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Azimuthal anisotropy in the central European lithosphere from seismic ambient noise

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Measurements of relatively short-period surface-wave dispersion, extracted from seismic ambient noise, are the best tool available to map shear-velocity structure of the Earth's crust and lithosphere-asthenosphere system at the regional scale, particularly in regions of moderate seismic activity like central Europe. Using phase velocity dispersion curves derived from our dataset of ambient noise cross-correlations in central Europe, we computed layered vertical azimuthal anisotropy from mid-crustal levels to the depth of asthenosphere. Based on azimuthal quality criteria for observations, we are able to reliably image significant anisotropy variations from northern Italy to southern Germany. The main cause of anisotropy in the crust is interpreted as shape-preferred orientation (SPO) of biotite. To the north and south of the Alpine arc, the fast directions of anisotropy are parallel to the strike of the Hercynian orogenic belt and to strike of Po plain. Within the Alpine orogenic root, we observe a pronounced anisotropy perpendicular to the arc that is interpreted as caused by the stacking of crustal slivers which were compressed and accumulated during Alpine orogen. At periods equal to or longer than 34s, the patterns of anisotropy are caused by past –within mantle lithosphere- and current asthenospheric flow, which also coincides with previous results.