

Supplementary Materials

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Additional Supporting Information (files uploaded separately)

1. Receiver function SAC files
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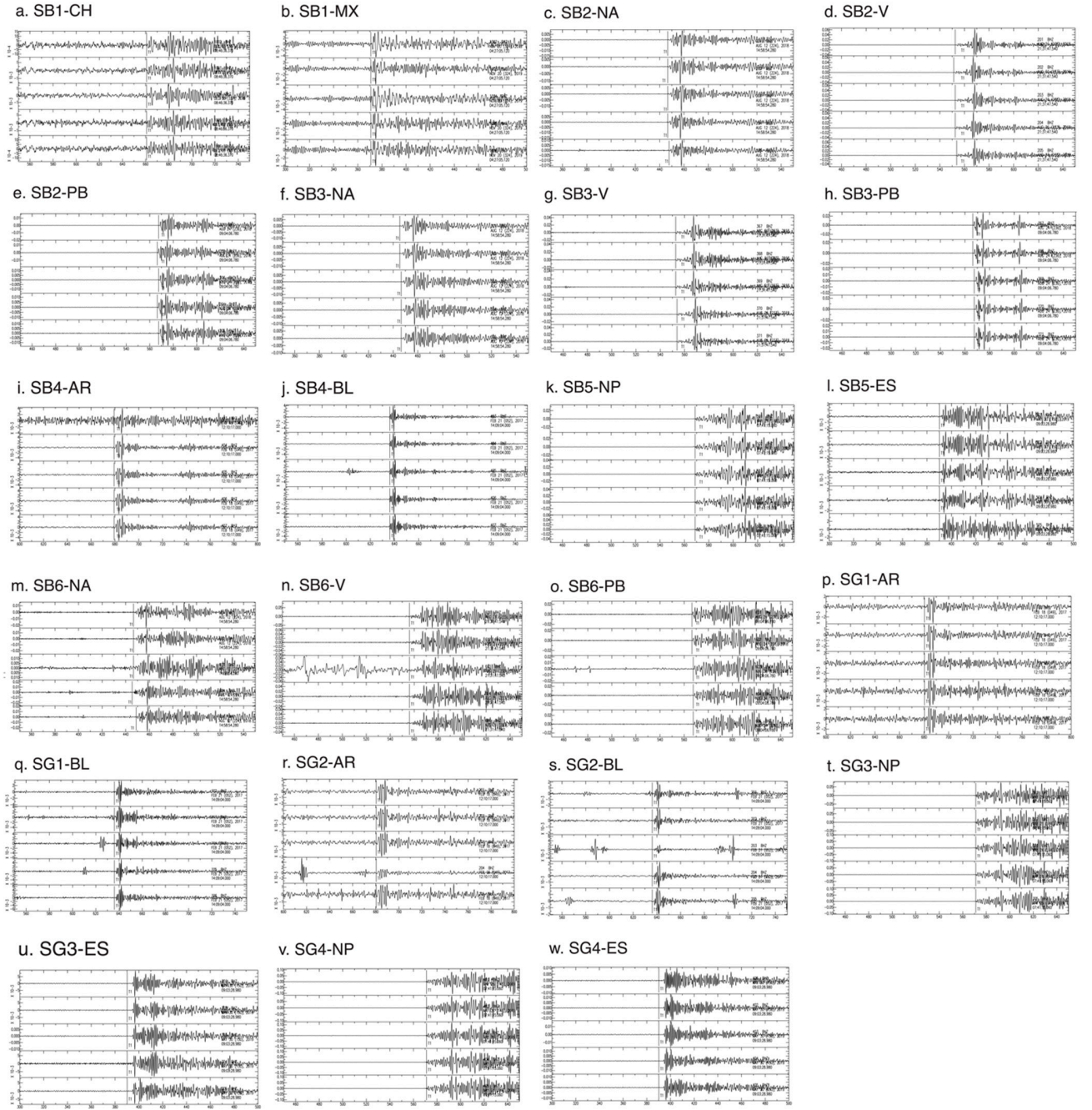


Figure S1. Each plot in this figure shows Z-component waveforms for five stations along each line for specific events that were used in the RF computations shown in this paper. The T1 markers represent the P arrivals.

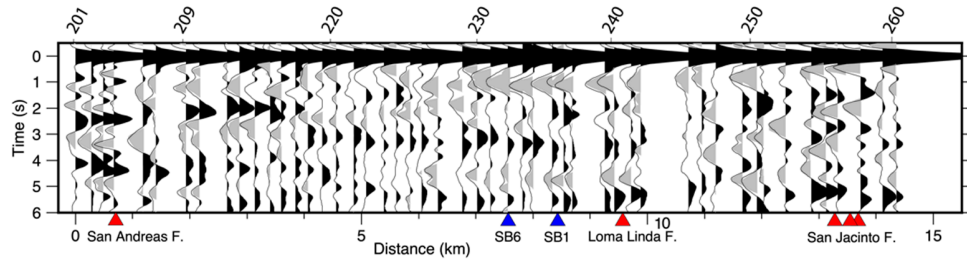


Figure S2. Stacked RFs along the SB2 line for three 2018 events (marked with * in Table S1) with back azimuths ranging from 100 to 120 and epicentral distances ranging from 40° to 65°. Two of the three single-event RF profiles are shown in Figure S3 (c and e).

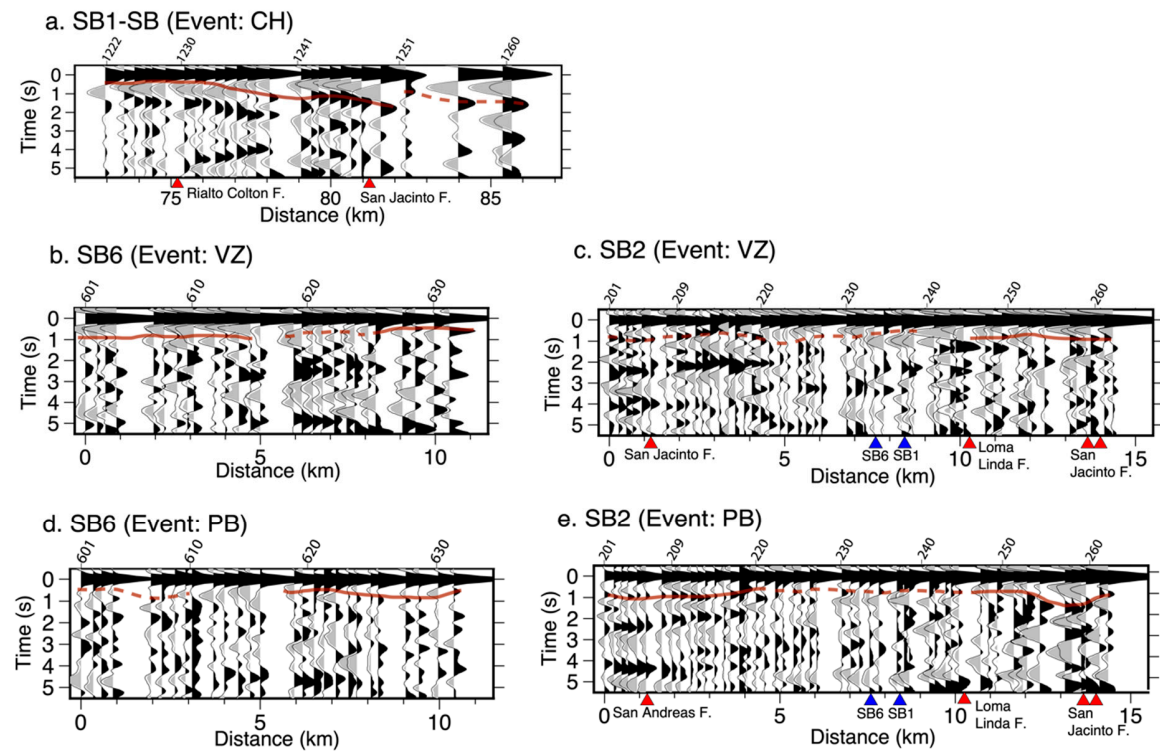


Figure S3. 3 Hz Receiver function profiles along the seismic lines in the San Bernardino basin for multiple events. The sediment–basement interface is marked with the brown line in the profiles.

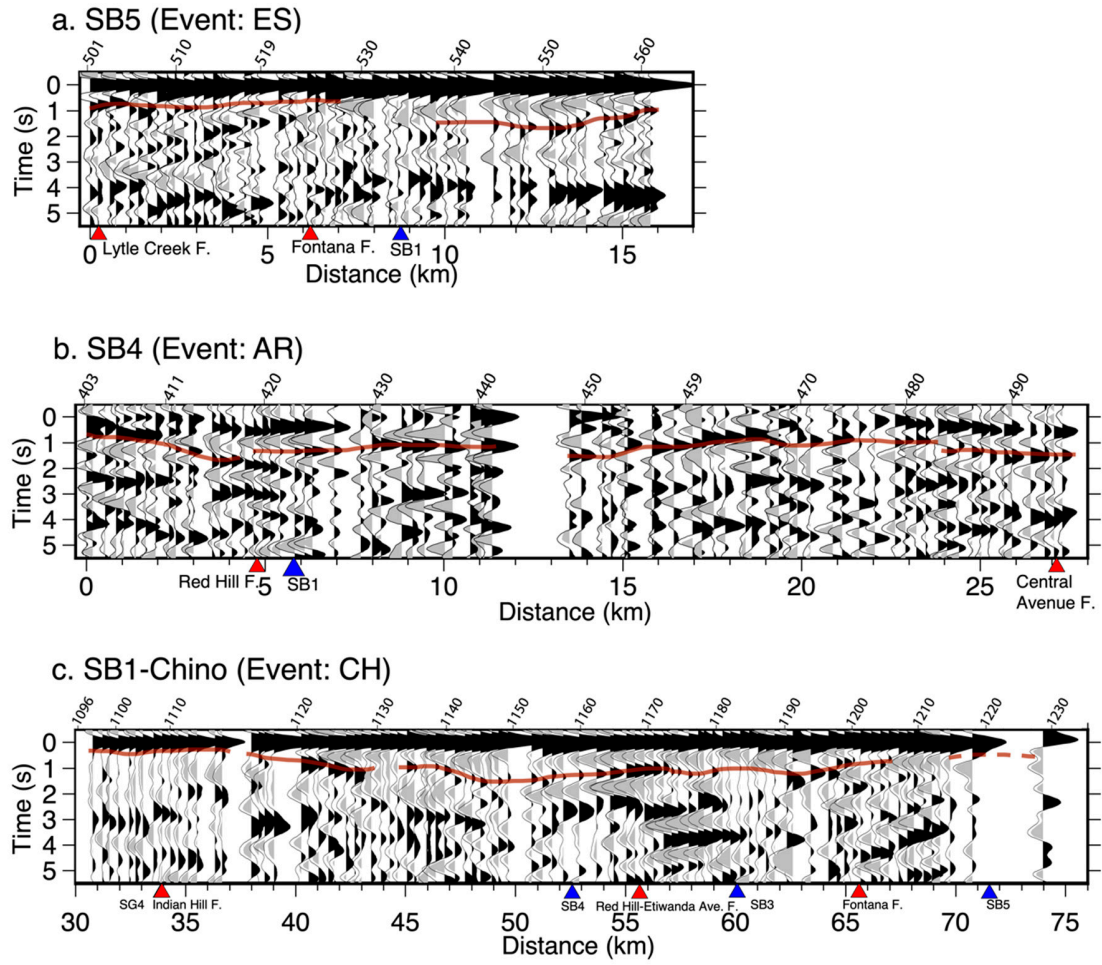


Figure S4. 3 Hz Receiver function profiles along the seismic lines in the Chino basin for multiple events. The sediment–basement interface is marked with the brown line in the profiles.

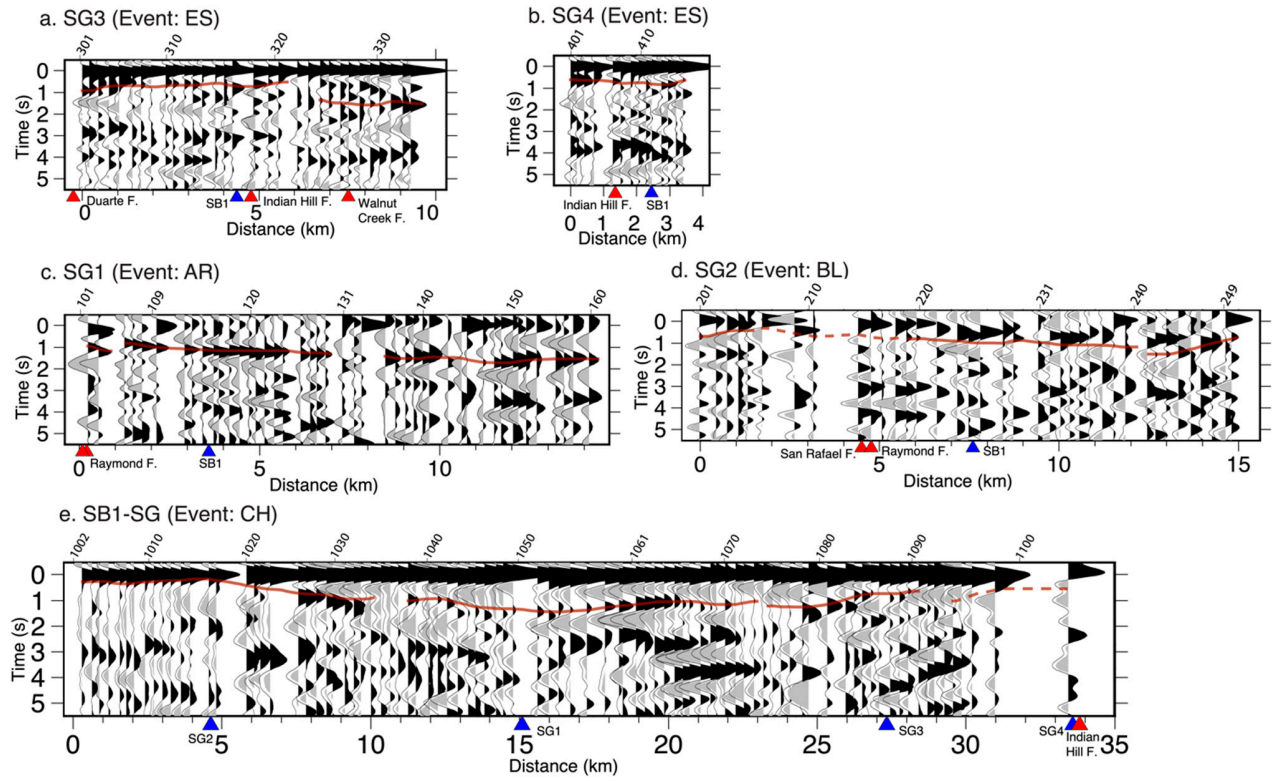


Figure S5. 3 Hz Receiver function profiles along the seismic lines in the San Gabriel basin for multiple events. The sediment–basement interface is marked with the brown line in the profiles.

Table S1: Teleseismic earthquakes with magnitudes greater than 5.9 recorded by different lines in the seismic array.

Event Date yy/mm/dd	Event Time hh:mm:ss	Latitude	Longitude	Depth (Km)	Magnitude	Back- Azimuth (°)	Distance (°)
17/03/11	17:10:38.67	-30.5181	-177.5201	22	5.6	228.1432	85.2727
17/03/07	23:38:22.52	-15.0230	168.1626	8	5.6	248.479	85.3265
17/03/07	16:08:19.04	41.5149	141.9022	56	5.7	309.9548	74.8119
17/03/05	12:22:16.42	-55.1821	-129.1773	10	5.6	186.2788	89.4942
17/02/28	17:35:40.37	-44.7930	-80.8972	10	5.6	154.3645	85.5778
17/02/28	7:49:02.86	37.5573	141.3377	47.36	5.7	306.7735	77.318
17/02/24	23:46:45.37	-17.9678	-178.4533	581.4	5.9	237.9172	77.2932
17/02/24	17:28:44.87	-23.2601	-178.8033	414.89	6.9	234.2063	81.108
17/02/21	14:09:04.32	-19.2814	-63.9047	595.98	6.5	127.1219	74.1145
17/02/18	12:10:17.97	-23.8613	-66.6592	222	6.3	132.29	75.6783
17/02/03	19:54:22.14	15.0833	-60.5290	39.27	5.8	95.218	55.036
17/01/30	23:35:24.00	-14.7729	167.1710	79	5.9	249.2555	85.9441
17/01/29	14:59:51.98	-30.0938	-177.4531	18	5.9	228.4063	84.9358
*18/08/24	9:04:06.78	-11.0424	-70.8169	609.48	7.1	126.2461	63.5841
18/08/23	3:35:15.95	51.5106	-177.8810	43.91	6	311.1181	45.74
18/08/21	22:32:26.85	-16.0248	168.1307	11.14	6.5	247.7005	85.9513
*18/08/21	21:31:47.54	10.7791	-62.9070	146.18	7.3	101.1272	55.395
18/08/19	4:28:58.70	-16.9783	-178.0332	415.6	6.8	238.3851	76.3332
18/08/19	00:19:40.67	-18.1125	-178.1536	600	8.2	237.6109	77.1803
18/08/18	19:39:07.16	8.8013	-77.2503	10	5.6	114.2287	45.2463
*18/08/17	23:22:24.90	8.7694	-83.1531	15	6.1	119.9503	40.9094

18/08/16	18:22:53.36	23.4226	143.3187	20	6.3	293.953	83.7729
18/08/15	21:56:54.36	51.4215	-178.0516	20	6.6	310.9987	45.8496
18/08/12	14:58:54.28	69.5619	-145.2998	2.2	6.3	345.0952	38.4927
18/08/10	18:12:07.13	48.4526	154.9250	28.00	5.90	312.00	63.44
18/08/09	19:21:51.97	13.5687	-91.2332	18	5.6	123.47	31.89
18/08/07	13:57:09.83	74.6458	8.4549	10	5.7	13.54	65.98
18/07/28	9:28:17.40	-30.0601	-177.4508	18	5.7	228.43	84.91
19/06/04	4:39:17.50	29.0623	139.2932	430.3	6.3	300.6678	83.5222
19/06/02	10:36:29.65	-21.2091	-173.9076	10	6	232.482	76.4305
19/05/30	15:38:01.45	-21.7541	-176.3171	177.85	6	233.7015	78.4089
19/05/30	9:03:28.97	13.1462	-89.3663	25	6.6	121.6811	33.4905
19/05/27	9:52:21.78	58.8565	-152.3581	64	5.7	328.041	33.4715
19/05/26	7:41:15.05	-5.8132	-75.2775	122.4	8	125.9287	56.7737
19/05/25	10:31:10.82	-18.9971	169.0424	145	5.7	244.8168	87.0513
19/05/23	15:02:18.59	-21.6535	169.7938	19	5.7	242.2926	88.1105
19/05/23	8:45:17.74	51.3078	-178.2387	30	6.1	310.8465	45.9711
19/05/20	11:18:32.75	-31.4861	-69.8663	102.26	5.6	139.5559	79.6044
19/05/19	12:32:9.15	-21.6619	169.7779	20	6.3	242.2951	88.1273
19/05/16	22:52:43.93	-4.5883	-105.7309	10	5.8	160.5889	40.3051
19/05/16	16:22:16.60	12.6286	-87.8430	62.86	5.9	120.5357	34.9246
19/05/12	19:24:50.39	8.6227	-82.8326	19	6	119.7806	41.2399
19/12/10	8:40:42.59	-20.9041	168.5652	10	5.6	243.5835	88.562
19/11/30	7:44:25.04	13.9284	-91.8586	47.61	5.6	123.7971	31.2103
19/11/09	11:24:30.63	-20.2924	-176.3942	255	5.6	234.824	77.452
19/11/19	23:10:40.57	-33.6399	-66.8723	10	5.7	138.9848	82.8731
19/11/17	12:13:27.79	-20.8071	-177.8316	499	5.8	235.3913	78.7819
19/12/10	17:05:02.66	30.7178	141.7364	14.44	5.9	300.811	80.8383
19/12/06	13:04:46.93	-15.2838	-175.1193	10	6	237.6853	73.1354
19/12/04	20:10:03.59	-19.0677	169.5748	266	6	244.4531	86.6953
19/12/03	8:46:36.37	-18.5597	-70.6504	32.44	6	131.5577	69.2598
19/11/11	23:03:28.05	-18.8857	-175.3598	10	6.1	235.1648	75.7788
19/11/24	5:40:1.05	51.3809	-175.5108	20	6.3	310.8987	44.2592
19/11/20	8:26:07.54	53.1633	153.6852	486.81	6.3	317.2483	62.4401
19/11/20	4:27:05.12	13.8855	-93.2133	14.16	6.3	125.6884	30.3177

Table S2: Number of stations recording the teleseismic events used in this study and number of stations that produced useful RFs from those events.

Line	Number of stations used in RF computation	Number of stations producing useful RFs			
		Argentina	Bolivia		
SB4	96	80	78		
SG1	60	41	41		
SG2	50	37	28		
		North Alaska	Peru Brazil	Venezuela	
SB2	61	48	51	50	
SB3	87	70	16	15	
SB6	33	28	27	27	
		Northern Peru	El Salvador		
SB5	62	52	52		
SG3	34	33	33		
SG4	15	14	14		
		Mexico	Chile		
SB1	260	205	168		