

1 **Supporting Information for ”The detection of**
2 **transient subduction zone interface properties using**
3 **teleseismic data”**

F. Rappisi* ^{1,2}, T. J. Craig ^{1,3}, S. Rost ¹

4 ¹School of Earth and Environment, University of Leeds, Leeds, UK

5 ²Now at: European Center for Geodynamics and Seismology, Walferdange, Luxembourg.

6 ³COMET, School of Earth and Environment, University of Leeds, Leeds, UK

7 **Contents of this file**

8 1. Supplementary Figure 1-7

9 2. Supplementary Tables 1 and 2

*Corresponding author: F. Rappisi, francescorappisi@gmail.com.

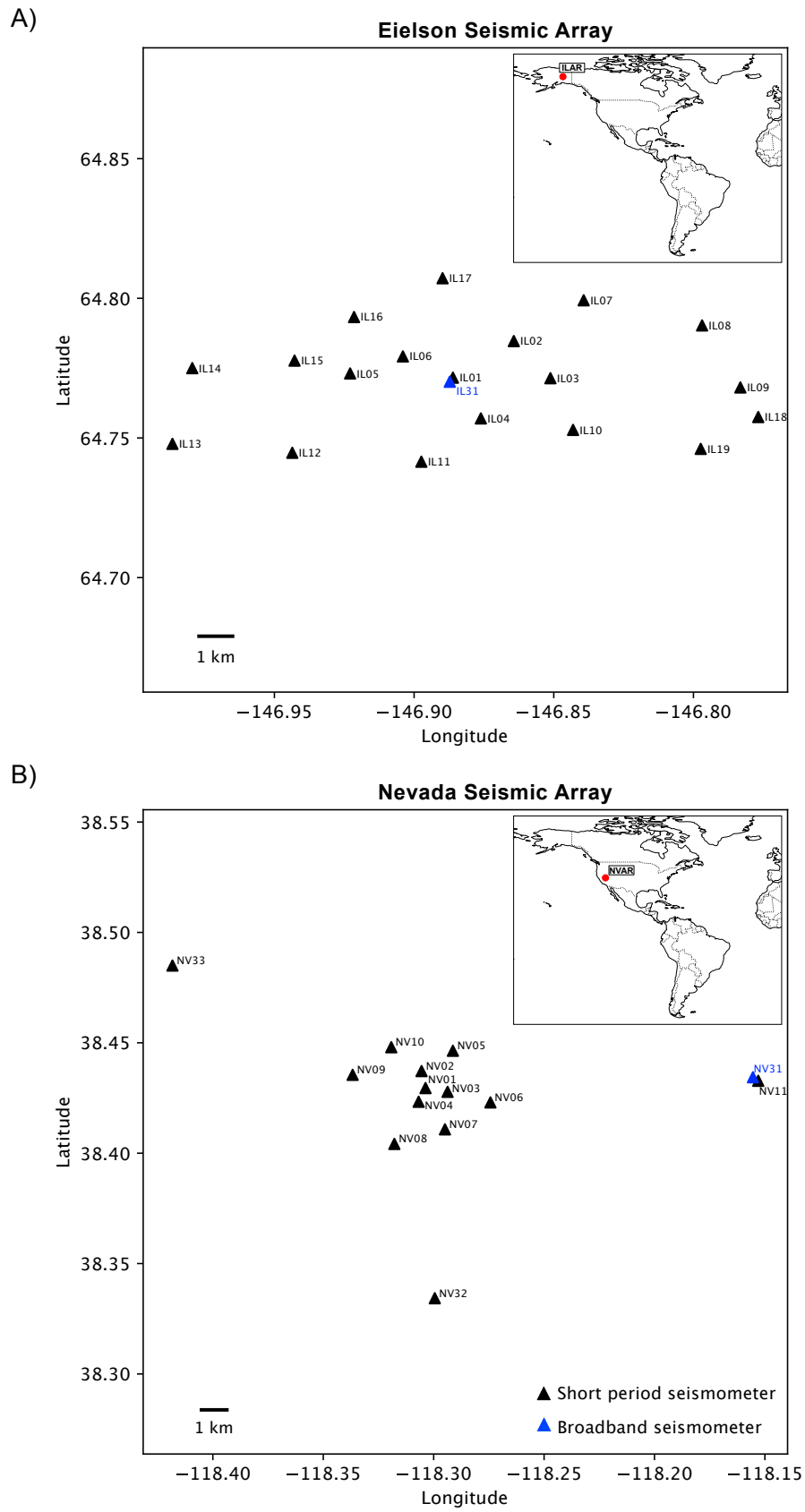


Figure 1: A) ILAR and B) NVAR seismic arrays

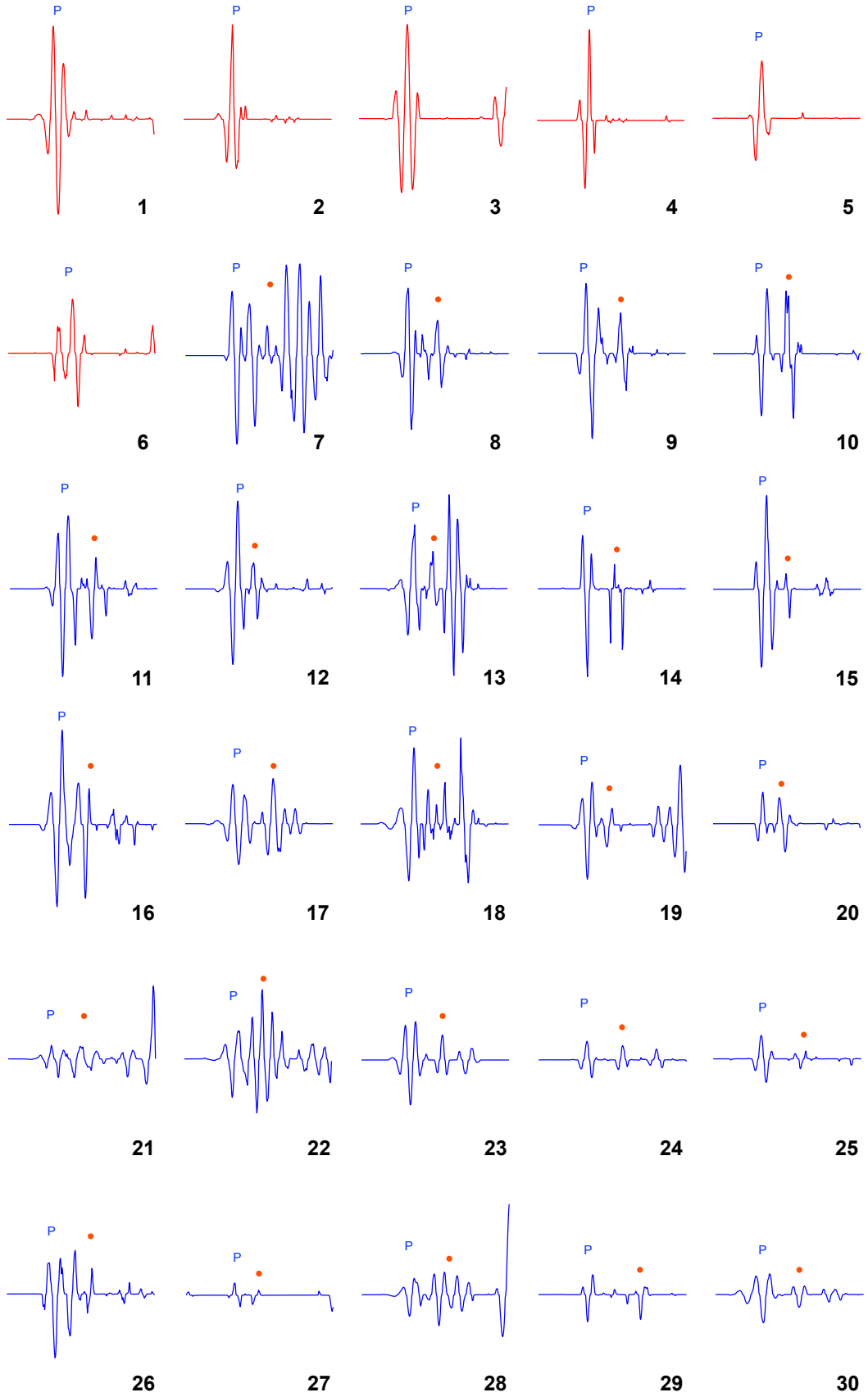


Figure 2: Waveforms for the Guerrero case study, as shown in Figure 2 of the main text. Red waveforms (1-6) represent events without seismic phases associated with USVL reflections, while blue waveforms (7-30) indicate events with reflections (marked by red dots). Event numbers correspond to those in Figure 3 of the main text and Supplementary Table 1.

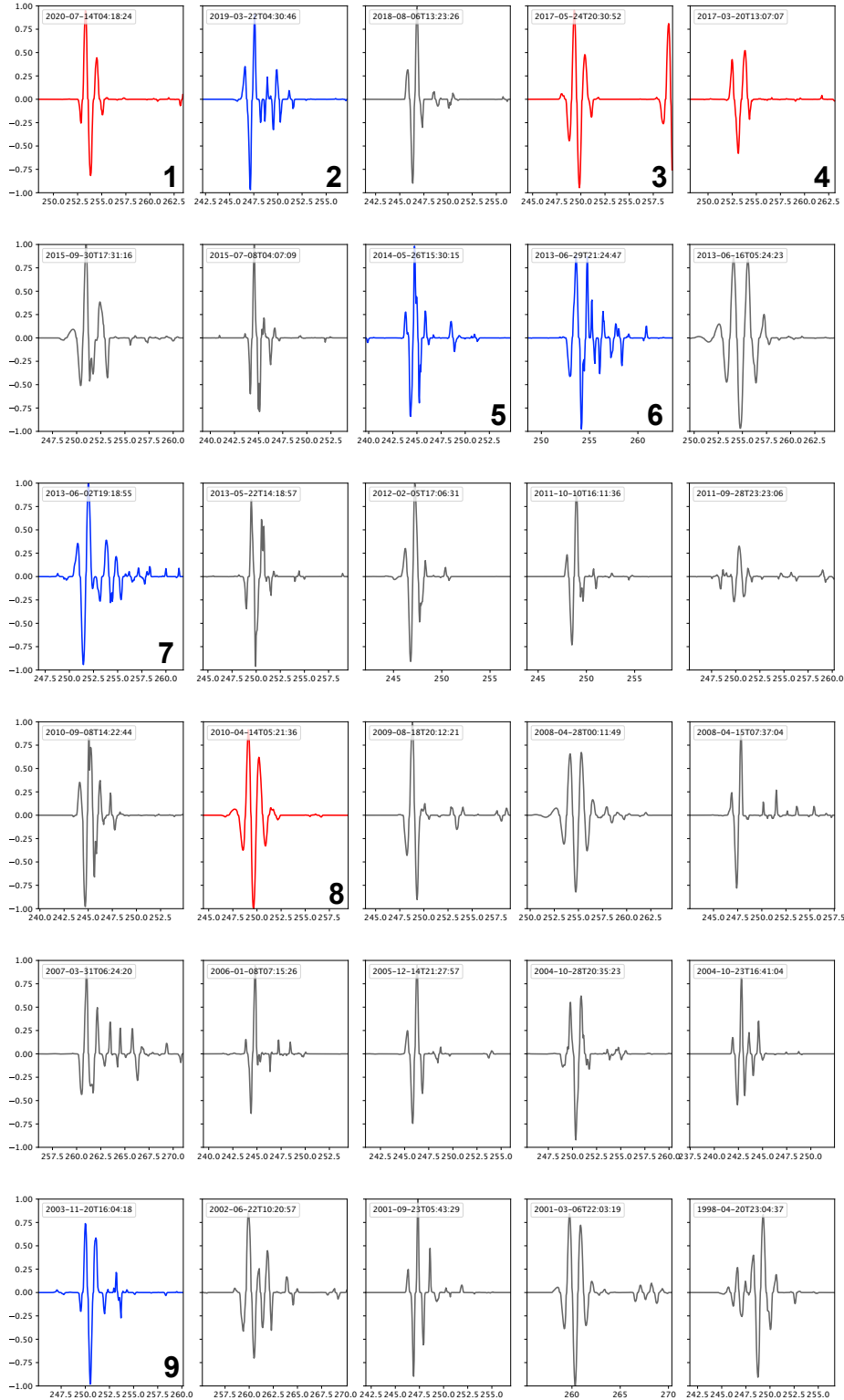


Figure 3: Ambiguous waveforms identified in the Guerrero case study. These traces were classified by the automated algorithm as uncertain — exhibiting potential secondary phases of interest but lacking sufficient confidence to be classified as either HRI Present or Absent. A subset of nine events was manually reviewed and reclassified based on visual inspection: blue waveforms indicate those interpreted as HRI Present, and red as HRI Absent. Their spatial and temporal distribution relative to SSE activity is shown in Supplementary Figure 4

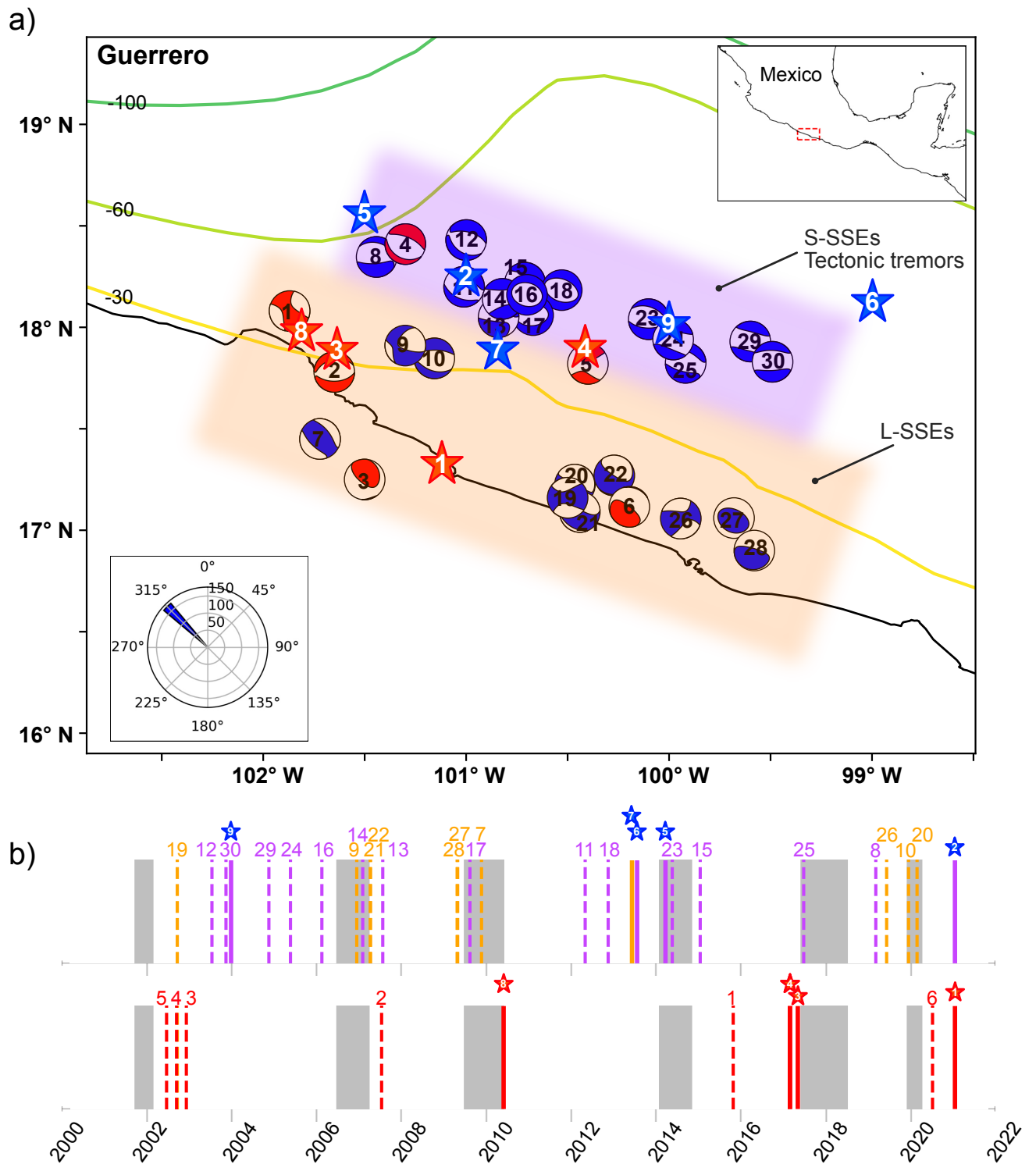


Figure 4: Same as Figure 3 of the main text but including nine additional events that were originally flagged as ambiguous by the automated classification algorithm. These events were manually interpreted and are shown with stars on the map (panel a) and solid lines in the temporal panel (panel b). Event numbers correspond to the waveform examples shown in Supplementary Figure 3

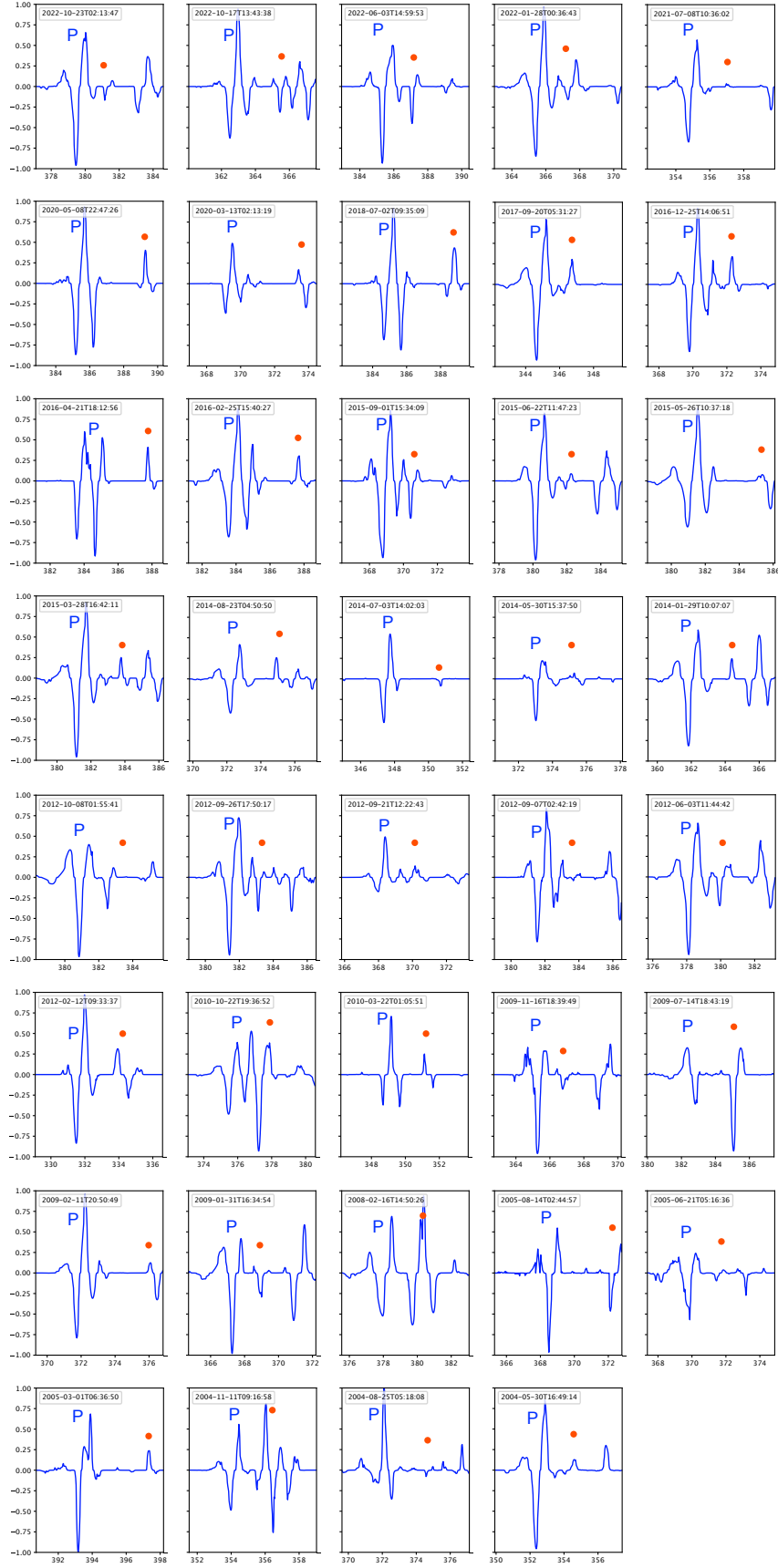


Figure 5: Waveforms classified as HRI Present for the Northern Chile case study. Events characteristics are listed in Supplementary Table 2

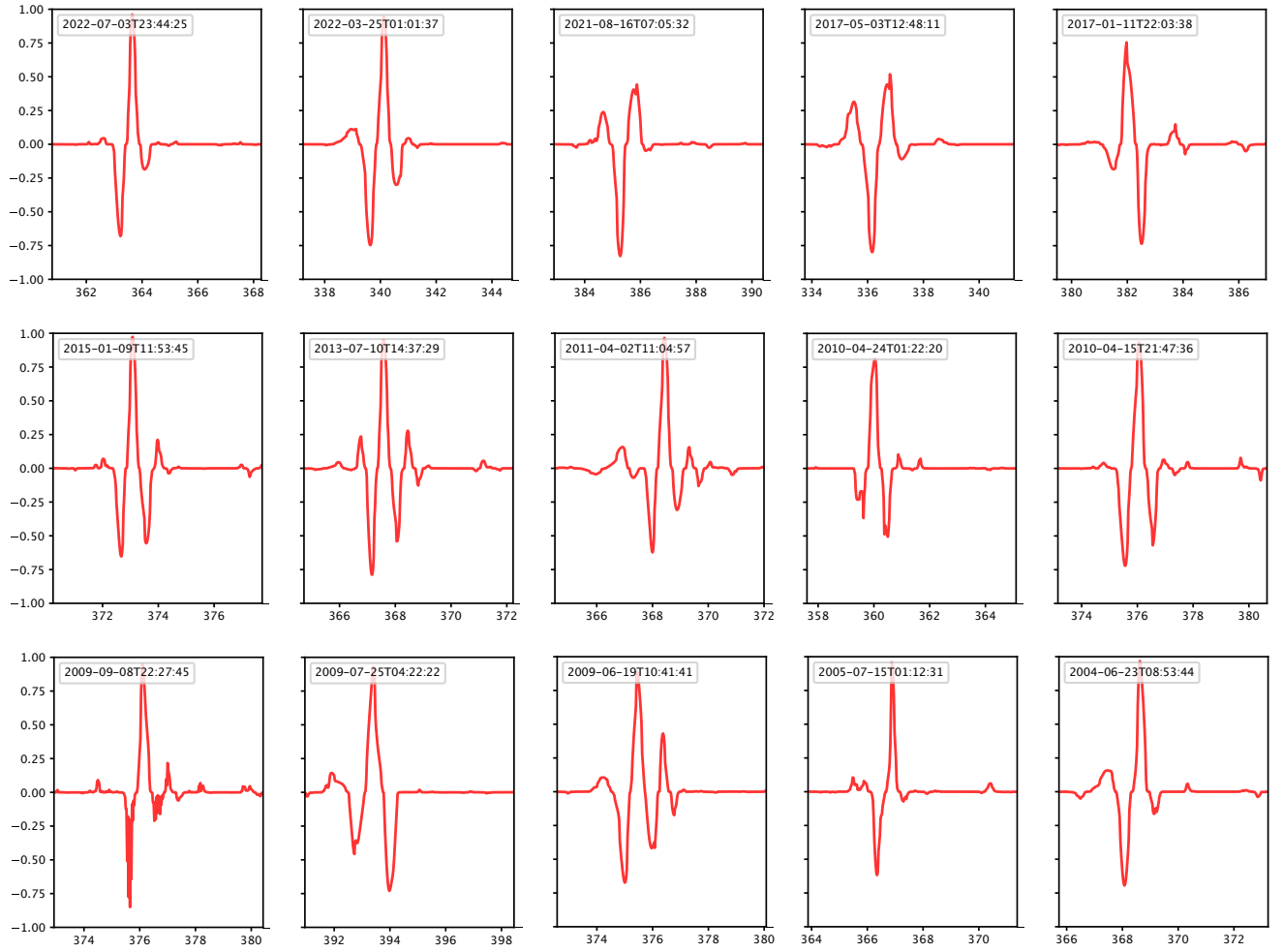


Figure 6: Waveforms classified as HRI Absent for the northern Chilean case study. Events characteristics are listed in Supplementary Table 2

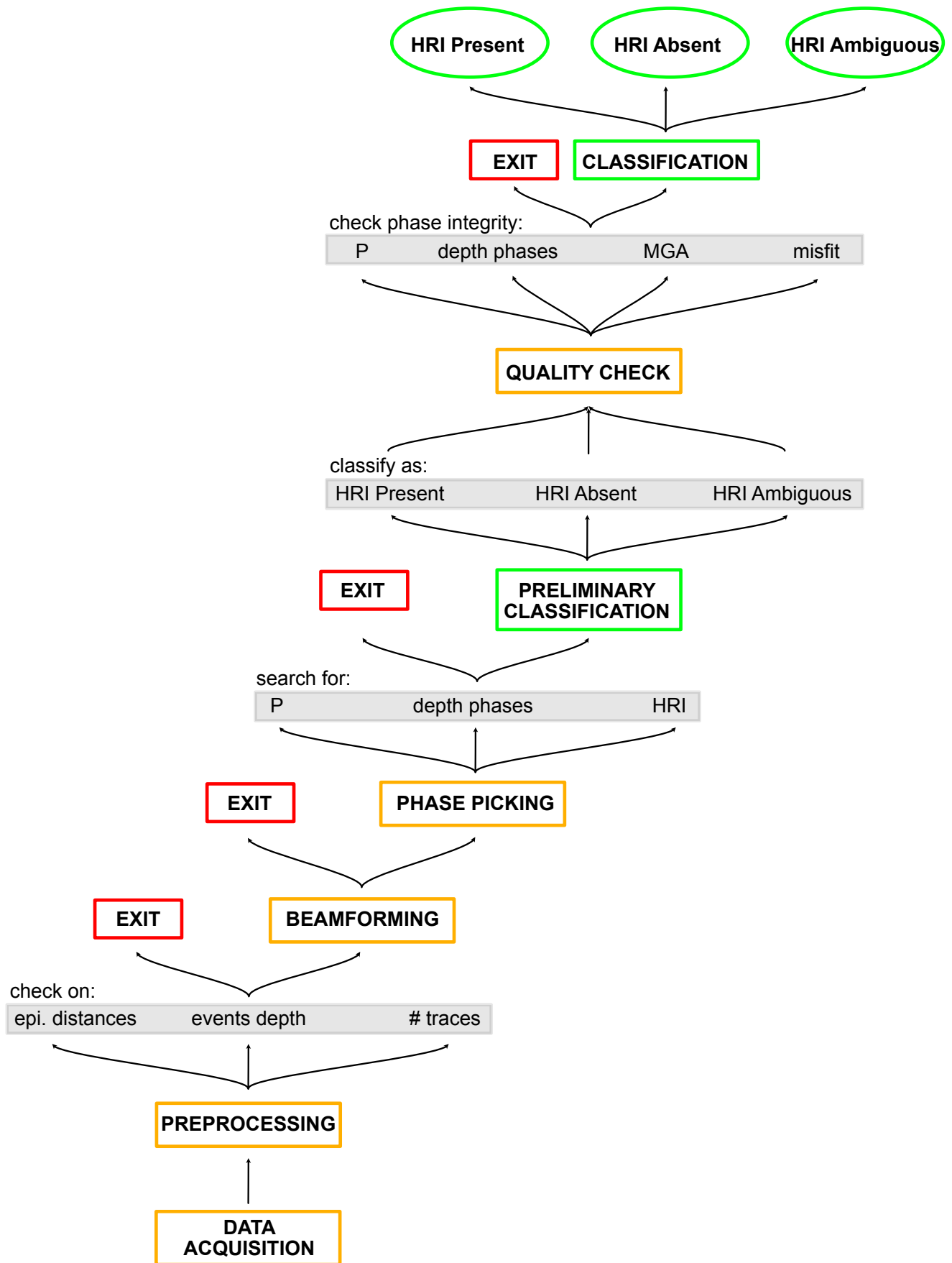


Figure 7: Flowchart summarizing the analysis pipeline for detecting HRI phases. See Methods for detailed descriptions of each step.

Table 1: Events from the Guerrero case study as reported by ISC

ID	Origin Time	latitude	longitude	depth (km)	Mw
1	2015-10-25T14-47-51	18.1137	-101.8001	43.00	5.1
2	2007-07-18T15-13-34	17.8647	-101.4542	44.45	4.87
3	2002-12-14T01-43-14	17.3868	-101.3481	32.81	4.68
4	2002-09-21T02-12-51	18.4579	-101.2723	62.89	5.00
5	2002-06-27T04-59-48	17.7967	-100.4353	55.25	4.32
6	2020-07-03T02-33-43	17.0483	-100.2030	34.96	4.40
7	2009-11-23T01-56-46	17.3756	-101.6197	30.08	4.56
8	2019-03-03T15-25-53	18.4252	-101.4423	59.55	5.13
9	2006-12-17T03-17-50	17.9465	-101.3244	62.24	4.91
10	2019-12-09T22-14-13	17.8059	-101.1979	52.50	4.47
11	2012-05-01T16-37-57	18.2888	-101.0700	63.97	5.51
12	2003-07-21T23-53-42	18.5062	-101.1097	62.92	5.04
13	2007-07-28T13-45-25	18.2449	-100.7421	87.19	5.01
14	2007-02-06T10-55-29	18.0839	-100.8302	63.69	4.53
15	2015-01-15T03-21-30	18.2084	-100.7098	54.30	4.64
16	2006-02-20T10-54-21	18.1836	-100.7546	58.12	5.18
17	2009-08-15T13-22-42	18.0933	-100.6488	61.62	5.32
18	2012-11-15T09-20-21	18.1995	-100.5249	57.87	5.77
19	2002-09-27T07-04-56	17.2569	-100.4582	30.48	5.12
20	2020-02-21T01-48-14	17.2352	-100.4179	40.61	4.72
21	2007-04-13T05-42-22	17.2305	-100.3083	32.94	5.84
22	2007-04-13T08-43-47	17.1961	-100.2654	42.34	5.41
23	2014-05-20T01-39-12	18.0591	-100.0570	55.45	4.97
24	2005-05-26T15-55-56	18.0237	-99.8444	68.73	4.68
25	2017-06-22T03-55-11	17.8228	-99.9148	56.73	4.66
26	2019-06-04T19-12-07	17.0886	-99.9476	32.50	4.48
27	2009-05-01T23-38-39	17.0841	-99.6759	37.86	4.45
28	2009-04-27T16-46-27	16.9514	-99.5678	32.84	5.66
29	2004-11-22T03-49-25	17.9462	-99.5672	55.27	4.35
30	2003-11-19T13-50-27	17.9063	-99.4829	63.51	4.98

Table 2: Events from the Chilean case study as reported by ISC

ID	Origin Time	latitude	longitude	depth (km)	Mw
1	2022-10-23T02-08-29	-21.9448	-68.7857	109.60	5.47
2	2022-10-17T13-38-22	-18.3543	-69.2365	130.63	5.20
3	2022-06-03T14-54-35	-23.0942	-68.3651	110.50	5.16
4	2022-07-03T23-39-04	-19.3526	-70.2544	76.48	4.82
5	2022-03-25T00-56-22	-15.6398	-71.6727	138.24	5.21
6	2022-01-28T00-31-25	-19.1003	-69.3769	101.83	5.67
7	2021-08-16T07-00-10	-23.7347	-69.9104	62.98	4.94
8	2021-07-08T10-30-37	-18.3577	-71.2439	35.74	5.36
9	2020-05-08T22-42-07	-23.1302	-68.8407	94.42	5.05
10	2020-03-13T02-08-01	-19.9213	-69.2601	107.65	5.44
11	2018-07-02T09-29-51	-23.1745	-68.9024	106.81	4.78
12	2017-09-20T05-26-10	-16.3371	-71.2800	119.45	5.51
13	2017-05-03T12-42-48	-16.1130	-73.3454	57.29	5.27
14	2017-01-11T21-58-17	-22.8047	-69.7917	73.07	5.87
15	2016-12-25T14-01-34	-19.9486	-68.7787	118.23	5.27
16	2016-04-21T18-07-43	-22.3069	-67.5714	164.89	4.93
17	2016-02-25T15-35-07	-23.0667	-69.0173	87.08	5.42
18	2015-09-01T15-28-50	-19.7600	-69.2620	98.52	5.33
19	2015-06-22T11-42-07	-21.7769	-68.2176	123.79	5.07
20	2015-05-26T10-32-01	-22.0011	-68.4379	120.00	5.65
21	2015-03-28T16-36-53	-22.1787	-68.5348	107.78	5.95
22	2015-01-09T11-48-27	-20.4023	-68.9735	104.43	4.86
23	2014-08-23T04-45-32	-20.1224	-68.9351	100.93	5.43
24	2014-07-03T13-56-44	-16.9158	-71.1262	100.00	4.71
25	2014-05-30T15-32-27	-21.2878	-69.9976	57.58	5.38
26	2014-01-29T10-01-50	-18.5539	-69.4240	116.66	5.43
27	2013-07-10T14-32-12	-19.3419	-69.3004	111.74	5.58
28	2012-10-08T01-50-25	-21.7976	-68.3792	122.89	5.88
29	2012-09-26T17-45-00	-22.2970	-68.6263	113.09	5.31
30	2012-09-21T12-17-25	-19.6785	-69.1886	107.59	5.31
31	2012-09-07T02-37-01	-22.4025	-68.3622	108.70	4.77
32	2012-06-03T11-39-26	-21.4543	-68.3428	123.91	4.97
33	2012-02-12T09-28-16	-15.6800	-74.2514	70.81	4.98
34	2011-04-02T10-59-39	-19.6717	-69.2191	101.97	5.81
35	2010-10-22T19-31-36	-20.9257	-68.4692	125.31	5.42
36	2010-04-24T01-17-04	-18.0975	-69.6867	122.83	4.60
37	2010-04-15T21-42-18	-21.1296	-68.6114	108.65	4.89

ID	Origin Time	Latitude	Longitude	Depth (km)	Mw
38	2010-03-22T01-00-42	-16.2655	-69.6371	205.30	4.89
39	2009-11-16T18-34-25	-19.5908	-70.4081	41.12	5.08
40	2009-09-08T22-22-27	-21.0126	-68.5893	103.67	4.89
41	2009-07-25T04-17-13	-24.0454	-66.8034	200.28	5.02
42	2009-07-14T18-38-08	-21.8455	-67.1473	178.99	5.29
43	2009-06-19T10-36-23	-21.0166	-68.7005	106.87	5.24
44	2009-02-11T20-45-31	-20.2356	-68.8946	104.79	5.29
45	2009-01-31T16-29-36	-19.4552	-69.1611	100.98	5.38
46	2008-02-16T14-45-10	-21.3768	-68.5619	128.10	5.54
47	2005-08-14T02-39-39	-19.8507	-69.1326	111.12	5.75
48	2005-07-15T01-07-15	-19.1344	-68.9056	123.58	4.96
49	2005-06-21T05-11-17	-20.0566	-68.9834	98.21	5.44
50	2005-03-01T06-31-40	-24.1157	-66.5750	194.76	4.96
51	2004-11-11T09-11-43	-17.2603	-69.7546	139.51	5.20
52	2004-08-25T05-12-49	-20.3404	-69.0622	92.31	4.95
53	2004-06-23T08-48-26	-19.5150	-69.2234	103.00	5.23
54	2004-05-30T16-43-56	-17.2830	-70.6126	107.50	5.35