

Explanatory Text of the Urban Geological Map of the Northern Area of Chiba Prefecture

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(ABSTRACT)

The northern area of Chiba Prefecture is located between Tokyo Bay and the Edo-gawa and Tone rivers in the eastern part of the Tokyo metropolitan area, Kanto Plain, central Japan. Topographically, the area includes uplands, lowlands, and reclaimed lands. Geologically, the area is situated within the eastern part of the Kanto Sedimentary Basin filled with thick Cenozoic successions. They comprise the Lower to Middle Pleistocene Kazusa Group, Middle to Upper Pleistocene Shimosa Group, Upper Pleistocene terrace deposits and loam, Alluvium (post-LGM deposits), and reclamation and banking (man-made strata) (Fig. 1).

The Lower to Middle Pleistocene Kazusa Group consists of marine sediments in the eastern part of Chiba Prefecture where the group crops out, while its detailed lithofacies is unknown in the northwestern part. The boundary between this group and the overlying Shimosa Group is defined by the base of the Jizodo Formation corresponding to MIS 12.

The Middle to Upper Pleistocene Shimosa Group is divided into seven formations; Jizodo, Yabu, Kamiizumi, Kiyokawa, Yokota, Kioroshi, and Joso formations. Each of them is composed of the depositional cycle of fluvial and marine sediments formed under the influence of the sea-level fluctuations during MIS 12–5c.

The terrace deposits younger than the Shimosa Group (younger terrace deposits) distributes along the small valleys dissecting the upland area. They comprise fluvial muddy sand accumulated at MIS 5a or later. These terrace deposits and the Shimosa Group are covered with the Joso Clay and the Younger Kanto Loam which are generally composed of volcanic ash soil.

The Alluvium, called “Chuseki-so”, is the post-LGM (Last Glacial Maximum) deposits which distribute beneath the lowlands along the rivers and the coastal area of Tokyo Bay. It consists mainly of sand and mud formed in the fluvial to inner-bay environments, including thick incised-valley fills.

The shoreline of Tokyo Bay in the northern area of Chiba Prefecture was mostly reclaimed for industrial estates by sand and mud sediments dredged from the off shore. These man-made strata were severely liquefied due to their high water-content when the large earthquakes such as the 1987 East off Chiba Earthquake and the 2011 off the Pacific coast of Tohoku Earthquake occurred.

| Chronostratigraphic division | | Lithostratigraphic division | | Tephra | MIS | Facies | Depositional environment | | | | |
|------------------------------|-------------|--|--------------------------|--------------------|--------------------|-----------------------------------|--------------------------|---------------------------------|---------------|--------------------------|--------------------------|
| Quaternary | Holocene | Reclamation and banking | Alluvium | Younger Kanto Loam | 1 | Reclamation and banking | Sand, mud | Reclamation | | | |
| | | Sand bar, beach ridge, natural levee, marsh, and valley floor deposits | | | | Sand bar and beach ridge deposits | Sand | Sand bar, beach ridge | | | |
| | Pleistocene | Upper | Younger terrace deposits | Shimoso Group | Younger Kanto Loam | 2, 3, 4, 5a, 5b, 5c, 5d, 5e | Natural levee deposits | Sand | Natural levee | | |
| | | | Joso Fm. | | | | Joso Clay | Marsh and valley floor deposits | Mud, sand | Marsh, valley floor | |
| | | | | | | | Kioroshi Fm. | Upper | AT | Alluvium (borehole logs) | Mud, sand, gravel |
| | | | Yokota Fm. | | | | | | Lower | HK-TP | Younger Kanto Loam |
| | | | | | | | Kiyokawa Formation | Upper | | On-Pm1 | Younger terrace deposits |
| | | | Kamiizumi Formation | | | | | | Lower | KIP | Joso Clay |
| | | | | | | | Yabu Formation | Upper | | Yk3 | Anesaki Fm. |
| | | | Jizodo Formation | | | | | | Lower | | Ky3 (TB-8) |
| | | | | | | | Kazusa Group (undivided) | Middle | | Km2 (TCu-1) | |
| | | | Kazusa Group (undivided) | | | | | | Lower | | Km1 |
| | | | | | | | Kazusa Group (undivided) | Lower | | Yb5 | |
| Kazusa Group (undivided) | Lower | Yb1 | Kiyokawa Fm. (upper) | Sand | Beach | | | | | | |
| | | | Kazusa Group (undivided) | Lower | Yb0 | Kiyokawa Fm. (middle) | Muddy sand, sandy mud | Bay | | | |
| Kazusa Group (undivided) | Lower | J4 (TE-5a) | | | | Kiyokawa Fm. (lower) | Gravelly sand, mud | Fluvial | | | |
| | | | Kazusa Group (undivided) | Lower | Kh6 | Kamiizumi Fm. (upper) | Sand | Beach | | | |
| Kazusa Group (undivided) | Lower | Ks11 | | | | Kamiizumi Fm. (middle) | Muddy sand, sandy mud | Bay | | | |
| | | | Kazusa Group (undivided) | Lower | Ks11 | Kamiizumi Fm. (lower) | Gravelly sand, mud | Fluvial | | | |
| Kazusa Group (undivided) | Lower | Ks11 | | | | Yabu Fm. (upper) | Sand | Beach | | | |
| | | | Kazusa Group (undivided) | Lower | Ks11 | Yabu Fm. (middle) | Muddy sand, sandy mud | Bay | | | |
| Kazusa Group (undivided) | Lower | Ks11 | | | | Yabu Fm. (lower) | Gravelly sand, mud | Fluvial | | | |
| | | | Kazusa Group (undivided) | Lower | Ks11 | Jizodo Fm. (upper) | Sand | Beach | | | |
| Kazusa Group (undivided) | Lower | Ks11 | | | | Jizodo Fm. (middle) | Muddy sand, sandy mud | Bay | | | |
| | | | Kazusa Group (undivided) | Lower | Ks11 | Jizodo Fm. (lower) | Gravelly sand, mud | Fluvial | | | |
| Kazusa Group (undivided) | Lower | Ks11 | | | | Kazusa Group (undivided) | Sand, mud | | | | |

Fig. 1 Stratigraphic summary in the northern area of Chiba Prefecture.