

LILLE 2021: Ordovican of the World



PROGRAMME WITH ABSTRACTS

2021 Virtual Annual Meeting of IGCP 653

International Geoscience Programme Project 653 The Onset of the Great Ordovician Biodiversification Event

2021 Virtual Annual Meeting of IGCP 735

International Geoscience Programme Project 735 Rocks and the Rise of Ordovician Life – Filling knowledge gaps in the Early Palaeozoic Biodiversification

Meeting of the Subcommission on Ordovician Stratigraphy



Lille University, Villeneuve d'Ascq, France September 13–16, 2021 The size and nature of the eruptions that generated the Deicke and Millbrig tephras point to an important inconsistency with any model having its presumptive tectonic setting based around an andesitic island arc volcanic system. In particular, the lack of an obvious silica-rich source for these massive Ordovician eruptions along a typical oceanic island arc is problematic. Our findings support a tectonic setting for the Laurentian margin during the late Ordovician that was analogous to a combination of select modern settings in the western Pacific and Indonesia, specifically (1) New Guinea, where mature quartz arenites occur in the foreland succession, and (2) Sumatra, where the enormous Toba caldera formed in association with subduction beneath the Cretaceous-aged continental crust of Sumatra.

The temporal and spatial proximity between the island arc system and the quartz-rich sandstone and conglomerates that were deposited contemporaneously with the K-bentonites originally generated as tephras from that island arc also requires an adequate explanation that accounts for the presence of thin and compositionally mature siliciclastics in the otherwise mud-rich redbed sequence. These coarser clastics provide evidence for appreciable chemical weathering that eliminated less robust grains like the feldspars, and of extensive transport across (and probably intermittent storage in) an extensive alluvial plain that transitioned from a predominantly fluvial/floodplain setting to a more marginal marine coastal plain setting. Weathering, transport, and deposition of these quartz-rich sandstones likely occurred in a humid and tropical climate, suggesting the possibility that some component – possibly an appreciable one – is comprised of first-cycle quartz arenite sand.

Keywords: Blountian tectophase, K-bentonite, U-Pb geochronology

Latest Ordovician to early Silurian integrated bio- and chemostratigraphy in northern Lithuania, central East Baltic

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Abstract

The late Katian, Hirnantian and Rhuddanian carbonate succession of Baltoscandia has often served as a global reference. However, time correlations are still being debated in the region, and basin-wide patterns in geochemistry and biodiversity are not well resolved across the Ordovician–Silurian boundary. Here we studied the Likėnai 396 drill core from northern Lithuania in order to provide a late Ordovician to early Silurian bio- and chemostratigraphic reference section for the central East Baltic region, and to assess spatial variability of recorded events and fossil communities. Our primary focus was on the Hirnantian carbon isotopic event (HICE) interval as well as the smaller-amplitude late Katian Parovėja carbon isotopic excursion. The latter occurs within the Parovėja Fm., for which the Likėnai section serves as neostratotype. The Katian to Aeronian part of the section was sampled for paired

carbonate and organic matter carbon isotopes, other geochemical proxies and four groups of microfossils: chitinozoans, conodonts, ostracods and scolecodonts.

The $\delta^{13}C_{\text{carb}}$ data revealed a prominent HICE with a long falling limb, and distinct Moe and Parovėja excursions. The $\delta^{13}C_{org}$ records show a somewhat different pattern, with less prominent and stratigraphically shorter HICE, no expression of the Paroveja event, but positive excursions before it and higher up in the Silurian Remte Fm. The microfossil study revealed altogether more than 180 taxa, including the key species of chitinozoans, conodonts and ostracods. The late Katian C. rugata Chitinozoan Biozone corresponds to the basal part of the Paroveja Fm., the S. taugourdeaui and C. scabra biozones are identified in the Kuldiga and Saldus formations, and the Stačiūnai Fm. is characterized by the S. fragilis and B. postrobusta zones. Index conodonts are rare, but include A. ordovicicus and ?Noixodontus sp. The ostracod fauna comprises typical elements known from the Katian and Hirnantian of Baltoscandia, with an abrupt turnover within the Kuldiga Fm. where the H. harparum fauna appears. Scolecodonts revealed a rich polychaete fauna in the Kuldiga and Saldus formations, very similar to that reported previously from the Hirnantian of Estonia and Latvia. The new data allow integrating four microfossil groups and geochemical proxies for the first time and allow the assessment of origins of geo- and bioevents at the Ordovician-Silurian boundary interval in East Baltic.

Keywords: Hirnantian, Baltoscandia, end-Ordovician extinction, integrated stratigraphy, microfossils

Life habits of Ordovician infaunal lingulids – A Baltic perspective

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Abstract

In the Ordovician of Estonia infaunal lingulids (assigned to *Pseudolingula* in a wide sense) are not uncommon in assumed vertical life positions. In the carbonate rocks of Uhaku and Vormsi stages, lingulids occur within deep vase-shaped trace fossils, broadly similar to *Gastrochaenolites*. The *Gastrochaenolites*-like trace fossils from the Uhaku Stage are strongly phosphatized, whereas the Vormsi Stage traces are less well defined. Well-documented records of lingulid brachiopods preserved in life position have previously been described from Ordovician and younger deposits, but these are the first known *in situ* occurrence of lingulids were responsible for producing the vase-shaped trace fossil, and they most likely settled within an existing trace, produced by another organism. If active burrowing was at all involved, it was most likely performed with the pedicle oriented downward into the soft sediment filling the pre-existing depressions. Lingulids preserved