

TO Brownbag Seminar
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The anisotropic signature of slab retreat
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Many subduction zones exhibit significant retrograde motion of their arc and trench in an absolute reference frame. The observation of fast shear-wave velocities parallel to the trench in such settings has been inferred to represent trench-parallel mantle flow around a retreating slab. We report the observation of three distinct domains of anisotropy over the Western Hellenic Subduction Zone, a small-scale subduction characterized by rapid trench-retreat, on the basis of dense SKS and local-S splitting measurements. Trench-normal anisotropy dominates at stations nearest the trench, then transitions to trench-parallel above the tip of the mantle wedge, and rotates back to trench-normal over the back-arc. We argue that this anisotropic signature is best explained by trench-normal mantle flow associated with slab retreat, but may only be clearly observable at shallow-dipping subductions. This result has implications for lithosphere-asthenosphere coupling and the role of small-scale convection in continental tectonics.