Fling-step recovering from near-source waveforms and ground displacement attenuation models

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We present a processing scheme (eBASCO, extended BASeline COrrection) to remove the baseline of strong-motion records by means of a piece-wise linear de-trending of the velocity time history. Differently from standard processing schemes, eBASCO does not apply any filtering to remove the low-frequency content of the signal. This approach preserves both the long-period near-source ground-motion, featured by one-side pulse in the velocity trace, and the offset at the end of the displacement trace (fling-step). Hence, the software is suitable for the identification of fling-containing strong-motion waveforms. Here, we apply eBASCO to reconstruct the ground displacement of more than 400 three-component near-source waveforms recorded worldwide (NESS1, http://ness.mi.ingv.it/; Pacor et al., 2019) with the aim of: 1) extensively testing the eBasco capability to capture the long-period content of near-source records; 2) calibrating attenuation models for peak ground displacement (PGD), 5% damped displacement response spectra (DS), permanent displacement amplitude (PD) and period (Tp). The results could provide a more accurate estimate of ground motions, to be adopted for different engineering purposes such as performance-based seismic design of structures.

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