

Upper and middle crustal structure in and around the Hinagu fault system, Kyushu, Japan

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The Hinagu fault system, Kyushu, Japan, is located in the western extension of Median Tectonic Line (MTL), which is a major tectonic boundary in Japan. This fault system is characterized by a quite high seismic activity as compared with the other part of the MTL, and regarded as a higher seismic risk among active onshore faults. The seismic observation by Kyushu University indicates that NS extensional stress is dominant in this region. In order to clarify the physical process of inland large earthquakes, it is inevitably important to obtain a detailed information on various scale crustal heterogeneities and elucidate their relations with ongoing crustal activities in and around the source regions.

In 2003, we conducted an extensive seismic expedition in and around the Hinagu fault area. This expedition involves seismic refraction/wide angle reflection, array observation and natural earthquake observation using temporal and permanent seismic stations. For the refraction/wide-angle reflection study, two profile lines of 56 and 34 km were set in EW and NNE-SSW directions. The crustal structure model for the EW line consists of 2.7-3.2, 4.5-4.7 and 3.0-5.5 km/s layers overlying a 5.8-6.2 km/s, layer. The total thickness of the upper three layers is 1.5-2.0 km with abrupt geometry change in the vicinities of the faults. The velocity below a depth of 6 km is estimated as 6 km/s. The crustal structure beneath the northern half of the NS line is almost comparable to that for the EW line. In its southern half, on the contrary, the upper crustal layers mentioned above show southward thinning, below which 5.5-5.7 km/s body appears.

The observed records shows several remarkable later phases, probably representing wide-angle reflections from the mid crust. The boundaries corresponding to these phases are situated at depths of 6-8, 15-20 and 23-28 km.