

Explanatory Text of the Urban Geological Map of Central Tokyo (Special Wards Area)

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(ABSTRACT)

Tokyo is one of the largest cities in the world. The population density of central Tokyo (i.e., the special wards) is approximately 15,000 persons/km², which is the highest in Japan. The region is characterized by numerous commercial and residential buildings, and the utilization of underground space is well established. However, central Tokyo is situated on a coastal plain that faces Tokyo Bay, and the region has repeatedly experienced earthquake disasters to date. It is therefore expected that detailed geoinformation resources will be required for earthquake disaster mitigation in the future.

Topographically, central Tokyo comprises both upland and lowland areas. The western part of central Tokyo overlaps part of the Musashino Upland, which was formed as an alluvial fan of the Tama River. The lowlands are distributed along rivers and coastal areas of Tokyo Bay, mainly in the eastern part of central Tokyo, such as the Arakawa and Tokyo lowlands. Narrow valley-floor lowlands also developed along smaller rivers in the Musashino Upland.

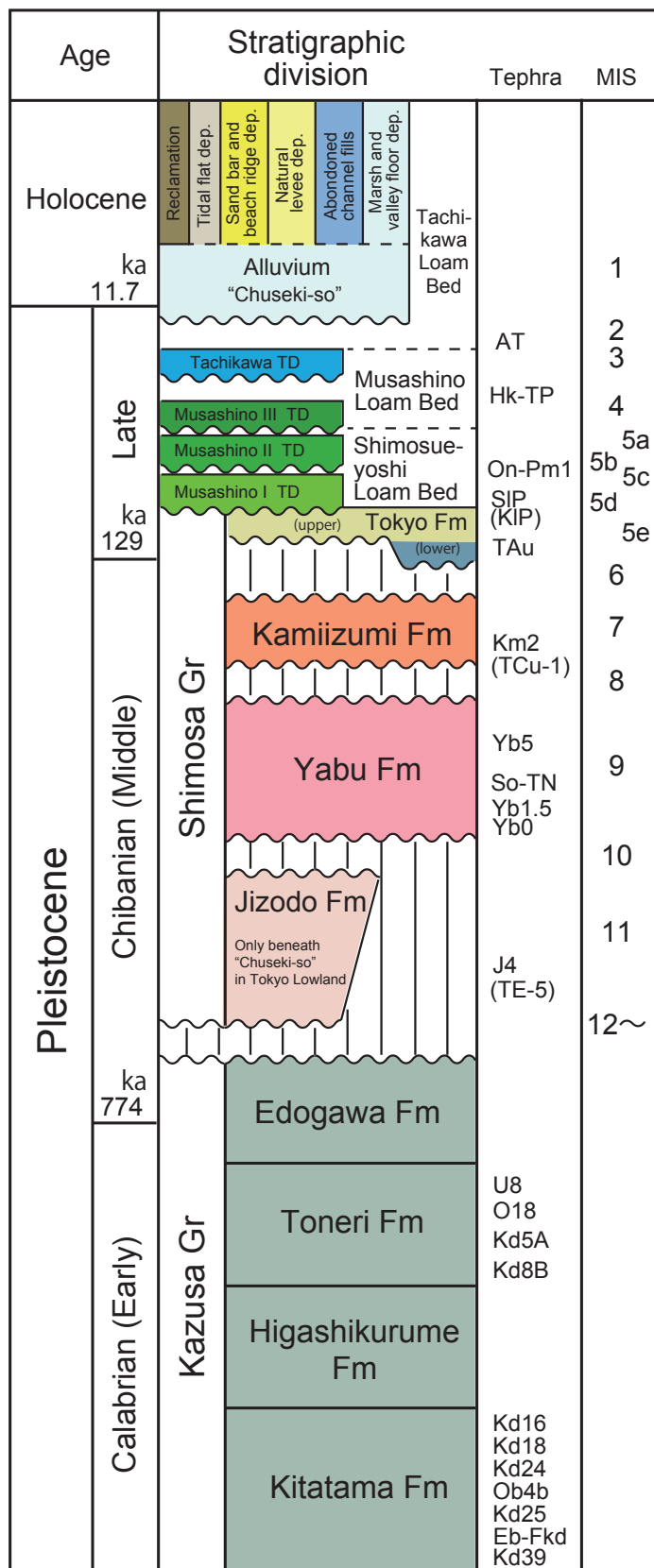
Geologically, central Tokyo is situated in the center of the Kanto Sedimentary Basin, which comprise thick Cenozoic sedimentary successions, including the Lower to Middle Pleistocene Kazusa Group, Middle to Upper Pleistocene Shimosa Group, Upper Pleistocene terrace deposits and loam beds (volcanic ash soil), Alluvium (post-Last Glacial Maximum (LGM) deposits), and reclaimed areas (i.e., man-made strata) (Fig. 1).

The Lower to Middle Pleistocene Kazusa Group beneath central Tokyo comprises the Kitatama, Higashikurume, Toneri, and Edogawa formations. These formations are composed mostly of marine sediments, but the Toneri and Edogawa formations also include non-marine sediments. The Kitatama, Higashikurume, and Toneri formations are considered to have formed 1.8–0.9 Ma based on tephro-, paleomagneto-, and calcareous nannofossil biostratigraphic analyses. The Matuyama–Brunhes Boundary (*ca.*0.77 Ma), which closely corresponds with the boundary between the Lower and Middle Pleistocene, is recognized in the Edogawa Formation.

The Middle to Upper Pleistocene Shimosa Group, which unconformably overlies the Kazusa Group in central Tokyo, comprises four formations: the Jizodo, Yabu, Kamiizumi, and Tokyo formations. Of these, the Jizodo Formation is located beneath the Tokyo lowland areas, but not beneath the Musashino Upland. Each of the formations in the Shimosa Group is composed of a depositional cycle of fluvial and marine sediment layers deposited under the influence of sea-level fluctuations during MIS 12–5e.

Terrace deposits younger than the Shimosa Group widely cover the Musashino Upland. They comprise gravelly sediments that formed as an alluvial fan of the Tama River at MIS 5c or later. These terrace deposits and the Tokyo Formation of the Shimosa Group are overlain by the Kanto Loam Beds, which are generally composed of volcanic ash soil.

The Alluvium, referred to as “Chuseki-so” in Japanese, is composed mainly of post-LGM deposits that are distributed beneath the lowlands along the rivers and coastal areas of Tokyo Bay. It consists mainly of incised-valley fills composed of soft sand and mud that formed in fluvial and inner-bay environments. The Tokyo Bay shoreline was mostly reclaimed for industrial and residential estates using industrial and domestic waste, and/or sand and muddy sediments that were dredged offshore.



Gr: Group, Fm: Formation, TD: Terrace Deposits
dep.: deposits

Fig. 1 Stratigraphic summary of the central Tokyo region (special wards area).