Depositional systems during the last interglacial stage -Pleistocene Kioroshi Formation in the northern Kitaura area

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Two parasequences (PS) reflecting small-scale sea-level changes during the last interglacial stage, are detected for the upper Pleistocene Kioroshi Formation, Shimosa Group in the northern Kitaura area of the southeastern part of Ibaraki Prefecture, by analyzing the distribution of depositional facies, key erosional surfaces and some key tephras. PS1 is composed of incised-valley fill facies on an unconformable sequence boundary subsequently modified into a bay ravinement surface, and open shoreface facies on a wave ravinement surface. PS2 constitues lagoon-tidal flat facies following the parasequence boundary as a tidal ravinement surface and shoreface-beach facies on the next wave ravinement surface.

The upper Pleistocene Kioroshi Formation of the Shimosa Group is widely distributed in the Kanto Plain as remnants of Paleo-Tokyo Bay during the last interglacial stage, called shimosueyoshi stagein Japan. Depositional facies of a lagoon-barrier island system are well developed in the Namekata Upland and the Kitaura area, the southeastern part of Ibaraki Prefecture. In contrast to the previous sedimentological studies interpreting the Kioroshi Formation through a single depositional sequence, two parasequences (PS1 and PS2) reflecting small-scale sea-level changes during the Shimosueyoshi stage, are newly detected by analyzing the distribution of detailed depositional facies, key erosional surfaces and some key tephras in the northern Kitaura area.

The lower part of the Kioroshi Formation as PS1 covers the Yabu and Kami-Iwahashi Formations with an unconformable sequence boundary which is subsequently modified into a bay ravinment surface (BRS) by inner bay wave erosion during the first transgressive stage. PS1 contains incised-valley fill facies of estuary mud as transgressive systems tract (TST) and open-marine shoreface sand facies as highstand systems tract (HST) overlying a ravinement surface. Judging from the thickness of only about one to six meters, the upper part of PS1 was eroded away by PS2.

PS2 constitutes lagoon-tidal flat facies as the second TST and shoreface-beach facies as the second HST. The basal parasequence boundary is interpreted to be the second BRS, but occasionally a tidal ravinement surface, taking the local development of the overlying tidal sand facies into account. On the other hand, the basal erosional surface of HST appears to be a wave ravinement surface formed by open-marine shoreface wave erosion. Open-marine facies are not found, but lagoonal-tidal flat facies are thickly developed in the western part of the studied area. Furthermore, in the northern area, the upper stream of the Tomoe River, sandy tidal flat facies become to be dominant. These facies distribution suggests that the barrier island system retreated into the present position of the western part of the Namekata Upland at the maximum transgression. On the fore barrier side the underlying lagoon-tidal flat facies of TST seems to have been eroded away. In this case, shoreface sand facies of PS1 and PS2 may have been amalgamated with an indistinct parasequence boundary due to the facies similarity. Tide-influenced river mouth and overbank facies of the Joso Formation overlie the PS2.