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LESSONS LEARNT BY PARAMETERISING A NEAR-FIELD WAVEFORM DATASET GENERATED BY DYNAMIC RUPTURE SIMULATIONS

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Selectively presented in this contribution are the key results obtained by parameterising a near-field synthetic waveform dataset based on dynamic rupture models (Baumann and Dalguer, 2014) in the moment magnitude range $5 < M_W < 7+$ relevant for seismic hazard studies in central and western Europe. Developing predictive equations using synthetics allows: a) to overcome the difficulties posed by the paucity of near-field data in the calibration datasets of empirical ground-motion prediction equations (GMPEs); b) to expand our understanding of source-dominated ground-motion phenomena; c) to investigate the characteristics of "noise-free" long-period ground motions. We identify the main explanatory variables by analysing the variation of the synthetic peak ground-motions and response spectral ordinates as a function of different predictors, including earthquake source parameters in addition to classical source-to-site path terms. Our approach is largely based on verifying whether the common predictive equations used in empirical and semi-empirical GMPEs (Gregor et al., 2014; Douglas et al., 2014) are appropriate for the parameterisation of our synthetic data suite. Corrective terms or alternative functional forms are introduced if supported by the synthetic data. Emphasis is placed on the impact of using different finite-fault distance metrics on the predictions, with special reference to the oversaturation (Baumann and Dalguer, 2014; Graizer et al., 2013) of peak-motion amplitudes apparent from our synthetics at distances smaller than the depth to the top of rupture. Spurred by the recently published findings of the NGA-West2 project (Gregor et al., 2014) we further discuss the parameterisation of hanging wall and directivity effects and their impact on the severity of ground-shaking in the near-source region.

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