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# Upper mantle heterogeneity and depth-dependent anisotropy in the Central Mediterranean subduction zone

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The Central Mediterranean subduction zone is of particular interest due to complex dynamic process with a westward retreating trench. The openings of several basins, such as the Tyrrhenian Basin are coupled to the slab evolution. However, details of the process are still unclear. Further complexities of the subduction dynamics are caused by a series of slab windows in the Calabrian arc, as indicated by body wave tomography and complex pattern of magmatism.

Here, we apply a Rayleigh surface wave tomography for a part of the Central Mediterranean subduction zone, the Tyrrhenian Sea. The retrieved anisotropic phase velocity maps provide a more sophisticated image of the 3D anisotropic structure than teleseismic shear wave splitting measurements with their restricted depth resolution. Our results reflect the disrupted subduction dynamics of the study area. Changes in fast orientations and anisotropic strength appear for different periods corresponding to different depths. In the shallower parts (up to 60 s) the fast orientations are oblique to the trend of the trench. The anisotropic strength is low, but onshore anisotropy is stronger then offshore. For periods of 80s and more, the pattern changes. The anisotropy in northern Italy becomes stronger, while in the southern part the trend change to more trench parallel orientations.

Additionally, the inversion for isotropic shear wave velocity images the 3D distribution of heterogeneities. The most striking observation is a strong low velocity layer in about 80 km depth. It covers the backarc region of the Calabrian arc, the islands of Sardinia and Corsica and the onshore parts of Italy.

The combined results of the anisotropic and heterogeneous structure are interpreted in the context of the dynamic processes and evolution of the Central Mediterranean and the Calabrian arc.