Search for Buried Faults Using Gravity Anomaly Data and Edge Search Algorithm: Application to Kinki Region

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It was shown that the ground motion generated by buried rupture in the period range around 1 sec is larger than the ground motion from earthquakes that ruptured the surface (Kagawa et al., 2001, Kagawa et al., 2003). If we assume that buried ruptures are generated by buried faults, the problem of identification of the buried active faults become important for strong-ground motion predictions. In this work, to search for potential buried faults we used gravity anomaly data: in the situation when density changes with depth, movent of a fault results in the assymetric mass distribution on both sides along the fault. This is detected in gravity field and in many cases the edges of gravity anomaly field coincide with the active faults.

We used Bourger gravity anomaly data published in the CD-ROMs """"Gravity CD-ROM of Japan"""" and """"Gravity database of Southwest Japan"""". For the edge search we applied Sobel algorithm. Threshould of algorithm was adjusted using a fitness/correlation value between the edges and the known active faults in studied area. Before applying the search algorithm, regional trend in the gravity anomaly field was removed. This procedure sharpens the edges.

The applied procedure very well confirms location of known faults with large component of vertical movement (thrust or normal faults) and in few cases was able to detect strike-slip faults too. Some lineaments can be assigned to the boundaries of geological masses, but the nature of many other liniaments is unknown and they potentially can be buried faults.

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