



Influence of source distance on site-effects in Delhi city

I. A. Parvez (1), F. Vaccari (2), G. F. Panza (2,3)

(1) CSIR Centre for Mathematical Modelling and Computer Simulation (C-MMACS), NAL Belur Campus, Bangalore, India, (2) Department of Earth Sciences, University of Trieste, Via E. Weiss 4, 34127 Trieste, Italy, (3) The Abdus Salam International Centre for Theoretical Physics, SAND group, Trieste, Italy (parvez@cmmacs.ernet.in / Fax: +91 80 25220392 / Phone: +91 80 25051909)

The seismic ground motion along a geological cross-section from Tilak Bridge to Punjabi Bagh in Delhi city has been simulated at every 130 meters with a hybrid technique (modal summation and finite differences). We use two earthquake source scenarios: (1) August 27, 1960, $M=6.0$ at a distance of about 45 km (near source) and (2) a large ($M=8.0$) earthquake due in the central seismic gap in the Himalayan region, at a distance of about 225 km (far source). We focus on the influence of the seismic source location and focal mechanism on site-response, which, in general, is neglected in traditional site-effect studies. We compare the Response Spectra Ratio (RSR) for frequency up to 3 Hz computed due to far and near sources. We observe 6-7 times higher amplification in the radial component at around 2-2.5 Hz due to the far source as compared to the near source. However, there is some amplification, of the order 2-3, at lower frequencies (less than 1 Hz) due to the near source, which is missing when the far source is considered. To validate our results, we compare the RSR, obtained from the signals at soft sites, namely CPCB, IHC and CSIR, normalized to the bedrock Ridge site, recorded during Chamoli earthquake of 1999, with the RSR at similar sites theoretically computed along our 2-D geological cross-sections.