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ABSTRACT

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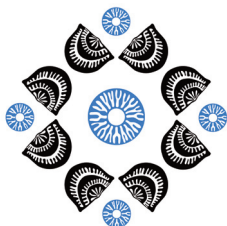
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Corresponding author:

Jana Bruthansová
jana.bruthansova@nm.cz

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Subway into the Ordovician (Prague Basin, Czech Republic)

Jana Bruthansová^a, Petr Kraft^{b,c} and Jiří Bruthans^d

- ^a Department of Palaeontology, National Museum, Cirkusová 1740, 19300 Prague 9, Czech Republic
^b Institute of Geology and Palaeontology, Faculty of Science, Charles University, Albertov 6, 12843 Prague 2, Czech Republic
^c West Bohemian Museum in Plzeň, Kopeckého sady 2, 30100 Plzeň, Czech Republic
^d Department of Hydrogeology, Engineering Geology and Applied Geophysics, Faculty of Science, Charles University, Albertov 6, 12843 Prague 2, Czech Republic

In the Late Ordovician, the Prague Basin was located at the high-latitude northwestern shelf of Gondwana. This period was characterised by profound environmental changes and ended by one of the most severe mass extinctions, which was caused by climatic changes. Although the end-Ordovician extinction is closely related to the Hirnantian glaciation, biodiversity started to decrease already in the late Katian. Decrease in temperatures and sea level drop are the main factors that affected these biodiversity changes.

During the last years, construction of the new subway line D in Prague has provided a unique opportunity to study different aspects of the Upper Ordovician and Silurian of the Prague Basin. These tunnels have provided detailed information about the succession of fossil assemblages, facies variability and actual thicknesses of the upper Katian and Hirnantian formations (upper part of the Bohdalec, and entire Králův Dvůr and Kosov formations) in this part of the basin.

Our study is based on material and data from several sites. We studied drill cores from vertical boreholes drilled from the surface and also horizontal boreholes drilled from the tunnel faces. The richest material came from an interim storage of excavated material near pitheads. In total, almost 700 m of sections in the tunnels were investigated. As the preliminary geological exploration was carried out by various companies in connection with subway construction, intensive excavation and mining took place in several locations at the same time, and the frequency of our research activities and site visits were limited. Therefore, our palaeontological and stratigraphical research was focused mainly on the Bohdalec Formation (upper Katian). The succession is, however, tectonised, apparently incomplete, and repetition of some parts cannot be excluded. The actual thickness of the investigated part of the Bohdalec Formation excavated so far is slightly less than 140 m (December 2022). The unit is dominated by fine-grained siliciclastics (dark grey shales and siltstones), except for the Michle Facies in the uppermost part of the Bohdalec Formation. This facies consists of calcareous sandstones alternating with siltstones and thin shaly interbeds. The section is regarded to be deposited in an offshore setting below the storm wave base.

The Bohdalec Formation in the studied section is fossiliferous, and the abundance of fossils and composition of their associations are variable. Some subsections are typified by reduced fossil content. However, we also recorded several stratigraphical intervals (a few metres in thickness) with distinctly enriched fossil assemblages, notably with echinoderms, bryozoans, cnidarians, planktic graptolites, and sessile dendroid graptolites that are extremely rare anywhere else. Deposits of these specific intervals accumulated during gradual slowdown periods during the subsidence of the Prague Basin, which resulted in a decrease in the sedimentation rate and were followed by uplift, causing local shallowing. Also, global events, such as climatic and sea level fluctuations, influenced these changes of fauna and facies.