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The crust and upper mantle structure under station ISP (Isparta, Turkey) constrained by joint inversion of receiver functions and surface waves

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We have employed a joint inversion algorithm to determine the one-dimensional (1-D) crust and upper mantle velocity structure beneath station ISP located in SW Turkey. The joint data set comprises the teleseismic P and S receiver functions and regional fundamental mode Rayleigh and Love surface wave group velocities. The receiver functions constrain the velocity discontinuities and travel times whereas the surface waves describe the average velocity in the medium, i.e. both data sets complement each other. The P (25 events) and S (32 events) receiver functions are obtained from the deconvolution of the teleseismic arrivals with backazimuths around NE and are stacked to increase the signal content. A Gaussian filter with low-pass effect (i.e.) is used to suppress the unwanted high frequency noise caused by heterogeneous receiver structure. The regional surface waves are short period and are selected to sample the crust and uppermost mantle structure around the station under consideration. Both forward and inverse solutions are used to constrain a correct receiver structure. The forward solution is particularly preferred to characterize the lithosphere-asthenosphere boundary (i.e. LAB) since our short period surface waves relatively poorly resolve deep structures. The Sp conversions preceding the direct S phase and also the crustal multiples are distinctly observed on the waveforms whereas the Ps phases are partly masked by the crustal multiples. Our solutions indicate that a positive velocity gradient characterizes the upper crust under station ISP. The mid-crust includes a low-velocity layer at ˜3.5 km/s speed. The Moho discontinuity with a pronounced velocity jump

is placed at ˜37 km depth. The LAB discontinuity, which is better defined on the S receiver functions, is relatively shallow (i.e. ˜79 km), but this depth is consistent with other similar studies in the region. The LAB discontinuity is characterized by a velocity decrease with depth from ˜4.5 km/s sub-Moho velocity to ˜4.25 km/s asthenosphere velocity.