STRUCTURE OF THE UPPER MANTLE BENEATH THE ALPS AND APENNINES AS SEEN BY RECEIVER FUNCTIONS

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The boundary between the African and Eurasian plates in the Mediterranean area consists of a broad zone of deformation, due to the convergence between the two plates. Since late Cretaceous the Adriatic microplate, acting as a promontory of Africa, has deeply indented Europe, resulting in the Alpine orogeny. Within the convergence of the large (Europe and Africa) plates, the Adriatic microplate moves independently, and rotates counterclockwise with respect to stable Europe, controlling the strain pattern along its boundaries. The Apennines nucleated along the retro-belt of the Alps, moving southward, where oceanic or thinned continental lithosphere was present.

The Alps show a double-vergent growth, with the involvement of large volumes of basement and the exhumation of metamorphic rocks belonging to the European, oceanic and African realms. The Apennines describe an arc from northwestern Italy, down throughout the Italian peninsula, continuing to the southwest into Sicily and merging into the Maghrebides of northwestern Africa. Alps and Apennines developed along opposite subductions, in an area characterized by strong variability of tectonic signatures.

In order to shed light on these complex tectonic structures, we aim unraveling both the isotropic and anisotropic properties of the Alpine and Apennines mantle; teleseismic observations recorded at permanent and temporary seismic stations have been employed to produce images of the lithospheric discontinuities with tens of kilometers lateral resolution. We illustrate the feasibility of the lithosphere-asthenosphere boundary detection on a regional scale through P- and S-receiver functions, and detect the occurrence of deeper seismic discontinuities due both to positive and negative seismic velocity jumps.