

Holocene sequence stratigraphy and the division of strata in Chikushi plain, West Japan.

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Chikushi plain is the biggest plain in West Japan, and contacts to the innermost Ariake bay. Low-flat land less than 10m in height occupies the most part in the plain. The tidal range in the present Ariake bay is about 6m in maximum and is the biggest in Japan. Large tidal range between flood and ebb tides causes widespread tidal flat and strong tidal current. The depositional condition, transportation of sediments, erosion and deposition by strong current make unique landform and strata.

Strong tidal currents dig and fling up bottom materials during rising tide, and make suspended mud and residual sand at the front of tidal flat and river mouth in Ariake Bay. Suspended mud is transported by a tidal current counterclockwise from the central to innermost part, and then forms mud flat at the innermost bay. Fluid mud occurred at river mouth goes up the river backward with strong dilution of salt and fresh water and sorting. The backward flow of fluid mud goes to several 10 km from the river mouth, and fill up the reed plain at the raising limit. Pore water of settled mud and the salinity of fluid mud are almost fresh water there as a result of strong mixing. Sediment of fluid mud makes a homogenous muddy bed with reed subterranean stem. This kind of non-marine clayey sediment occupy the surface of low-flat land. Therefore fluid mud sediment made the greater part lowland in Chikushi plain. Marine clayey sediments are found at surface of only man-made land.

There is no typical landform of delta at the low-flat land in Chikushi plain, because fluid mud was always reclaiming for a long time.

Ariake Bay Research Group (1965) proposed basic stratigraphy of the Quaternary strata on the basis of a lot of boring data obtained from the coastal area and bay bottom in Ariake Bay. The basic stratigraphy and formation names are used in the northern and central Kyushu for about 30 years until now. With accumulation of enormous boring data for about 40 years, several inconvenience problems (for example, the problem of Shimabara-kaiwan formation etc.) became obvious in Chikushi plain.

Shimoyama et al. (1994) gave re-definition to the underground Quaternary strata in Chikushi plain as one of the solution. Their stratigraphy and division of strata were carried out on the basis of sea-level cycle and consider the difference of sedimentary conditions like marine-nonmarine units. Between surface and underground strata were correlated with key beds such as wide spread tephra, and formation names were united. Specific boring core samples and the columnar sections were standardized to guarantee concreteness in the division of underground strata.

Changes of sedimentary systems in the past 20,000 years provide the most concrete sedimentary sequence stratigraphy. However there are difference on the basis of variation of local sedimentary condition. For example, biggest tide influenced the sedimentary system in Chikushi plain.

In order to universal division of the Alluvium in Chikushi plain, strata were applied into the newest sequence unit, and marine or nonmarine were identified.

Lowstand system tract is the Mitagawa formation, transgressive system tract is lower part of the Hasuike and Ariake formations, highstand system tract is middle part of the Hasuike and Ariake formations, progradational regressive system tract is upper part of the Hasuike and Ariake formations.

On these boundaries, sequence boundary (SB), transgressive surface (TS), tidal ravinement surface (TR), maximum flooding surface (mfs) were recognized.

Existence of tidal ravinement and low-flat land well symbolized sedimentary futures of Chikushi plain especially.