Conodonts in Silurian hypersaline environments: Specialized and unexpectedly diverse

Emilia Jarochowska (1), Viive Viira (2), Rein Einasto (3), Rafał Nawrot (4), Oskar Bremer (5), Peep Männik (2), and Axel Munnecke (1)

(1) GeoZentrum Nordbayern, Erlangen, Germany (emilia.jarochowska@fau.de), (2) Institute of Geology, Tallinn University of Technology, Ehitajate tee 5, Tallinn 19086, Estonia, (3) Tallinn University of Applied Sciences, Pärnu mnt 62, Tallinn 10135, Estonia, (4) Department of Paleontology, University of Vienna, Althanstr. 14, Vienna 1090, Austria, (5) Department of Organismal Biology, Uppsala University, Norbyvägen 18A, Uppsala, 75236, Sweden

Hypersaline marginal-marine settings are commonly assumed to be characterized by low-diversity, high-dominance faunas. They are consequently unattractive for most paleontologists and undersampled. However, in early Paleozoic marine ecosystems, in which conodonts were the most diverse nektonic organisms, beta diversity increased towards the lagoonal end of the onshore-offshore gradient. We present autochthonous conodont fauna from evaporite-bearing horizons from the middle Silurian of Estonia. Based on a global compilation of coeval conodont assemblages, we show that marginal-marine, periodically emergent environments were characterized by higher conodont diversity than open-marine shallow settings. This diversity is due to a high number of species occurring in these environments only. The high degree of specialization is also reflected by the highest within-habitat variability (β diversity) in marginal settings. Evidence of in situ conodont occurrence along with evaporitic minerals indicates their efficient osmoregulation.

Our findings reveal an unappreciated diversity in Silurian marginal-marine environments. We provide a quantitative estimate that 15% of total conodont diversity in the middle Silurian is concealed by sampling bias against this type of settings.