Supplementary Document

Figures S1-S7 show diagnostic calculations related to splitting measurements made for OBS10, Event 1 (see Table 1 for event information). They show 1) Time window of processed data; 2) Time window of processed data with the transverse component minimized; 3) Particle motion after minimizing transverse component energy, 4) Contour of transverse energy; 5) Phi stacked errors; 6) Delay time stacked errors; 7) Contour of transverse stacked energy.

Figures S8-S15 show anisotropy calculations for the four separate models investigated at depths of 150 km, 200 km, 250 km, and 300 km. These are for both the no-slip boundary condition models and for the total models (APM + density-buoyancy driven flow).
S1. Time window of processed data for OBS10 Event 1.

S2. Time window of processed data with the transverse component minimized for OBS10 Event 1.
S3. Particle motion after minimizing transverse component energy for OBS10 Event 1.

S5. Phi stacked errors for OBS10.

S7. Contour of transverse stacked energy for OBS10.
Figure S8. Anisotropy fast polarization directions (green) associated with density buoyancy driven flow in Figure 8, computed with no-slip boundary conditions and obtained from tomography model SAW642AN (Panning and Romanowicz, 2006). Predicted anisotropy directions are plotted on top of SKS splitting directions (red vectors – this study; purple vectors compiled by Becker et al. (2012)) (a) anisotropy at 150 km; (b) anisotropy at 200 km, (c) anisotropy at 250 km, and (d) anisotropy at 300 km.

Figure S9. Same as Figure S8, but for model HMSL-p06 (Houser et al. 2008).
Figure S10. Same as Fig. S8 but for model SH11_TX2008 (Becker, 2012; Schmandt and Humphreys, 2010, 2011; Simmons et al. 2009).

Figure S11. Same as Fig. S8 but for model SEMum (Lekić and Romanowicz, 2011).
Figure S12. Anisotropy fast polarization directions (green) associated with effects of APM (HS3-NUVEL-1A, Gripp and Gordon, 2002) and density buoyancy driven flow (Figure 10) from model SAW642AN (Panning and Romanowicz, 2006), but with predictions for depths of (a) 150 km; (b) 200 km; (c) 250 km; and (d) 300 km. Predicted anisotropy directions are plotted on top of SKS splitting directions (red vectors – this study; purple vectors compiled by Becker et al. (2012)).

Figure S13. Same as Fig. S12, but for model HMSL-p06 (Houser et al. 2008).
Figure S14. Same as Fig. S12, but for model SH11_TX2008 (Becker, 2012; Schmandt and Humphreys, 2010, 2011; Simmons et al. 2009).

Figure S15. Same as Fig. S12, but for model SEMum (Lekić and Romanowicz, 2011).