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INVESTİGATİON OF EARTHQUAKE SOURCE AND GROUND MOTİON CHARACTERİSTİCS BY MEANS OF NUMERİCAL MODELS

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We bring together competences in physics-based numerical modeling of waveform propagation and frictional sliding to simulate the complexity of earthquake source (kinematically and dynamically) and near-source broadband ground motion (deterministic and stochastic), with the final goal to quantify statistical properties of ground-motion variability and to propose physics-based Ground Motion Prediction Equations (GMPE) for engineering applications. This work involves the derivation of dynamic source parameters from real earthquakes and theirs scaling relations; the investigation of the upper frequency limit of deterministic ground motion simulations; and the contributions of source complexity to the near-field ground motion spatial variability. The 2009 L'Aquila, Italy, earthquake is extensively studied to this purpose. A database of 360 synthetic physics-based earthquakes is used to investigate the feasibility of the development of physics-based GMPEs and to study the effects of source parameters on ground motion predictions as well as a sensitivity of near-source ground motion to source (correlation) statistics.

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