

Three-dimensional distribution of transgressive sandy-river bodies of the Arakawa incised valley

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The subsurface geology of alluvial plains was examined by analyzing cores and borehole databases. Positional geological and geotechnical data in these databases are useful for three-dimensional analysis due to the GIS-based design of the borehole databases. Surface, grid-based, and grid-based models incorporating geological surface models of geological boundaries have recently been built for many alluvial plains in Japan. Grid-based models, efficiently used for sedimentological studies are advantageous for visualizing three-dimensional distribution of lithofacies of alluvial plains. Grid-based models depend on data using simple rules of statistics, unlike the construction of subjective and time-intensive surface models that require interpretation of the continuity and boundaries of sedimentary facies. The Arakawa Lowland, adjacent to the Tokyo Lowland originates from the Arakawa River and extends to the Tokyo Bay. The sediment supply associated with deposition differentiates the Arakawa Lowland from the Tokyo and the Nakagawa Lowlands. Transgressive river-sand bodies dominate the incised valley fills of the Arakawa Lowland, while the Tokyo and the Nakagawa lowlands comprise mud-dominated inner bay deposits. This study presents details of the transgressive river-sand bodies predicated on grid-based models of the incised valley fills of the Arakawa Lowland. The transgressive river-sand bodies exhibit a meandering and stacked distribution, with some fixed muddy floodplain deposits.

Keywords: 3D model, river sand body, Arakawa Lowland, borehole data