Supporting Information for "Signals of 660-km topography and harzburgite enrichment in seismic images of upwellings"

Contents of this file

1. Figures S1 to S3

References

French, S. W., and B. a. Romanowicz (2015), Broad plumes rooted at the base of the Earth's mantle beneath major hotspots, *Nature*, *525*(7567), 95–99, doi:10.1038/nature14876.

Ritsema, J., A. Deuss, H. J. Van Heijst, and J. H. Woodhouse (2011), S40RTS: A degree-40 shear-velocity model for the mantle from new Rayleigh wave dispersion, teleseismic traveltime and normal-mode splitting function measurements, *Geophysical Journal International*, *184*(3), 1223–1236, doi:10.1111/j.1365-246X.2010.04884.x.

Simmons, N. A., A. M. Forte, L. Boschi, and S. P. Grand (2010), GyPSuM: A joint tomographic model of mantle density and seismic wave speeds, *Journal of Geophysical Research: Solid Earth*, *115*(12), 1–24, doi:10.1029/2010JB007631.

0094-8276/17/$5.00

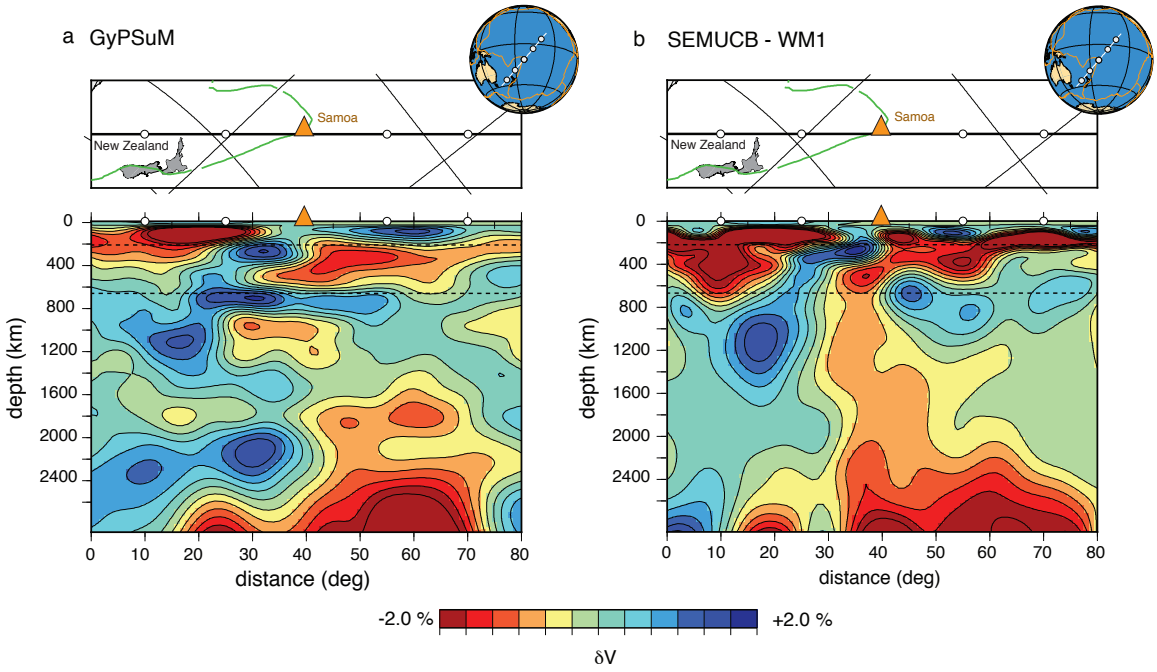

Figure S1. Vertical, SW–NE oriented cross-section through the shear velocity models (a) GyPSuM-S [*Simmons et al.*, 2010] and (b) SEMUCB-WM1 [*French and Romanowicz*, 2015] centered on the Samoa hotspot. The 660-km discontinuity is marked by a dashed line. See Figure 1 for comparison with S40RTS.

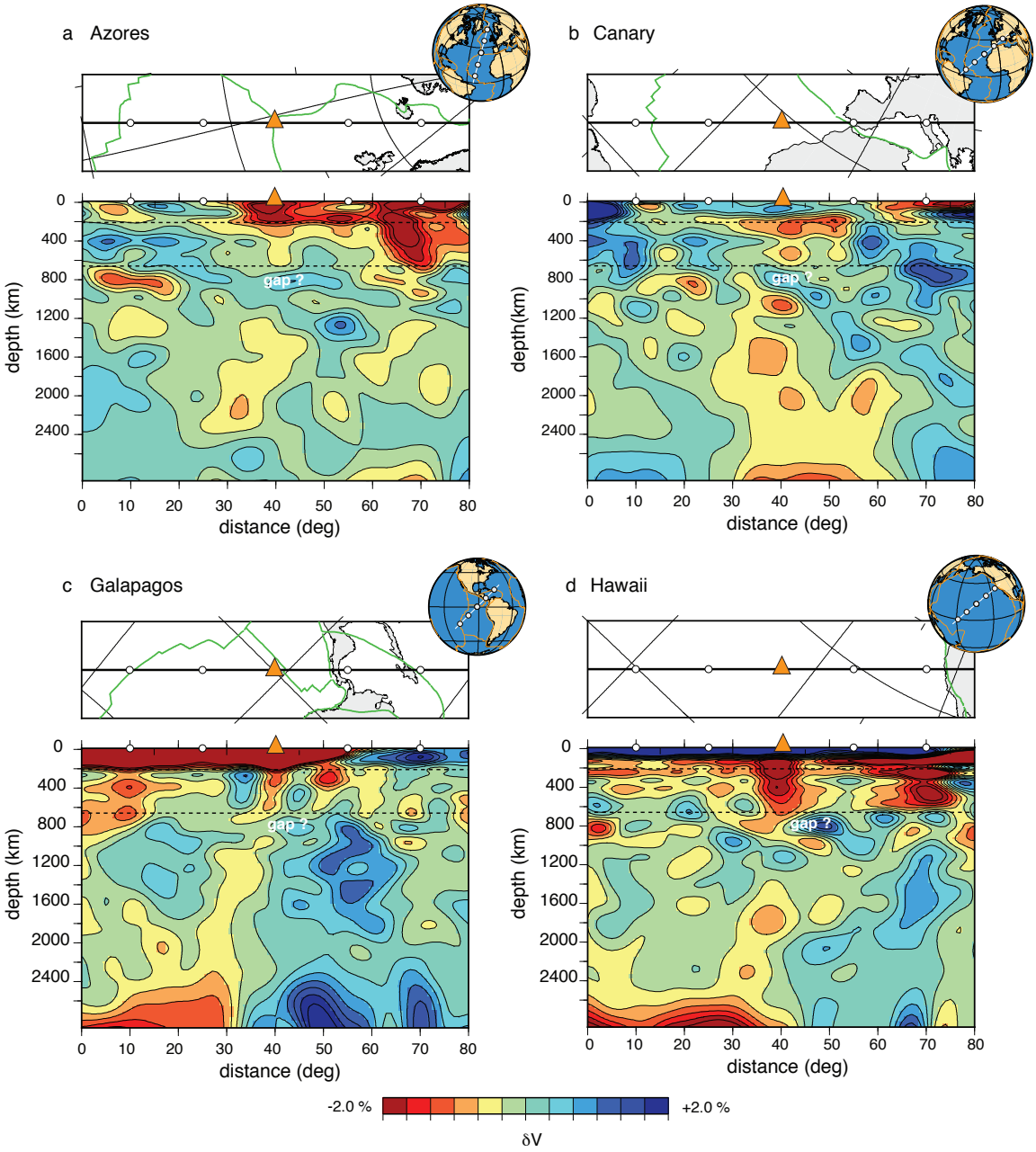

Figure S2. Cross sections through shear velocity model S40RTS *Ritsema et al.* [2011] beneath the Azores (a), Canary (b), Galapagos (c), and Hawaii (d) hotspots. Low wavespeed anomalies beneath each of these hotspots may represent upwellings from the deep mantle. Each cross section shows a gap in the low wavespeed anomaly near 660, potentially due to elevation of the 660, or basalt depletion at the top of the lower mantle.

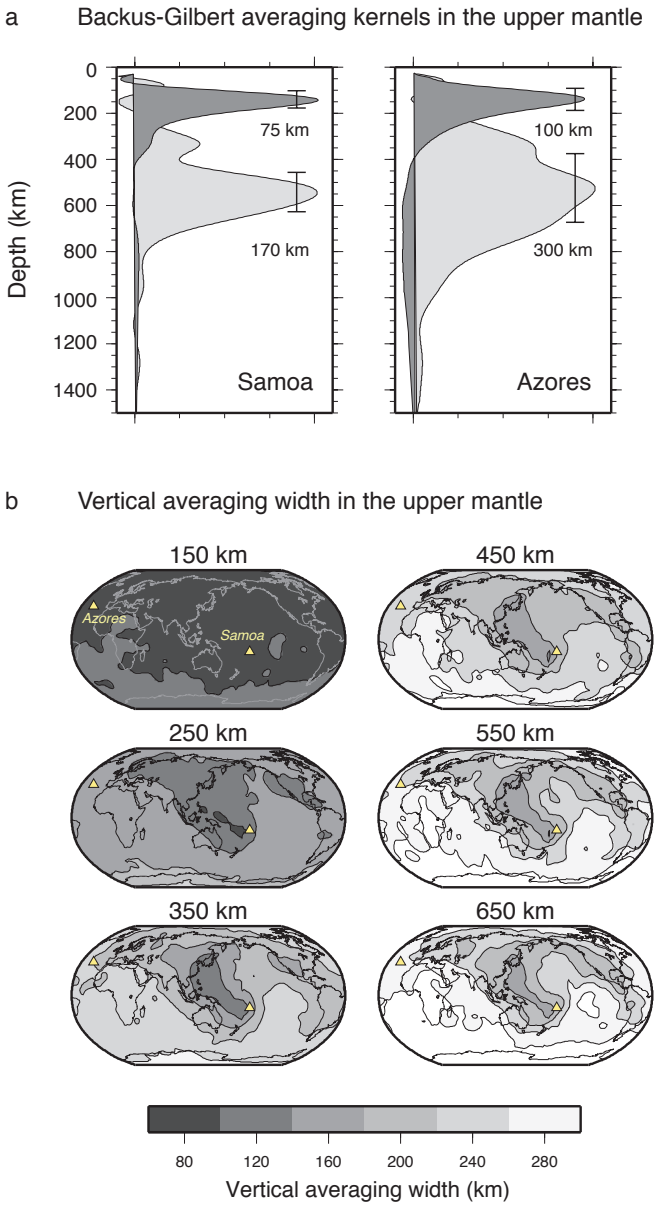

Figure S3. (a) S40RTS resolution kernels indicating how a velocity anomalies at 150 km and 550 km depth represent weighted averages of the structure in the mantle. The vertical width of the kernels is a measure of vertical resolution. Here, the width is defined by the interval for which the area under the curve is 50% of the total area. For Samoa, vertical resolution is 75 km and 170 km at depth of 150km and 550 km, respectively. For Azores, these values are 100 km and 300 km. (b) Geographic variations of vertical resolution of S40RTS, as quantified in (a), at six depths in the mantle.