

Seismic Activity in the Area of the Yamasaki Fault Zone – Summary of Data in 30 Years

Takuo Shibutani[1]; setsuro Nakao[2]; Kazuhiro Nishimura[1]; James Mori[3]; Yasuyuki Kano[1]

[1] DPRI, Kyoto Univ.; [2] RCEP, DPRI, Kyoto Univ.; [3] EQH, DPRI, Kyoto Univ.

<http://www.rcep.dpri.kyoto-u.ac.jp/~shibutan/>

1. Introduction

Yamasaki Fault Zone is an active faults zone with 80 km running in the northwest - southeast direction from Okayama to Hyogo Prefectures. The average recurrence time is estimated as 2,000 years in the northwestern part. More than a half of the recurrence time has passed since the latest large event in 868.

Disaster Prevention Research Institute (DPRI), Kyoto University has started seismic observations in the Yamasaki Faults area since the mid-1960s. Telemetering observation systems installed in the mid-1970s. As a result, the accuracy of the hypocenter determination and the detectivity of earthquakes were improved. In this study, we relocated earthquakes in ~30 years after introducing the telemetering observation systems and investigated in detail features of the seismic activity in the Yamasaki Fault Zone.

2. Hypocenter Data and Relocation

We merged hypocenter data (including arrival times) accumulated by Tottori and Abuyama Observatories, Research Center for Earthquake Prediction (RCEP), DPRI, Kyoto Univ. and Japan Meteorological Agency (JMA) from June 1976 to December 2007. In addition we also merged data from two temporary stations which we recently installed in the southeastern area of the Yamasaki Fault Zone.

We selected 1,776 events for which both P and S times were picked up at 10 stations or more and relocated them by a joint hypocenter determination method with estimating simultaneously 1-D velocity structures and station corrections. Then, we relocated all 27,741 events in the data set with the resulting velocity structures and station corrections. We showed an epicenter distribution map of 16,049 well-determined earthquakes in the figure.

3. Features of Seismic Activity

As shown in the figure the earthquakes occur along the Yamasaki Fault Zone in a large sense. However, for details they do not concentrate on the fault traces as do aftershocks on a fault surface. They form a seismic zone with the half width of ~5 km. The northeastern boundary of the seismic zone is sharp, while the southwestern boundary is obscure.

In the period studied here there was no earthquake with a magnitude of $M_j = 5$ or larger in the seismic zone of the Yamasaki Fault, except an event that occurred on Kuresaka-Toge Fault on May 1984. The seismic activity of this level has been low for over 20 years. However, the seismic activity of smaller earthquakes is high in the vicinity of Kuresaka-Toge, Biwako and Yasutomi Faults.

