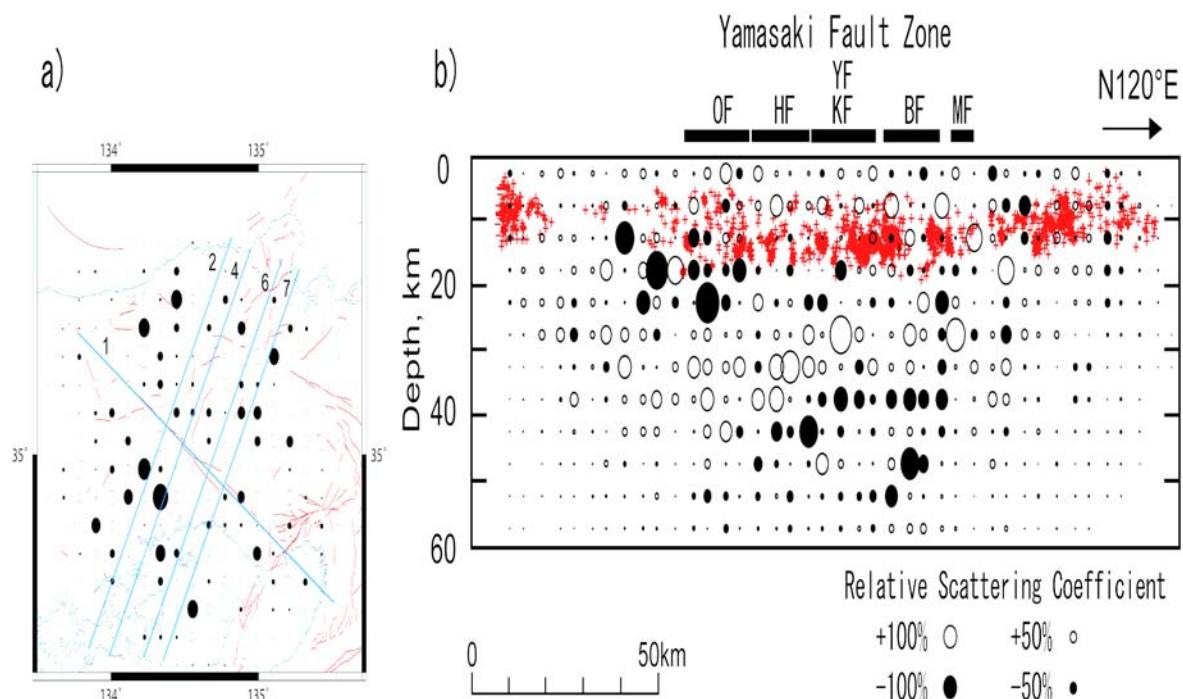


Deep Structure and Earthquake Generating Properties in the Yamasaki Fault Zone Estimated from Dense Seismic Observation

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We have been estimating crustal heterogeneous structure and earthquake generating properties in and around the Yamasaki fault zone, which is a left-lateral strike-slip active fault with a total length of about 80 km in southwest Japan. We deployed dense seismic observation network, composed of 32 stations with average spacing of 5-10 km around the Yamasaki fault zone. We will estimate detailed fault structure such as fault dip and shape, segmentation, and possible location of asperities and rupture initiation point, as well as generating properties of earthquakes in the fault zone, through analyses of accurate hypocenter distribution, focal mechanism, 3-D velocity tomography, coda wave inversion, and other waveform analyses. We also deployed a linear seismic array across the fault, composed of 20 stations with about 20 m spacing, in order to delineate the fault-zone structure in more detail using the seismic waves trapped inside the low velocity zone. We also estimate detailed resistivity structure of the fault zone by AMT (audio-frequency magnetotelluric) and MT surveys. In the scattering analysis of coda waves, we used 1,762 wave traces from 106 earthquakes that occurred in 2002, 2003, and 2008, recorded at 60 stations, including dense temporary and routine stations. We estimated 3-D distribution of relative scattering coefficients along the Yamasaki fault zone. Microseismicity is high and scattering coefficient is relatively larger in the upper crust along the entire fault zone. The distribution of strong scatterers suggests that the Ohara and Hijima faults, which are the segments in the

northwestern part of the Yamasaki fault zone, have almost vertical fault plane from surface to a depth of about 15 km.

We used seismic network data operated by Universities, NIED, AIST, and JMA. This study has been carried out as a part of the project "Study on evaluation of earthquake source faults based on surveys of inland active faults" by Japan Nuclear Energy Safety Organization (JNES).

Fig.1

(a) Horizontal distribution of relative scattering coefficients at a depth of 0-5 km. Open and solid symbols represent stronger and weaker scattering than the average, respectively. (b) Distribution of relative scattering coefficients projected on a vertical cross section along the Yamasaki fault zone. Red crosses show distribution of microearthquakes in 2002, 2003, and 2008 (JMA data). The Yamasaki fault zone is composed of Ohara (OF), Hijima (HF), Yasutomi (YF), Kuresakatoge (KF), Biwako (BF), and Miki (MF) faults, whose approximate location is shown at the top.

Keywords: active fault, deep structure of active fault, crustal heterogeneous structure, segmentation, seismic activity