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Regional domains of crustal seismic anisotropy in the central European Variscides

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We investigated if the tectonic processes that formed the central European Variscides have left regionally coherent imprints in terms of seismic anisotropy. The study is based on P-receiver functions (RFs) of the stations of the German Regional Seismic Network (GRSN) and on spatial cluster analysis. It turned out that almost all GRSN sites have azimuthally variable RFs and show strong coherent energy on the transverse seismometer components. Most of the azimuthal RF patterns are too complicated to be explained by simple subsurface models of anisotropy or layer dip. Despite their complicated appearance the crustal RFs show geographical coherence that can be understood as regional anisotropic domains. Major anisotropic domains are found along the suture zone of the Saxothuringian and Moldanubian terranes and around the metamorphic core complex of the Saxonian Granulite Massif. The anisotropic domains generally do not agree with the areas of the Variscan terranes of which the central European lithosphere is composed but seem to be associated with specific tectonic processes such as complex oblique folding or the formation of laminated lower crust during the Variscan post-orogenic collapse.