Supporting infomation for "Ambient noise tomography of northern Borneo reveals evidence of subduction and post-subduction processes."

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1 2D tomography convergence

The method described in section 2.3 uses an rj-MCMC method to solve the inverse problem, which requires the user to tune various parameters such as widths of proposal distributions for velocity perturbations and prior probability distribution functions and then check to see if the Markov chains have converged. Here we show the values we used to assess convergence plotted for each iteration in the Markov chain. We show the number of wavelet coefficients (khistory), the likelihood, the hierarchical prior and the hierarchical error scaling parameter. These plots are shown for the 16 second phase velocity inversion in Figure S1; the result of this inversion is shown in Figure 6B in the main text. These chains have converged since they are stationary and sample the same distribution.

2 1D inversion locations and convergence

For the 1D inversion procedure we sampled our 2D phase velocity maps at discrete points on a regular grid and then invert for 1D shear wave velocity structure. The locations at which we sample the phase velocity maps to obtain pseudo-dispersion curves are shown in Figure S2. The 1D inversion method described in section 2.5 of the main text also uses an rj-MCMC inversion method and so the output must be checked to ensure convergence in a similar manner to the 2D tomography. Since there are 1495 separate inversions, we look at the chain history of a random selection of points located inside the mask used for the final model and check that they have all converged. Since all the inversions are quite similar, it is likely that if the random selection has converged then the rest have as well. The history of inversion number 373 located at 117.10^o longitude and 4.70^o latitude is shown in Figure S3, which illustrates the number of layers in the model, the misfit from the data and the hierarchical error scaling parameter.

3 Full TransD model

The equivalent of Figure 8 in the main text but generated using the TransD method rather than the ANN is shown in Figure S4. This is to further demonstrate the similarity of the two approaches despite there being some differences in the synthetic inversions (see Figure 5).

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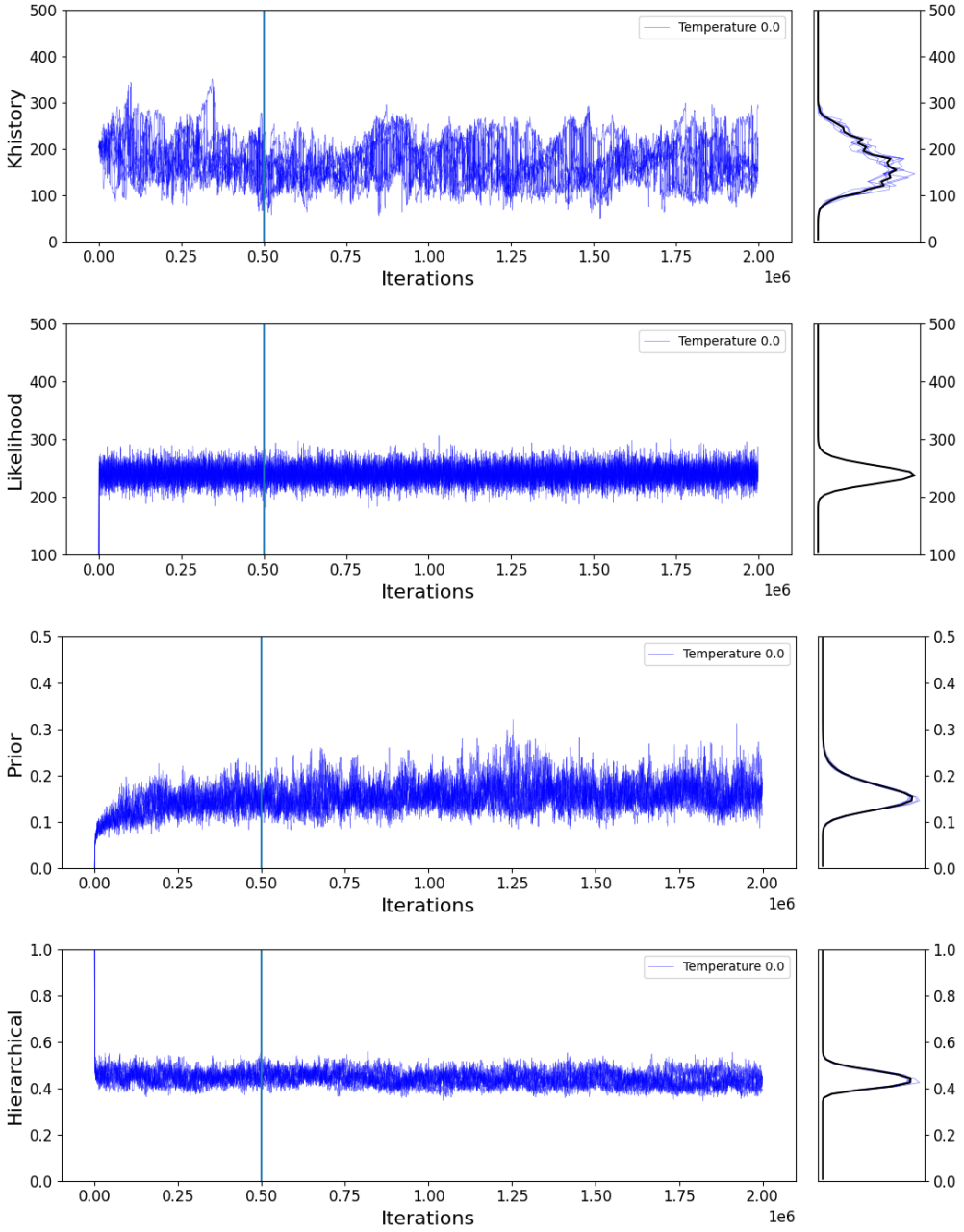

Figure S1: The history of the un-tempered Markov chains for the 16 s phase velocity inversion showing the number of wavelet coefficients, likelihood, hierarchical prior and the hierarchical error scaling parameter for each step of the chain. The blue line at 500,000 iterations marks the end of the burn-in period.

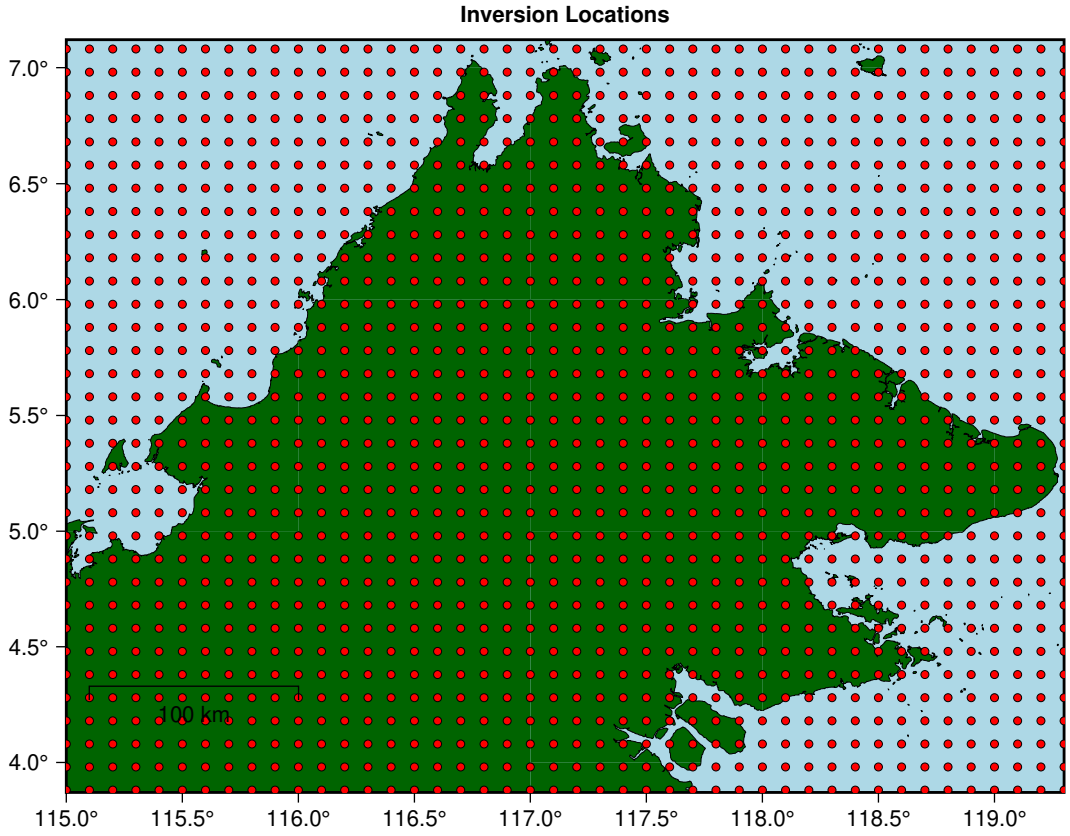

Figure S2: The locations of the sampled pseudo-dispersion curves and 1D shear wave velocity inversions marked by red dots.

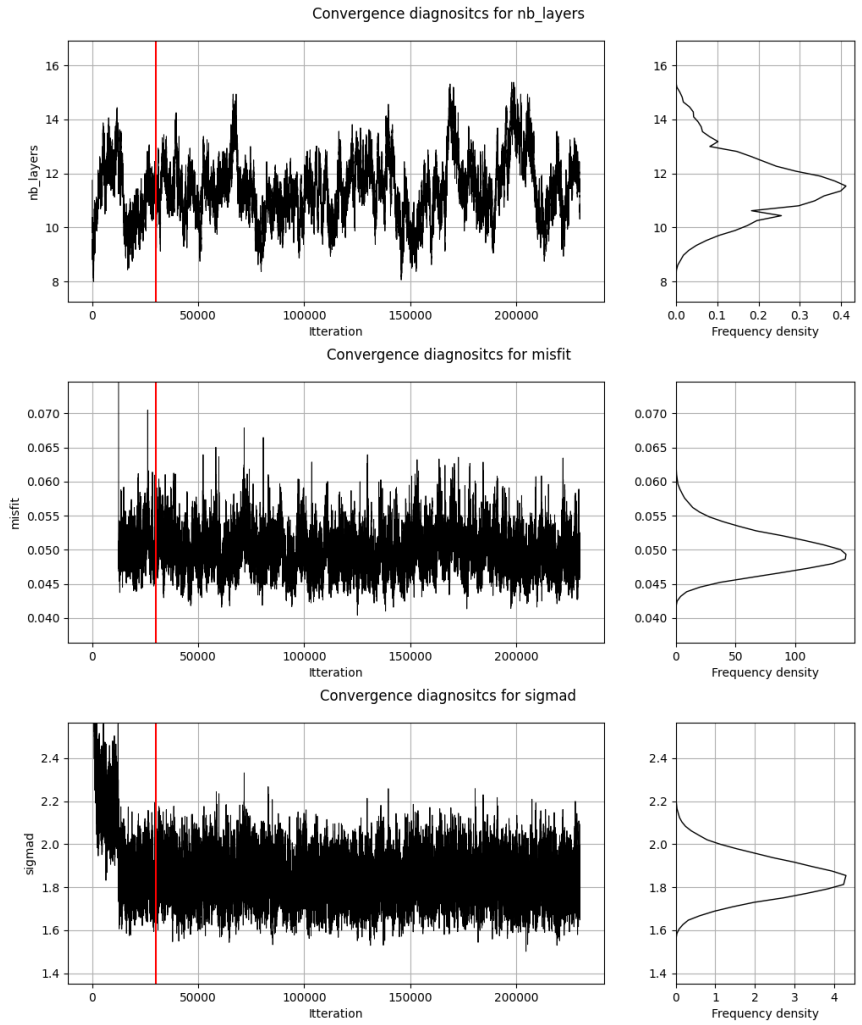

Figure S3: The history of the Markov chain for inversion number 373 located at 117.10^o longitude and 4.70^o latitude showing how the number of layers in the model (nb layers), the misfit and the hierarchical error scaling parameter (sigmad) change through the iterations of the Markov chain. The red line at 40,000 iterations shows the end of the burn-in period.

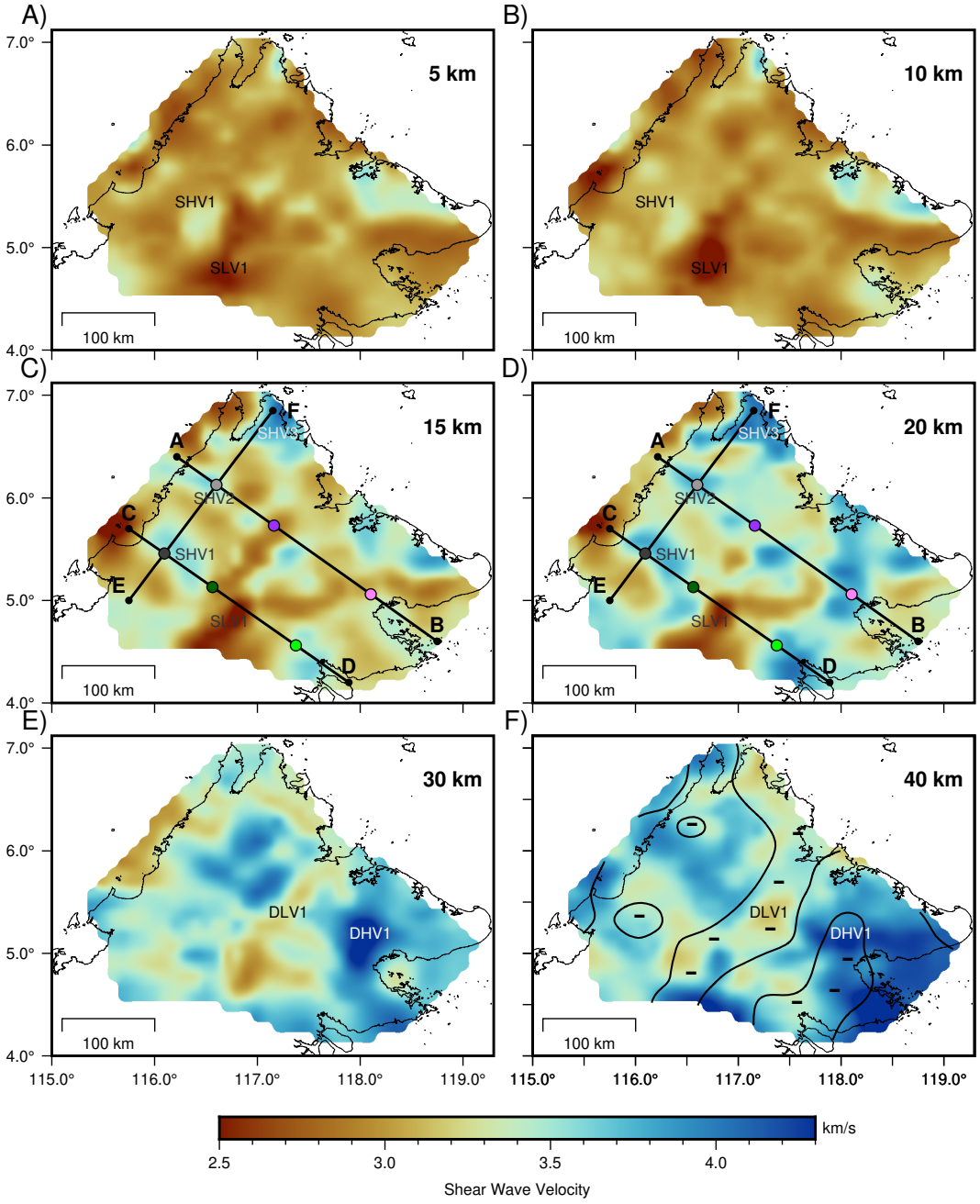

Figure S4: Horizontal slices from 5 to 40 km depth (Panels A-F) through the final shear wave velocity model produced by the TransD 1D inversion method. This plot facilitates comparison to Figure 8 in the main text to support the validity of the results from the ANN method.