

P wave velocity structure at Kuju area in Japan

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Kuju area located at central part of Kyushu Island in Japan is characterized by volcanic and geothermal activity. Kuju volcano is one of the most active volcanos in this area. Recently in 1995 a small phreatic eruption occurred at the volcano. A tomographic study was done at this area. 6439 P arrival times were inverted in order to find a 3-D P wave velocity structure by using the method of Zhao et al. (1994).

The area was divided in blocks of 1x1x1km, covering a volume of 13x9x5km³. Good resolution was found at the southern part of the studied area up to 5km depth by using checkerboard test.

A good correlation with surface geology was found for layer Z=0km (1km above sea level). A high-Vp zone to the northeast was well correlated with lava flows. Low-Vp zones to the southwest were correlated with pyroclastic and volcanic deposits.

A high-Vp zone at 1km depth was found at the southern part of kuju volcano. Another high-Vp zone was found to the northwest at 2km depth. Those two zones were interpreted as fluid-saturated zones related with the geothermal system.

A shallow low-Vp zone from 1 to 2km depth following a northeast trend was found. This zone is believed to be representing a buried tectonic fault, which from point of view of geology is observable at the northeasternmost part. Moreover, some volcanoes are aligned with this shallow low-Vp zone.

A deeper low-Vp zone at 4km depth was found to the southwest. This deeper low-Vp zone seems to be connected with the shallow low-Vp zone mentioned previously. It is possible that the deeper low-Vp zone represents a source of heat for some of the geothermal system and the hot springs located around it. Thus we suggest that the shallow low-Vp zone could be associated also with a transportation zone of fluids and heat from this deeper low-Vp zone to the shallow parts of the geothermal system, and the hot springs.