

## Mapping of the precision of hypocenter determination

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If no seismic station exist near a hypocenter, we cannot determine the location with high precision. Especially, it is difficult to determine depth of hypocenter. In the case of the 2000 Western Tottori earthquake, networks for microearthquake of Universities and JMA had no station near the aftershock area. The results using only permanent stations show distribution which almost aftershocks are located deeper than true depth. Many temporal aftershock observations show that aftershocks occurred in shallower part of the crust, especially at northern part of the aftershock area. Similar depth shift was observed in a series of seismic activities at Northern Hyogo prefecture in 2001.

The effect of station distribution is estimated by a simple simulation. Theoretical travel time from a given hypocenter position to each seismic stations. A model input data is made from calculated travel times. Then, we relocate the hypocenter using model data and the hypocenter determination program, which is used in routine processing. The results of these simulation show that depth shift is occurred as seen in real observations.

Same simulation is done for wider area. We calculate relocation of model hypocenters for grid points of 5km interval in the 200km x 200km area of Chugoku District. The velocity structure used in Tottori network of Kyoto University is used for calculation of theoretical travel time and re-location. Stations of universities and JMA are used for station distribution. The results are plotted on maps. Depth precision in area apart from nearest seismic station more than 20km is bad. In many cases, re-located hypocenters are deeper than true depth. The 2000 Western Tottori earthquake and earthquakes at Northern Hyogo prefecture in 2001 occurred in less precise area. Using a station distribution including Hi-net stations, there is no bad area in in-land.

These simple simulation provide important information to estimate precision of hypocenter catalog in past, and also is useful to make a plan of new seismic network.