Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

SSS016-P20 Room: Convention Hall Time: May 24 17:15-18:45

Strong Ground Motion Prediction for Earthquake Scenarios along the Itoigawa-Shizuoka Tectonic Line (2)

Motoko Ishise[1*], Hiroe Miyake[1], Kazuki Koketsu[1], Takaya Iwasaki[1], Motofumi Watanabe[2], Takashi Hayakawa[2]

[1]Earthr. Res. Inst., Univ. Tokyo, [2]ORI

The Itoigawa-Shizuoka Tectonic Line (ISTL) is a major active fault system, which divides the Japan islands into northeast and southwest. The Headquarters for Earthquake Research Promotion reports that the central part of the ISTL with the Gofukuji fault has a probability of a M8-class earthquake occurrence with 14% in the next 30 years. This region of Japan has experienced several earthquake disasters. Thus, it is important to assess strong ground motions for the forthcoming earthquake along the ISTL.
In this study, we have constructed four source fault models for the earthquake scenarios along the ISTL based on the seismic profiling and the geomorphological observations obtained from the Integrated Research Project for Active Fault System along the ISTL (2005-2009). Since the results of the surveys offer multiple possibilities for the fault shape, we prepared two sets of outer fault parameters; one is based on the seismic profiles, 'Seismic Profiling Based Model', and the other is based on the geomorphology and structural geology data, 'Seismic Profiling Based Model'. We assumed four earthquake scenarios for the seismic hazard assessment around the ISTL. (1) all the fault segments ruptured with the source model based on the geomorphological observations with Mw 7.64, (2) all the fault segments ruptured with the source model based on the seismic profiling with Mw 7.68, (3) three northern east-dipping fault segments ruptured with the source model based on the seismic profiling with Mw 7.14, (4) three southern west-dipping fault segments ruptured with the source model based on the seismic profiling with Mw 7.23. We calculated distributions of PGV and seismic intensity for the earthquake scenarios at ground surface using the empirical attenuation relationship [Si and Midorikawa, 1999] with the local site amplification with a mesh size of 250 m [Wakamatsu and Matsuoka, 2005]. We also simulated broadband ground motions using the hybrid method [e.g., Irikura and Kamae, 1999] considering the rupture processes inferred from the source fault models. The predicted ground motion strongly depends on the earthquake scenarios. The ground motion at Suwa show smallest variation (about 5 times) and those at Joetsu show largest variation (about 30 times). As well as the configuration of the source fault and location of asperity, the site amplification factors have a significant influence on the amplitude of the ground motion.

Keywords: Itoigawa-Shizuoka Tectonic Line, earthquake scenario, strong ground motion prediction