Sedimentary processes of tidal delta inferred from the Pleistocene shell bed of Kioroshi Formation, Shimosa Group, eastern Japan

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Tidal delta deposits are characterized by allochthonous shallow-marine shells beds. A molluscan shell bed of the Pleistocene Kioroshi Formation observed at Kioroshi, Inzai-city, Chiba Prefecture, eastern Japan, has been recognized as a flood tidal delta deposit in previous study (Okazaki and Masuda, 1992). The delta deposit is divided into five sedimentary facies; Facies I-V in ascending order (O'Hara et al., 2004). These facies except the lowermost one are regarded as bottomset and foreset deposits of tidal delta. Facies II including an inner-bay muddy-bottom fossil assemblage and no sedimentary structure represents a bottomset deposit of tidal delta. In the fossil assemblage of Facies III, well-preserved and various-sized clypeasteroid shells are predominant and show parallel stratification or imbricate structures. These features suggest that Facies III was deposited at 5-10m depth, on sandy bottom where a weak flow exists. Facies IV characterized by concentration of abundant shells of Mactra chinensis and divided into smaller units by erosional base, indicates that deposition occurred under high-energy flow. It is presumed that Facies III and IV had been deposited at lower part of the delta foreset. Facies V shows low-inclined tabular cross-stratification. The fossil assemblage shows composite fauna consisting mainly of inner-bay sandy bottom species and additional open-coast sandy bottom species and fragmentary shells of inter-tidal zone species. Facies V resulted from the transgression of delta foreset by flood tidal currents.

The grain-size distribution and variety index of fossil assemblage are considered in this study. In the units of Facies IV, reverse and normal grading structures are observed accompanied with variations of the variety index of fossil assemblage. This indicates that a rapid flow eroded and deposited bottom sediments including shells. In Facies V, obvious correlation of grain-size distribution and variety index of fossil assemblage are not recognized among the beds. Facies V contains smaller- and more various-sized shells of Mactra chinensis than Facies IV. Facies V was deposited by ordinary tidal currents.

These results represent the expansion of the bay, the widening of the tidal-inlet and the increasing of sand supply into bay from open-coast, during sea-level rise.

Refrence:

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