



Upper Mantle Structure of the transition between Alps and Apennines Revealed by Shear Wave Splitting from the CIFALPS Project

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Northern Apennines, Alps and surrounding regions are often studied separately. The structure of their upper mantle has been studied repeatedly in the past and some studies reported on the seismic anisotropic properties in the litho-asthenosphere. However, a joint interpretation of the Alps-Apennines transition zone is still lacking, mainly at depth. The China-Italy-France Alps seismic survey (CIFALPS, 2012) provided an improved image of the crust and upper mantle beneath the southwestern Alps and the transition to the Apennines. Here we show the SKS shear wave splitting results obtained from the analysis of teleseismic data recorded by 55 temporary seismic stations along the CIFALPS profile and by some other permanent stations. The strain-induced lattice preferred orientation of olivine minerals within the upper mantle, expressed by the analysis, confirms the NW trending fast polarization directions parallel to the strike of the orogen, in good agreement with the results of previous studies all along the Alpine chain. On the contrary, in the Po Plain, new shear wave splitting measurements show a scattered distribution; the coexistence of both NNE-SSW and E-W directions provides new insights on upper mantle deformation in the complex transition zone between the Alpine and Apenninic subductions. The comparison of this new dataset with recent tomographic studies and geological improvement should compose a more complete picture of the mantle structure and deformation of this puzzling region.