

Supplementary Materials

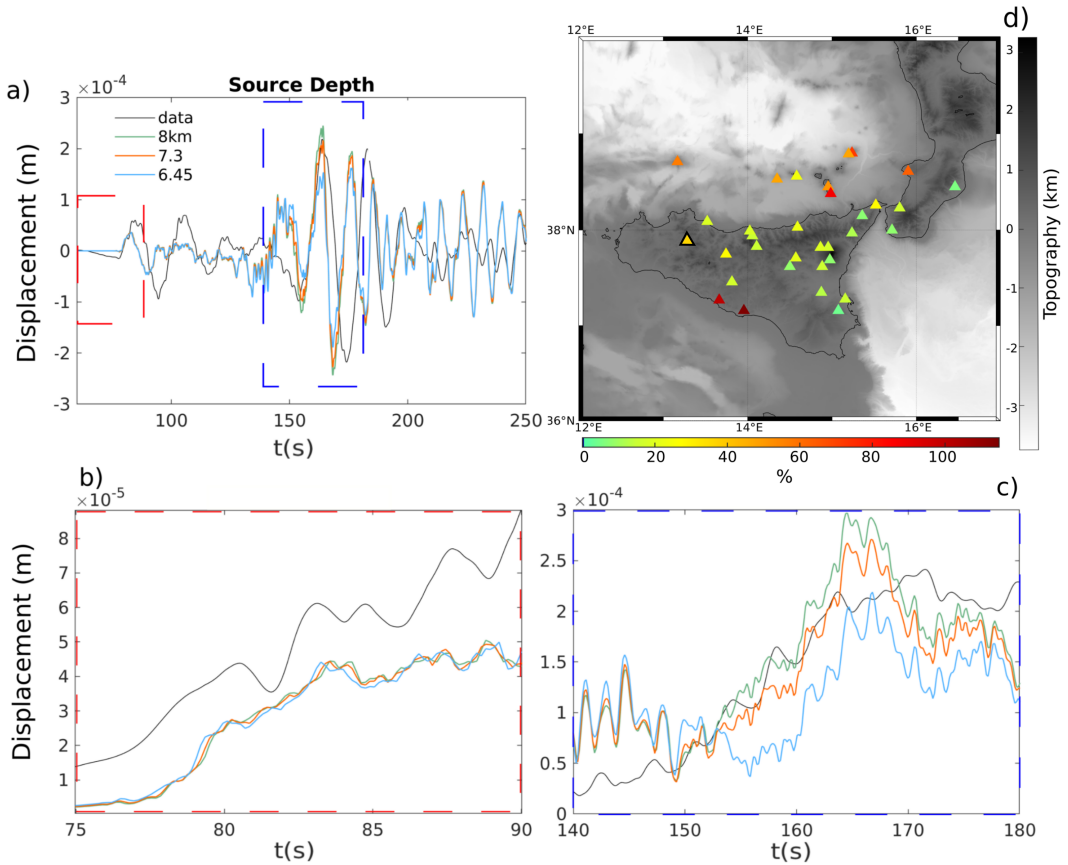


Fig. 1 **a:** Comparison between the station recording (coordinates: $37.89, 13.30$; triangle contoured by the black edge) and the synthetic waveforms that are obtained using different focal depths (Tinti et al 2016, Istituto Nazionale di Geofisica e Vulcanologia). The boxcar is set with a rise time of 4s. **b** and **c:** Enlargement of the two insets in panel (a). They show the comparison between envelopes in the two time windows corresponding to compressional waves arrival and from S-wave arrival, respectively (dashed red and blue lines). **d:** Percentage differences of the correlation coefficients computed for a focal depth of 7.3 km with respect to 6.45 km.

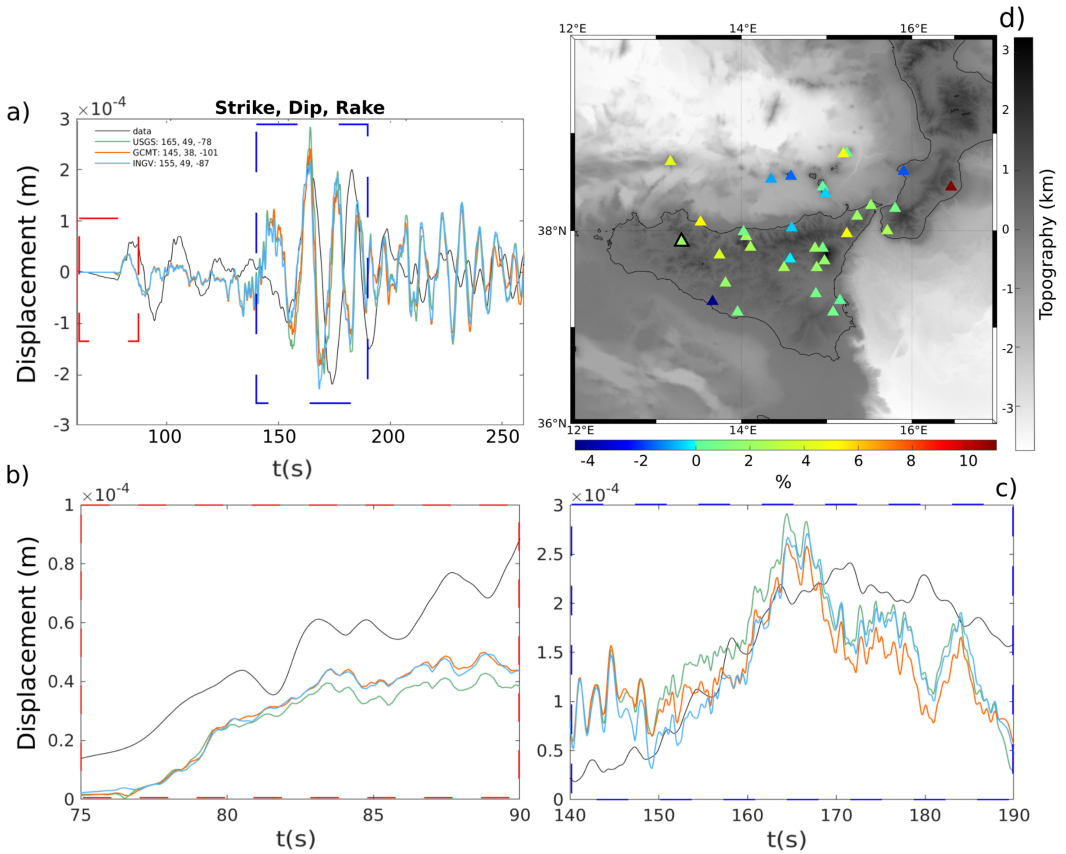


Fig. 2 **a:** Comparison of synthetic seismograms varying the strike, dip and rake values (INGV, GCMT Global Centroid Moment Tensor Catalog, USGS Earthquake Hazards Program). The boxcar is set with a rise time of 4s and the focal depth is 7.3 km. The used station is indicated by the triangle contoured by the black edge. **b** and **c:** Enlargement of the two insets in panel (a). **d:** Percentage differences of the correlation coefficients computed for the INGV and USGS focal mechanisms.

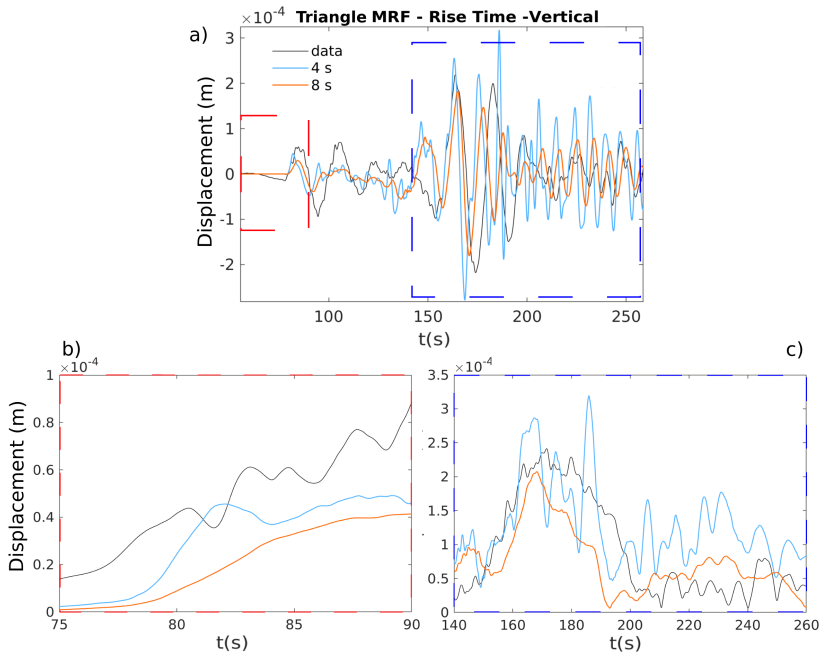


Fig. 3 Rise time variation for the triangle MRF. The depth is fixed at 7.3 km.

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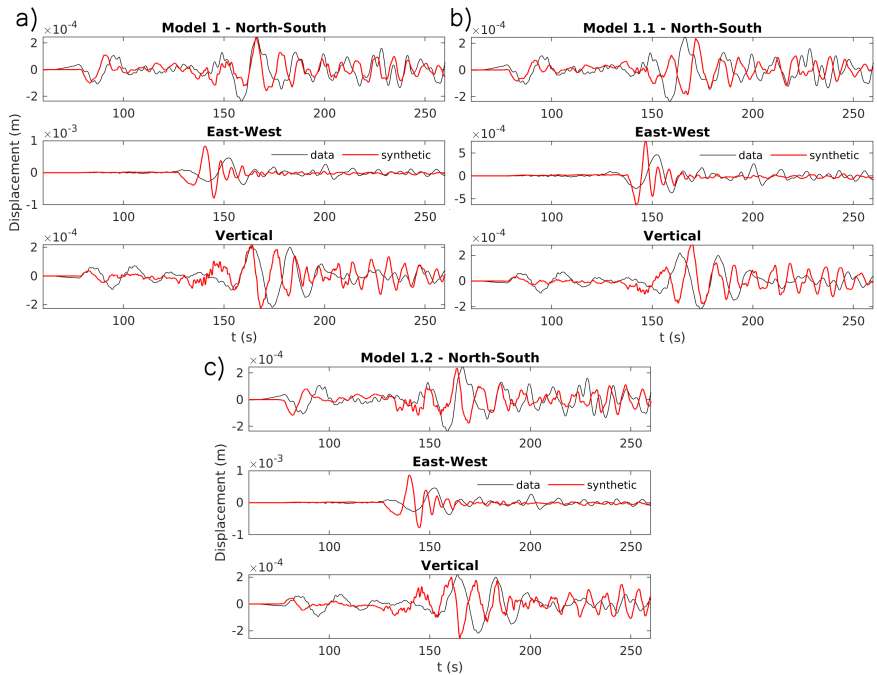


Fig. 4 Comparison of the three seismogram components with the synthetic waveforms obtained implementing different velocity models. Layers velocity is shown in Tab. 2. The crust thickness is set according to Manu-Marfo (2019), the sediments are 2 km thick below the continental regions and there are no sediments below the sea (as explained in section 2.1).

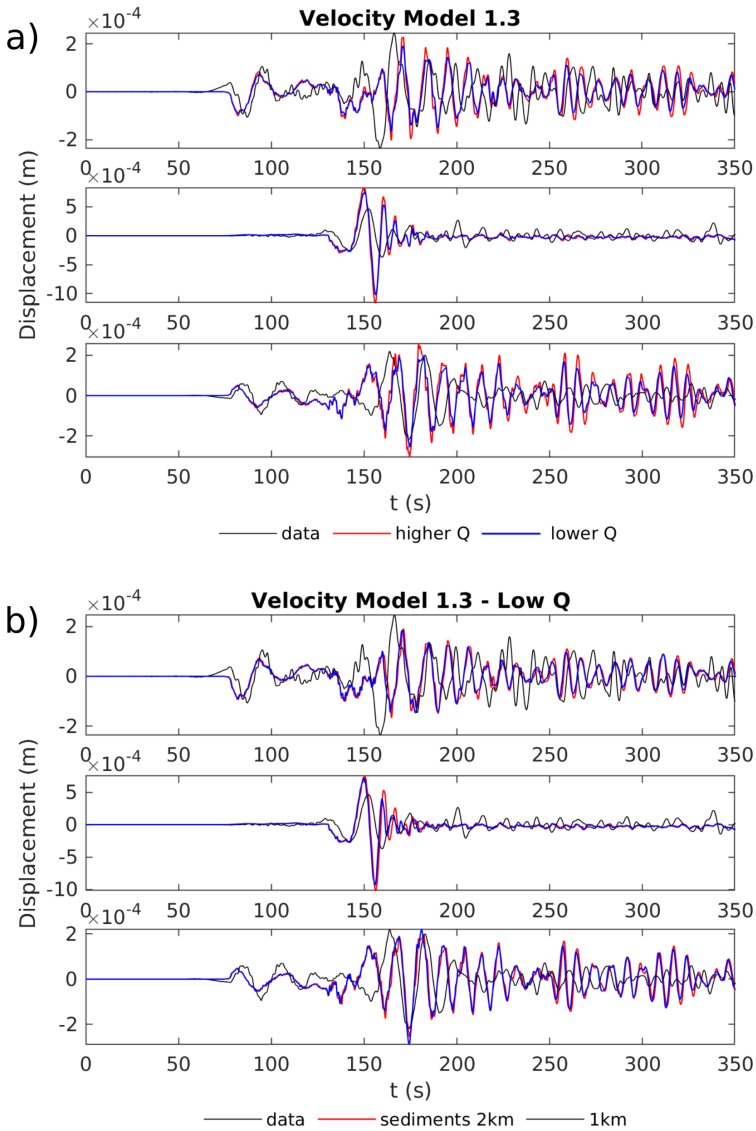


Fig. 5 Effects of the variations of the P and S waves quality factors (a) and the thickness of the sediments (b) on the waveforms amplitude. From the top below, the seismograms correspond to north-south, east-west and vertical components, respectively.

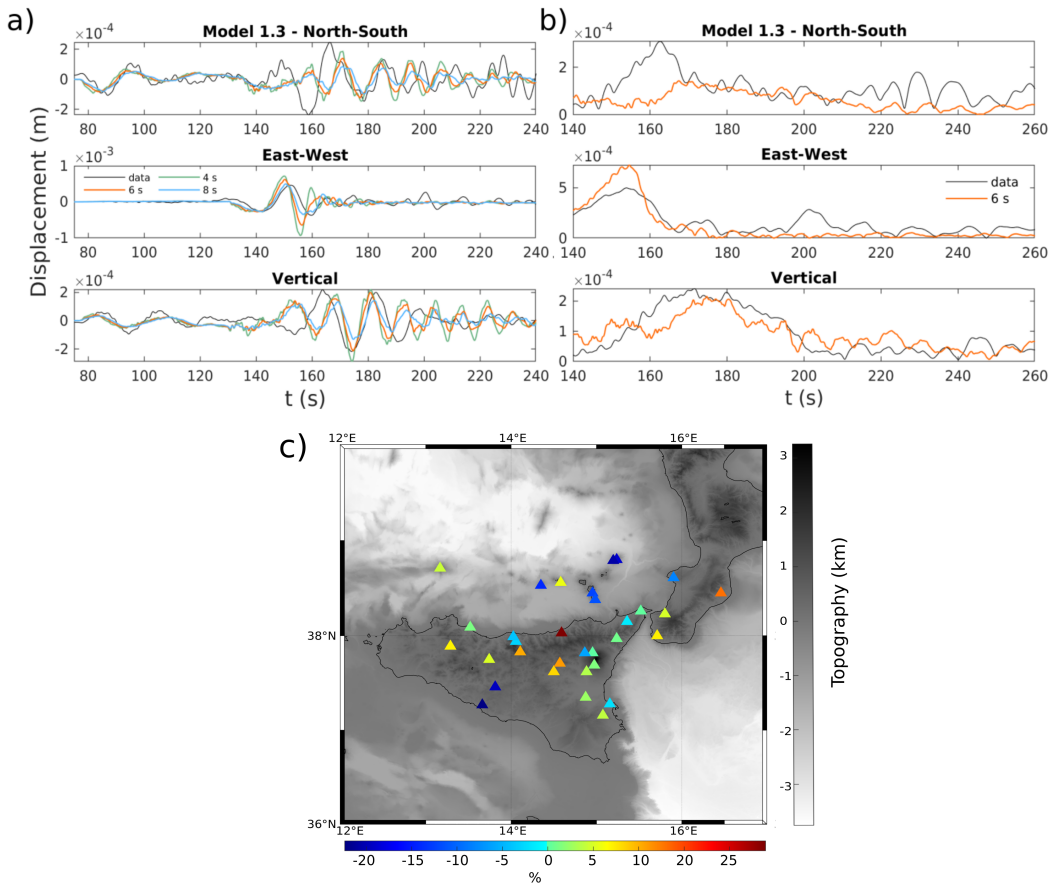


Fig. 6 **a:** Effects of different rise times assuming velocity Model 1.3. **b:** Comparison between envelopes of the recordings and the synthetic seismograms for a rise time of 6s. From the top below, the seismograms correspond to north-south, east-west and vertical components, respectively. **c:** Percentage differences of the correlation coefficients computed for a rise-time of 6s and 4s at each station.

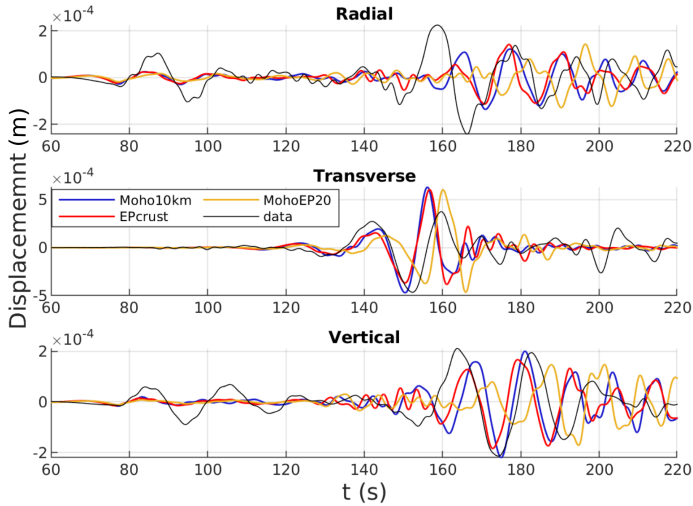


Fig. 7 Comparison between the different Moho models (Tab. 3) for each seismogram components, recorded at the station in Sicily.

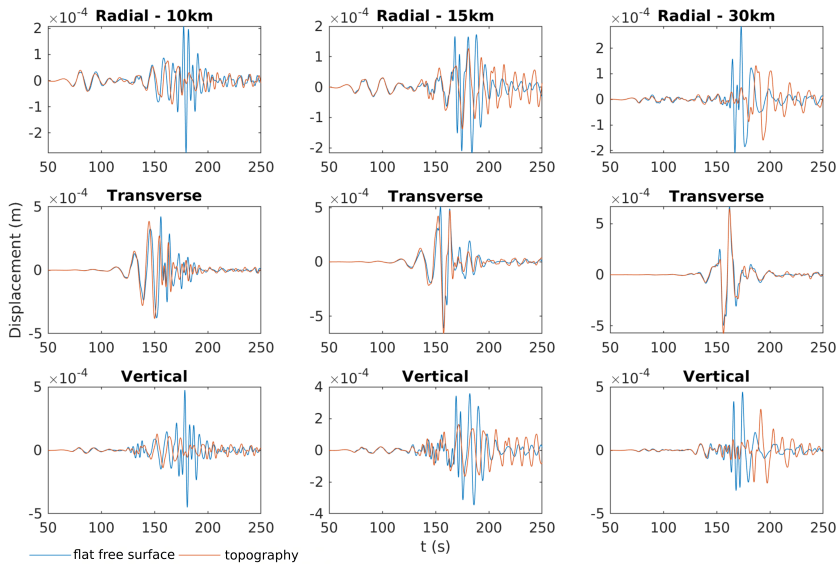


Fig. 8 Comparison between flat free surface and topography for 3 different layered models by varying the Moho interface depth: 10km (left panels), 15km (center panels), 30km (right panels).