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Shear wave azimuthal anisotropy in the transition zone from oceanic to continental subduction along the western Hellenic subduction zone

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In western Greece, the Hellenic subduction system is separated by the Cephalonia Transform Fault (CTF), a dextral offset of ∼100 km, into the northern and southern segments, which are characterized by different convergence rates and slab composition. Recent seismic data show that north of CTF there is a subducted continental lithosphere in contrast to the region south of CTF where the on-going subduction is oceanic. Shear wave splitting of SKS phases provide useful information for the upper mantle anisotropy. Its direction and strength is caused by the ongoing upper mantle flow that constrain the subduction geodynamics. I have now measured SKS splitting parameters from all broadband stations of the Hellenic Unified Seismic Network (HUSN) and some selected stations of the National Strong Motion Network, specially concentrated in the transitional area from oceanic to continental subduction. These measurements, combined with previously published observations, provide the most complete up-to-date spatial coverage for the area. Generally, the pronounced zonation of seismic anisotropy across the subduction zone, as inferred from other studies, is also observed here. Fast SKS splitting directions are trench-normal in the region nearest to the trench. The fast splitting directions change abruptly to trench-parallel above the corner of the mantle wedge and rotate back to trench-normal over the back-arc. Additionally, beneath western Greece, between the western Gulf of Corinth in the south and the Epirus-Thessaly area in the north a toroidal pattern emerges that possibly depicts a slab tear between the oceanic and the continental subducted slabs and a consequent toroidal asthenospheric flow.