Geophysical Research Abstracts, Vol. 7, 05174, 2005
SRef-ID: 1607-7962/gra/EGU05-A-05174

Simulation of strong ground motion by hybrid green's function technique: application to the 2004 Parkfield earthquake

B. Sanli, E. Durukal and M. Erdik

Bogazici University, Kandilli Observatory and Earthquake Research Institute, Department of Earthquake Engineering, Istanbul, Turkey (banu.sanli@boun.edu.tr, durukal@boun.edu.tr , erdik@boun.edu.tr / Fax: +90 216-3080163 / Phone: +90 216-3329701)

Strong ground motions from a large earthquake are simulated using hybrid Green's function technique. In the hybrid Green's function method, synthetic ground motions representing a small event are used as Green's functions instead of real records. Basically Green's functions are simulated by combining high-frequency and low-frequency parts of ground motion. The high frequency small event motions are obtained using the stochastic method of Boore (1983). The frequency dependence of the radiation pattern is taken into consideration when calculating the two horizontal components of ground motion from the average horizontal motion found from the stochastic approach. The low frequency motions for the small event are simulated by discrete wave number method (Bouchon, 1981). The total small event motions are synthesized by summing the low and high frequency parts. Ground motions due to a large earthquake are simulated as in the EGF method where a delay-sum of small events is introduced based on a seismological spectral model (Irikura, 1986). The reliability and the efficiency of the approach is tested by simulating the ground motion recorded at the rock sites during the September 28, 2004 Mw 6.0 Parkfield earthquake. Preliminary asperity models are utilized in the analysis. The results are interpreted from the point of view of applying the technique to regional simulation of earthquake ground motion and difficulties associated in particular with the velocity simulations are discussed.