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SUPPLEMENTARY MATERIAL TO

TESTING OBSERVABLES FOR TELESEISMIC SHEAR-WAVE SPLITTING INVERSIONS: AMBIGUITIES OF INTENSITIES, PARAMETERS, AND WAVEFORMS

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1. Animation of XKS wavefront passing through the anisotropic upper mantle

The wavefront is passing through the laterally and vertically varying anisotropic medium. Snapshots from this animation are shown in Figure 8 of the main text. When passing through the anisotropic domains, part of the energy is transferred from the radial to the transverse component. Lateral and horizonal lines denote boundaries between anisotropic domains in the mantle (see Fig. 7).

2. Supplementary figures

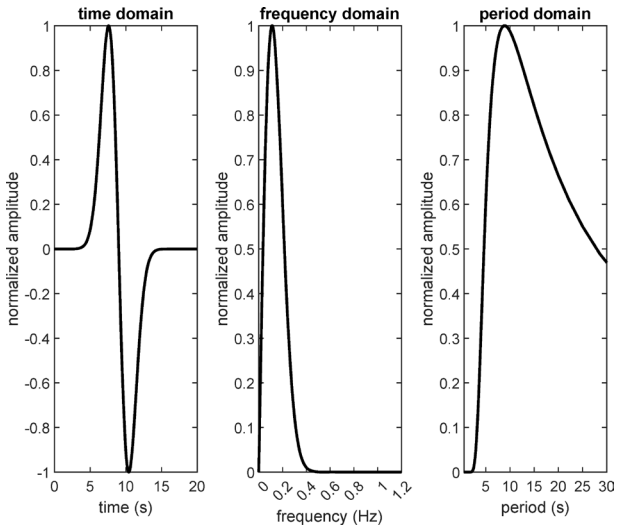

Figure S1. Shape of the input waveform employed in the modeling. Its Fourier transform is characterized by a dominant period of $T = 9$ s. However, periods between about 5 s and 20 s contribute considerably.

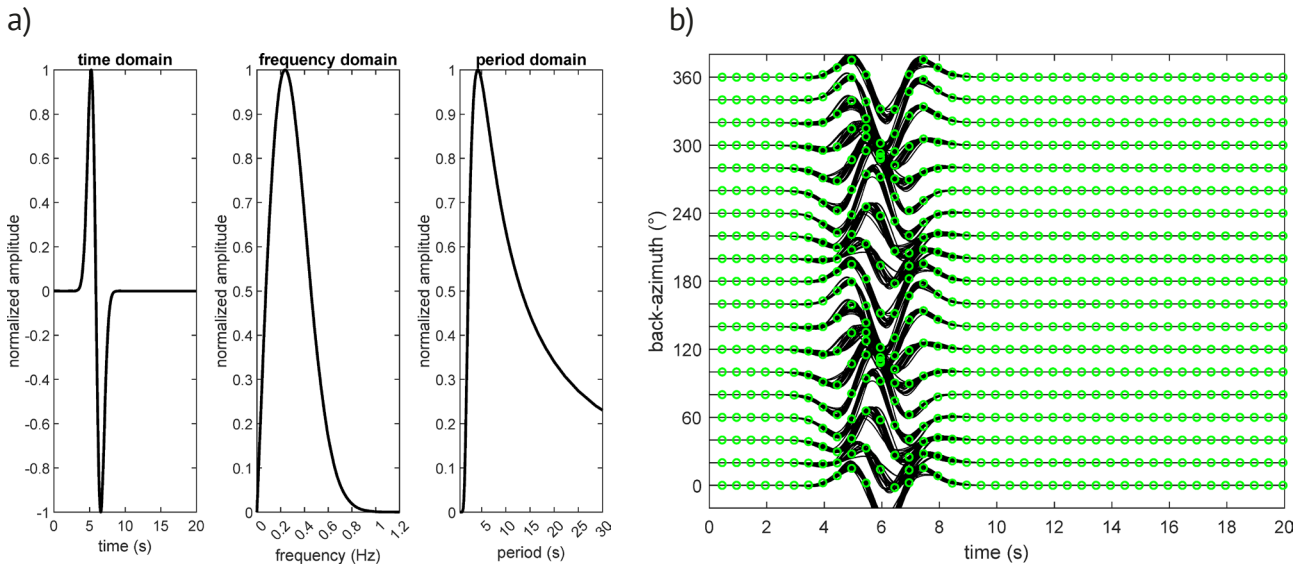

Figure S2. (a) Input waveform with a dominant period of 4 s. (b) Corresponding transverse component waveforms as function of back-azimuth for the 20 best models derived from fitting of waveforms with dominant period of 9 s (see Fig. 5). The green circles correspond to values for the waveforms of the reference model (Fig. 1).

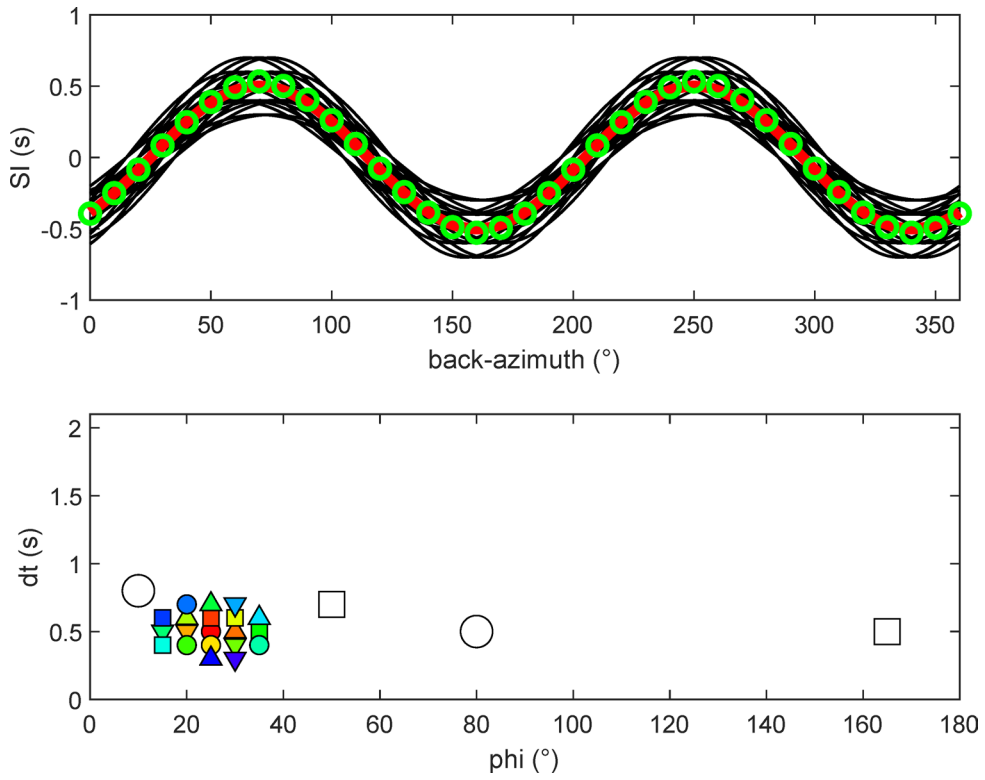

Figure S3. Best 20 (single layer) models from the inversion of splitting intensities obtained from waveforms for the vertically and laterally varying model (lower panel, colored symbols). Large open circles and squares correspond to parameters of the four anisotropic domains (see Fig. 7). The upper panel shows the corresponding splitting intensity curves (black lines) and the input splitting intensities (green circles) obtained from the waveform modeling by averaging the splitting intensities shown in Fig. 12 over all positions. The splitting intensity curve for the best-fitting model (given by the red solid circle in the lower panel) is marked by a red line (upper panel).

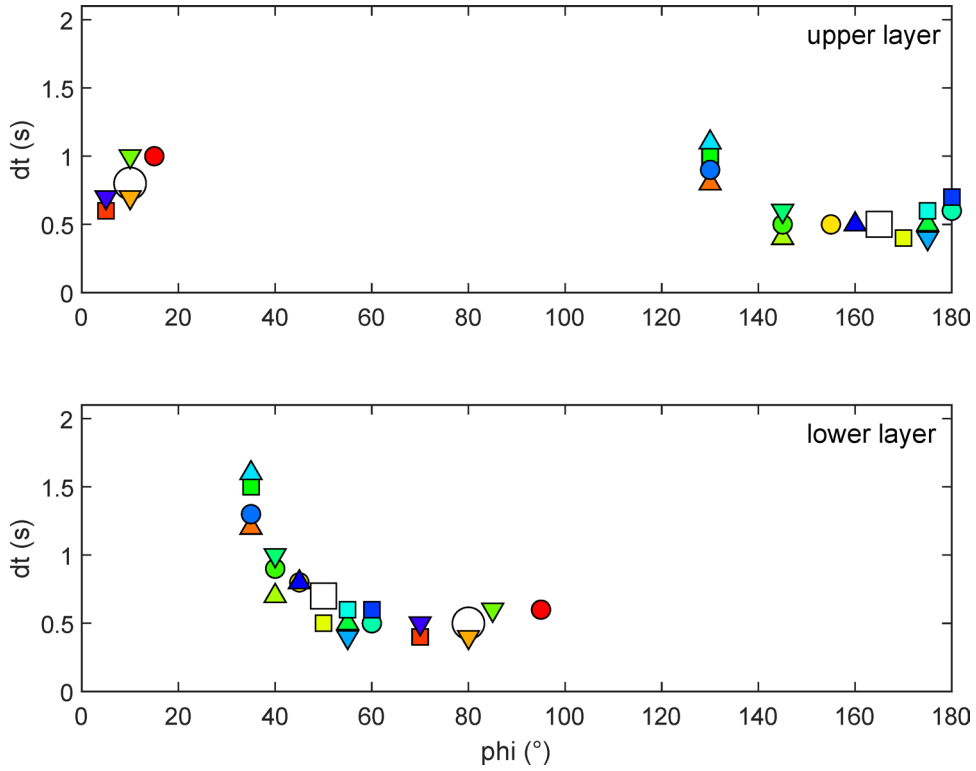

Figure S4. Best 20 models from the inversion of apparent splitting parameters obtained from waveforms for the laterally varying model. Large open circles and squares correspond to parameters of the four anisotropic domains (see Fig. 7).