



High-resolution crustal structure in the area of the 2016-2017 seismic sequence of Central Italy: insights from Receiver Function analysis

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The 2016-2017 seismic sequence of Central Italy has been characterized by the occurrence of medium to large magnitude events along a complex fault system with diffuse seismicity distributed at different depth levels. It has been shown that the rupture of the largest event propagated along two different fault segments potentially associated to complex shallow crustal seismic geometries. Moreover, along-strike profiles of microseismicity clearly depict an heterogeneous depth-distribution of hypocenters, suggesting that such complex structure can extend to the mid-crustal level. Despite the huge amount of seismic data available from active and passive seismic surveys, a clear picture of the entire crust is still lacking.

In this study, for the first time, we depict the geometry of the main crustal seismic discontinuities across the area of the 2016-2017 seismic sequence of Central Italy. High-resolution receiver function (RF) have been computed for about 70 temporary and permanent seismic stations deployed during the sequence, with an inter-station distance between 5 and 10 km. Such passive seismic data-set is used to (a) image the complex shallow crustal structure associated to the multi-segmented events via CCP migration, and (b) reconstruct a pseudo 3D S-wave velocity model of the area based on single-station RF inversions. Our results provide new constraints in terms of geometry of crustal seismic discontinuities and S-wave velocity measurements for the entire area, to be compared with, e.g. results from local earthquake tomography, seismicity relocation and ambient noise measurements.