Precise relocation of hypocenters and mapping of spatial distribution of b-value - 1. Yamasaki Fault -

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In source models used for the prediction of strong motions we should specify macroscopic parameters such as the location, length, width, strike and dip of the fault plane of scenario earthquakes, microscopic parameters such as the location, size and number of asperities in each fault, stress drops and slip velocity time functions, a rupture starting point and a rupture propagation type.

The purpose of this study is to provide useful information for specifying some of the above parameters by means of analyses of the seismicity on active faults. Some of the macroscopic parameters such as the location, length and strike of seismogenic fault can be read from active fault maps, however, the width and dip can also be estimated from earthquake distributions for buried faults as well. In addition, some of the microscopic parameters such as the location, size and number of the asperities can be estimated from inhomogeneous distributions of the seismicity on the fault plane. The rupture starting segment can be estimated from inhomogeneous distributions of b-values. In this study, we assume that the rupture starting point is located in areas with low b-values and that the asperities are located in areas with low seismic activity.

We selected the Yamasaki Fault as the target. We combined earthquake catalogues of Tottori Observatory, RCEP, DPRI, Kyoto Univ. and JMA from June 1976 when telemetry observations began at the Tottori Observatory. We chose 4,000 events from the combined catalogue, relocated them with a JHD method (Kissling et al., 1994). We simultaneously obtained 1-D velocity structures and station corrections for P- and S- waves. The JMA catalogue contains data from stations in the Japan University Network from October 1997 and in the Hi-net, NEID from October 2000. Therefore, the accuracy of determined hypocenters has been significantly good in recent years. One of the good points about this relocation method is that the accuracy of hypocenters in the past when the distribution of stations was sparse can be better due to common stations in different periods (Shibutani, 2002).

We chose events beneath the region within +/- 2.5 km from the surface trace of the Yamasaki Fault. We tried to estimate the location, size and number of asperities by detecting low seismicity areas in the depth distribution of the chosen events. Here, we should notice that the absolute accuracy of the hypocenters, especially of the depth could affect the estimations. In this study we can solve the problem by using the data from the recent dens seismic networks and the JHD method as mentioned above.

In the next step we will map b-values in and around the Yamasaki Fault with the same data set and try to estimate a rupture starting segment by detecting low b-value areas.