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3-D shear velocity model of the Eastern and Southern Alps from ambient noise tomography

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The eastern and southern part of the Alpine chain is considered to be an area of complex tectonics, both in the crust and the lithosphere. Having a relatively dense network of seismic stations in this region provides an opportunity to study crustal velocity structure with ambient-noise tomography. In this study, we show results from ambient noise correlations. We used two year of continuous data recorded at 59 permanent stations and 19 stations of the AlpArray-EASI profile during 2014 and 2015. Cross correlations of ambient noise are computed in order to estimate the Green's functions of surface waves propagating between the station pairs. Dispersion curves of Rayleigh and Love waves are constructed between 2 and 40 seconds and are then inverted to obtain group velocity maps at different frequency. The Rayleigh and Love wave group velocity measurements are inverted for shear-wave velocities. We present here a 3-D shear-wave velocity model for the Eastern and Southern Alps. Our results show that velocity variations at short periods (up to 10 km depth) correlate well with the surface geology, e.g. tectonic features and faults. The results clearly show low velocity zones associated with the Po-Plain and the Molasse Basin. Under the Molasse basin the low velocity anomaly extends down to 10 km depth. We also observe a high-velocity anomaly surrounded by Northern Calcareous Alps and Dolomites (Southern Limestone Alps), where its southern edge is well-marked by the Periadriatic and Giudicarie lines. Sharp-high velocity zones at shallower depth are also observed which seem to be associated with the highly metamorphic basement, e.g. the Campo and Ötztal nappes.