Delineating Crustal Thickness Beneath the Western Indian Ocean Using Teleseismic P-Wave Coda Autocorrelations on Ocean-Bottom Seismic Data

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Supplementary materials

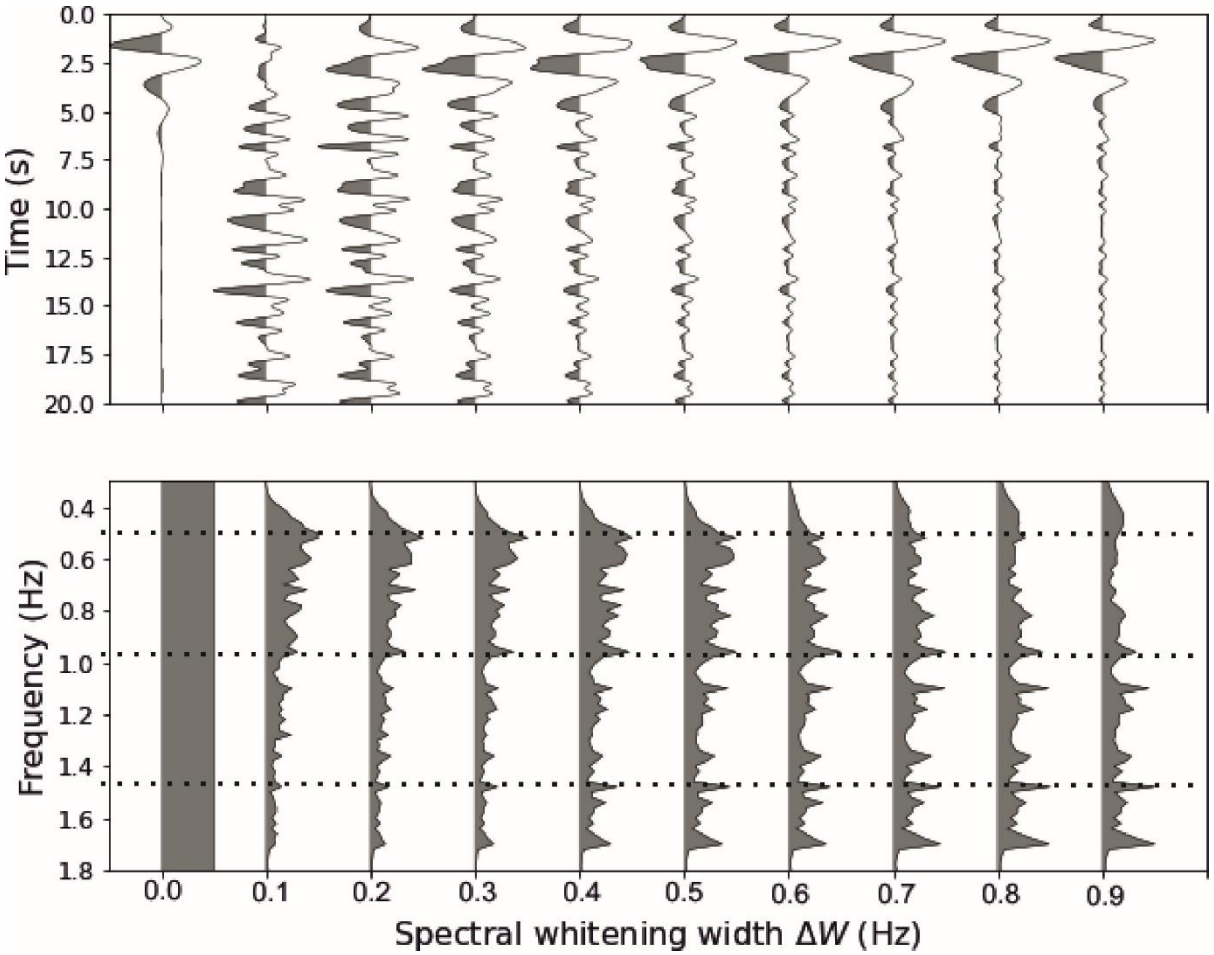


Figure S1: Influence of varying the spectral whitening bandwidth ΔW, on the vertical-component autocorrelations obtained for station RR07. The dataset used is identical to that presented in Figure 5c. (a) Time-domain autocorrelations calculated for different whitening bandwidths, as shown along the horizontal axis, and (b) the corresponding linear stacks of their power spectra. Black dotted lines likely indicate the resonance peaks associated with P-wave reverberations in the crust. Further details are provided in the main text.

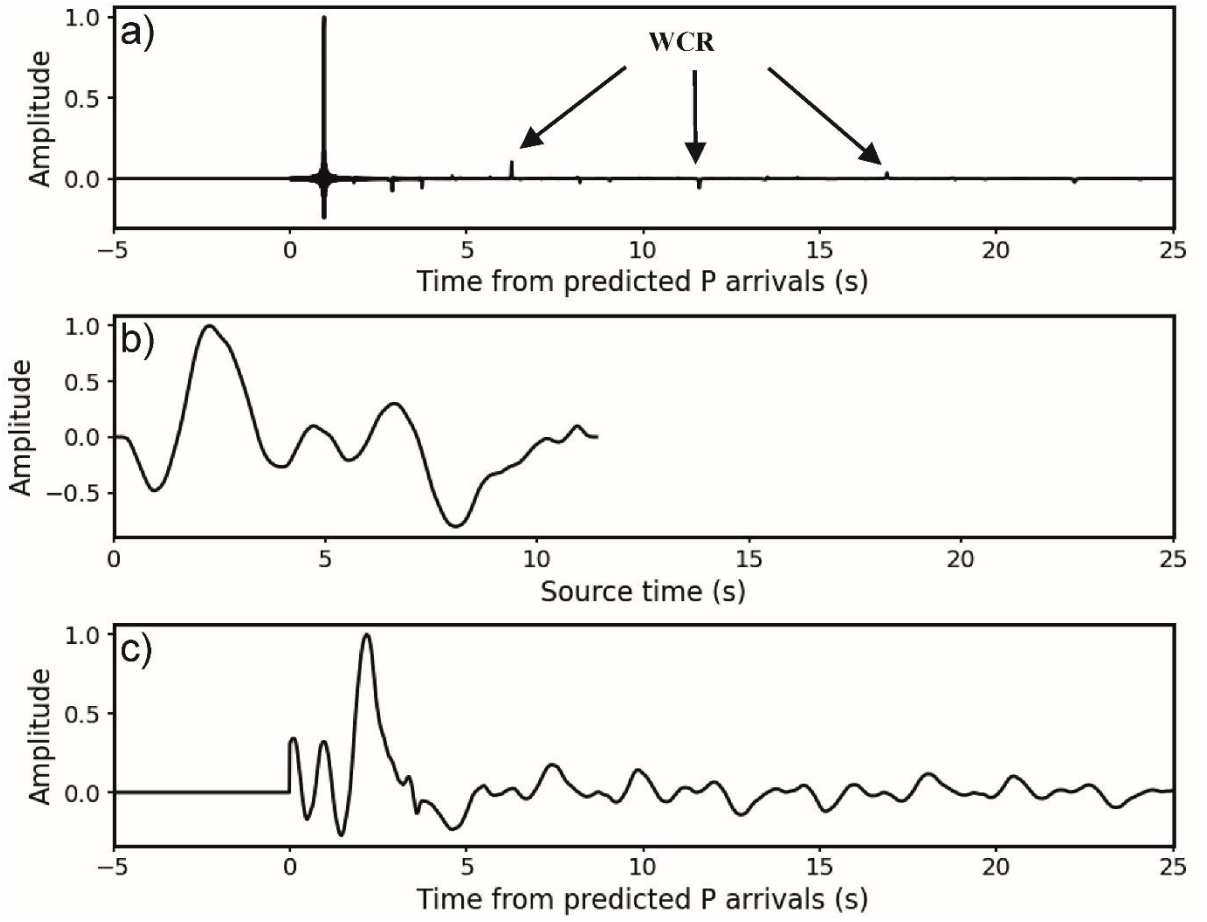
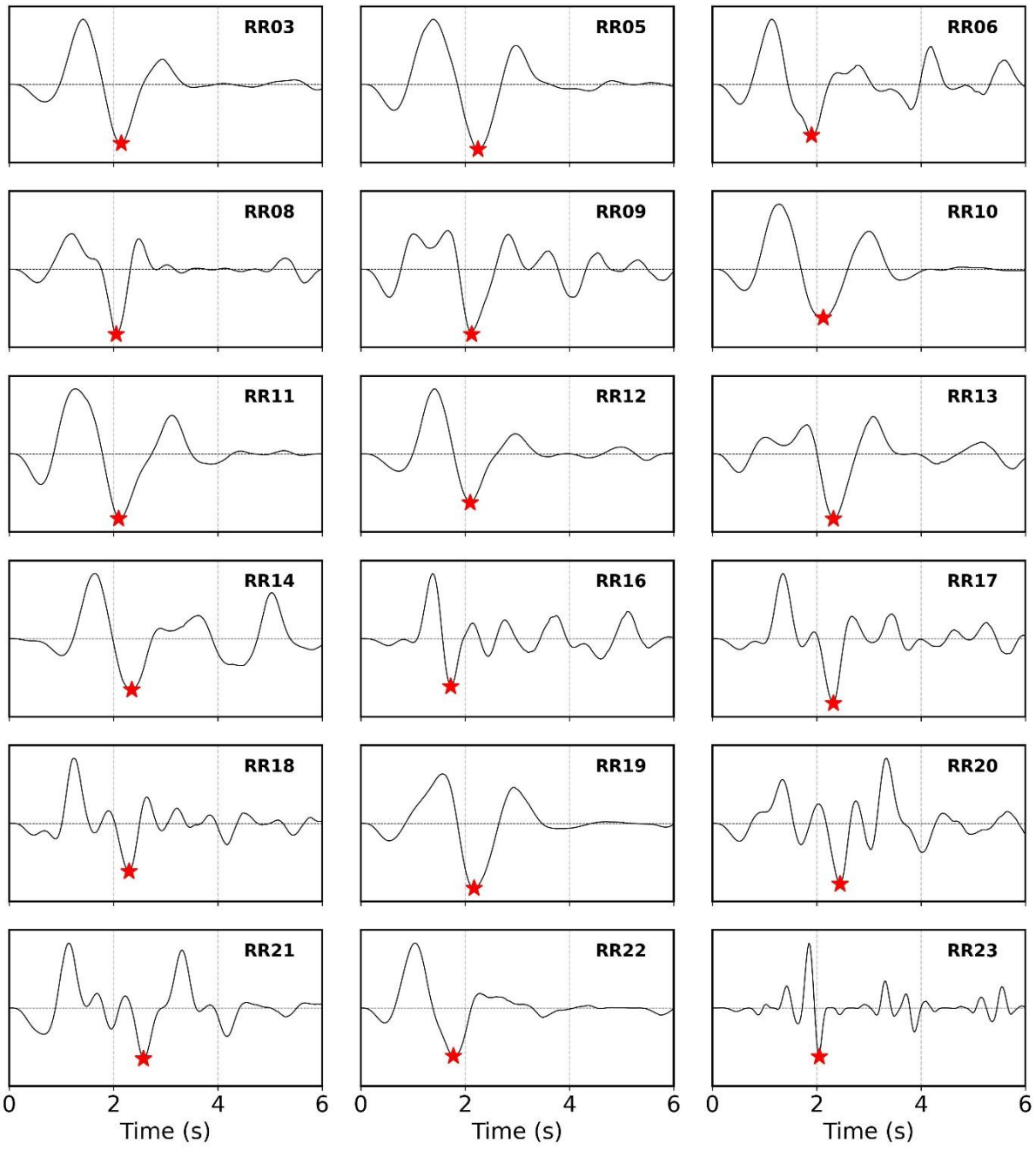


Figure S2: (a) Impulse response of an OBS station located on the abyssal plain, generated using the Telewavesim Python package (Audet et al., 2019). Water-column reverberations (WCR) are also indicated. The reference velocity model is the same as that described in Section 2.3. (b) Randomly generated waveform representing source and path effects. (c) Final synthetic seismogram obtained by convolving the impulse response with the random waveform, which is then used as input for the autocorrelation analysis.



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17 **Figure S3:** Vertical phase-weighted stacks for the 18 additional OBSs used in this study. The
18 station code is shown in the upper-right corner of each panel, and red stars mark the selected
19 arrival times of the Moho reflections used in the analysis.

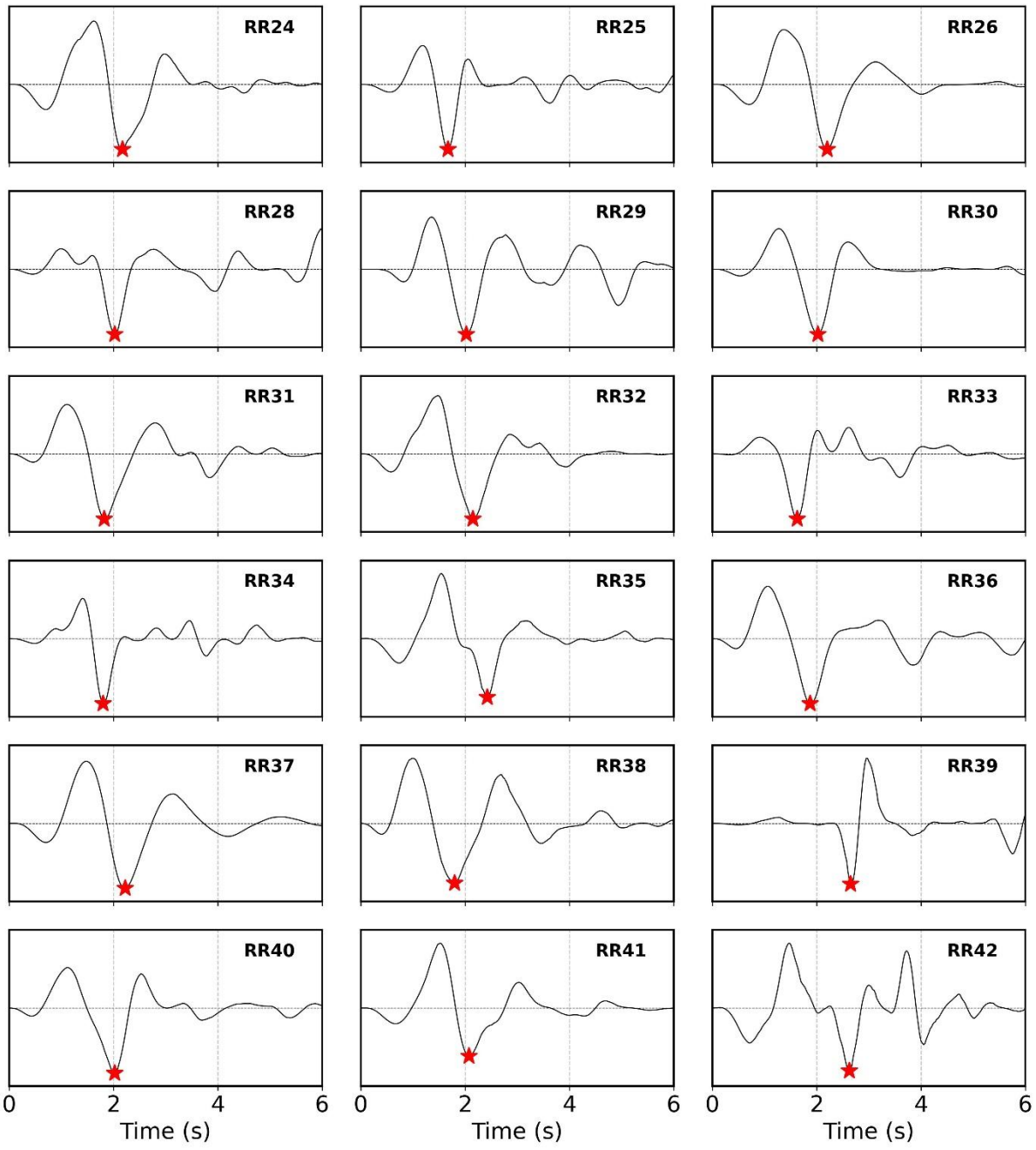

Figure S4. Vertical phase-weighted stacks for the 18 additional OBSs used in this study. Caption details are otherwise identical to those described for Figure S3.

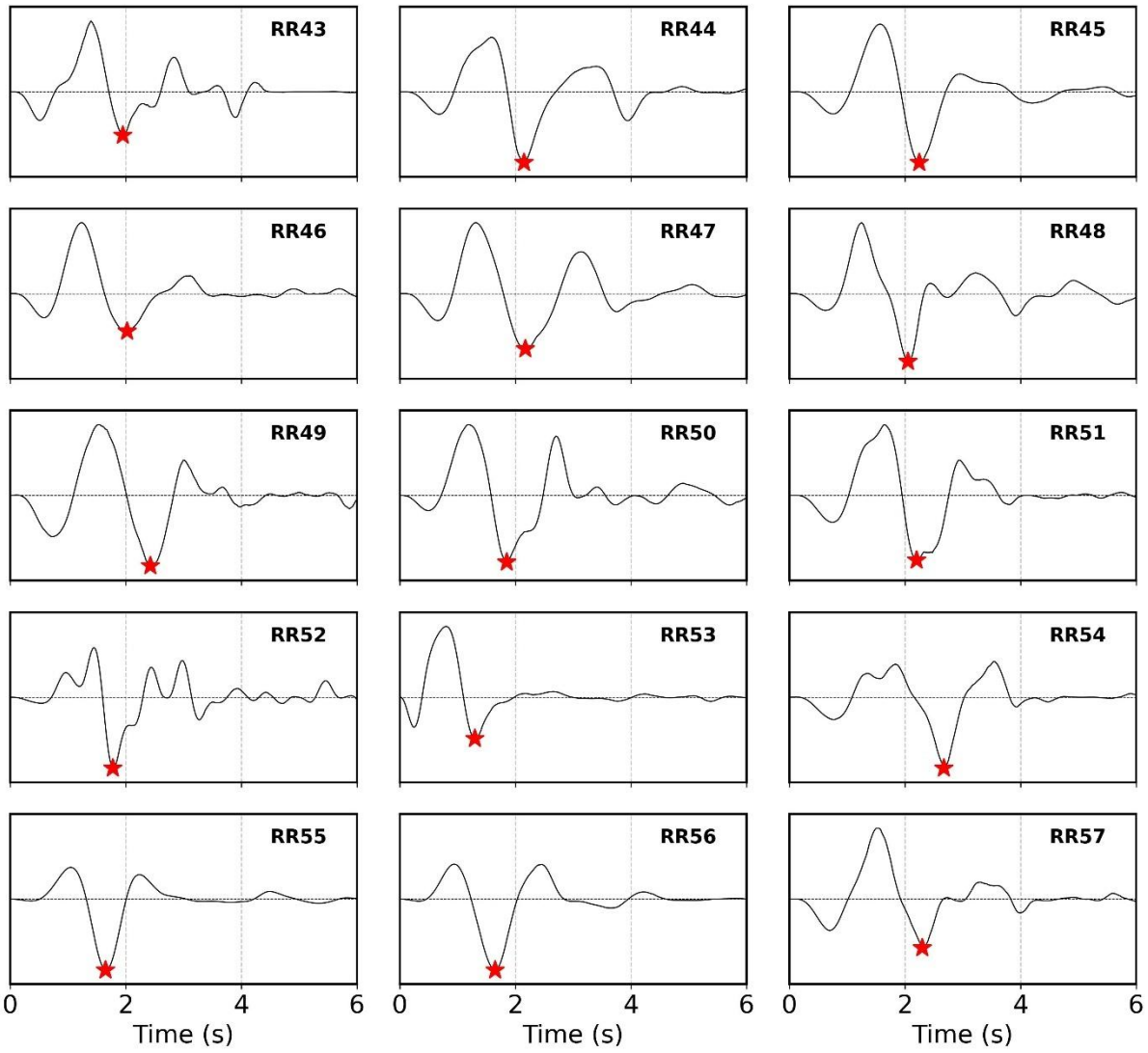

Figure S5: Vertical phase-weighted stacks for the 15 additional OBSs used in this study. Caption details are otherwise identical to those described for Figure S3.

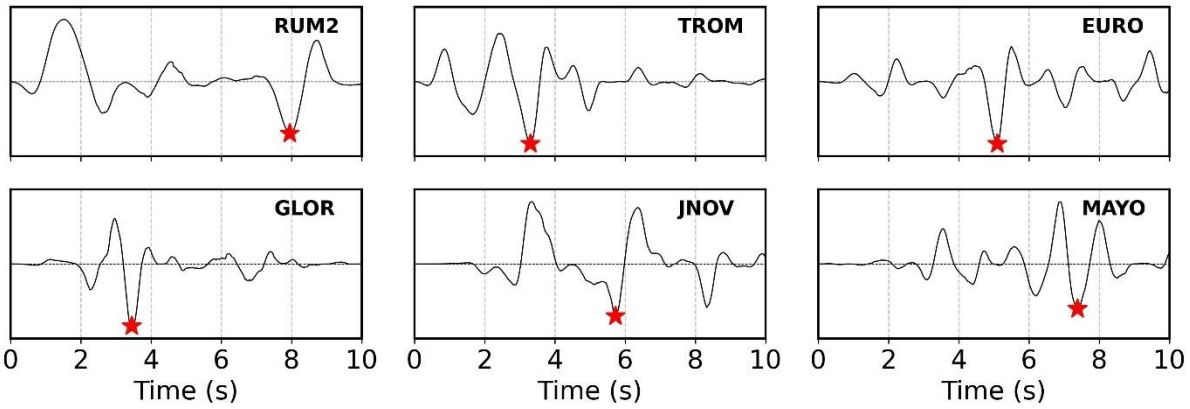

Figure S6: Vertical phase-weighted stacks for the 6 additional land stations used in this study. Caption details are otherwise identical to those described for Figure S3.

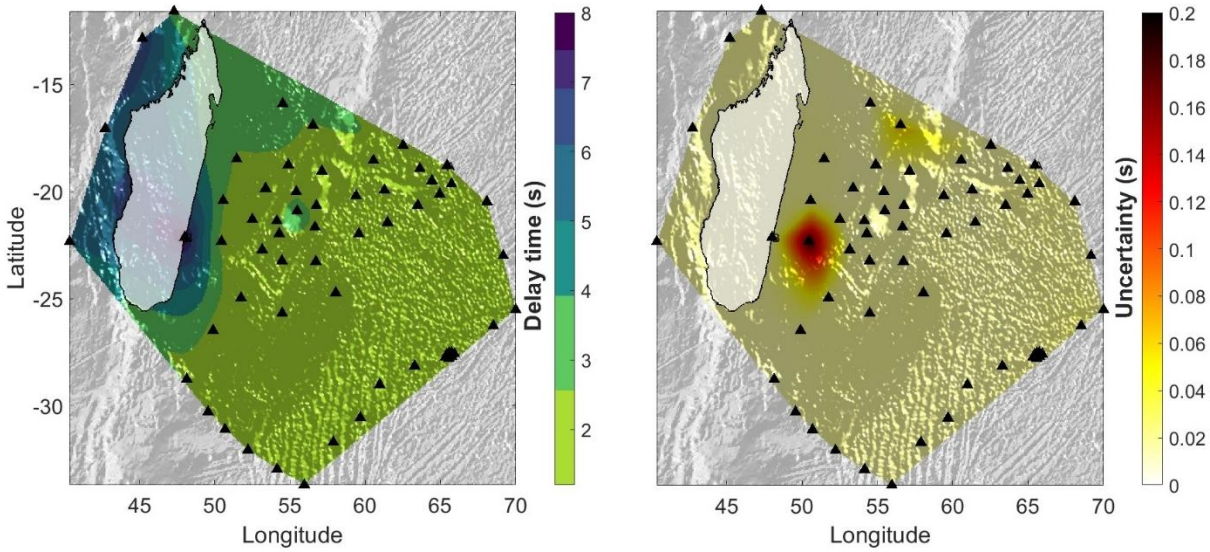

Figure S7: (a) Interpolated map of delay time and (b) corresponding uncertainty distribution across the study area. Black triangles indicate seismic station locations. The region over Madagascar is masked.

Table S1: Seismic station information, including station code, latitude, longitude, elevation, and data duration used in this study. OBS stations are identified by station codes starting with RR. Negative elevation values indicate locations below sea level.

SL No	Station code	Latitude (°)	Longitude (°)	Elevation (m)	Start Date (YYYY-MM-DD)	End Date (YYYY-MM-DD)
1.	**RR01**	-20.01	55.42	-4298	2012-10-05	2013-11-07
2.	**RR03**	-21.37	54.13	-4340	2012-10-04	2013-11-06
3.	**RR05**	-21.66	56.67	-4092	2012-10-02	2013-11-03

4.	**RR06**	-20.66	56.76	-4216	2012-10-02	2013-10-31
5.	**RR07**	-20.19	59.41	-4370	2012-09-29	2013-10-24
6.	**RR08**	-19.93	61.29	-4190	2012-09-29	2013-10-24
7.	**RR09**	-19.49	64.45	-2976	2012-09-30	2013-10-25
8.	**RR10**	-19.64	65.76	-2310	2012-09-30	2013-10-26
9.	**RR11**	-18.78	65.46	-3473	2012-09-30	2013-10-26
10.	**RR12**	-18.93	63.65	-3185	2012-09-30	2013-10-26
11.	**RR13**	-18.54	60.56	-4130	2012-10-01	2013-10-09
12.	**RR14**	-17.84	62.53	-3420	2012-10-01	2013-10-27
13.	**RR16**	-16.9	56.53	-4426	2012-10-01	2013-10-28
14.	**RR17**	-19.04	57.13	-2205	2012-10-02	2013-10-23
15.	**RR18**	-18.75	54.89	-4743	2012-10-05	2013-10-29
16.	**RR19**	-19.85	53.38	-4901	2012-10-08	2013-10-30
17.	**RR20**	-18.48	51.46	-4820	2012-10-05	2013-10-30
18.	**RR21**	-20.42	50.56	-4782	2012-10-06	2013-10-31
19.	**RR22**	-21.3	52.5	-4920	2012-10-08	2013-11-01
20.	**RR23**	-22.33	50.45	-4893	2012-10-08	2013-08-26
21.	**RR24**	-25.68	54.49	-5074	2012-10-21	2013-08-10
22.	**RR25**	-23.27	56.72	-4759	2012-10-02	2013-11-04
23.	**RR26**	-23.23	54.47	-4259	2012-10-03	2013-11-02
24.	**RR27**	-21.97	54.29	-4277	2012-10-03	2013-07-19
25.	**RR28**	-22.72	53.16	-4550	2012-10-10	2013-11-13
26.	**RR29**	-24.97	51.75	-4829	2012-10-11	2013-11-13
27.	**RR30**	-26.49	49.89	-5140	2012-10-10	2013-10-08

28.	**RR31**	-28.76	48.14	-2709	2012-11-30	2013-06-16
29.	**RR32**	-30.29	49.56	-4670	2012-10-12	2013-10-06
30.	**RR33**	-31.12	50.68	-4904	2012-10-12	2013-09-19
31.	**RR34**	-32.08	52.21	-4265	2012-11-15	2013-06-23
32.	**RR35**	-32.97	54.15	-4214	2012-10-12	2013-05-27
33.	**RR36**	-33.7	55.96	-3560	2012-10-14	2013-11-17
34.	**RR37**	-31.7	57.89	-4036	2012-10-14	2013-10-19
35.	**RR38**	-30.56	59.69	-4560	2012-10-15	2013-11-19
36.	**RR39**	-29.02	60.98	-4700	2012-10-14	2013-06-07
37.	**RR40**	-28.15	63.3	-4780	2012-10-16	2013-11-20
38.	**RR41**	-27.73	65.33	-5430	2012-10-15	2013-06-17
39.	**RR42**	-27.62	65.44	-4771	2012-10-15	2013-08-10
40.	**RR43**	-27.53	65.58	-4264	2012-10-15	2013-06-15
41.	**RR44**	-27.53	65.75	-4548	2012-10-15	2013-06-03
42.	**RR45**	-27.66	65.6	-2822	2012-10-15	2013-03-04
43.	**RR46**	-27.79	65.58	-3640	2012-10-15	2013-05-26
44.	**RR47**	-27.7	65.76	-4582	2012-10-16	2013-06-22
45.	**RR48**	-27.58	65.94	-4830	2012-10-16	2013-06-11
46.	**RR49**	-26.27	68.54	-4444	2012-10-17	2013-11-06
47.	**RR50**	-25.52	70.02	-4118	2012-10-18	2013-11-23
48.	**RR51**	-23	69.19	-3463	2012-10-18	2013-01-03
49.	**RR52**	-20.47	68.11	-2918	2012-10-19	2013-11-25
50.	**RR53**	-20.12	64.97	-2940	2012-10-18	2013-10-30
51.	**RR54**	-20.64	63.51	-3375	2012-10-19	2013-10-21

52.	**RR55**	-21.44	61.5	-4462	2012-10-19	2013-11-08
53.	**RR56**	-21.97	59.59	-4230	2012-10-20	2013-06-29
54.	**RR57**	-24.73	58.05	-5200	2012-10-21	2013-10-31
55.	**EURO**	-22.34	40.34	10	2011-04-06	2013-12-09
56.	**GLOR**	-11.58	47.29	4	2011-04-18	2013-12-11
57.	**JNOV**	-17.05	42.71	8	2011-04-11	2013-12-07
58.	**MAYO**	-12.85	45.19	41	2011-04-15	2014-01-14
59.	**RUM2**	-22.14	48	11	2012-09-23	2014-08-31
60.	**RER**	-21.17	55.74	834	2020-01-01	2024-01-01
61.	**TROM**	-15.89	54.52	6	2011-04-23	2013-12-16

Table S2: Seismic station code, applied whitening bandwidth, estimated crustal thickness (bst), Moho depth below sea level (bsl), and associated uncertainties obtained in this study. OBS stations are identified by station codes starting with RR.

SL No	**Station code**	**Whitening bandwidth (ΔW)**	**Crustal Thickness bst (km)**	**Moho depth bsl (km)**	**Uncertainty (± km)**
1.	**RR01**	0.5	7.15	11.45	0.26
2.	**RR03**	0.5	7.15	11.49	0.25
3.	**RR05**	0.5	7.48	11.57	0.26
4.	**RR06**	0.6	6.4	10.53	0.23
5.	**RR07**	0.5	7.4	11.77	0.26
6.	**RR08**	0.5	6.82	11.01	0.24
7.	**RR09**	0.5	7.07	10.04	0.25

8.	**RR10**	0.5	7.07	9.38	0.27
9.	**RR11**	0.5	6.98	10.46	0.26
10	**RR12**	0.5	6.98	10.17	0.25
11	**RR13**	0.5	7.73	11.86	0.27
12	**RR14**	0.5	7.81	11.23	0.26
13	**RR16**	0.5	7.98	10.16	0.44
14	**RR17**	0.5	7.73	9.94	0.27
15	**RR18**	0.5	7.56	12.39	0.26
16	**RR19**	0.5	7.23	12.13	0.25
17	**RR20**	0.5	8.15	12.97	0.29
18	**RR21**	0.5	8.56	13.34	0.3
19	**RR22**	0.6	5.9	10.82	0.22
20	**RR23**	0.5	6.82	11.71	0.79
21	**RR24**	0.5	7.23	12.31	0.26
22	**RR25**	0.7	5.49	10.33	0.2
23	**RR26**	0.5	7.32	11.57	0.26
24	**RR27**	0.5	7.65	11.92	0.27
25	**RR28**	0.5	6.73	11.28	0.24
26	**RR29**	0.5	6.73	11.56	0.26
27	**RR30**	0.5	6.73	11.87	0.24
28	**RR31**	0.6	6.07	8.78	0.22
29	**RR32**	0.5	7.32	11.81	0.25
30	**RR33**	0.7	5.4	10.31	0.21
31	**RR34**	0.6	5.99	10.25	0.23

32	**RR35**	0.5	8.06	12.27	0.29
33	**RR36**	0.5	6.23	9.79	0.23
34	**RR37**	0.5	7.4	11.43	0.26
35	**RR38**	0.6	5.99	10.55	0.22
36	**RR39**	0.5	8.73	13.51	0.31
37	**RR40**	0.5	6.73	11.51	0.24
38	**RR41**	0.5	6.9	12.33	0.25
39	**RR42**	0.5	8.73	13.50	0.3
40	**RR43**	0.6	6.57	10.75	0.23
41	**RR44**	0.5	7.15	11.70	0.27
42	**RR45**	0.5	7.48	10.30	0.26
43	**RR46**	0.5	6.73	10.37	0.25
44	**RR47**	0.5	7.23	11.81	0.25
45	**RR48**	0.5	6.82	11.65	0.26
46	**RR49**	0.5	8.06	12.51	0.31
47	**RR50**	0.6	6.15	10.27	0.22
48	**RR51**	0.5	7.32	10.78	0.26
49	**RR52**	0.6	5.9	8.82	0.22
50	**RR53**	0.8	4.32	7.26	0.19
51	**RR54**	0.5	8.89	12.27	0.31
52	**RR55**	0.7	5.49	9.95	0.2
53	**RR56**	0.7	5.49	9.72	0.21
54	**RR57**	0.5	7.65	12.85	0.28
55	**EURO**	0.2	16.58	16.57	0.52

56	**GLOR**	0.4	11.21	11.21	0.37
57	**JNOV**	0.2	18.61	18.60	0.57
58	**MAYO**	0.2	23.98	23.94	0.72
59	**RUM2**	0.2	25.85	25.84	0.77
60	**RER**	0.2	14.63	13.79	0.47
61	**TROM**	0.4	10.73	10.72	0.37

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