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Late Holocene environmental change in alluvial lowlands around the Lake Hamana, central Japan

Yoshiki Sato[1*], Osamu Fujiwara[2], Eisuke Ono[3], Masatomo Umitsu[4], Kaoru Kashima[5]

[1]Kyushu University, [2]AIST, [3]Niigata University, [4]Nara University, [5]Kyushu University

Lake Hamana is a brackish lake located on the Pacific coast of central Japan, facing the Nankai Trough. It covers ˜65.0 km^2 and is connected to the Pacific via a single channel between the sand bars. The lake has a complicated coast line with many alluvial lowlands, which were originally created as drowned valleys incising the Pleistocene terraces through the Holocene transgression and have progressively buried by sediments from the rivers and resulted in a fresh water marsh. This environmental change is closely related to both of the Holocene sea-level change and crustal movements(Ikeya *et al*. 1990). We carried out coring survey at coastal lowlands of the lake, and reconstructed their environmental changes since the middle Holocene using the depositional facies, diatom assemblages and radiocarbon ages.

Rokken-gawa lowland is located at southeastern coast of the lake. Surface geology of this lowland consists of mud layer, peat layer and sand layer in ascending order. The peat layer is divided into the upper and the lower parts by the mud layer identified between them. Sato *et al*. (2010) has pointed out that environmental changes from fresh water to brackish water condition occurred at ca.5500 calBP and ca. 3400 calBP respectively in this lowland. Here we discuss the environmental change of this lowland with additional data of sediment cores. The mud layer, above and beneath the lower part of the peat layer, shows dominance of brackish-marine species, for example *Cyclotella striata*, *Cocconeis scutellum* and so on. We also recognized at an elevation of -3.0 to -4.5 m in the mud layer, *Staurosira construens*, fresh-brackish water species, increased abruptly to be dominant. On the contrary, in the peat layer, fresh water species are dominant, for example *Tabellaria fenestrate*, *Aulacoseira* spp. and *Pinnularia* spp. These data indicate that water salinity decreased three times since the middle Holocene in this lowland. Radiocarbons ages by Sato *et al*. (2010) suggest that these events have occurred around 3400 calBP, 5500 calBP and before 5500 calBP.

In Shinjo lowland, located at southwestern coast of the lake, surface geology consists of mud layer, peat layer and sand layer in ascending order. The peat layer is subdivided into three parts by mud layer. We obtained new radiocarbon ages from each of these parts: 6420-6640 calBP (at the basis of the lower part), 4970-5300 calBP (in the middle part) and 5640-5900 calBP (at the basis of the upper part). The main components of diatom species in the mud layer are brackish-marine species, for example *Cyclotella striata*, *Cocconeis scutellum* and *Achnanthes submarina*. On the other hand, the peat layer shows abundance of fresh water species and dominance of *Staurosira construens*. These data imply that water salinity decreased three times in this lowland. On the basis of the radiocarbon ages, we infer that these events occurred around 6500 calBP, 5700 calBP and 5100 calBP, respectively.

According to the above data, synchronic occurrence of water salinity decreasing event is recognized between the two lowlands around 6500-5000 calBP. This period is also synchronous with the enclosure of bay by sand bars estimated from foraminiferal assemblages taken from lake bed sediments (Matsubara 2001). This suggests that environmental change at the two lowlands was also caused by the development of the sand bars sheltering the lake from the Pacific to decrease the seawater influx to Lake Hamana. Lake water salinity around 6500-5000 calBP is fluctuated drastically in short period. This indicates the formations and collapses of the sand bars occurred repeatedly.

Reference

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