THE 2011 MW 5.2 LORCA EARTHQUAKE AS A CASE STUDY TO INVESTIGATE THE GROUND MOTION VARIABILITY RELATED TO THE SOURCE MODEL

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Near-field recordings are very sensitive to the spatiotemporal details of the rupture process while far-field signals show the signature of the overall ‘‘point-source’’ earthquake mechanism. Near- and far-field recording ranges are dependent on the event magnitude and modulate the variability of the ground motion. This study investigates the ground motion and

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the source-related near-field variability for the 2011 Lorca earthquake, a moderate seismic event (Mw = 5.2) that caused significant localized damage in the Region of Murcia, Spain. The low-frequency content (up to 1 Hz) is simulated by the wavenumber integration method assuming four different source models obtained by inversion of geodetic or seismological data. As a first result, we estimate the variability of the ground motion. We observe that the dispersion in the peak and spectral parameters is larger at LOR, the closest station to the source, and decreases as the source distance increases (more than 50 km far from the source) where the finite-fault effects become negligible. The variability of the pseudo spectral velocity at 2 s is within the ground motion prediction equation ±1 sigma, apart from the very near-source station and those stations affected by forward directivity effects. These effects are also found in high-frequency seismograms obtained by the empirical Green’s functions approach.