

High resolution seismic reflection profiling in Gotemba, central Japan

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We collected and processed shallow high-resolution seismic reflection data in Oyama Town and Gotemba City, Shizuoka Prefecture, in order to resolve structures and activity of shallow blind thrust faults buried beneath thick volcanoclastic deposits derived from the Hakone and Fuji volcanoes. We deployed 200 seismic channels, 10-Hz geophones, and mini-vibrator as a seismic source along about 8-km-long seismic line. Common midpoint stacking by use of initial velocity analysis successfully illuminates subsurface geometries of active fault-related fold to 1-1.5 two-way time. Detailed seismic reflection analyses including refraction and residual statics, migration, deconvolution, and time-space variant bandpass filters, and depth-conversion by use of stacking velocities enable to obtain subsurface depth section of these thrust structures. The high-resolution depth section shows that Southwestern extension of the Tanzawa group is thrust over Pleistocene Ashigara Group and younger sediments buried between the Fuji and Hakone volcanoes. Upper tip of the thrust is located at ca 25 m deep beneath the Gotemba mudflow deposits and is possibly active during the late Quaternary. In addition, Ashigara Group is also thrust over the younger sediments (uQt) speculatively correlated with middle to upper Pleistocene Ikudo Formation, Suruga gravel deposits and undefined younger deposits. Angular unconformity between these units is recognized in the seismic section. Additionally upward-decreasing dips in the uQt over the forelimb indicates recent activity of this blind thrust fault during the deposition of the uQt.

Keywords: active fault, Izu collision zone, blind thrust fault, Fuji volcano, Hakone volcano, seismic reflection profile