

Estimation of S-wave velocity structures in Turkey: (2) Avcilar - Istanbul

Oguz Ozel[1]; Tsutomu Sasatani[2]; Kazuyoshi Kudo[3]; Tatsuo Kanno[4]; Seiji Tsuno[5]; Masataka Yoshikawa[5]; Shinako Noguchi[1]; Masakazu Miyahara[1]; Hiroyuki Goto[6]

[1] Earth and Planetary Sci., Hokkaido Univ; [2] Earth and Planetary Sci., Hokkaido Univ.; [3] Earthq. Res. Inst., Univ. Tokyo; [4] Hiroshima Univ.; [5] Arch, Eng, Univ of Tokyo; [6] Engineering, Kyoto Univ.

Approximately 1000 people were killed by the collapse of buildings in the west part of Istanbul, Turkey, during the 17 August 1999 Izmit earthquake ($M_w=7.4$), whose epicenter was roughly 90 km east of the city. Most of the fatalities and damage occurred in the suburb of Avcilar that is 20 km further west of the epicenter than the city proper. As a continuation of the same type observations carried out soon after the 17 August 1999 Izmit earthquake, array observations of microtremors were carried out in September, 2003 at this heavily damaged area (AVC) and at a very close site to the international airport in Istanbul where a permanent strong-motion station is located (DHM). On the other hand, U.S. Geological Survey, in cooperation with Bogazici University, performed a small tripartite array observation of aftershocks at AVC to study site effects and propagation of the seismic wavefield. We estimate the empirical amplification functions coming out from the aftershock data. The main objective of the current array observations of microtremors is to determine S-wave velocity structures at deeper parts beneath these sites and to compare the empirical amplification function with theoretical ones in order to understand the site effects on strong-ground motion and damage pattern. The spatial autocorrelation (SPAC) method is used in analysis of array data of microtremors for determining S-wave velocity structures. Then, we verify the S-wave velocity structures derived from microtremor data through the comparison of empirical and theoretical amplification functions; we obtain a reasonably good agreement between them.