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Late Holocene environmental changes in the Rokken-gawa lowland near Lake Hamana, Pacific coast of central Japan

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Analyses of the sediment cores in the Rokken-gawa lowland, eastern coast of Lake Hamana, Pacific coast of central Japan, indicate stepwise environmental change from an estuary to a fresh water pond or marsh, which occurred during the last 5500 years. Previous researches on the Holocene environmental changes around Lake Hamana are limited. Studies of cored sediments by Ikeya et al. (1985) showed the outline of the Holocene stratigraphy of this lowland.
Rokken-gawa lowland is a small drowned valley lowland. An array coring survey up to ca. 5 m depth was carried out in the lowland using handy geoslicer and hand corer to clarify surface geology. We radiocarbon-dated a total of 7 samples, including samples of wood, plant fragments and marine molluscan shells. All samples were dated by the AMS method. Depositional environment of the cored section was estimated from mainly the depositional facies with the help of diatom assemblages and electric conductivity (EC) for each 2 cores. We referred the habitats of each diatom species to Kosugi (1988) and Ando (1990).
Surface geology in the Rokken-gawa lowland consists of a sandy silt layer, a silt layer, a peat layer, an event-derived sand layer and a sand layer in ascending order. The sandy silt and silt layers yield fossils of intertidal mollusks such as Macoma tokyoensis. A calibrated age of 6175-62 80 calBP was obtained from one of these fossils. Event-derived sandy layer, which is distributed in the lower reach of the lowland, showed a thinning- and fining-landward trend and was interpreted as a tsunami deposit (Fujiwara et al., this meeting). The peat layer was divided into the upper and the lower parts by the sandy silt or silt layers identified between them. Four calibrated ages of 338 5-3465 calBP, 3255-3365 calBP (basal part), 515-555 calBP and 315-395 calBP (upper part) ware obtained from the upper peat layer. Two calibrated ages of 3845-3935 calBP and 3705 -384 0 calBP were obtained from the uppermost part of the lower peat layer. Ikeya et al. (1985) reported a calibrated age of 5050-5950 calBP from the basal part of this peat layer. The sand layer is distributed in the northern part of the lowland and is composed of poorly-sorted fine to medium sand with granules.
The silt layers above and beneath the lower peat layer showed high EC values of 100-200 mS m^{-1}. Dominance of brackish and marine diatom species, Cyclotella hakansoniae and Cocconeis scutellum (10-20% in total) characterizes the silt layer beneath the lower peat layer. On the contrary, fresh water and brackish diatom species, such as Staurosira construens and Rhopalodia gibberula, are dominant in the upper part of this silt layer. In the bottom of the upper and lower peat layers, numerous diatom fossils were found. The fossils identified in these parts were dominantly fresh water diatom species, such as Frustulia rhomboids and Tabellaria fenestrate. On the other hand, there were few diatom fossils in the other parts of both peat layers.
According to above results, we reconstructed environmental changes in the Rokken-gawa lowland as follows: Before 5500 calBP, the sandy silt and the silt layers had deposited in a tidal flat or marsh environment. Decreasing of EC values and increasing of fresh-to-brackish water diatom species indicate that saline concentration of water gradually decreased in the northern part of the lowland. During 5500-3800 calBP, the lower peat layer was deposited in a fresh water pond or marsh. Subsequently, the sandy silt and the silt layers covered the lower peat layer, which was

deposited in a tidal flat or marsh environment during 3800-3400 calBP. Since 3400 calBP, a fresh water pond or peaty marsh have been expanded in the lowland.

Reference

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