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SITE EFFECTS IN GROUND MOTION SIMULATION FOR UPSTRAT-MAFA TEST AREAS

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The development of a common approach to generate simulations of earthquake ground motion was one of the main goals of the UPSTRAT-MAFA project. The calibration of the input parameters for the simulations requires both the integration of instrumental observations as well as the macroseismic fields, being instrumental strong ground motion data rare. In the framework of the project the approach was applied to various test areas, including volcanic (Southern Italy volcanoes, Azores, Iceland) as well as tectonic (Main land Portugal, Alicante-Murcia, south-eastern Spain). The stochastic finite-fault simulation method has been used for the generation of synthetic ground motion, sensitivity tests with respect to input parameters were carried out comparing both instrumental data (Fourier amplitude spectra, response spectra and peak ground motion) as well as macroseismic observations, where ground motion records are scarce, to the results of synthetic simulations.
Specific care has to be devoted to the identification of the seismogenic environment of potentially damaging earthquakes. In volcanic areas small events located closely to the surface are known to be of importance, and must be distinguished from deeper events as they follow different scaling laws. A further issue is the inclusion of site effects in the simulation. In the framework of the stochastic finite-fault simulation modelling, local site effects are accounted for by spectral site correction functions. Besides generic geological and geotechnical data, ambient noise can be used for the estimation of the site corrections. In this context, the inversion of velocity models from noise measurements (such as H/V spectral ratios) is of particular interest. The knowledge of the subsurface conditions under a site allows to adjust the site corrections according to factors such as the source-receiver configuration (e. g., distance, source depth and ray incidence which may alter the characteristics of the spectral site correction function (Fig. 1). We discuss this aspect for examples both in volcanic and tectonic areas.

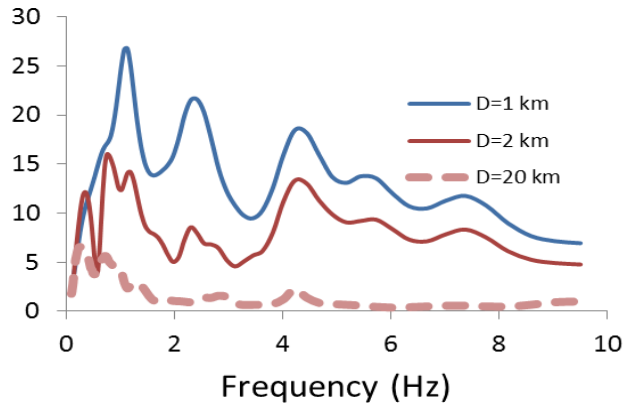

Fig. 1. Theoretical distance dependence of site correction for station CTA (Sicily, soil condition “D”).

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