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Stochastic Ground Motion Simulation of the 12 October 1992 Dahshour Earthquake

Sayed S.R. MOUSTAFA[1] and Hiroshi TAKENAKA[2]

[1]Department of Seismology
National Research Institute of Astronomy and Geophysics, Helwan, Cairo, Egypt
e-mail: sayed.moustafa@gmail.com (corresponding author)

[2]Department of Earth and Planetary Sciences
Faculty of Science, Kyushu University, Fukuoka, Japan
e-mail: takenaka@geo.kyushu-u.ac.jp

Abstract

The stochastic method for finite faults is applied to simulate the ground motion of the 12 October 1992, m_b = 5.9, Dahshour earthquake. The method includes discritization of the fault plane into certain number of subfaults, and a ω-squared spectrum is assigned to each of them. Contributions from all subfaults are then empirically attenuated to the observation sites, where they are summed to produce the synthetic acceleration time-history. The method is first tested against its ability of reproducing the recording at Kottamya station. The calibrated model is then applied to calculate the synthetics at a large number of grid points covering the area around the fault plane. Simulated peak values are subsequently used to produce the synthetic peak horizontal acceleration map for the area.

We compare the peak horizontal acceleration with the attenuation laws proposed for Egypt as well as the macroseismic intensity map of the 1992 Dahshour earthquake. The peak horizontal acceleration contours estimated using the calibrated model are mostly consistent with the observed intensity values and evidences of strong ground motions. Our results encourage the application of the approach as a supplementary tool for site-specific strong ground motion prediction.

Key words: stochastic ground motion simulation, Dahshour earthquake.