Explanatory Text of the
Urban Geological Map of the Southeastern Area of Saitama Prefecture

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(ABSTRACT)

The southeastern area of Saitama Prefecture is located to the north of the Tokyo Metropolis and has been urbanizing remarkably in recent years. It is home to the Saitama New Urban Center, which serves as part of the capital city's functions, and is an area of growing importance from both administrative and economic perspectives. Centered along the railroad lines, office areas, commercial facilities, and residences are densely developed, and the effective use of underground space has been promoted, extending development deeper into the city. On the other hand, the development of residential areas is also spreading to areas with soft ground, such as lowlands along rivers.

This geological map shows the distribution pattern of strata in the shallow subsurface based on borehole data. The computer-generated 3D geological model is browsable as 2D and 3D geological map, and the borehole data used in the analysis can also be viewed.

In the shallow subsurface part of the study area (depth less than 100 m), the Middle to Upper Pleistocene Shimosa Group, Upper Pleistocene terrace deposits and the Kanto Loam Bed, uppermost Pleistocene to Holocene alluvium (post-LGM deposits) and artificial deposits are distributed (Fig. 1).

The Shimosa Group in the study area is divided into the following 6 formations: the Jizodo, Yabu, Kamiizumi, Kiyokawa, Kioroshi and Omiya formations in ascending order. Each formation, except the Kiyokawa and Omiya formations, consists of a depositional cycle comprising terrestrial and marine beds formed under the influence of sea-level change during MIS 12–5c. The total thickness of the Shimosa Group reaches approximately 170 m in the northern part of the study area.

Upper Pleistocene terrace deposits and the Kanto Loam Bed are distributed on the uplands as cover layers of the Shimosa Group. The terrace deposits are fluvial. The Kanto Loam Bed is divided into the Joso Clay and the Younger Kanto Loam Bed. These are treated as covered soil layers in this study and are not shown on the geological map. However, the borehole logs in the 3D views allow the readers to understand the vertical facies changes including the terrace deposits, Joso Clay, and loam beds.

The alluvium (post-LGM deposits) is a deposit formed under the influence of sea-level change since the Last Glacial Maximum (LGM), and is distributed beneath lowlands such as the Arakawa and Nakagawa lowlands, and lowlands in small valleys that incised uplands (valley floor lowlands). Beneath the Arakawa Lowland, the alluvium consists of the lowermost basal gravels and overlying sand and mud. The Nakagawa Lowland is underlain mainly by mud beds, which are thickly distributed upstream of the lowland. The Shibakawa Lowland is an example of a small valley that incised an upland, where a mud-dominated strata about 20 m thick is distributed.

The 3D geological model of this map is given by a surface-based 3D model composed of the ground surface that includes the terrain classification information and the basal surfaces of the formations. The terrain classification information consists of 3 terrace surfaces, 5 microtopographic divisions on the alluvial surface, and artificial lands. The basal surfaces of the formations comprise 7 layers, the Yabu, Kamiizumi, Kiyokawa, Kioroshi (lower and upper parts), Omiya formations, and the alluvium. They are estimated using the elevation dataset of geological boundaries obtained from stratal correlation for borehole data.

The study area has suffered from widespread land subsidence caused mainly by excessive water pumping associated with

postwar reconstruction and rapid economic growth. Although groundwater levels are now generally recovering and subsidence is improving, there have been cases of widespread land subsidence caused by drought in the past. Other environmental issues of geological origin specific to the area, soil contamination and ground liquefaction, are also being considered.

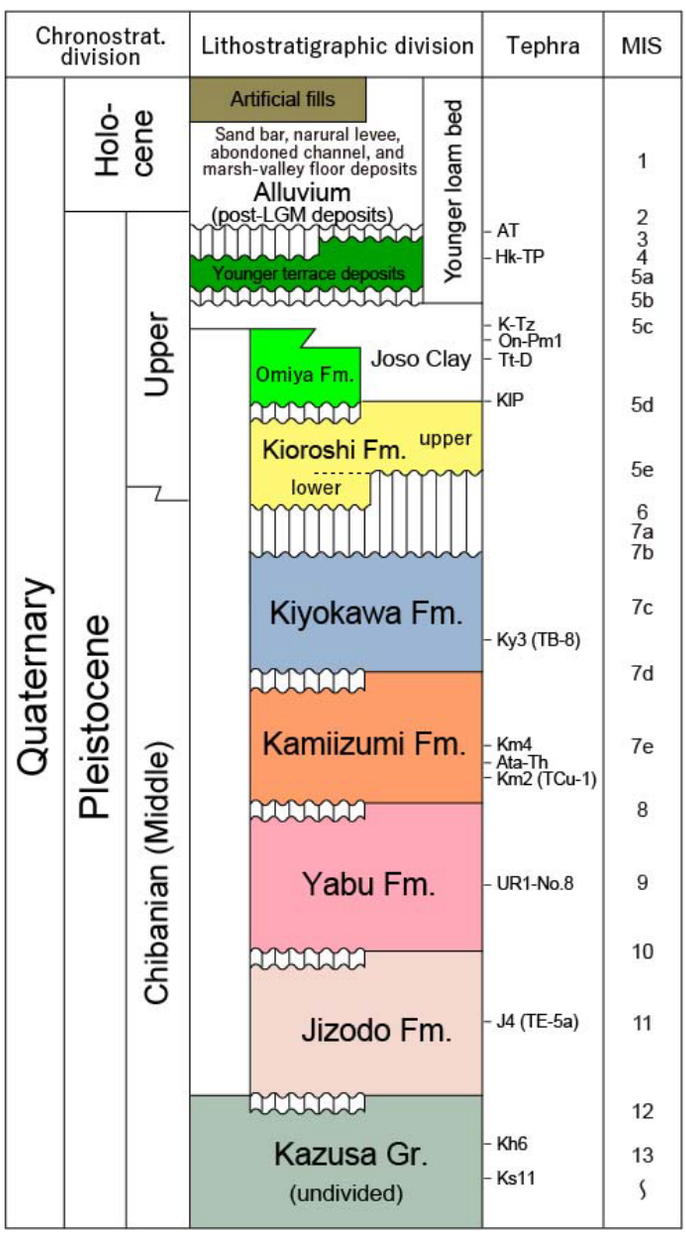

Fig. 1 Stratigraphic summary in the southeastern area of Saitama Prefecture.
Gr: Group, Fm: Formation