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## Estimate of ground motion for simplified and complex source models: the 1997 Umbria-Marche earthquake (Central Italy) as study case

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We modelled the main shock earthquake (Mw=6.0) of 26 September 1997 occurred in the Umbria-Marche region (central Italy) generating velocity and acceleration wave fields (up to 5 Hz) at a grid of 64 receivers and at eight sparse stations where recorded accelerations were available.

To simulate the full wave field we applied the modal summation technique, and we considered two different source models as proposed in the literature, with different rupture velocities and slip distribution on the fault. For each simulation we computed the peak ground motion values and some integral ground motion parameters in order to estimate their variability as function of the source process modeled.

The comparison between recorded and computed seismograms obtained from the source model retrieved by inversion of real data, as proposed in the literature, shows a good fit for bedrock sites despite the simplified 1D velocity model adopted. The directivity effect is confirmed by the accelerometric data recorded close to the source.

Subsequently we investigated how the computed patterns relate with the cumulative damage effects as reported in the observed macroseismic data points. The theoretical intensity values obtained from displacement or velocity strong motion compare well with the observed macroseismic data points.

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