Supplementary Material for "Imaging microearthquake rupture processes using a dense array in Oklahoma"

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Figures

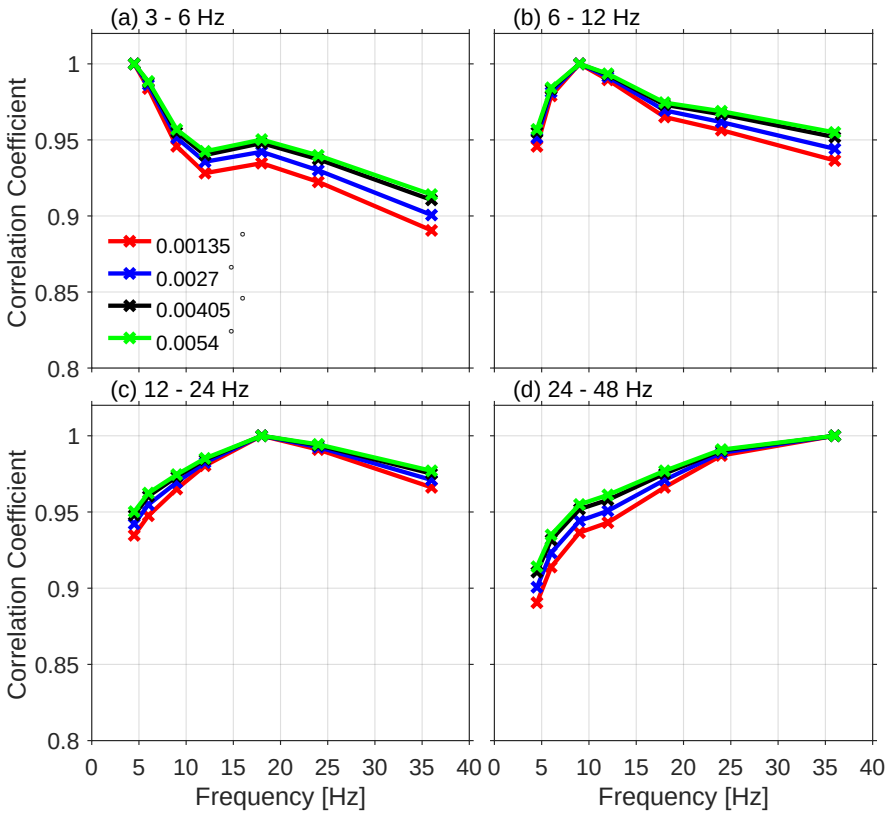

Figure S1 Intra-event correlations for 17 earthquakes at the ok1 location for a varying moving average (color corresponds to the radii). For each event, we take the wavefield recorded in the (a) 3–6 Hz (b) 6–12 Hz (c) 12–24 Hz and (d) 24–48 Hz band and correlate it with wavefields, for the same event, at all seven frequency bands. Line colors shows the approximate number of stations used in the moving average.

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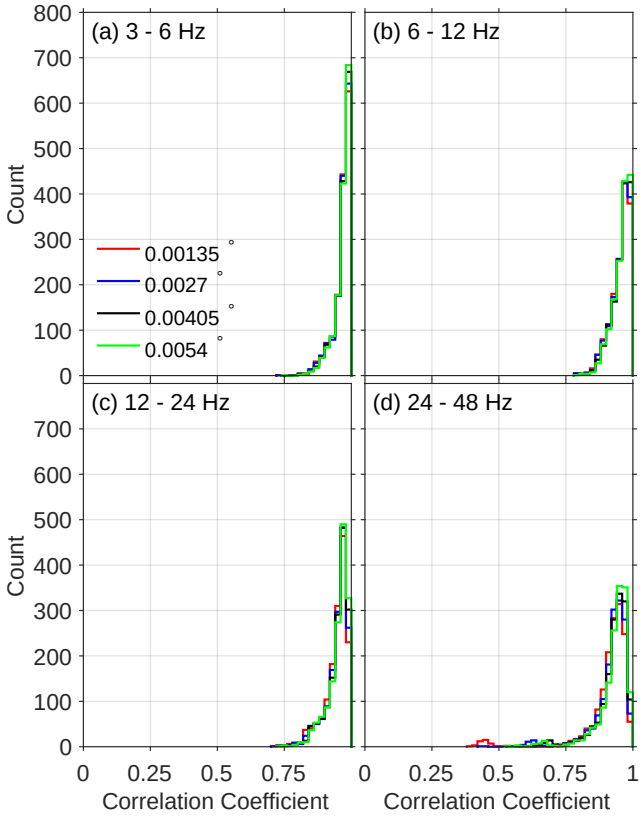

Figure S2 Inter-event SH wavefield correlations for 59 earthquakes at the ok1 location for a varying moving average (color corresponds to the radii). Histogram show the pairwise SH wavefield correlations for the qualified wavefield functions in the (a) 3–6 Hz (b) 6–12 Hz (c) 12–24 Hz and (d) 24–48 Hz band. Line colors shows the approximate number of stations used in the moving average.

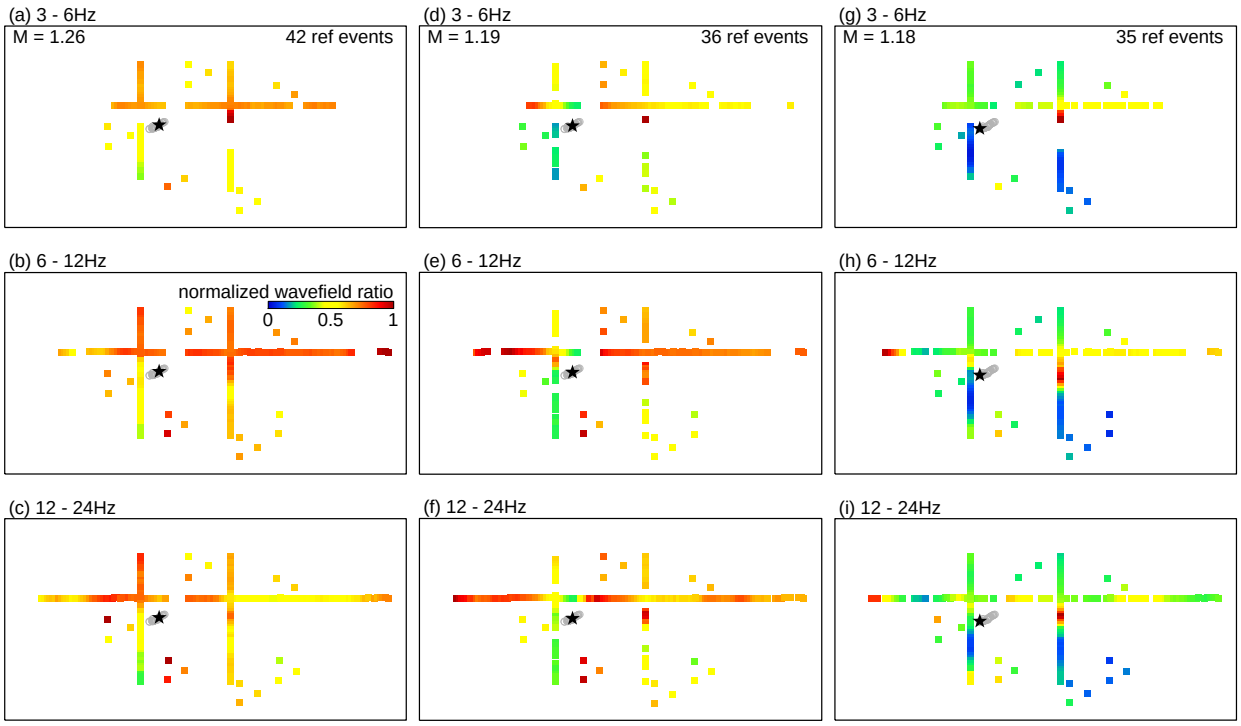

Figure S3 Stacked wavefield ratio for three new target events (top left; magnitude) with several egf events (top right; same eGf events used for each column). Black star shows target epicenter and grey lines show epicenters of eGf events.

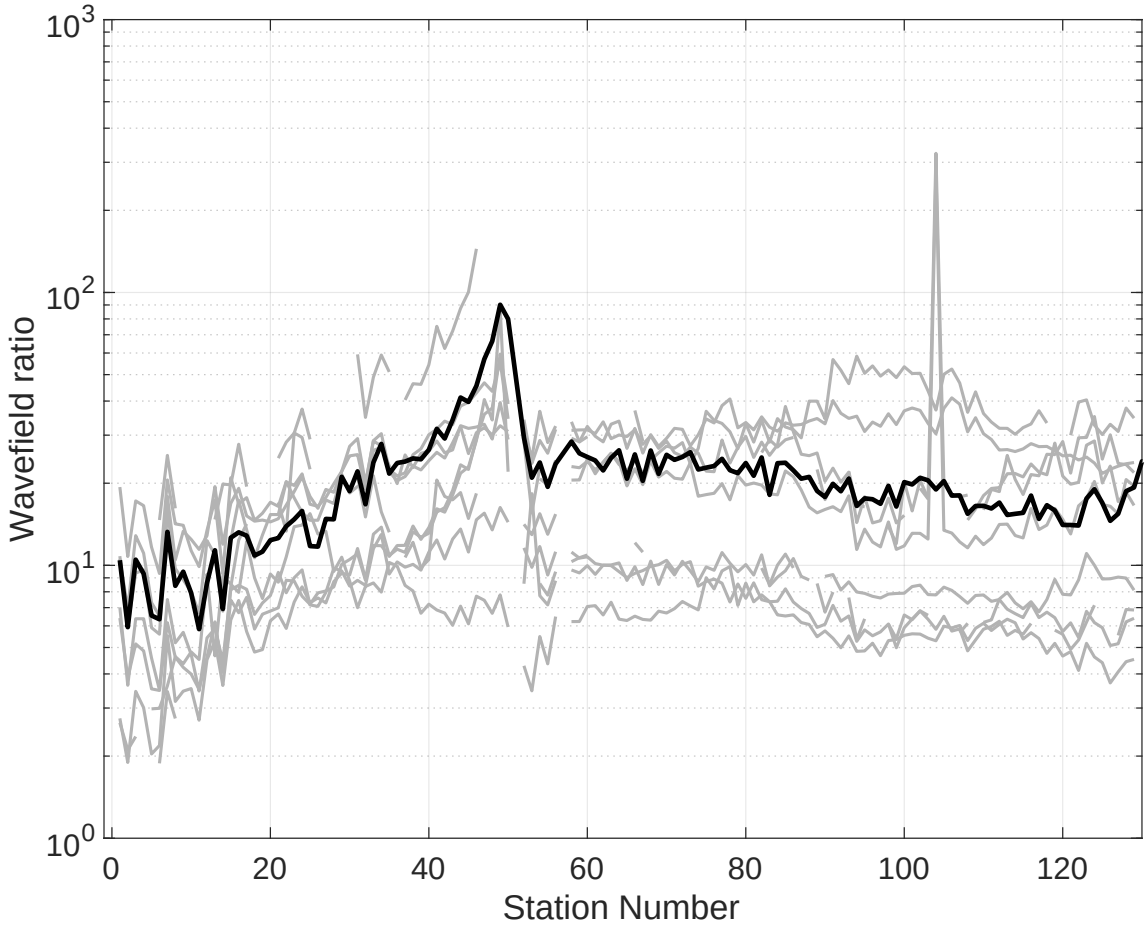

Figure S4 Spectral ratios between M 2.3 event and 10 reference events. Grey lines show ratios and black line shows geometric mean.

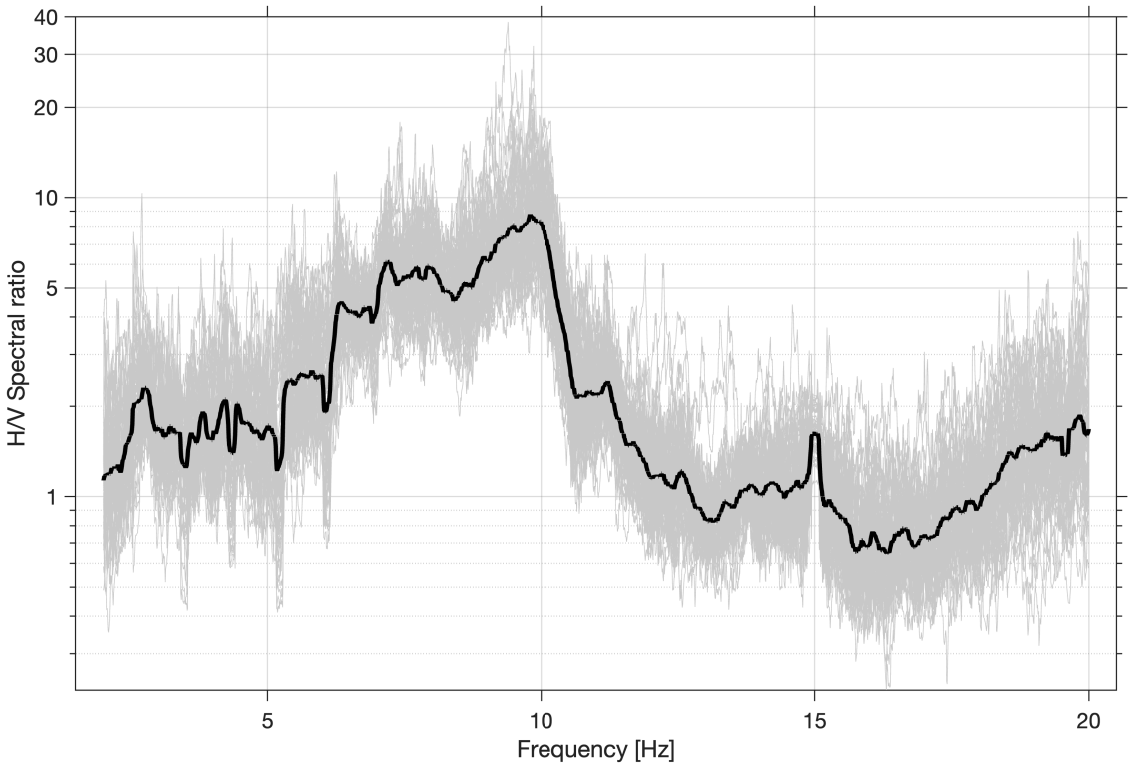

Figure S5 Spectrum of H/V ratios for one station (1055) between 2 and 20 Hz. Grey lines show 80 estimates and black line shows geometric mean.

Tables

use_amplitude	False
vel	3Vp = 6, Vp/Vs = 1.75
use_dbscan	True
dbscan_eps	6s
dbscan_min_samples	3
oversampling_factor	3
min_picks_per_eq	8
min_p_picks_per_eq	2
min_s_picks_per_eq	2
max_sigma11	2
max_sigma22	1

Table S1 Parameters for GAMMA Association

parameter	Catalog-18	Catalog-57
rmin	0.6	0.6
max range for ngood count	80	80
minimum connection fraction to join clusters	0.05	0.05
rmsmax, rmedmax	0.4, 0.05	0.5, 0.05
min number in cluster to apply shift test	10	10
max permitted horz, vert shifts (km)	1, 1	0.5, 0.5
min number of branches to output cluster	1	1

Table S2 Parameters for GrowClust relocation

Parameter	Catalog-18	Catalog-57
N	5995	5884
N(with mag)	3581	2360
Mc	0.300	0.600
σ(Mc)	0.0277	0.0426
N(M $\geq$ Mc)	1039	414
b	0.923	0.958
a	3.29	3.19

Table S3 Catalog statistics

name	num events	strike [deg clockwise from N]	mean lat [deg]	mean lon [deg]	mean depth [km]
ok1	227	74.060	36.6153	-97.6904	3.596
ok2	1176	n/a	36.6375	-97.7017	5.7365
ok3	407	71.615	36.6666	-97.6691	4.265
ok4	230	69.742	36.6825	-97.679	5.121

Table S4 Cluster statistics