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Strong ground motion simulation of the 2013 MS 7.0 Lushan, China, earthquake

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The near source strong ground motions of the 2013 MS 7.0 Lushan, China, earthquake were simulated using empirical Green's function (EFG) method. At first, we estimated the amount and location of strong motion generation areas (SMGA) based on the character of both slip distributions from far-field seismic inversion and the envelopes of recorded acceleration from main shock, and determined the amount of subfaults on SMGAs referring to the scaling law introduced by Somerville et al.. Then, we implemented the genetic algorithm searching for the optimized source parameters. Based on the source models, we synthetized the waveforms for the 30 stations selected near the source region. Our results show that the comparison between the synthetic waveforms and the observed records agree very well with each other, especially for the part of high-frequency larger than 1.0 Hz. We found that there are two obvious SMGAs on the fault, which take the position that the asperities from far-field seismic inversion take. The combined strong motion generation areas we obtained were smaller than those values predicted by extension of the scaling law by Somerville et al..