On the anomalies of distribution of Green's function amplitudes for M9 source in Nankai trough

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Effect of various areas (asperities or SMGA) in source of a megathrust subduction zone earthqauke on the simulated long-period ground motions is studied. For this case study we employed source fault model proposed by HERP (2012), for future M9-class event in Nankai trough. Velocity structure is 3-D JIVSM model developed for long-period ground motion simulations (Koketsu et al., 2012). Target site is located in center of Osaka basin. Green's functions for large number of subsources (>1000) were calculated by the finite-difference method using reciprocity approach. Depths, strike angles and dip angles of subsources are adjusted to the shape of upper boundary of the Philippine sea plate in the JIVSM model.

Results for period range 4-20sec are shown in the Figure below. Figure shows distribution of peak amplitudes of Green's functions, calculated at the target site in Osaka basin (marked by triangle). Darker colors indicate subsources producing larger amplitudes in Osaka, while lighter colors indicate smaller amplitudes. Strongly nonuniform distribution is observed, with two areas of anormal large amplitudes: (1) large elongated area just south of Kii peninsula and (2) a smaller area north of Suruga bay. Elongation of both areas fit well 10-15km isolines of depth distribution of the Philippine sea plate, while target site is located on a perpendicular to these isolines. For this reason, preliminarily we suppose that plate shape may have critical effect on the simulated ground motions, through a cumulative effect of subsource radiation patterns and specific strike and dip angle distributions.

Keywords: Megathrust earthquake, Source modeling, Green's function, Long-period ground motions, Reciprocity method, Nankai trough