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Evaluation of ground motion simulations for the city of Thessaloniki, Greece using the FD method: the role of site effects and focal mechanism at short epicentral distances

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Thessaloniki is lying across Thermaikos gulf in the Northern part of Greece. Its moderate earthquake activity is controlled by a significant number of active faults, striking in close distances from the city (Papazachos et al, 2001). The city's geographical position and financial importance imposes the need for a thorough and complete study of the structure and the expected ground motions. There are only two available studies which provide 3D information for the basin structure of the metropolitan area of Thessaloniki, performed by Anastasiadis et al. (2001) and Apostolidis et al. (2004). The results from both studies are used to shed some light into the ground motion properties in Thessaloniki in 3 dimensions. Using a computer code that implements a 3D - 4th order staggered-grid velocity-stress finite-difference scheme (Moczo et al., 2002) full 3-dimensional synthetics of ground motion have been computed. The complete synthetic waveforms (time series and frequency content) for 20 positions spread in the metropolitan area of Thessaloniki are used for studying strong motion properties. Moreover parametric studies such as the impact of focal mechanism in the expected strong motions are also examined. Preliminary results show a significant dependence of the expected ground motions on the focal mechanism of the earthquake produced them, at least for short epicentral distances. Older efforts employed for ground motion assessment in the specific area in 2 dimensions (e.g. Raptakis et al., 2004a,b, Tri-

antafyllidis et al., 1998, 2001) are also incorporated for the evaluation of the obtained results. The final goal is to obtain 3D synthetic waveforms that will be representative of the expected ground motion for the city of Thessaloniki and if possible minimize uncertainties in the available structural models.