

Diatom fossil analysis as an aid for paleoseismology

Yuki SAWAI

**Abstracts**

This paper reviews the recent usage of diatom fossil analysis as an aid for paleoseismology. In tsunami geology, preliminary identification of tsunami deposits is often based on finding anomalous sand deposits in peaty or muddy deposits. The anomalous layers are then diagnosed using several criteria such as regional-scale inundation, grading of the particle size, and floral and faunal fossils within the deposits. During the interpretation of the deposits, marine diatoms are utilized to eliminate other processes such as flood. To understand the diatom assemblages within the anomalous deposits, many papers have described modern, historical, and prehistoric tsunami deposits. In the early stage of such a study, diatoms within tsunami deposits were regarded as chaotic assemblages that had been composed of broken valves. However, in recent studies such as those of the 2004 Sumatra and 2011 Tohoku tsunamis, diatom assemblages in the deposits did not follow such a pattern. As a result, we can recognize various types of assemblages and realize there is no specific criterion for evaluating event deposits based on diatom analysis. In reconstructing crustal deformation accompanied with earthquakes, diatoms are used mainly for the amount of vertical coastal deformation. For example, diatom micropaleontology was used at southwestern Washington sites to estimate subsidence ranging from 0.5 to at least 1.0 m during six of the seven great earthquakes. In another example, detailed land-level reconstructions using diatoms especially just before the earthquake had occurred have been done in southern Alaska. In the reconstructions, a few decimeters of land-level changes were attributed to preseismic deformation in earthquake cycles. Despite these successful examples, the research area still has the problem of lacking information on the early stage of taphonomy and diagenesis via modern analogues.

**Key index words:** coastal deformation, diatom fossil analysis, transfer function method, tsunami deposit