Supplemental Figures

Seismic imaging of the laterally varying D" region beneath the Cocos Plate

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Accepted:
Received:
In original form:

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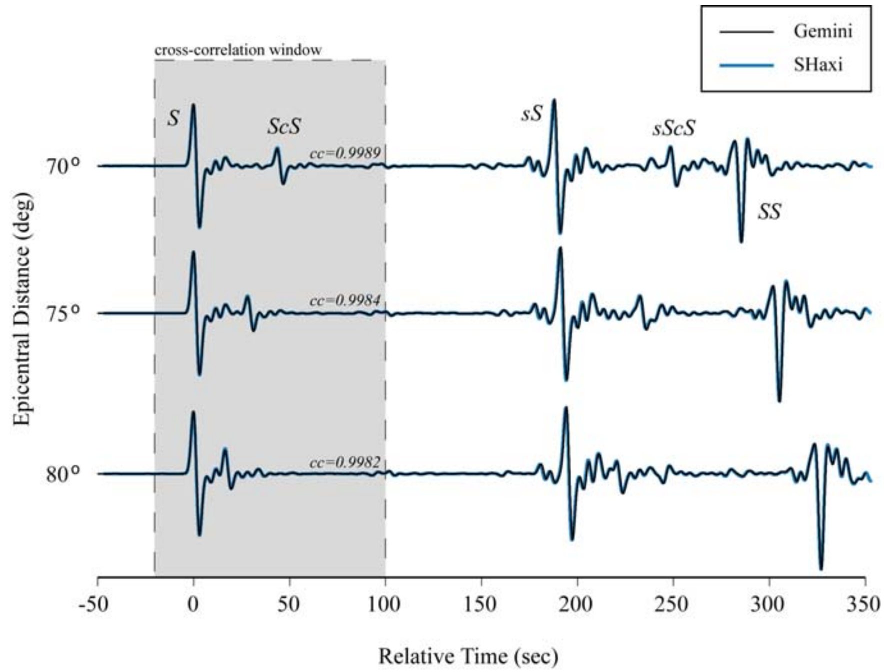
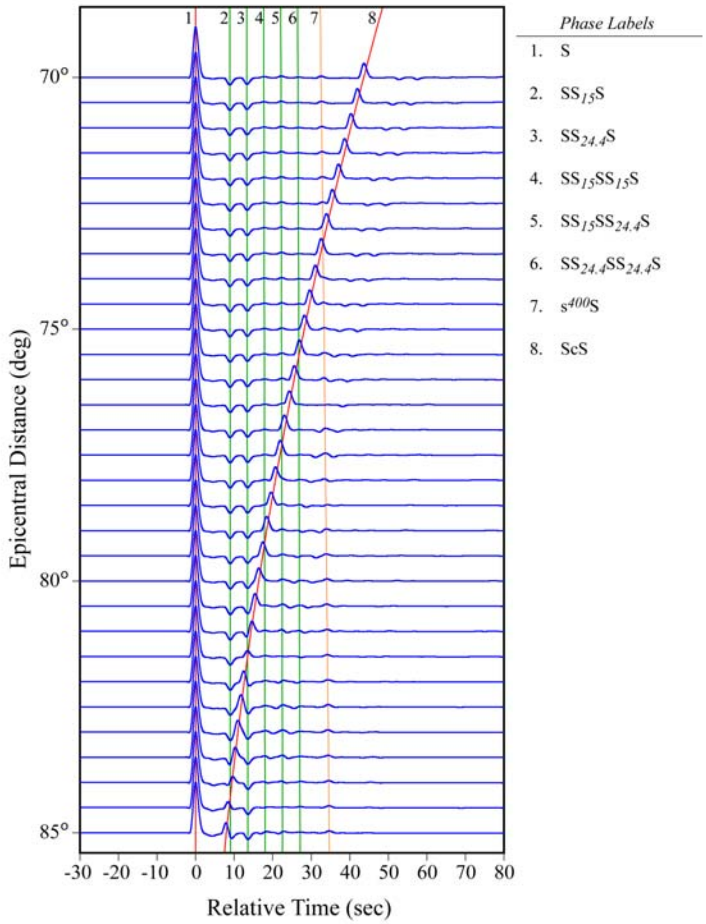


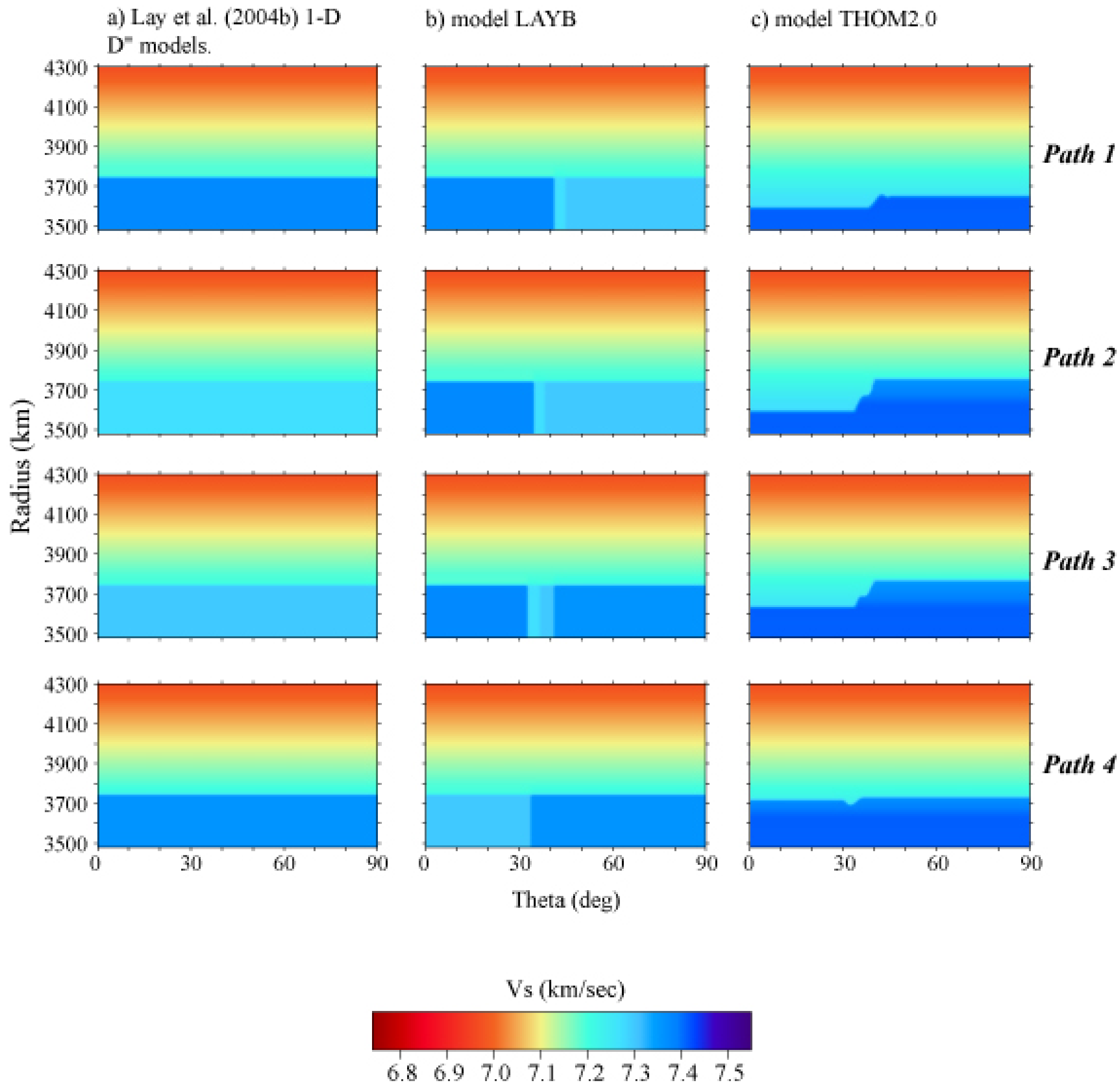
Supplement A
(Thorne, Lay, Garnero, Jahnke, and Igel. 2006)

Supplement A. Transverse component velocity synthetics are shown. Synthetics for PREM with a 500 km source depth are drawn. Synthetics are aligned and normalized to unity on the phase *S*, and calculated for a dominant period of 10 sec. Synthetics computed by the SHaxi and Gemini methods are drawn in blue and black respectively. We compare synthetics by cross-correlation in a time window (gray box) containing *Sab* and *ScS* starting 20 sec before and ending 100 sec after the *Sab* arrival in epicentral distance ranging from 70º – 85º. Excellent agreement exists between the SHaxi and Gemini methods, as demonstrated by a minimum cross-correlation coefficient between records of 0.9982 at 80º.



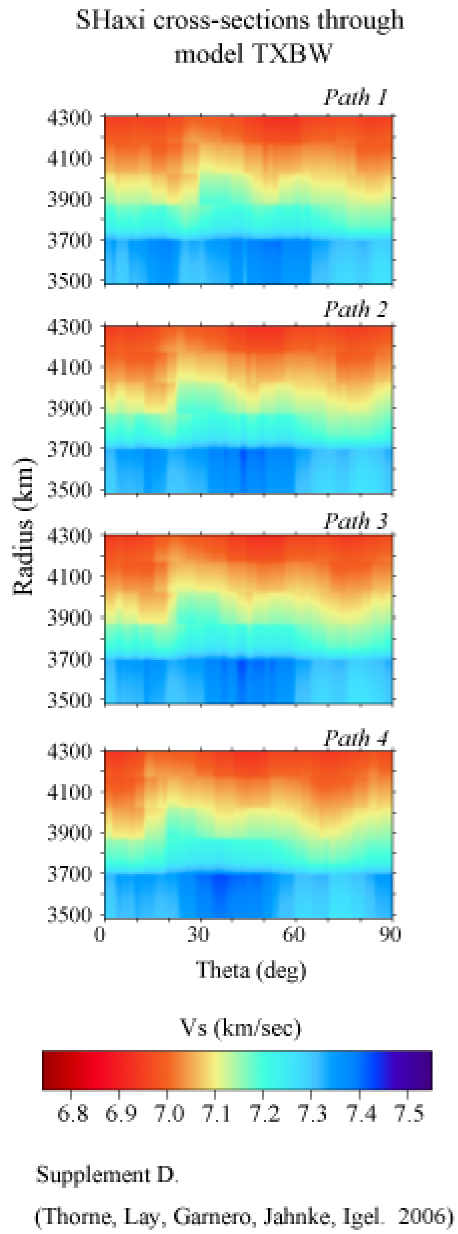
Supplement B.
(Thorne, Lay, Garnero, Jahnke, Igel. 2006)

Supplement B. Transverse component displacement synthetics are shown. Synthetics for PREM with a 500 km source depth are drawn in blue. Synthetics are aligned and normalized to unity on the phase *S*, and calculated for a dominant period of 4 sec. Crustal and mid-crustal phases that interfere with the *SdS* and *ScS* wave field are labeled with green lines. *S* and *ScS* are labeled with red lines. The yellow line labels the underside reflection of the 400 km depth discontinuity in PREM ($s^{400}S$).

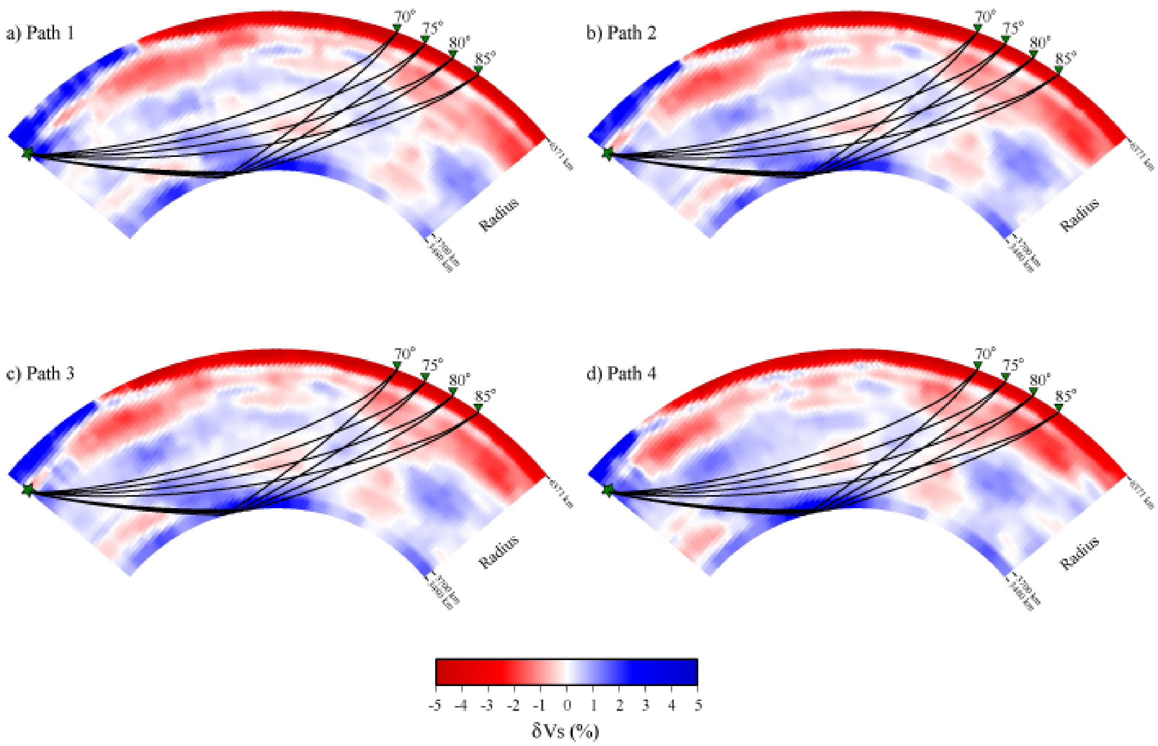


Supplement C.
(Thorne, Lay, Garnero, Jahnke, Igel. 2006)

Supplement C. Lower mantle cross-sections for a) 1-D D" discontinuity models of Lay *et al.* (2004b), b) model LAYB, and c) model THOM2.0. Cross-sections for each of the four Paths we computed synthetic seismograms for are shown. Color scaling is based on absolute V_S in each model.



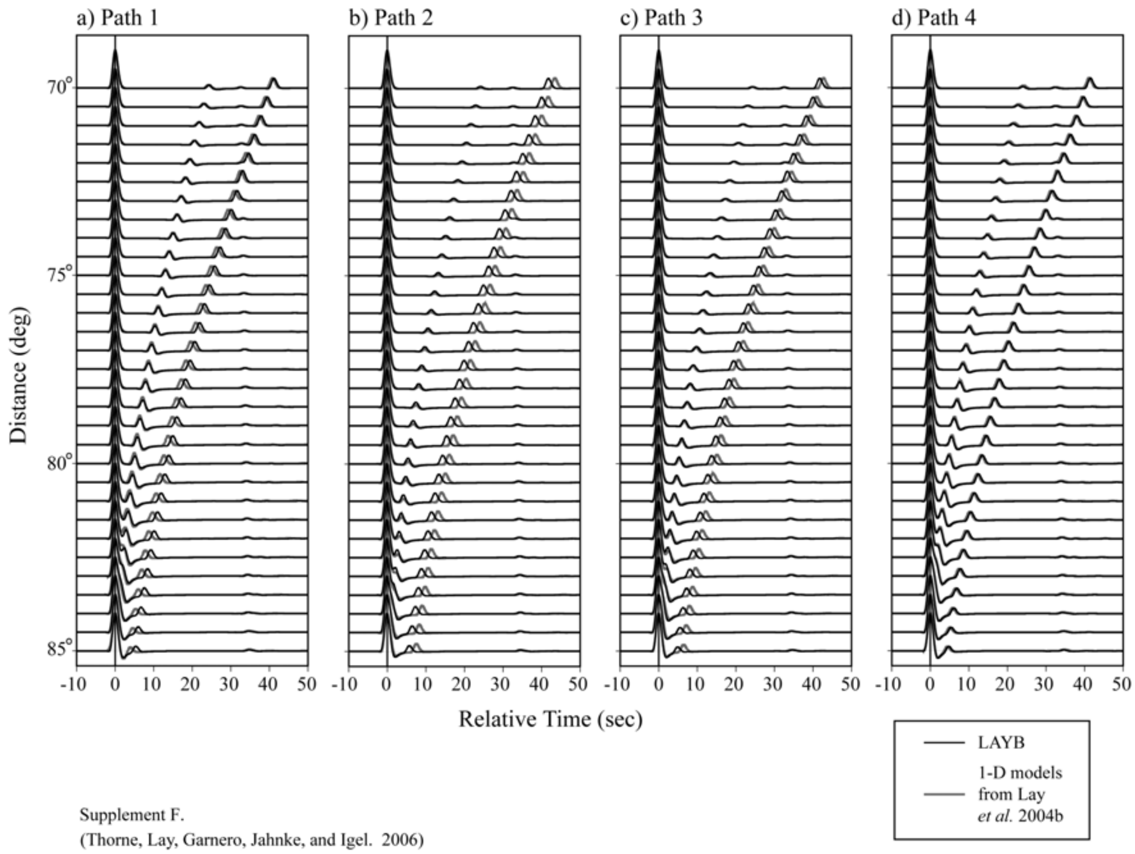
Supplement D. Lower mantle cross-sections for model TXBW. Cross-sections for each of the four Paths we computed synthetic seismograms for are shown. Color scaling is based on V_S.



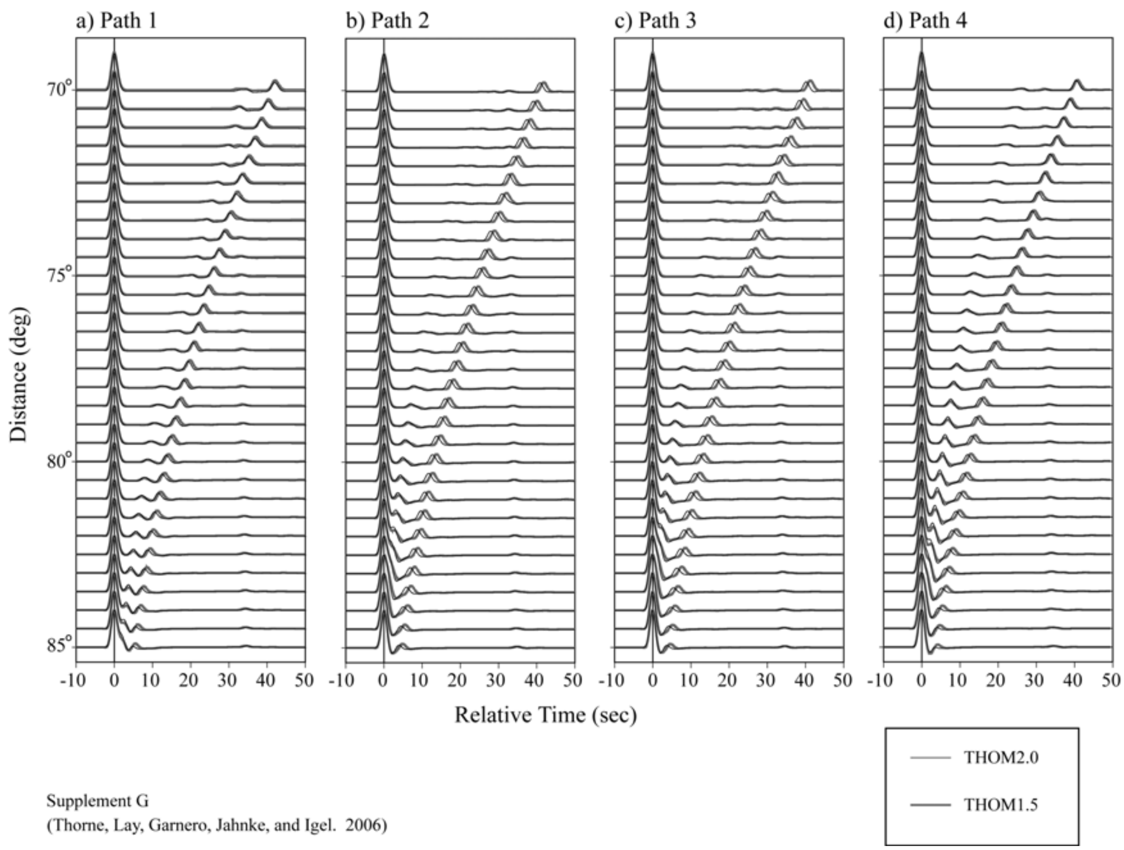
Supplement E.

(Thorne, Lay, Garnero, Jahnke, Igel. 2006)

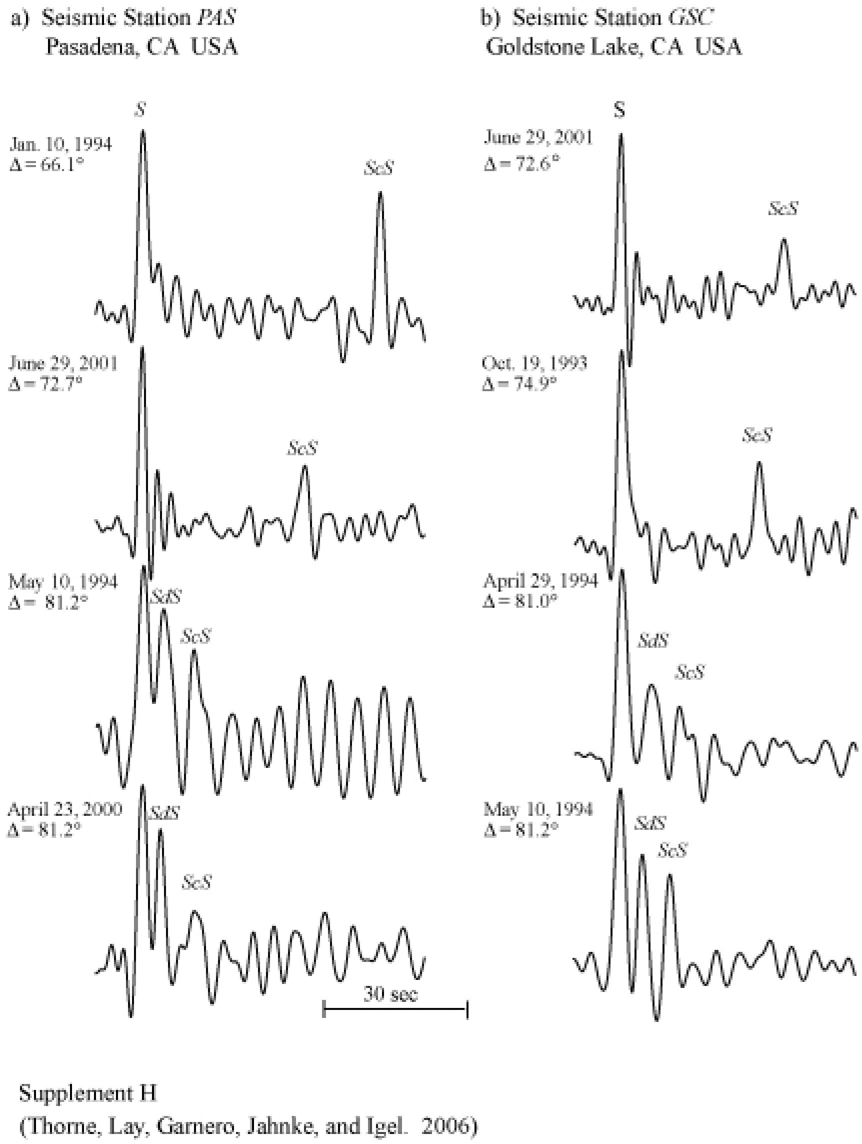
Supplement E. Whole mantle cross-sections for model TXBW. Cross-sections for each of the four Paths we computed synthetic seismograms for are shown. Color scaling is based on δV_S. Ray path geometry is shown for the phases *S* and *ScS* for a 500 km deep event (green star) recorded at receivers (green triangles) with epicentral distances 70º, 75º, 80º, and 85º.



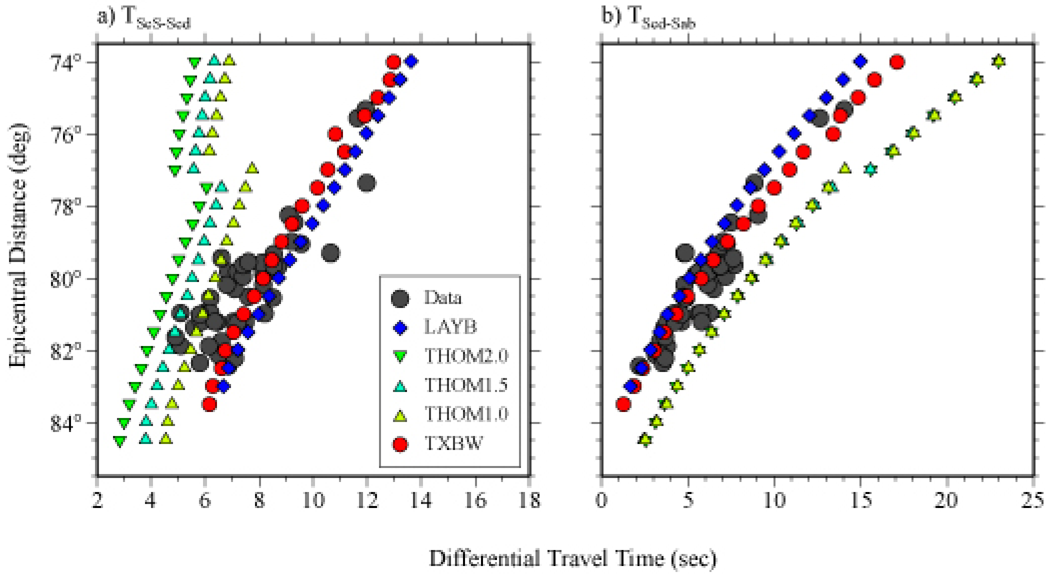
Supplement F. Comparison of synthetics computed for the 1-D D" models of Lay *et al.* (2004b, drawn in gray) with synthetics created for model LAYB (drawn in black). Each panel displays synthetics for the labeled Path. Synthetics are aligned and normalized to unity on the phase *S*, and calculated for a dominant period of 4 sec.



Supplement G. Comparison of synthetics computed for models THOM1.5 (drawn in gray) and THOM2.0 (drawn in black). Each panel displays synthetics for the labeled Path. Synthetics are aligned and normalized to unity on the phase *S*, and calculated for a dominant period of 5 sec.



Supplement H. Example record sections at seismic stations PAS (a) and GSC (b). Data are aligned and normalized to unity on the direct S arrival. Event date and epicentral distance are recorded next to each trace.



Supplement I. Differential travel times $\delta T_{ScS\text{-}Scd}$ (panel a) and $\delta T_{ScS\text{-}Sab}$ (panel b) for data and synthetics for Path/Bin 1.