

An aspect for environmental reconstruction of alluvium based on relationship water mass with diatom assemblages in Ariake Bay

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Ariake Bay in western Japan is located in the western part of central Kyushu surrounded by tidal flats. Environmental deterioration has decreased the abundance and quality of products such as fish, shellfish and laver. There are some programs for consideration about alluvium formation. Hase et al.(2003) discussed the construction of paleogeographical features at the southeastern part of Ariake Bay. Recently, we understand that diatom assemblages in surface water belonged to the water mass of sea and sea surface. Therefore, we have an aspect for environmental reconstruction of alluvium based on the relationship of water mass and diatom assemblages in the area.

In 2003 and 2004, we took surface water samples of Ariake Bay, and analyzed diatoms in the surface water at about 230 sites. The diatom assemblages were composed of *Coscinodiscus asteromphalus* under high salinity in the main part with invasion flow from the Tsushima current. Off shore from the Kumamoto area consisted of *Thalassionema nitzschioides* with fresh-water species increasing while *Coscinodiscus asteromphalus* decreased because of somewhat low salinity in the area influenced by the inflow of river water. When high tide condition occurs, diatom assemblage in the off shore area of Kumamoto are similar to the assemblage under the condition of low tide. It is clear that these diatom assemblages belong to water mass of off shore Kumamoto.

In May 2004, the samples taken from surface water indicated that a red tide occurred at Isahaya Bay and on to Shimabara Peninsula after heavy rain. The diatom assemblages changed from *Coscinodiscus asteromphalus* to the addition of *Cyclotella meneghiniana* and *Skeletonema costatum*, because normally high salinity water mixed with low salinity and eutrophication of river water.

We consider that diatom assemblage is related to water mass condition during the formation of alluvium in Ariake Bay. We reviewed our previous studies of environments after the last Glacial Age in this area and considered that it became a brackish condition and tide flowed in the Kumamoto area earlier than in the southeast Ariake Bay in Post Glacial Age. Sedimentation continued in the Kumamoto area, but southeast Ariake Bay had a gap of non-sedimentation during Holocene. It seemed that the water mass of tide in the central Bay had quick current and a gap occurred, but in the Kumamoto area water mass was gentle and sedimentation continued. After the gap, two diatom assemblages of the southeastern Ariake Bay and Kumamoto area differed with respect to the rate of *Paralia sulcata* versus *Coscinodiscus* spp. and *Thalassionema nitzschioides*. It is assumed that there were different water masses in the southwest Ariake Bay and in Kumamoto area since ca. 8.5 kyr BP.