

Fault geometry on Miura-hanto fault group revealed by an integrated seismic profile using various resolution seismic reflection data

Hidefumi Tanoguchi¹, *Shintaro Abe², Noriko Tsumura¹, Hiroshi Mori³, Ryoyu Arai⁴, Yasuhira Aoyagi⁵

1. Chiba University, 2. AIST, Geological Survey of Japan Research Institute of Earthquake and Volcano Geology, 3. Shinshu University, 4. Kawasaki Geological Engineering Co.Ltd, 5. Central Research Institute of Electric Power Industry

To evaluate how intraplate earthquakes affect the deformation of the surface layer and growth of active faults, it is important to elucidate the continuity of the faults from seismogenic layer to the shallow part. Around the Miura-hanto fault group (MHFG) targeted in this study, several seismic reflection surveys were conducted to clarify fault geometries and those activities. Further long seismic survey line was set crossing at high angle with the trend of the MHFG from Sagami bay to Tokyo bay to reveal the geometry of the Philippine Sea plate's upper surface.

Since spatial resolutions of these surveys arranged from several centimeter to several hundred meter order, it makes us possible to discuss a detailed fault geometry of MHFG from the sea bottom to the depth of the PHS plate boundary by creating integrated profile.

This integrated profile shows that Takeyama fault and Kitatake fault continue from the shallow part to the deep part with their dip loosening. If these faults are extended with their tilts as they are, they seem to merge into an interface derived from the Philippine Sea Plate (PSP). In other words, the MPFG may change those dip angles from steep to gentle as increasing depth and it may be branch faults from the PSP which continues to the deeper part.

In order to understand earthquakes which are expected to occur at the MHFG, we checked a velocity structure around the faults and examined a spatial relationship between it and distribution of local earthquakes' hypocenters. Then we found that very few earthquakes were observed at the depths between surface and 10km along the estimated faults where P wave velocities show approximately 5km, while most of local earthquakes occurred in the depth deeper than 10km. In the source region of another intraplate earthquake such as Iwate-Miyagi earthquake, Okada et al, (2012) estimated a P wave velocity structure and revealed that the aftershocks are concentrated within the region of $V_p > 6\text{km/s}$. Their results might indicate that such part of the faults can radiate the usual seismic waves. Therefore, the shallower part of MHFG down to the depth of 10 to 15km, accompanied with the displacement at the source region, may deform without generating strong ground motion.

Keywords: Miura-hanto fault group, Active fault, Seismic reflection survey