

Table S1. Relocated hypocenters using 3-D seismic wave speed and a double-difference relocation procedure, measured S-P times and dominant frequencies determined in this study. Solutions with depths slightly above the earth's surface are set to zero depth.

Origin Time (JST)					M	Lat. (deg)	Lon. (deg.)	Dep. (km)	S-P (sec)	Freq. (Hz)
1933	3	3	3	26	6.99	6.7	39.744	145.094	0.2	
1933	3	3	3	48	1.2	6.1	39.588	144.441	59.0	
1933	3	3	4	27	46.81	4.7	38.930	143.313	18.2	
1933	3	3	4	31	53.75	5.1	40.636	143.535	18.0	
1933	3	3	4	41	38.31	6.2	39.455	143.727	0.0	
1933	3	3	4	55	53.51	4.9	40.488	143.084	6.5	
1933	3	3	5	7	13.76	4.8	39.145	144.285	0.0	
1933	3	3	5	14	49.7	5.1	38.901	145.208	0.0	0.90
1933	3	3	5	22	51.11	4.6	38.626	142.881	0.0	0.56
1933	3	3	5	42	52.47	6.5	39.477	143.682	17.7	
1933	3	3	6	5	3.63	4.3	39.117	143.505	1.7	0.50
1933	3	3	6	21	18.38	4.3	39.358	143.127	12.5	0.38
1933	3	3	6	48	22.46	5.2	38.286	142.797	0.7	18.0 0.96
1933	3	3	6	58	39.1	4.5	39.549	143.153	0.0	1.00
1933	3	3	7	1	34.77	4.8	39.636	142.901	2.6	0.56
1933	3	3	7	11	5.91	4.6	38.025	143.724	26.6	
1933	3	3	7	34	49.22	5.5	39.934	143.427	0.0	0.60
1933	3	3	7	43	5.51	4.3	38.679	144.103	10.4	
1933	3	3	8	57	19.06	4.7	39.413	144.621	135.9	
1933	3	3	9	18	21.73	5.4	39.237	143.466	0.0	
1933	3	3	9	24	8.21	4.4	39.261	143.834	0.0	
1933	3	3	9	25	41.59	5.1	39.077	144.089	5.2	
1933	3	3	9	27	39.21	5.2	39.479	144.271	24.7	
1933	3	3	12	33	50.32	4.5	38.125	144.486	0.0	0.52
1933	3	3	12	51	13.99	4.3	39.440	143.773	25.1	
1933	3	3	13	9	13.43	4.2	37.723	143.378	0.0	
1933	3	3	13	31	47.49	4.6	38.952	144.374	3.5	0.52
1933	3	3	13	37	51.73	5.7	38.565	143.657	0.4	25.9 0.40
1933	3	3	16	51	47.66	4.4	39.128	144.236	29.5	
1933	3	3	17	14	42.56	4.7	39.443	143.372	0.0	0.48
1933	3	3	17	25	23.32	4.5	38.534	143.302	0.0	
1933	3	3	18	12	39.24	6.5	39.128	144.495	0.0	
1933	3	3	18	25	52.52	4.9	39.243	143.519	0.0	0.60
1933	3	3	18	38	37.42	6.1	39.661	143.742	2.7	
1933	3	3	18	52	20.48	5	36.767	143.909	0.7	
1933	3	3	19	4	2.84	5.9	38.487	142.769	10.4	
1933	3	3	19	32	15.04	5.6	39.736	143.611	0.0	
1933	3	3	20	56	32.76	5.7	39.233	143.706	3.5	24.7 0.60
1933	3	3	21	13	53.18	5.5	38.506	144.249	17.0	1.10
1933	3	3	21	20	44.6	5.4	38.016	143.728	0.0	0.48

1933	3	4	0	2	10.18	5.7	39.619	143.638	0.0	31.2	
1933	3	4	0	7	15.43	5.8	39.838	143.889	14.2		
1933	3	4	0	50	56.45	5.5	38.861	142.894	0.0		0.78
1933	3	4	1	11	43.28	5.5	39.325	144.673	0.0		1.10
1933	3	4	1	31	41.75	4.5	39.072	144.167	2.1		
1933	3	4	3	47	23.35	5.4	38.450	143.014	0.0	25.8	0.60
1933	3	4	4	7	26.61	5.8	39.065	143.510	1.0	23.5	0.64
1933	3	4	4	50	28.46	5.6	39.751	143.560	0.0		
1933	3	4	5	10	40.66	4.5	38.269	143.217	0.3		
1933	3	4	5	20	28.64	5.3	39.356	143.463	0.0		0.48
1933	3	4	7	30	56.13	4.6	38.147	143.323	0.0		0.46
1933	3	4	8	18	13.14	4.7	38.092	143.345	0.0		
1933	3	4	8	45	3.18	4.6	39.962	143.717	0.0		0.62
1933	3	4	15	44	22.47	5.3	39.950	144.368	10.7		0.74
1933	3	4	17	21	58.98	4.6	38.067	144.027	7.0		0.78
1933	3	4	21	40	10.92	5.3	39.226	144.089	6.2		1.20
1933	3	5	0	29	15.69	4.2	39.993	143.557	0.0		0.72
1933	3	5	2	26	22.75	4.5	40.629	144.295	6.0		0.64
1933	3	5	5	27	34.22	5.4	39.950	145.010	0.0	27.5	1.48
1933	3	5	7	13	49.22	4.7	37.826	144.053	1.7		1.16
1933	3	5	7	44	11.29	4.4	40.314	144.971	0.0		0.84
1933	3	5	10	25	35.96	4.8	38.929	142.975	0.0	17.5	1.10
1933	3	5	15	38	26.5	4	39.269	142.523	0.0		
1933	3	5	16	0	34.57	4.6	40.363	144.771	0.8		0.72
1933	3	6	5	47	10.66	5.2	38.783	142.934	0.0	21.8	0.42
1933	3	6	13	2	49.2	4.1	39.306	142.597	0.0		0.52
1933	3	6	16	52	44.51	4.6	39.105	144.083	0.0		0.76
1933	3	6	17	57	16.34	4.6	38.413	144.124	0.0		0.88
1933	3	7	1	19	12.03	4.4	39.309	144.055	10.1		0.50
1933	3	7	16	24	11.81	4.5	38.776	144.239	3.8		0.90
1933	3	8	7	21	22.01	5.2	39.663	144.474	0.0	28.8	0.80
1933	3	8	7	47	38.79	4.6	39.388	144.050	14.3		0.60
1933	3	8	10	35	39.88	5.9	39.867	143.265	1.2	23.7	
1933	3	8	12	30	19.56	4.7	39.609	142.648	0.0		0.56
1933	3	8	21	42	14.8	4.7	38.343	143.727	0.0		1.40
1933	3	9	14	34	20.72	4.9	38.342	144.031	5.3		0.66
1933	3	9	18	55	13.16	4.8	38.837	143.456	7.5	21.9	0.80
1933	3	10	16	34	51.71	5.1	39.380	144.531	0.0	29.9	0.50
1933	3	10	17	3	42.52	4.3	39.367	143.499	0.3		0.42
1933	3	10	20	59	7	4.2	39.237	143.416	0.0		0.78
1933	3	11	4	50	35.77	4.4	37.999	143.820	0.0	30.7	0.86
1933	3	12	9	41	11.2	4.8	39.322	144.319	0.3		0.76
1933	3	12	14	5	53.26	5.6	38.973	143.672	0.0	30.0	0.34
1933	3	12	17	44	54.12	4.6	39.294	143.310	17.3		0.80
1933	3	13	21	31	25.12	4.7	41.919	143.186	0.0		
1933	3	14	0	57	3.93	5	39.488	144.897	43.7		0.78
1933	3	14	6	3	37.26	4.3	38.376	141.936	0.0		0.74
1933	3	14	13	27	47.89	4.7	39.399	143.166	3.9		1.04

1933	3	14	21	59	8.92	4.9	37.228	142.919	3.2		
1933	3	15	1	4	38.82	5.1	39.504	144.852	0.3	29.0	0.60
1933	3	15	2	21	49.6	4.3	41.604	141.787	72.5		
1933	3	15	7	50	0.89	4.4	39.510	143.752	1.6		
1933	3	16	2	31	18.32	4.5	39.597	144.371	0.0		0.86
1933	3	16	18	4	44.22	5.2	38.718	143.039	0.0	27.5	
1933	3	18	20	45	1.88	4.6	38.589	143.592	0.0		0.78
1933	3	19	6	25	20.23	5.1	39.136	143.595	0.7		0.58
1933	3	19	7	49	9.39	4.8	38.664	144.040	0.0	24.9	1.26
1933	3	20	19	37	17.56	4.5	38.180	144.623	4.5		
1933	3	20	21	33	22.04	4.6	39.263	144.154	11.0		
1933	3	22	0	53	58	5.2	38.135	141.429	58.3	11.5	
1933	3	23	21	42	51.76	5.4	39.206	144.093	17.7		1.02
1933	3	26	19	58	6.3	4.7	38.584	143.218	0.0	29.7	0.56
1933	3	28	0	54	27.27	4.4	39.410	144.552	3.7		
1933	4	2	0	58	59.31	6	40.116	143.477	0.0		
1933	4	2	1	8	17.61	4.6	39.528	143.854	16.0		0.74
1933	4	2	7	40	57.78	5.6	39.825	144.483	1.8		0.96
1933	4	2	18	43	0.72	4.1	39.110	142.575	0.0		0.70
1933	4	2	19	10	34.36	5.5	39.733	143.466	0.9	21.8	0.58
1933	4	3	1	52	23.26	4.8	38.050	143.447	3.2		0.82
1933	4	6	17	11	44.74	4.3	39.871	144.157	0.0		
1933	4	7	0	11	51.65	5.5	39.394	144.537	1.2		1.16
1933	4	8	1	12	13.7	4.8	41.125	143.718	41.7		
1933	4	9	11	46	32.98	6.6	39.557	143.802	0.0		
1933	4	9	11	57	15.63	5.7	39.303	143.509	0.5	17.6	
1933	4	9	15	27	56.49	5	39.374	143.302	0.0		
1933	4	9	17	27	39.6	4.7	39.358	143.251	0.0	26.7	
1933	4	9	19	30	15.84	6	39.403	143.922	0.0		
1933	4	10	8	49	37.87	5.1	39.268	143.452	0.0		
1933	4	10	21	47	40.2	4.6	39.995	143.85	8.3		
1933	4	12	16	35	55.13	4.5	38.966	143.327	0.0	28.0	
1933	4	13	1	23	7.09	4.3	39.173	143.876	40.6		
1933	4	14	0	53	34.93	4.6	38.666	144.086	11.0		
1933	4	15	20	8	41.92	5.3	39.985	144.79	0.6		
1933	4	17	1	20	32.31	4.5	39.244	143.881	1.7		
1933	4	17	2	0	10.19	4.7	39.556	144.742	1.4		
1933	4	19	11	55	27.88	5.8	39.59	144.887	3.8	27.2	
1933	4	20	5	57	59.53	4.6	40.086	144.494	0.0		
1933	4	21	3	20	15.59	4.4	39.022	144.337	15.7		
1933	4	21	13	26	25.65	4.3	39.37	143.756	0.0		
1933	4	23	16	13	34.28	6.4	38.794	143.864	0.0		
1933	4	23	17	25	56.2	5.7	38.886	144.047	7.4		
1933	4	23	21	19	44.48	5.1	39.048	143.604	0.0		
1933	4	25	10	57	33.9	5.1	38.8	143.187	5.7		
1933	4	25	13	2	54.61	4.3	38.786	143.487	0.0		
1933	4	27	15	32	22.97	3.8	37.505	142.125	9.9		
1933	5	3	14	14	20.98	4.7	38.262	143.741	0.0		

1933	5	4	23	13	28.52	4.1	41.964	142.907	33.6	
1933	5	5	3	13	5.62	4.4	38.013	143.682	0.0	
1933	5	14	23	19	19.6	4	38.28	141.697	38.4	
1933	5	17	3	25	4.75	4.5	39.034	143.637	1.0	
1933	5	21	0	15	56.48	4.1	39.208	144.765	5.0	
1933	5	21	0	52	11.35	4.3	39.778	144.179	16.2	
1933	5	21	1	3	28.88	4.7	39.45	144.461	16.7	
1933	5	21	3	21	21.11	4.4	39.612	143.839	4.4	
1933	5	21	4	9	6.03	5	39.464	144.494	1.0	
1933	5	21	4	13	56.47	4.6	39.669	144.323	4.8	30.8
1933	5	21	4	18	45.89	4.9	39.772	143.778	7.9	
1933	5	22	19	57	11	4.3	39.352	143.929	1.6	
1933	5	24	8	33	49.53	5.1	39.328	144.335	2.2	
1933	5	24	19	38	38	5	38.13	142.102	48.7	13.5
1933	5	28	13	49	33.2	4.8	37.571	142.533	5.6	
1933	5	29	14	55	56.01	4	37.77	141.469	56.1	
1933	5	31	12	14	51.46	4.7	40.019	141.968	13.8	
1933	6	3	12	12	57.72	4.5	41.209	141.145	75.1	

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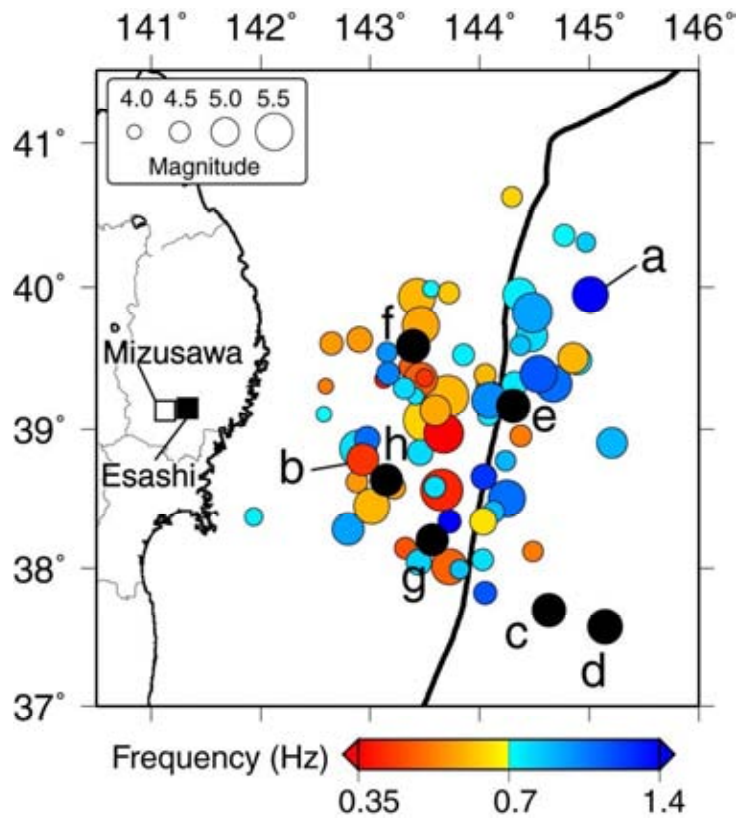
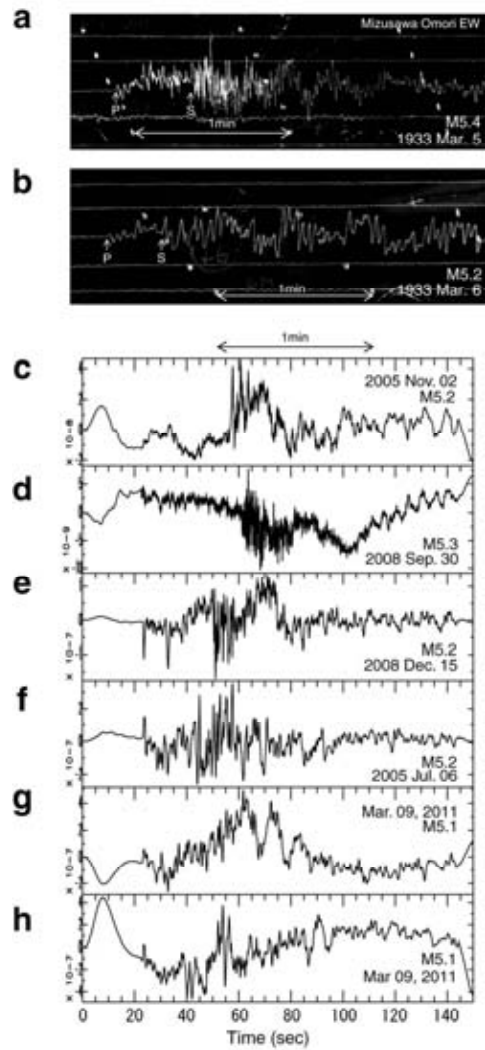


Fig. S1

Fig. S1 Locations of six (c-h) recent earthquakes in the aftershock area of the 1933 earthquake. Earthquakes c-e occurred in the outer trench area and earthquakes f-h in the inner trench area. Earthquake a and b are the ones whose waveforms are shown in Fig. 2. Recent earthquakes were selected in the similar magnitude range as the 1933 aftershocks. The blue and orange circles are the same as those in Fig. 8a.



**Fig. S2**

Fig. S2 Seismograms of the 1933 aftershocks (a, b) and recent earthquakes (c – h). The locations of the earthquakes are shown in Fig S1. For the recent earthquakes, we simulated the record of the 1933 Oomori seismometer by convolving instrument response assuming a period of 16 sec and damping of 0.2. The period is from the Mizusawa catalogue and the damping constant is from visual inspection of waveforms because this constant was not documented. The records for the recent earthquakes are EW component recorded at Esashi station by a STS-2 broad-band seismometer.