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# BOOK OF ABSTRACTS



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## The Neoproterozoic Uk Formation in the South Urals: organic geochemistry of a stromatolite reef complex

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The Neoproterozoic Uk Formation, which is widespread in South Urals, consists of the lower siliciclastic member and the upper carbonate member comprising large stromatolite reefs and associated bioclastic material and calcareous shales. Strontium isotope ratio in carbonates suggests that the Uk Formation is older than 720 Ma (Maslov et al., 2019), which is corroborated by presence of “molar tooth” structures in the carbonate rocks (Kuang, Hu, 2014; Maslov et al., 2019).

The organic matter (OM) from the upper Uk member was investigated. The analysed samples include stromatolites (5), biolaminitic limestones (2), intraclastic limestone (1) and calcareous shales (1). The total organic carbon content (TOC) is 0.01–0.05% for carbonates and 0.14% for calcareous shales. The bitumen content (bchl) and bitumen coefficient ( $100 \times \text{bchl} / (1.33 \times \text{TOC})$ ) average 0.001% and 4.9%, respectively. The bitumen mixture composition includes: saturated hydrocarbons (HCs) (19–26%); aromatic HCs (4–15%); resins and asphaltenes (64–75%). Saturated HCs were analysed using gas-liquid chromatography and gas chromatography-mass spectrometry. The chromatograms exhibit humps of an unresolved complex mixture of organic compounds, which is characteristic of Neoproterozoic dispersed OM (Peters et al., 2005).

The n-alkanes distribution pattern shows maximum at n-C17 and the presence of series of 12- and 13-mono-methyl alkanes. The pristane/phytane (Pr/Ph) ratio is 0.7–1.2. The identified steranes are: cholestane C27, ergostane C28, stigmastane C29, with their ratios averaging 35%; 26%; and 39%, respectively. The values of sterane ratios are: C29 aa 20S/(20S+R) = 0.4, C29 bb/(aa+bb) = 0.44. The diasteranes/regular steranes ratio is 0.26–0.31 irrespective of the rock composition. Cheilantanes, hopanes and homohopanes, moretanes were detected among terpanes. The determined ratios are: trisnorneohopane to trisnorhopane (Ts/Tm) (around 1.0); C35/C34 homohopanes (0.8–0.9); steranes (C27-C29)/hopanes (C27-C35) (0.5–0.6).

The values of Ts/Tm and sterane C29 aa 20S/(20S+R) ratios point to thermal maturity of the OM corresponding to “oil window” (Petrov, 1984; Peters et al., 2005). This enables more accurate interpretation of the biomarkers composition. The Pr/Ph and C35/C34 ratios indicate a lack of water column stratification and hydrogen sulfide contamination of bottom waters, along with the suboxic conditions developed in the Uk marine basin. The presence of hopanes, isoprenoids, methyl branched alkanes and steranes suggests the coexistence of both eukaryotic and prokaryotic communities in this sedimentary environment (Peters et al., 2005). The sterane/hopane ratio is higher than in other pre-Cryogenian formations (Hussar, Wallara, Johnny’s Creek, etc.) (Brocks et al., 2017), which may be indicative of the relative abundance of eukaryotes in the Uk marine basin. This hypothesis is corroborated by the presence of stigmastane and high concentrations of cheilantanes.

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