Supplementary Figures for

Rupture and Frequency-dependent Seismic Radiation of the 2012 M_w 8.6 Sumatra Strike-slip Earthquake

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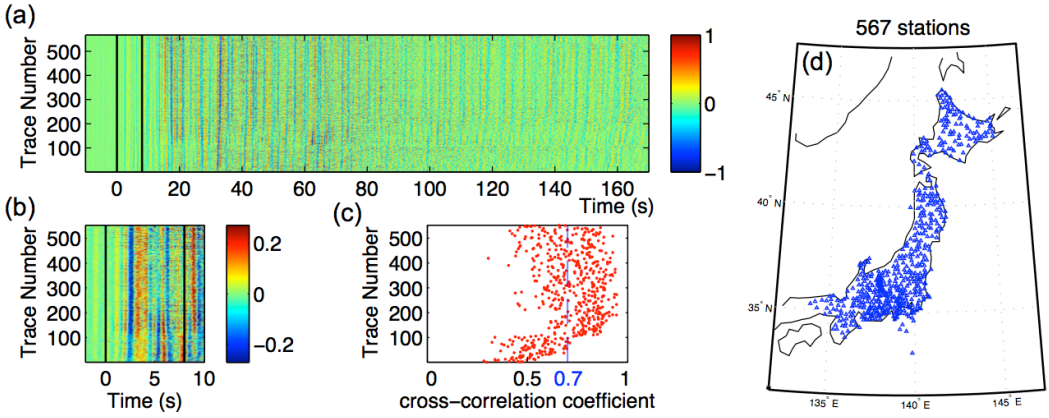

Figure S1. Waveforms and stations selection process. (a) Waveforms recorded at all the selected Hi-net stations. (b) Zoom-in of the first 8s waveforms, which are used to do the cross-correlation. (c) Cross-correlation coefficient distribution of each station. Blue dashed line shows the cross-correlation coefficient threshold (0.7) used in this study. (d) Distribution of all the 567 Hi-net stations (blue triangles). There are total 275 stations satisfying this threshold with their waveforms shown in Fig. 2 and station distribution shown in Fig. 3 in the main text.

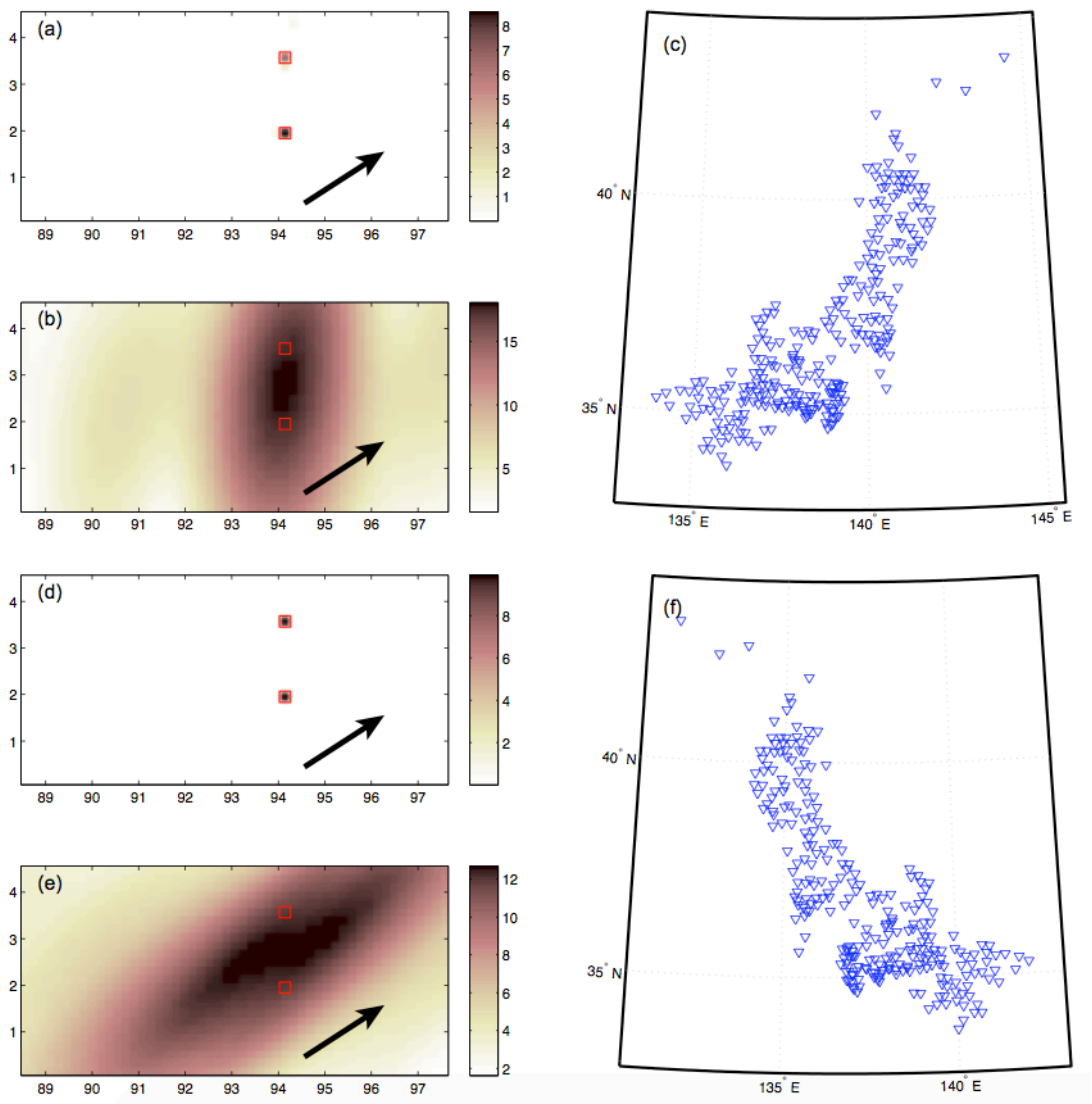

Figure S2. Synthetic tests for two different seismic array distributions. (a) and (b) are the CS and beamforming results, respectively, for the station distribution shown in (c). (d) and (e) are the CS and beamforming results, respectively, for the station distribution shown in (f). Black arrows are pointing to the direction of seismic array. Other symbols are the same as those in the Fig.4.

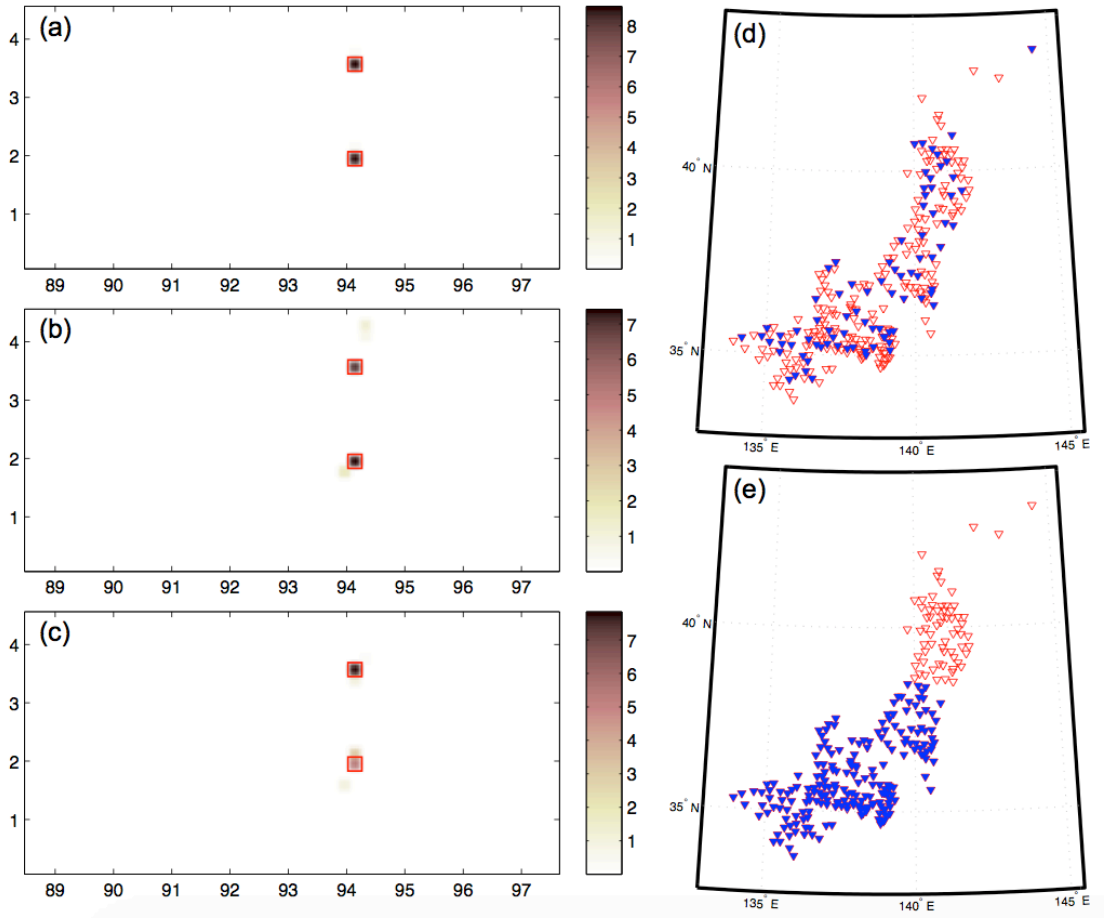

Figure S3. Synthetic tests indicating the influence from stations resampling. (a) Results from the CS method using all the stations [red triangles in (d) and (e)]. (b) Results from the CS method using 30% randomly selected stations [blue triangles in (d)]. (c) Results from CS method using part of all stations [blue triangles in (e)]. Other symbols are the same as those in Fig. 4.

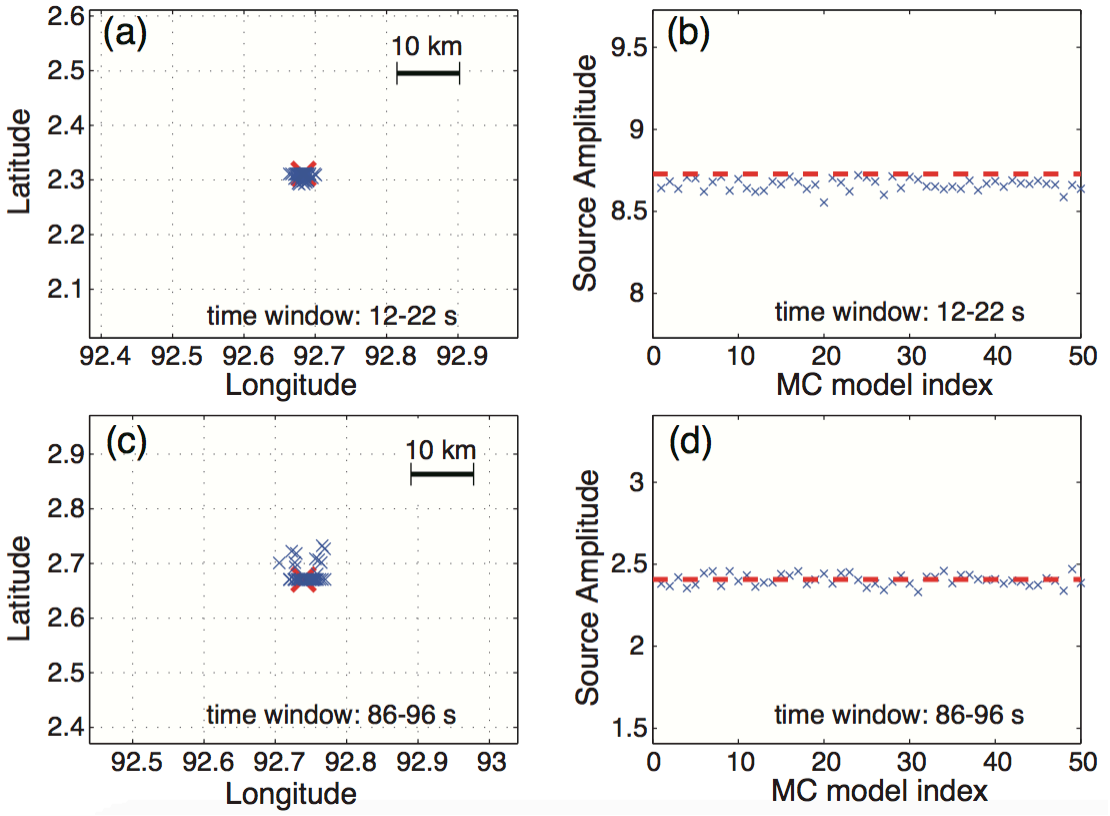

Figure S4. Error analysis of the CS results at f = 0.547 Hz using the Monte-Carlo (MC) error propagation method with 10% random noise added. (a) Spatial distribution of 50 MC estimation of the source locations (blue crosses) for the 12-22s time window. (b) Source amplitudes (y axis) recovered from 50 MC estimations (blue crosses) for the 12-22s time window. Red X and dashed line represent the results from CS without extra random noise. (c) and (d) are the same as (a) and (b) except for the 86-96s time window.

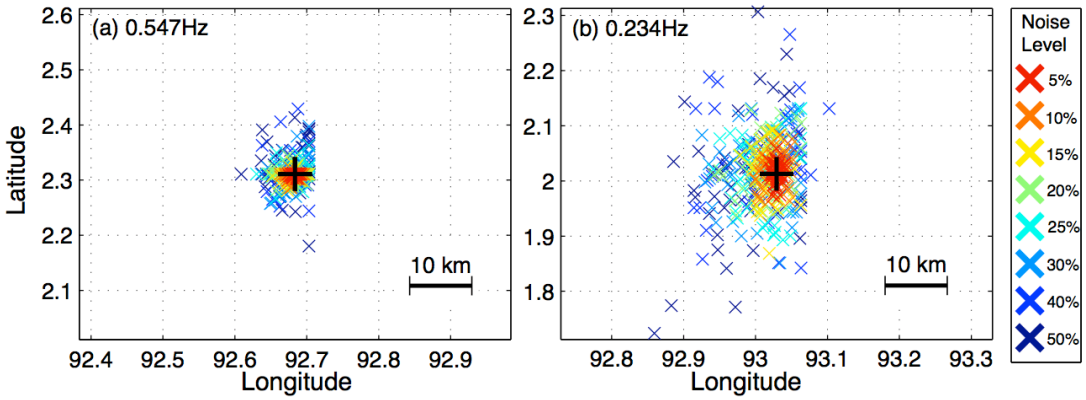

Figure S5. Monte-Carlo error propagation tests for the 12-22s time window at (a) 0.547 Hz and (b) 0.234 Hz. For the test, we add random noise to the data and perform the inversion. For each noise level (ratio of noise to signal amplitude) shown as the number beside the colored crosses on the right, we repeat inversion for 50 times and all results are plotted as the crosses with the corresponding noise-level color in (a) and (b). The black + is the original source position.

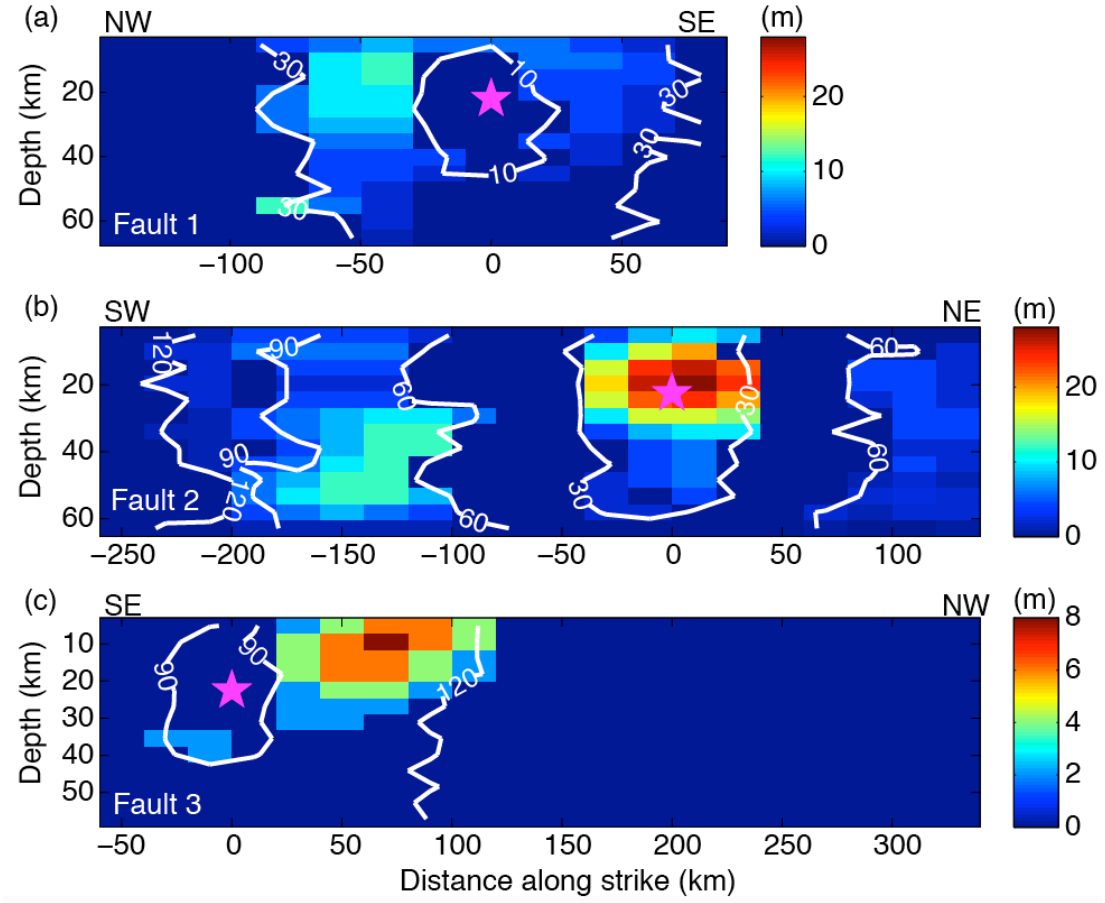

Figure S6. Slip inversion results from (a) subfault 1; (b) subfault 2; (c) subfault 3 in Wei et al. (2013). Only the slip within 10-30s, 60-90s and 90-120s time windows are shown, corresponding to the depth-averaged slip in Fig. 9. White contours indicate the time (s) as labeled.

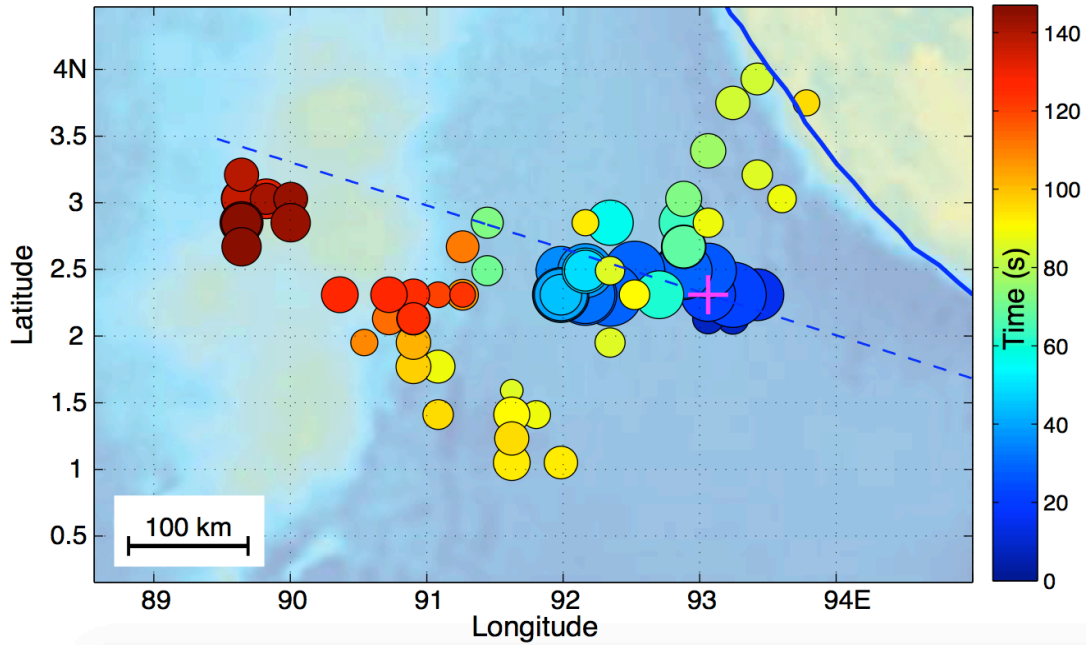

Figure S7. Seismic radiation in the frequency band 0.2-1 Hz using the beamforming method. For the meaning of symbols, please refer to Fig. 8.