

Publication of a three-dimensional model of the subsurface structure of the Osaka sedimentary basin

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<http://staff.aist.go.jp/h.horikawa/study/Osaka3D/oskbasin.html>

We have constructed a subsurface structure model of the Osaka sedimentary basin and its surrounding area including the Osaka bay, Rokko Mountains and Awaji island, as a part of the ground motion prediction project conducted in AFRC, GSJ/AIST (Horikawa et al., 2003). The model was just published in April 2004 from Geological Survey of Japan / AIST and provided by CD-ROM. The website on the model is <http://staff.aist.go.jp/h.horikawa/study/Osaka3D/oskbasin.html>.

Features of the model:

The model was based on geological maps, seismic reflection survey data, gravity anomaly data, PS logging data, and boring core analysis data. Reflection survey data from more than 10 survey lines in the Osaka bay were re-analyzed so that corresponding reflectors of mutually crossing reflection lines fall into the same depth. The model area is divided into 16 geologic blocks. Continuously varying depths of key sedimentary layers and basement floor are modeled inside each block, and discontinuities of those depths are allowed at the block boundaries. Therefore, realistic shapes of those layers, including overhang at reverse faults, are expressed. Medium parameters such as P- and S-wave velocities and density are given using empirical relations among those medium parameters and depositional age and depth separately estimated for seven regions in the model area.

Data format:

The model area is 90 km in EW direction, 85 km in NS direction and down to 3 km depth. We targeted the sedimentary layers (mainly consist of the Osaka Group) and only the upper surface depth was modeled for the basement rock (Pre-Tertiary System). Modeled medium parameters are P- and S-wave velocities and density. The model is expressed in a grid file. The grid intervals are 100m horizontally and 50m vertically. Grids are aligned from the earth surface. The model data consists of two files: medium parameters' grid file and altitude data file. The medium parameters' file is provided in both ASCII and binary forms.

Use of the model in ground motion prediction study:

This sedimentary basin structure model has been used in the ground motion prediction study in the Osaka basin (Sekiguchi et al., 2003). The simulated ground motion shows features like variation of propagation velocity and amplitude of ground motion due to the variation of the sediment layer depth, and remarkable strong motion belt along the boundary of the basin caused by interference of seismic waves.

References:

Horikawa, H. et al. (2003) A three-dimensional model of the subsurface structure beneath the Osaka sedimentary basin, southwest Japan, with fault-related structural discontinuities, Annual Report on Active Fault and Paleearthquake Researches, Geological Survey of Japan/AIST, No. 3, 225-259 (in Japanese with English abstract).

Sekiguchi et al. (2003) Heterogeneous slip and stress drop distribution for scenario earthquakes on active faults based on paleoseismological data, Annual Report on Active Fault and Paleearthquake Researches, Geological Survey of Japan/AIST, No. 3, 273-284 (in Japanese with English abstract).