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Taphonomy of diatoms and problems of paleoenvironmental reconstruction in coastal areas using diatom assemblages

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Abstract

Diatom analysis has been commonly used as a tool for reconstructing coastal paleoenvironments, however there still remain some fundamental problems. One major problem is the incorporation of allochthonous diatom frustules in early stages of the taphonomic process, which changes the composition of the living and fossil diatom assemblages. Another is chemical dissolution and physical breakage of diatom frustules during the taphonomic process, which alters the taxonomic composition of dead or fossil assemblages. In order to clarify the taphonomic process, it is necessary to study crystallography and physical mineralogy, and also to understand sedimentology from the viewpoint of diatom frustules as fine silica sediment particles. In addition, to identify soluble species and allochthonous components, it is necessary to study the taphonomic process at each stage and the relationship between the dissolution of diatom frustules and changes in groundwater pH or Eh in particular. On the other hand, we should present a list of total taxa used in the study for reconstructing paleo-coastal environments by diatom assemblages in order to understand the selective preservation of each taxon.

Key index words: coastal area, diatom analysis, Holocene, taphonomy, paleoenvironmental reconstruction