APPENDIX

Table A1. V_{S30} values for the Geomtrax third letter (Chiou et al. 2008) and NEHRP classifications (Atkinson and Boore 2003, 2008)

Geomatrix third letter	V_{S30} range (m/s)	Average V_{S30} (m/s)	
A	–	659.6	
B	–	424.8	
C	–	338.6	
D	–	274.5	
E	–	191.3	
NEHRP category	**V_{S30} range (m/s)**	**Average of range (m/s)**	**Center of range (m/s)**
A	>1500	1,745.3	—
B	760–1500	967.6	1,070
C	360–760	450.5	525
D	180–360	258.2	255
E	<180	152.5	—

Table A2. Summary of selected earthquakes and number of recordings per event used in the regression analysis

EQID	Year	Month	Day	Region	Mw	Depth	Main/after	Inter/intraslab	Number of Records
10003	1949	4	13	Cascadia	6.8	54	MS	Slab	2
10008	1956	2	14	Japan	6.0	45	MS	Slab	4
10012	1962	4	23	Japan	7.0	60	MS	Slab	2
10020	1964	7	6	Mexico	7.4	94	MS	Slab	3
10023	1965	4	29	Cascadia	6.7	67	MS	Slab	3
10034	1968	4	1	Japan	7.5	37	MS	Interface	8
10038	1968	5	16	Japan	8.3	20	MS	Interface	14
10039	1968	5	16B	Japan	7.5	26	AS	Interface	4
10047	1968	8	6	Japan	6.8	44	MS	Slab	4
10050	1969	4	21	Japan	6.3	39	MS	Interface	2
10057	1970	1	21	Japan	6.4	25	MS	Interface	2
10058	1970	4	1	Japan	5.8	67	MS	Slab	2
10060	1970	7	25	Japan	7.1	47	MS	Interface	4
10063	1971	1	4	Japan	6.1	39	MS	Slab	2
10072	1971	8	2	Japan	7.1	58	MS	Slab	3
10081	1972	3	19	Japan	6.4	77	MS	Slab	2
10085	1973	6	17	Japan	7.9	41	MS	Interface	2
10087	1973	8	28	Mexico	7.1	83	MS	Slab	3
10089	1974	1	5	Peru	6.6	95	MS	Slab	2
10095	1974	9	20	So. Isl	6.1	117	MS	Slab	2
10096	1974	10	3	Peru	8.1	27	MS	Interface	2
10098	1974	11	9	Peru	7.0	6	AS	Interface	2
10099	1974	11	12	Chile	6.2	93	MS	Slab	2
10108	1978	6	12	Japan	7.6	40	MS	Interface	7
10112	1978	12	6	Japan	7.8	100	MS	Slab	2
10114	1979	2	28	Alaska	7.5	13	MS	Interface	3
10115	1979	3	14	Mexico	7.4	20	MS	Interface	6
10119	1980	9	23	Japan	5.3	79	MS	Slab	3
10120	1981	1	23	Japan	6.8	121	MS	Slab	4
10122	1981	10	25	Mexico	7.2	20	MS	Interface	5
10123	1981	11	7	Chile	6.9	66	MS	Slab	6
10124	1981	12	2	Japan	6.3	77	MS	Slab	2
10127	1982	3	21	Japan	6.9	37	MS	Interface	2
10130	1982	7	23	Japan	7.0	30	MS	Interface	3
10131	1983	2	14	Alaska	6.5	25	MS	Interface	2
10133	1983	5	26	Japan	7.9	14	MS	Interface	8
10143	1985	3	3	Chile	7.9	31	MS	Interface	27
10145	1985	4	9	Chile	7.1	44	AS	Interface	7
10147	1985	9	19	Mexico	8.0	18	MS	Interface	16
10148	1985	9	21	Mexico	7.5	15	AS	Interface	12

(*continued*)

Table A2. (*continued*)

EQID	Year	Month	Day	Region	Mw	Depth	Main/after	Inter/intraslab	Number of Records
10149	1985	10	9	Alaska	6.6	15	MS	Interface	2
10152	1985	11	14	Alaska	6.0	19	MS	Interface	2
10153	1986	2	12	Japan	6.2	44	MS	Interface	2
10154	1986	4	30	Mexico	6.9	20	MS	Interface	2
10159	1987	1	14	Japan	6.8	109	MS	Slab	4
10166	1987	5	2	Alaska	5.3	43	MS	Slab	2
10170	1989	4	25	Mexico	6.9	19	MS	Interface	14
10241	1994	1	20	Taiwan	5.5	75	MS	Slab	51
10246	1994	10	12	Taiwan	5.2	73.1	MS	Slab	58
10247	1995	3	24	Taiwan	5.1	78	MS	Slab	85
10251	1995	6	25	Taiwan	6.0	57	MS	Slab	212
10172	1995	9	14	Mexico	7.3	22	MS	Interface	10
10253	1995	12	1	Taiwan	5.2	59	MS	Slab	153
10173	1996	1	25	Mexico	5.5	73	MS	Slab	2
10255	1996	3	5	Taiwan	6.3	44	MS	Interface	30
10175	1996	7	15	Mexico	6.6	26	MS	Interface	6
10258	1996	7	29	Taiwan	5.5	75	MS	Slab	103
10176	1996	9	11	Japan	6.1	58	MS	Slab	40
10178	1996	10	19	Japan	6.7	18	MS	Interface	23
10179	1996	12	3	Japan	6.7	29	MS	Interface	21
10181	1997	1	11	Mexico	7.1	54	MS	Slab	6
10180	1997	1	18	Japan	6.2	30	MS	Interface	4
10184	1997	4	1	Japan	5.1	43	MS	Slab	2
10261	1997	4	13	Taiwan	5.1	67	MS	Slab	36
10186	1997	5	22	Mexico	6.5	91	MS	Slab	2
10187	1997	7	15	Japan	6.1	37	MS	Interface	6
10263	1997	7	15	Taiwan	5.6	107	MS	Slab	4
10289	1998	4	20	Mexico	6.0	62	MS	Slab	5
10190	1998	6	14	Japan	5.7	38	MS	Slab	35
10191	1998	6	22	Japan	5.5	60	MS	Slab	6
10194	1998	12	16	Japan	6.0	42	MS	Slab	28
10195	1999	1	24	Japan	6.4	45	MS	Slab	32
10197	1999	3	7	Japan	5.1	31	MS	Slab	7
10268	1999	4	4	Taiwan	5.0	97	MS	Slab	14
10198	1999	4	25	Japan	5.3	53	MS	Slab	49
10270	1999	6	3	Taiwan	5.4	77	MS	Slab	46
10290	1999	6	15	Mexico	7.0	76	MS	Slab	3
10199	1999	7	3	Cascadia	5.8	43	MS	Slab	6
10272	1999	9	30	Taiwan	5.1	77	MS	Slab	69
10291	1999	9	30	Mexico	7.5	44	MS	Slab	2
10292	1999	12	29	Mexico	5.9	67	MS	Slab	6
10204	2000	1	28	Japan	6.8	53	MS	Slab	23

(*continued*)

Table A2. (*continued*)

EQID	Year	Month	Day	Region	Mw	Depth	Main/after	Inter/intraslab	Number of Records
10205	2000	6	3	Japan	6.1	50	MS	Slab	71
10206	2000	6	25	Japan	6.0	10	MS	Interface	18
10211	2000	10	31	Japan	5.5	36	MS	Slab	70
10215	2001	1	13	Cent.Am	7.7	72	MS	Slab	23
10216	2001	2	28	Cascadia	6.8	59	MS	Slab	81
10217	2001	3	24	Japan	6.8	53	MS	Slab	173
10220	2001	3	26	Japan	5.2	43	AS	Slab	80
10221	2001	6	10	Cascadia	5.0	46	MS	Slab	2
10280	2001	6	13	Taiwan	5.5	78	MS	Slab	58
10237	2001	6	23	Peru	8.4	29.6	MS	Interface	4
10222	2001	12	2	Japan	6.5	123	MS	Slab	136
10283	2001	12	18	Taiwan	6.8	28	MS	Interface	30
10282	2002	3	31	Taiwan	7.1	32	MS	Interface	215
10223	2003	5	26	Japan	7.0	77	MS	Slab	214
10224	2003	9	26	Japan	8.3	23	MS	Interface	319
10225	2003	9	26	Japan	7.4	50	AS	Interface	39
10231	2003	9	29	Japan	6.5	41	AS	Interface	20
10233	2003	10	8	Japan	6.7	41	AS	Interface	37
10284	2004	10	15	Taiwan	6.6	112	MS	Slab	174
10285	2004	11	8	Taiwan	6.5	30	MS	Interface	5
10239	2005	6	13	Chile	7.9	94.5	MS	Slab	2
10287	2006	12	26	Taiwan	6.9	44	MS	Slab	125
10288	2006	12	26	Taiwan	6.7	50	AS	Slab	237
10236	2007	8	15	Peru	8.0	33.8	MS	Interface	13

Table A3. Summary of statistics on number of events and number of recordings for each region in the regression analysis

Interface			
Region	**Number of events**	**Magnitude range**	**Number of records**
Alaska	4	6.0–7.5	9
Chile	2	7.1–7.9	27
Japan	21	6.0–8.3	545
Mexico	8	6.0–8.8	71
Peru	4	7.0–8.4	21
Taiwan	4	6.3–7.1	280
Intraslab			
Region	**Number of events**	**Magnitude range**	**Number of records**
Alaska	1	5.3	2
Cascadia	5	5.0–6.8	94
Central America	1	7.2	23
Chile	3	6.2–7.9	10
Japan	27	5.1–7.8	1,000
Mexico	9	5.5–7.5	32
Peru	1	6.6	2
Solomon Islands	1	6.1	2
Taiwan	15	5.0–6.9	1,425

Table A4. Correlation of epsilons for application to the total residual

Period	0.01 s	0.05 s	0.075 s	0.10 s	0.15 s	0.20 s	0.25 s	0.30 s	0.40 s	0.50 s	0.60 s	0.75 s	1.0 s	1.5 s	2.0 s	2.5 s	3.0 s	4.0 s	5.0 s
0.01 s	1.000	0.959	0.938	0.930	0.930	0.910	0.887	0.858	0.817	0.729	0.648	0.580	0.464	0.391	0.309	0.274	0.280	0.223	0.231
0.05 s	0.959	1.000	0.971	0.942	0.900	0.855	0.820	0.783	0.717	0.634	0.548	0.477	0.409	0.300	0.218	0.203	0.187	0.149	0.168
0.075 s	0.938	0.971	1.000	0.968	0.909	0.849	0.798	0.754	0.680	0.584	0.498	0.427	0.353	0.247	0.175	0.162	0.156	0.121	0.135
0.10 s	0.930	0.942	0.968	1.000	0.935	0.874	0.806	0.753	0.699	0.576	0.487	0.416	0.284	0.230	0.167	0.146	0.162	0.112	0.131
0.15 s	0.930	0.900	0.909	0.935	1.000	0.934	0.870	0.812	0.725	0.624	0.536	0.464	0.384	0.269	0.190	0.175	0.171	0.140	0.147
0.20 s	0.910	0.855	0.849	0.874	0.934	1.000	0.941	0.885	0.810	0.700	0.614	0.535	0.419	0.326	0.278	0.228	0.245	0.181	0.184
0.25 s	0.887	0.820	0.798	0.806	0.870	0.941	1.000	0.952	0.860	0.766	0.679	0.598	0.503	0.383	0.301	0.276	0.256	0.225	0.220
0.30 s	0.858	0.783	0.754	0.753	0.812	0.885	0.952	1.000	0.917	0.826	0.743	0.664	0.564	0.437	0.354	0.328	0.301	0.269	0.255
0.40 s	0.817	0.717	0.680	0.699	0.725	0.810	0.860	0.917	1.000	0.921	0.843	0.762	0.627	0.531	0.433	0.412	0.371	0.332	0.306
0.50 s	0.729	0.634	0.584	0.576	0.624	0.700	0.766	0.826	0.921	1.000	0.939	0.864	0.756	0.616	0.522	0.483	0.436	0.392	0.364
0.60 s	0.648	0.548	0.498	0.487	0.536	0.614	0.679	0.743	0.843	0.939	1.000	0.931	0.818	0.682	0.581	0.532	0.481	0.436	0.400
0.75 s	0.580	0.477	0.427	0.416	0.464	0.535	0.598	0.664	0.762	0.864	0.931	1.000	0.904	0.772	0.677	0.624	0.571	0.526	0.498
1.0 s	0.464	0.409	0.353	0.284	0.384	0.419	0.503	0.564	0.627	0.756	0.818	0.904	1.000	0.879	0.777	0.729	0.671	0.629	0.586
1.5 s	0.391	0.300	0.247	0.230	0.269	0.326	0.383	0.437	0.531	0.616	0.682	0.772	0.879	1.000	0.924	0.866	0.816	0.754	0.709
2.0 s	0.309	0.218	0.175	0.167	0.190	0.278	0.301	0.354	0.433	0.522	0.581	0.677	0.777	0.924	1.000	0.947	0.901	0.846	0.798
2.5 s	0.274	0.203	0.162	0.146	0.175	0.228	0.276	0.328	0.412	0.483	0.532	0.624	0.729	0.866	0.947	1.000	0.965	0.901	0.861
3.0 s	0.280	0.187	0.156	0.162	0.171	0.245	0.256	0.301	0.371	0.436	0.481	0.571	0.671	0.816	0.901	0.965	1.000	0.946	0.906
4.0 s	0.223	0.149	0.121	0.112	0.140	0.181	0.225	0.269	0.332	0.392	0.436	0.526	0.629	0.754	0.846	0.901	0.946	1.000	0.961
5.0 s	0.231	0.168	0.135	0.131	0.147	0.184	0.220	0.255	0.306	0.364	0.400	0.498	0.586	0.709	0.798	0.861	0.906	0.961	1.000

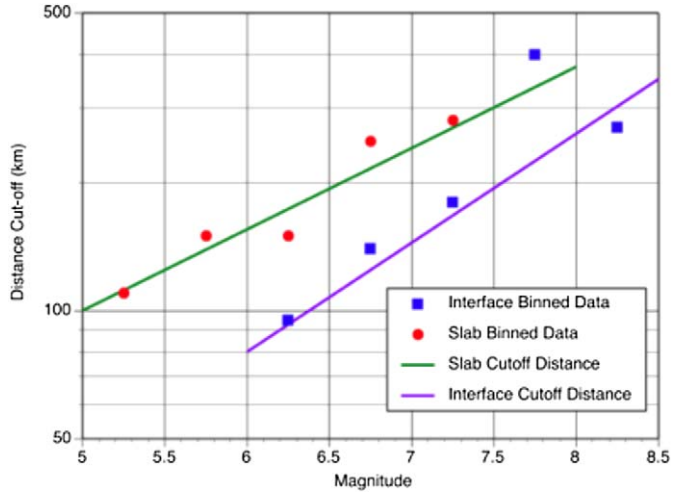

Figure A1. Distance cut-off used to capture censoring effects of triggered accelerometers in the subduction ground motion data set used in this study.

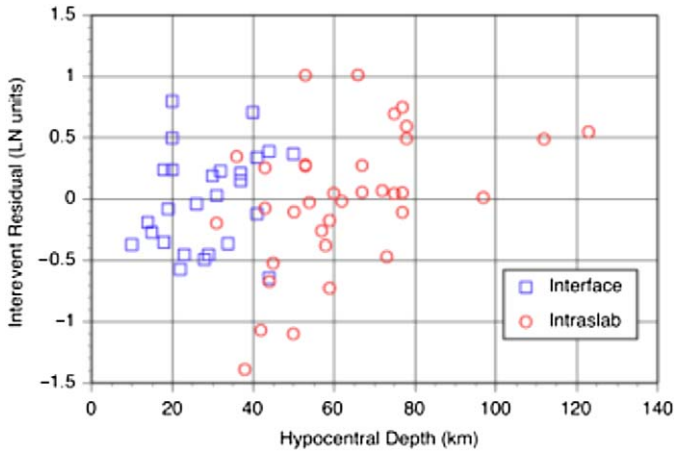

Figure A2. Residuals from an initial regression without hypocentral-depth scaling.

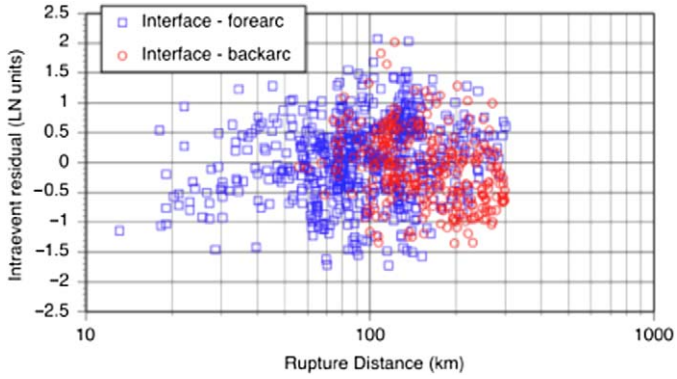

Figure A3. Intraevent residuals for interface earthquakes from an initial regression without a difference between forearc and backarc attenuation.

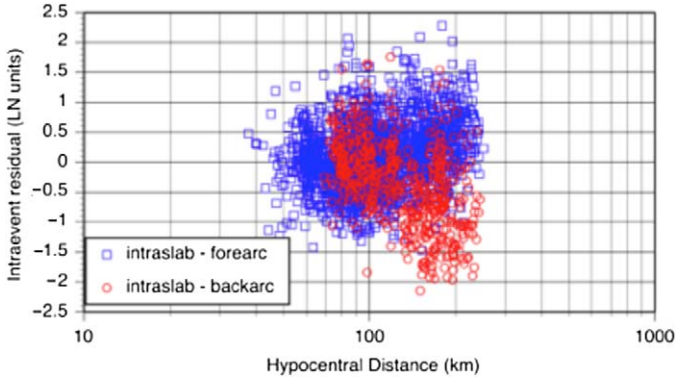

Figure A4. Intraevent residuals for intraslab earthquakes from an initial regression without a difference between forearc and backarc attenuation.

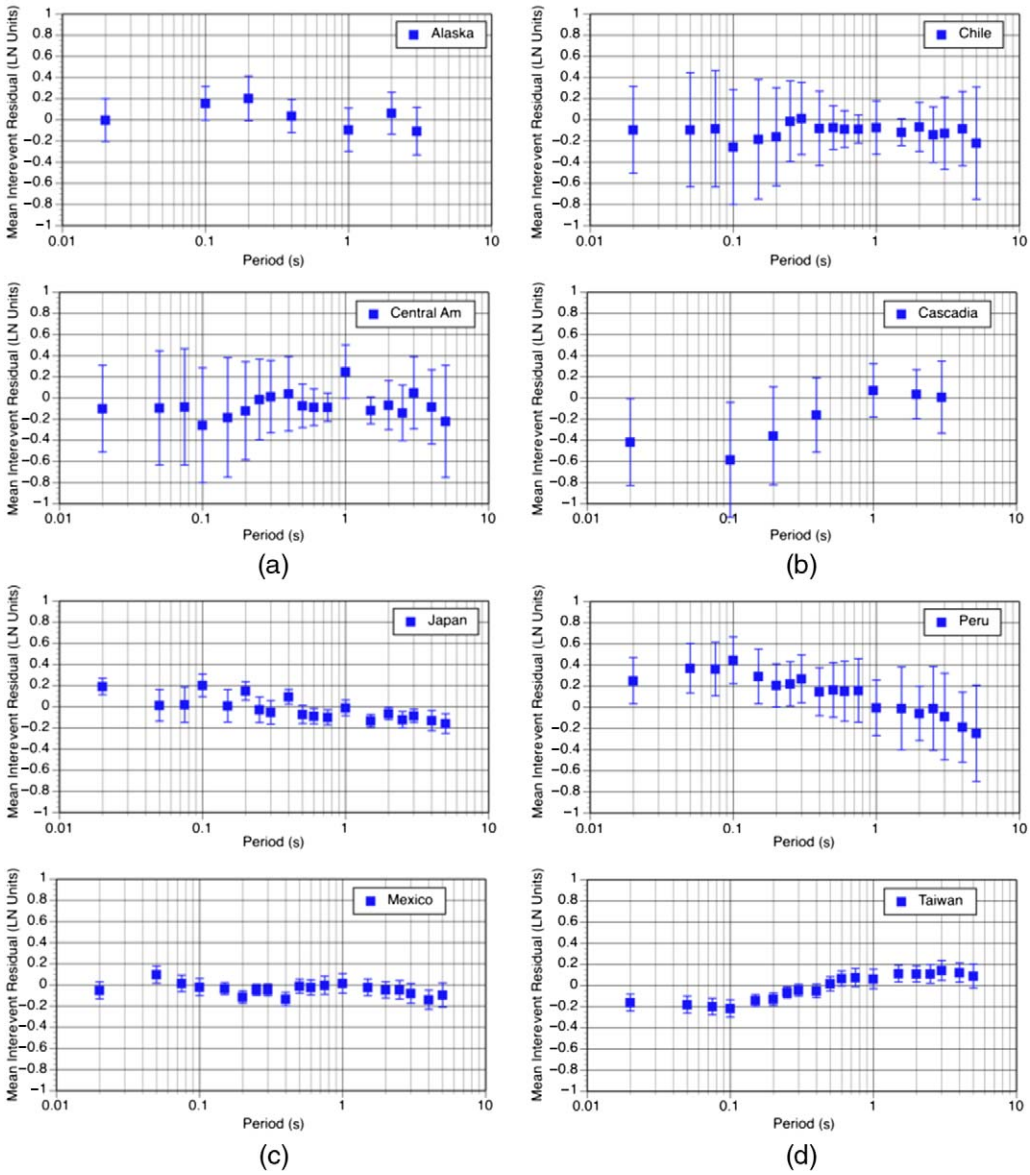

Figure A5. (a) Average interevent residual by region: Alaska and Central America. (b) Average interevent residual by region: Chile and Cascadia. (c) Average interevent residuals by region: Japan and Mexico. (d) Average interevent residual by region: Peru and Taiwan.

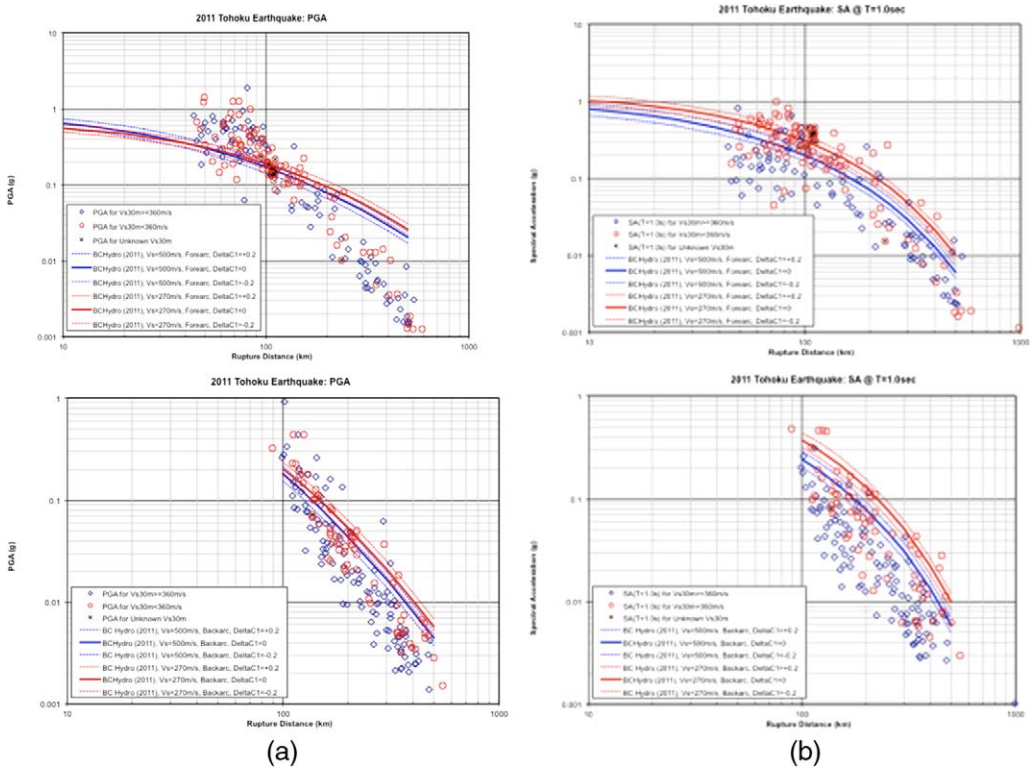

Figure A6. (a) Comparison of PGA attenuation from the 2011 Tohoku, Japan, earthquake with the regression model: forearc-region sites (*top*); backarc-region sites (*bottom*). (b) Comparison of the $T = 1$ attenuation from the 2011 Tohoku, Japan, earthquake with the regression model: forearc-region sites (*top*) backarc-region sites (*bottom*).