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ABSTRACT

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Global palaeogeographical implication of acritarchs in the Upper Ordovician

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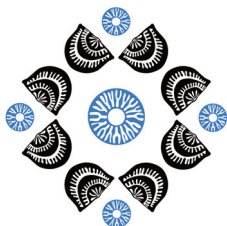
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The Early–Middle Ordovician peri-Gondwana and Baltica acritarch provinces are easily recognizable, illustrating a clear provincialism of global phytoplankton. However, acritarch assemblages have been reported to become increasingly similar towards the Late Ordovician, revealing a general cosmopolitanism, although, based on more recent studies, their assemblages from Laurentia and Baltica are reported to be rather different from those from peri-Gondwana. In this decade, new acritarch assemblages reported from South America, the Baltic region, Iran and Siberia, as well as the new material from South China and Tarim, provide additional data that help to understand the palaeobiogeographical distribution and evolution of phytoplankton during the Late Ordovician in more detail.

The binary dataset was compiled based on published information from about 120 localities in South China, the Middle East, North Africa, South America, India, Bohemia, Avalonia, Laurentia, Baltica, North China, Tarim and Siberia. This dataset was used for Cluster Analysis (CA), Nonmetric Multidimensional Scaling (NMDS), and Network Analysis (NA) to understand acritarch palaeogeography in the Late Ordovician. Re-evaluation of the global palaeobiogeographical distribution of acritarchs revealed their clear provincialism also during the Late Ordovician, particularly in the Katian. The Late Ordovician acritarch provinces were related to global climatic zones. The highly diverse acritarch assemblage normally existed around 30° in the Southern Hemisphere, which is similar to the latitudinal diversity gradient model proposed by Zacaï et al. (2021) for the Late Ordovician. The total diversity of acritarchs was highest and their palaeobiogeographical differentiation strongest in the Katian. The higher acritarch diversity recorded in this time interval may have resulted from their clearly developed provincialism. Acritarch diversity decreased rapidly at the end of the Ordovician, evidently due to the Late Ordovician Mass Extinction (LOME). The relative proportion of endemic taxa in the assemblages in different regions was very high during the main part of the Late Ordovician. However, as a consequence of the LOME, the relative proportion of cosmopolitan taxa increased in the Hirnantian and became higher than in the Sandbian and Katian. Acritarch assemblages from different plates (regions) reacted to the LOME differently and exhibited various diversity trends.



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