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Lithospheric structure and kinematic decoupling across the Pollino range

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The Pollino area in southern Italy is the hinge between the Apennines and the Calabrian arc. The area lacks of significant large earthquakes in historic times and is thought to be a persistent seismic gap. Recently, seismic swarms occurred within the gap area, creating concerns for incoming large earthquakes. In this study, we investigate the lithosphere structure across the Pollino range by merging a huge set of broadband data recorded at permanent and temporary stations. We compute angular harmonics of the P-wave receiver function (RF) data-set along profiles normal to the boundary between the Southern Apennines and the Calabrian arc and perpendicular to the Ionian subduction. The k=0 harmonics, i.e. the isotropic components, of the RF are migrated at 40 km depth, by using the CCP approach.
Migrated RF profiles show a sub-vertical lithospheric discontinuity across the range, defined by an abrupt change in Moho depth and mantle fabrics. The earthquake swarm activity occurs south of the lithospheric-scale discontinuity that likely decouples the delamination-related extension of the Apennines from the extensional collapse of the Calabrian fore-arc. This large-scale discontinuity implies the segmentation of the normal fault system across the range, limiting the lateral extent of faults.