Construction of 3D geologic model with concealed active faults based on analysis of borehole data in the Tokyo Lowland and the Musashino Upland

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Subsurface geological surveys are very difficult in the densely populated urban area such as the Tokyo metropolitan area, Japan. However, such area offers voluminous borehole data useful for detecting concealed faults as well as constructing ground model.
Based on geologic and analysis of more than seven thousands of borehole data, 3D geologic model has been constructed in the center of Tokyo metropolitan area. This area is located in the Tokyo Lowland and the adjacent Musashino upland to the east. Judging from previous studies, the geologic strata consist of the latest Pleistocene to Holocene incised-valley deposits (so-called Chuseki-so), the Kanto Loam beds, the Musashino conglomerate bed (80 to 100 ka), the Tokyo Formation (120 to 250 ka) and the underlying lower to middle Pleistocene strata. The 3D model consists of surface models of basal horizons of the Tokyo Formation, the Musashino conglomerate bed and the Chuseki-so.
The result of this research is as follows: 1) the Tokyo Formation and Musashino conglomerate bed make a half-dome structure plunging to the northeast direction, 2) A series of a right-stepping NNE-trending and a NW-trending faults are inferred in the southeastern margin of the upland and the western margin of the Tokyo Lowland. These faults extend more than 20 km and displace vertically about 5 to 10m the Tokyo Formation and the Musashino conglomerate bed. A major branch of them, named the Shinonome fault displaces the lower Chuseki-so. 3) The geomorphic development of the upland and buried geographic surface covered by the Chuseki-so should be strongly controlled by these faults.
We inferred the detailed location of concealed active faults based on geologic evidences. Further detailed researches on these concealed faults are required to prepare for earthquake disasters in the center of Tokyo metropolitan area.

Keywords: 3D geologic model, concealed active fault, Tokyo lowland

