Variance of Ground Motion Intensity by Stochastic Green's Function Method Part 2 Influence of Asperity and Rupture Start Point

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In this study, we have examined the variation in the intensity of the ground motion simulated by the stochastic green's function approach. The influence of variation of the position of the asperity and the rupture start point on the ground motion intensity (PGA, PGV and the acceleration response spectra (5%)) is simulated. The fault model is constructed based on Irikura's 'recipe', whereas the position of the asperity and the rupture start point are arranged based on Kito et al.(2007).

The strike-slip fault of Mw 6.5 is assumed. The fault length and the fault width are respectively 24km and 15 km. The ratio of the asperity area to the fault area is 22%. The phase waves for the sub faults are generated based on Kagawa (2004) considering coherent source time function in the long period range. The empirical envelope function by Murakami et al. (2002) is adopted, accounting for the dependence of the duration on the hypocenter distance. The acceleration time histories are calculated at 21 sites, the closest distances from the rupture surface are 10, 20 and 50 km.

The variance of the ground motion intensity is larger along the rupture direction than along the other directions. The variance of the response spectra increases for the longer period, and keeps constant or decreases for the period longer than 1 sec. The probability distribution for PGA, PGV and the response spectra follows the lognormal distribution within three sigma.

The variance of the ground motion intensity due to the variation of the position of the asperity and the rupture start point decreases as the fault distance increases. The probability distribution for PGA, PGV and the response spectra follows the lognormal distribution within two sigma, while it seems to have both the upper and the lower bounds at the near field in case of the response spectra for the long period range.

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