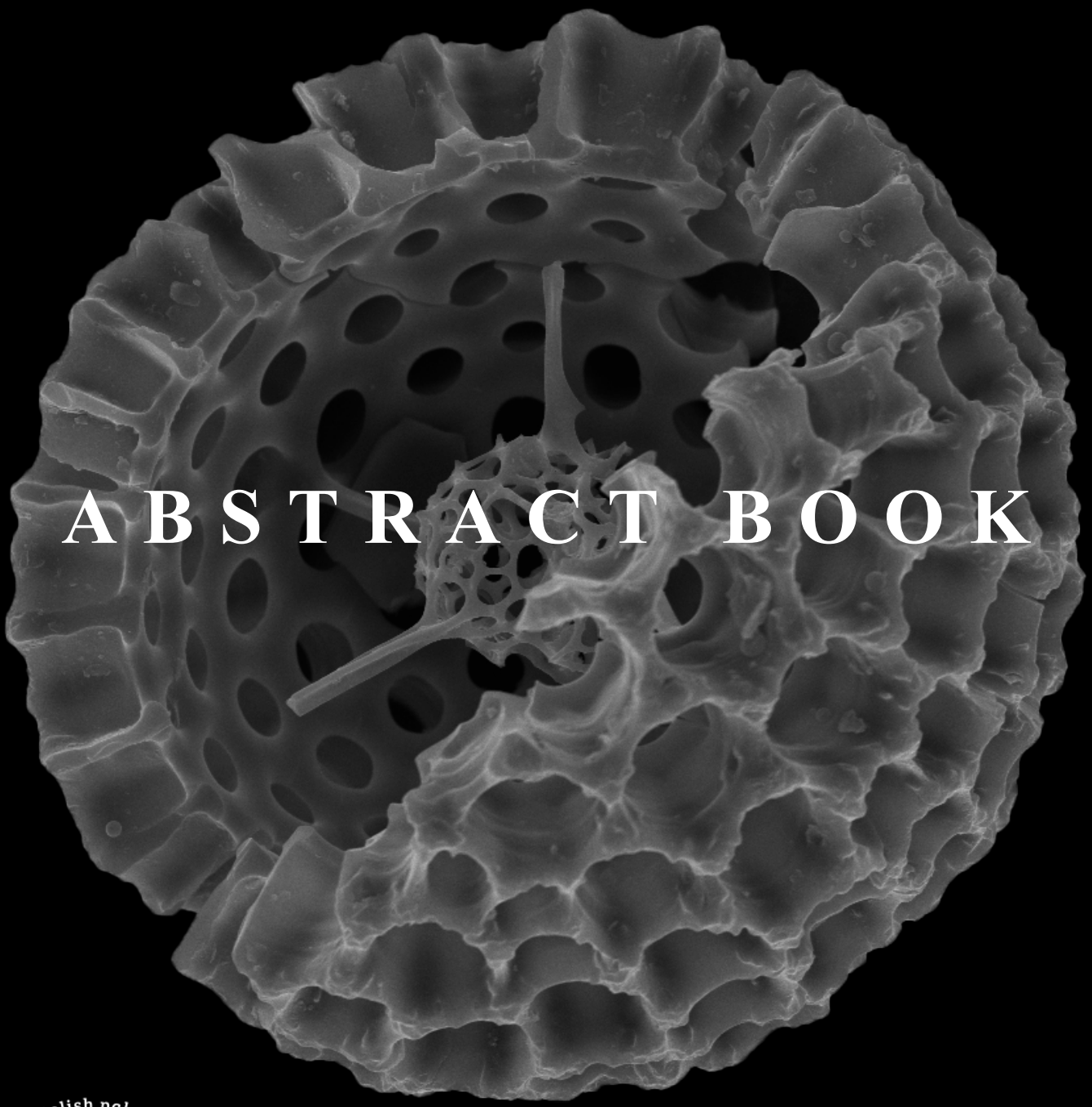
23rd Czech – Slovak – Polish Paleontological Conference
Banská Bystrica, Slovakia

October 15 –17, 2024



ABSTRACT BOOK

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Multi-instrumental methods reveal mystery of uniquely preserved Upper Cretaceous marine macrofossils from Northern Siberia

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An exceptionally well-preserved macrofossils from the Cenomanian through the Coniacian strata of Northern Siberia (Turgai Strait) are known since 70´s of the last century (Naidin et al. 1978). New expeditions between 2021–2023 collected new, unique and extensive material which is currently under investigation (Zverkov et al. 2023; Mironenko et al. 2024; Rogov et al. 2024; Kočová Veselská et al. submitted). The investigated material yields vertebrate remains, crustaceans, echinoids, ammonites, belemnites, bivalves, and gastropods from 3 fossiliferous areas (Nizhnyaya Agapa, Yangoda and Ikon rivers located N from Norilsk). All fossil groups possess original biominerals that are not and/or only very slightly diagenetically overprinted.

Uniquely preserved macrofauna have been studied by various geochemical methods to fully understand the biomineral composition and its potential for further investigations and palaeoenvironmental reconstruction. The Micro-CT technique has proved 3D preservation with original components that are usually very poorly preserved. Raman spectroscopy, PXRD and SEM were used to characterise the biominerals, and UV fluorescence was used to determine the amount of organic matter. Elemental composition was detected by point analysis and mapping using XRF, WDS (EMPA), LA-ICP-MS and ICP-OES methods. Stable isotopes of oxygen and carbon were analysed by a MAT253 gas isotope ratio mass spectrometer coupled to a Kiel IV and a Gasbench II connected to a Delta V Plus mass spectrometer. Strontium isotope data were obtained using a Triton Plus TIMS instrument.

Results from these biological archives (especially $\delta^{13}C$, $\delta^{18}O$, $^{87}Sr/^{86}Sr$) are used for global stratigraphic correlations. Detailed geochemical investigation showed that the unique preservation of fossils in carbonate concretions is also linked to hydrocarbon seeps eliminating stronger diagenetic overprint.

Acknowledgements: The research was supported by bilateral project GAČR No. 21-30418J and RFBR 20-55-26006.

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