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Freshwater diatoms living in variable environments with considerations on their use as paleoenvironmental indicators and insights into their biogeography

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Abstract

Records of freshwater diatom fossils over several tens of thousands of years are incomparable because the time interval is much longer than the life span of common lakes. Sediment cores containing such long diatom records have been taken by the International Continental Scientific Drilling Program which incidentally suggests that global freshwater diatom biogeography became synchronized with glacial-interglacial cycles. In a local diatom community, abrupt extinction and arbitrary immigration instead of gradual and repetitive changes were observed. Diatoms changed their dominance in a lake not only as a result of changes in local environmental factors, but their geographic distribution controlled by regional community structure and limited dispersal of each species. Argument against ubiquitous dispersal arose in the last few decades based on comprehensive researches during the 1990s on diatoms as environmental indicators. Insights into diatom biogeography are required to interpret fossil diatom flora, especially those with large geographic distributions and longtime ranges such as glacial-interglacial cycles.

Key index words: fossil freshwater diatoms, glacial-interglacial cycle, geographic distribution, ubiquitous dispersal, International Continental Scientific Drilling Program