Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08635, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08635
EGU General Assembly 2008

When does strong-motion modelling using 1D models sufficiently well reproduce 2D-modelling results?

W. Imperatori (1), H. Aochi (2), P. Suhadolc (1), J. Douglas (2), G. Costa (1)

(1) Dipartimento di Scienze della Terra, Università degli Studi di Trieste, via E. Weiss 1, 34127 TRIESTE, Italy, (2) BRGM –ARN/RIS, 3 avenue C. Guillemin, 45060 ORLEANS Cedex 2, France, (suhadolc@units.it)

Information on the 2D or 3D velocity crustal structure is still largely unavailable in most regions of the world. Even in areas where such information is available, 1D models are still used in many seismological applications. We perform a series of tests to evaluate how well different 1D approximations of a 2D structural model reproduce the ground motion, in particular its peak amplitude. We consider the case of a 2D section in Friuli (NE Italy) obtained on the basis of available data and approximate it with 1D models, both by averaging the 2D model along the source-receiver distance and by taking the local structure under the receiver. Synthetic seismograms are computed with an upper frequency cut-off of 0.6 Hz using point-sources and the finite-differences technique. We then compare the waveforms and the 1D and 2D behaviour of peak ground velocity (PGV) with distance. The analysis of the role played by the main heterogeneities on the propagating wavefield permit us to conclude that an acceptable fit to the 2D PGV values for the entire section is possible only if we consider at least two 1D models. 1D models provide an acceptable fit to the 2D PGV values only in the following two cases: along the entire model distance range the averaged models give the best performance and at some points receiver-based 1D models fit the 2D PGV values better than other 1D models.