

Zooming in on the GOBE

2020 Virtual Annual Meeting of IGCP 653

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

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Ordovician Bioerosion Revolution on Baltica

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Macroboring organisms have evolved and changed through the Phanerozoic. The major rise in the diversity of macroboring ichnofossils took place during the Middle and Late Ordovician. When the term "Ordovician Bioerosion Revolution" was coined by Wilson and Palmer in 2006, seven bioerosional ichnogenera were listed from the Ordovician. A decade later 11 Ordovician bioerosional ichnogenera were reported by Mángano and co-authors. The Ordovician succession of the Baltic region, however, hosts no less than 13 macroboring ichnogenera: *Trypanites*, *Oichnus*, *Tremichnus*, *Gastrochaenolites*, *Sulcolithos*, *Pinaceocladichnus*, *Dendrina*, *Sanctum*, *Osprioneides*, *Petroxestes*, *Bicrescomanducator*, *Rogerella*, and *Entobia*. Moreover, several undescribed macroborings, different bite marks, as well as microborings have been recovered from the Baltic Ordovician in recent years. It is noteworthy that the oldest representatives of eight bioerosional ichnogenera come from Baltoscandia. The earliest bioerosional traces in the Baltic region – *Trypanites* and *Oichnus* – appeared in the Cambrian. Carbonate sedimentation commenced during latest Floian in the region, and bioerosional traces *Trypanites* and *Gastrochaenolites* appear below the Early/Middle Ordovician boundary. A rich assemblage of macrobioerosional traces occur on Dapingian hardgrounds, consisting of *Trypanites*, *Gastrochaenolites* and *Sulcolithus*. Also, the tracemaker of *Balanoglossites* demonstrated the ability to bioerode. Only few Dapingian finds, assigned to *Tremichnus* and *Pinaceocladichnus*, are related to biogenic substrates. In the Darriwilian, three new ichnogenera associated with biogenic substrates appeared: *Sanctum*, *Bicrescomanducator* and *Dendrina*. From the Sandbian, already eight ichnogenera are known and six have been recorded from the Katian. The majority of Upper Ordovician bioerosional ichnogenera in the Baltic region are related to various shelly fossils. *Trypanites* is an exception to this occurring in both organic and inorganic substrates.

Mikuláš and Dronov (2004) expressed the opinion that the Baltic region was the birthplace of bioerosion. Our data corroborate to this idea and show that the Ordovician Bioerosion Revolution might have begun in Baltica. The rapid diversification of bioerosional traces in the region was probably a coincidence of multiple global and regional factors. The major global factors were the seawater chemistry and oxygenation, stability of the sea level and increasing phytoplankton availability. The main regional drivers supporting the diversity of bioerosional organisms were the unusually long "colonisation window", a warming climate and a nutrient-rich, well-oxygenated epeiric sea.

References:

Mikuláš R., Dronov, A. V. 2004. Early Ordovician of the Baltic Region: a birthplace of modern bioerosion and complex ichnofabrics? *Ichnia 2004. Abstract book – First International Congress on Ichnology, Trelew*, 57–58.