

Designing small-aperture seismic arrays to enhance earthquake monitoring on ocean islands: application to Antikythera island, Greece

Supplementary material

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Figure S1. Earthquake moment tensors clustered by mechanism type in five distinct types (a), and map showing their spatial distribution (b). The inverse triangle represents the location of ANKY permanent station.

Figure S2. Maps showing the spatial distribution of the 23 distinct seismic sources, colour-coded by depth (a), and mechanism type. The inverse triangle represents the location of ANKY permanent station. Source index numbers appear on top of the beachballs.

Figure S3. Topographic map of the Antikythera island showing the location of the permanent seismic station ANKY (blue inverse triangle). Red crosses denote discrete points of the road network of the island, and black dots represent a 350 m $\times$ 600 m grid, over the area that is defined by the parameter space boundaries. The grid-cells in yellow indicate areas where an array station is allowed to be deployed.

Figure S4. Parameter space scatter plots as a function of the objective function (see colour scale). Red crosses indicate the optimal values.

Figure S5. Theoretical transfer function in three different frequency bands for the cross-shaped array layout discussed in Section 4.3.

Figure S6. Same as in Figure S5 but for the rectangular array.

Figure S7. Co-array analysis of the cross-shaped array for different narrow frequency bands, namely, 0.5 Hz - 1.0 Hz (a), 1.0 Hz - 2.0 Hz (b) and 2.0 Hz - 4.0 Hz (c). Synthetic seismograms of a seismic source from a backazimuth of 147° are shown in the left hand side ordered by epicentral distance (bottom to top). Time delay measurements were made in data segments denoted by the red vertical lines. The time delays between all the array element pairs are expressed in phase shifts (see colour-scale) on the maps in the right hand side. The circle size is proportional to signal coherence. The black arrow represents the direction of propagation of the incoming seismic wavefront.

Figure S8. Same as in Figure S7 but for the rectangle-shaped array.

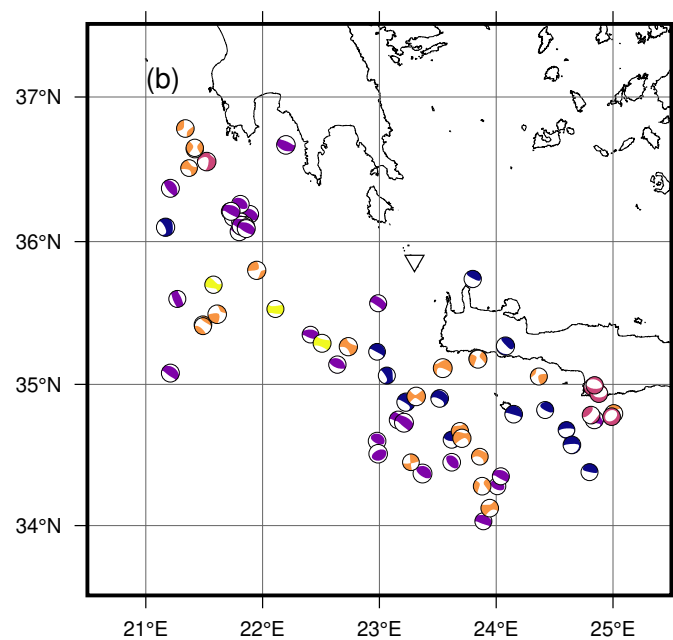
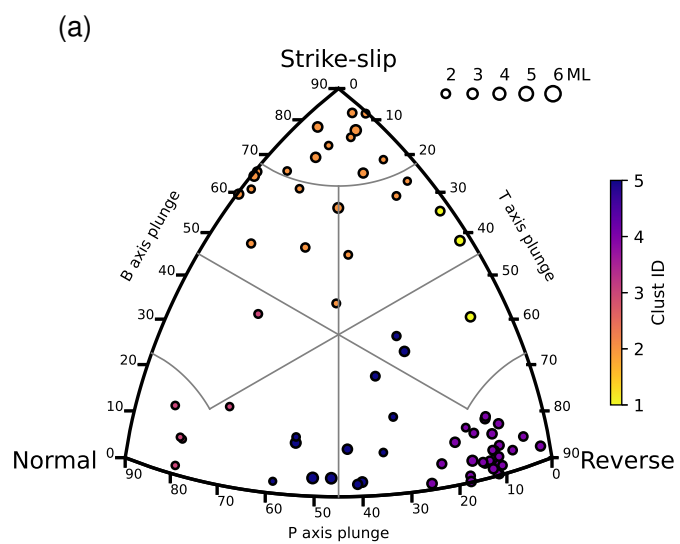


Figure S1

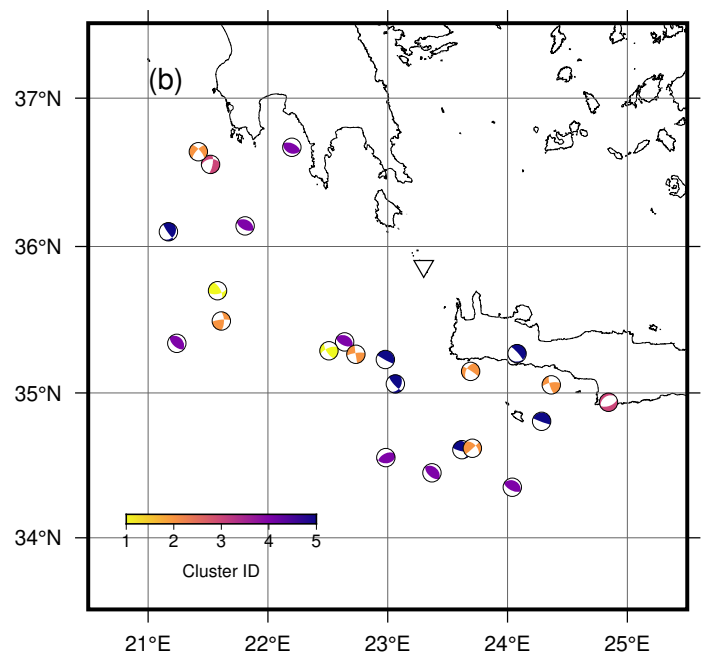
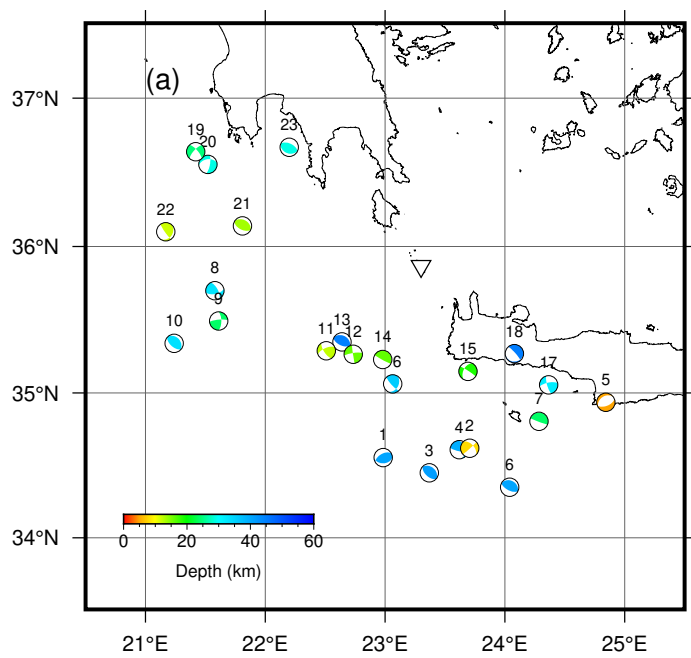


Figure S2

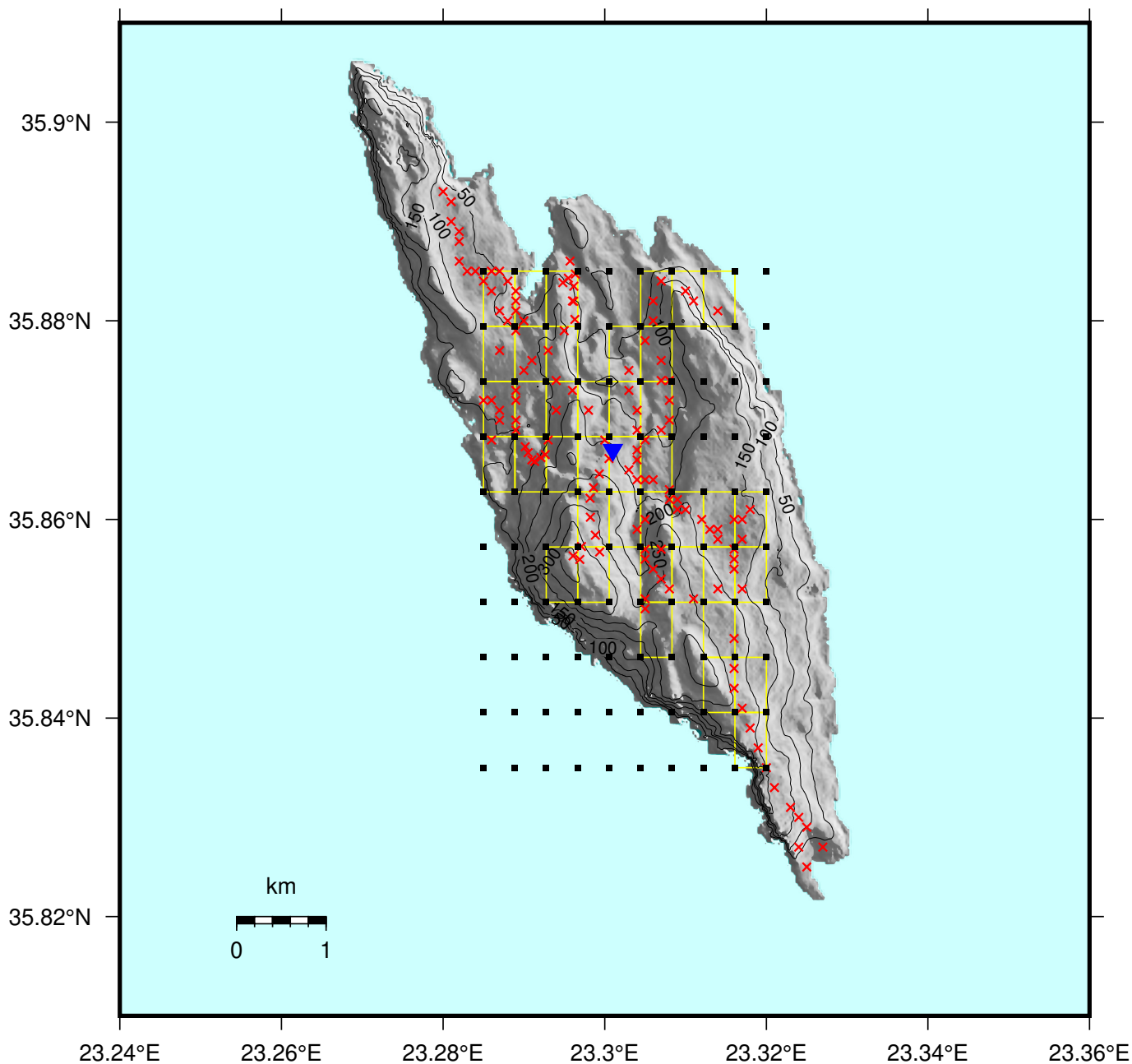


Figure S3

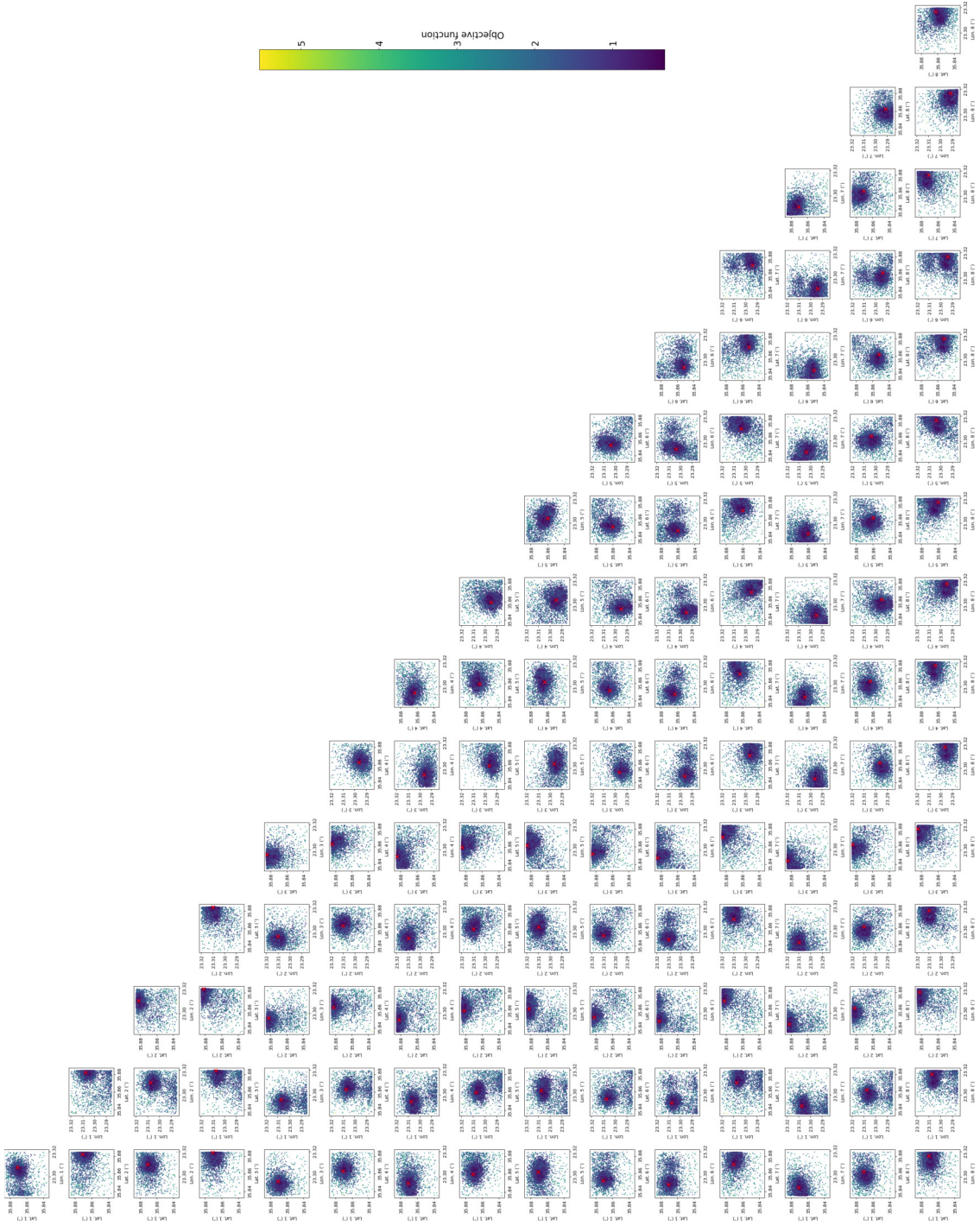


Figure S4

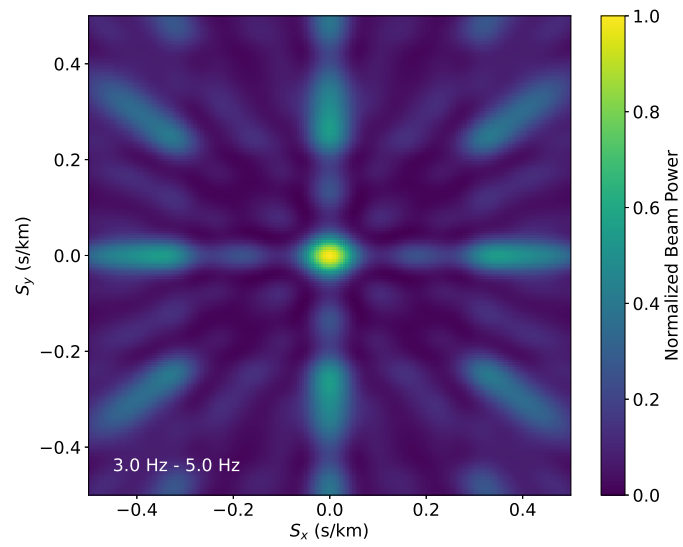
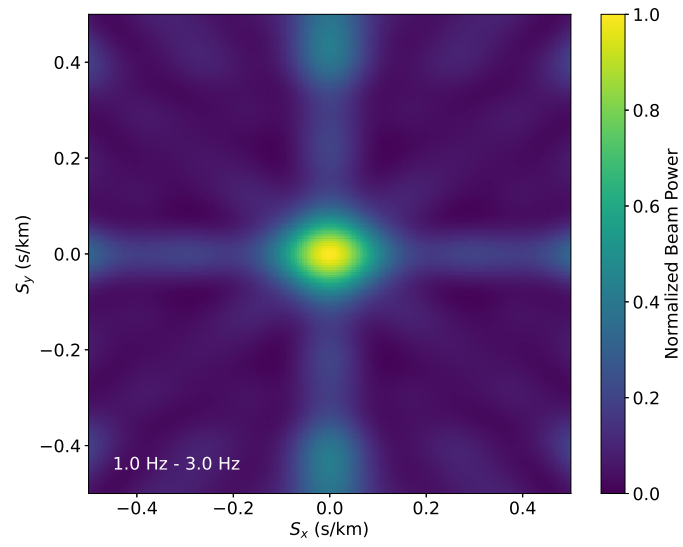
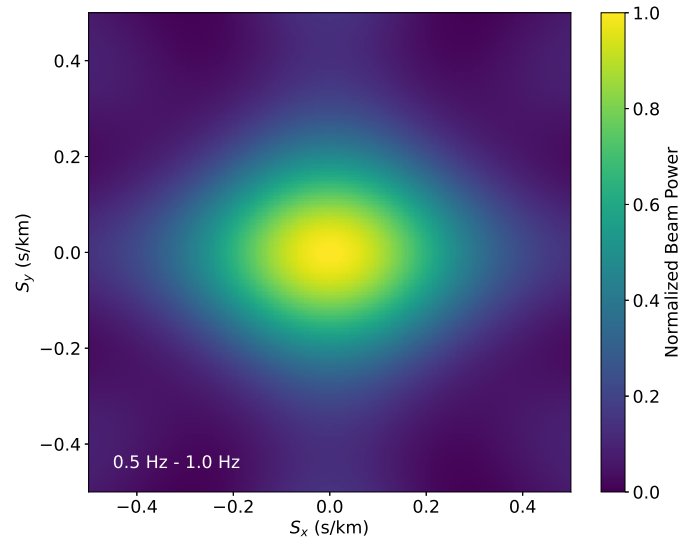


Figure S5

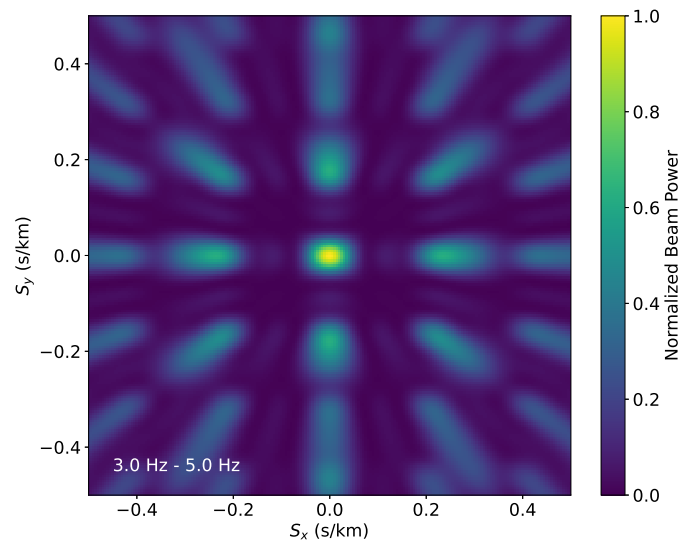
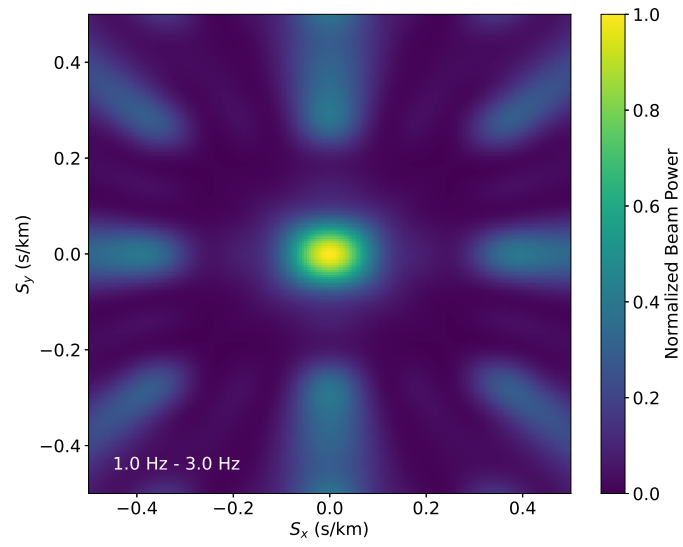
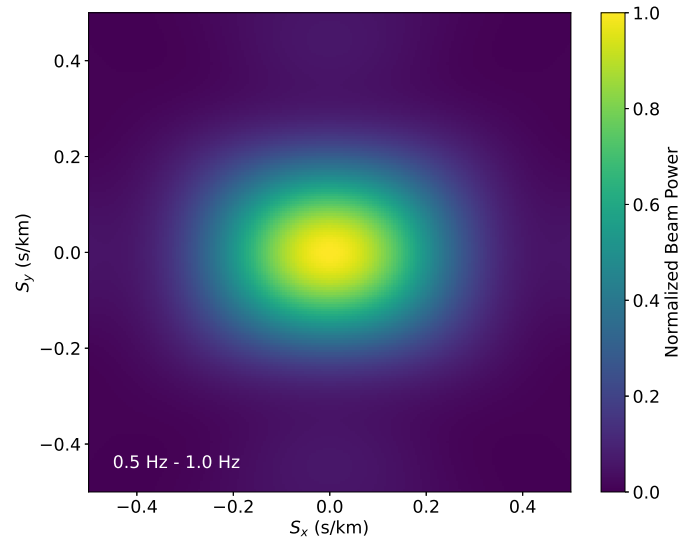


Figure S6

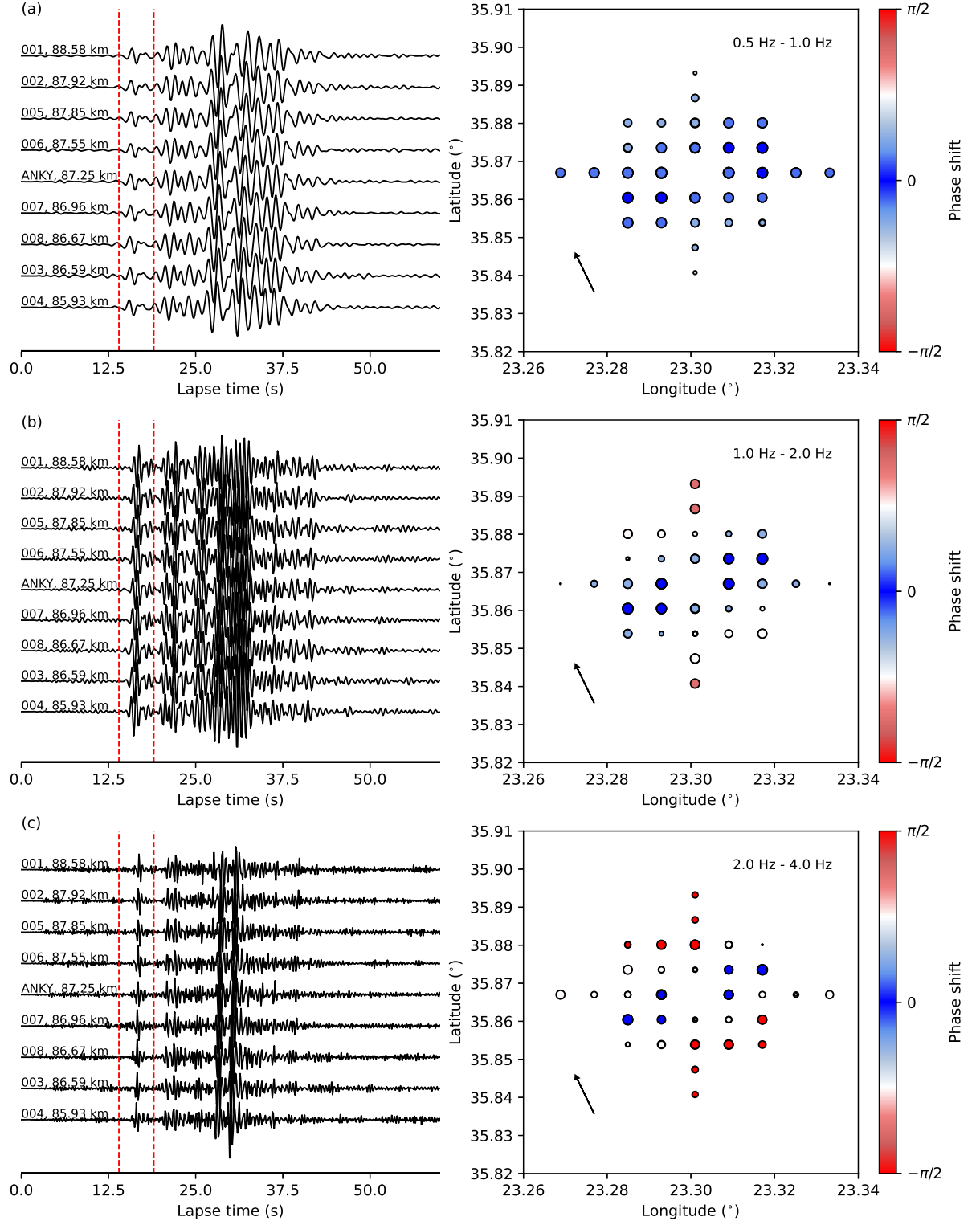


Figure S7

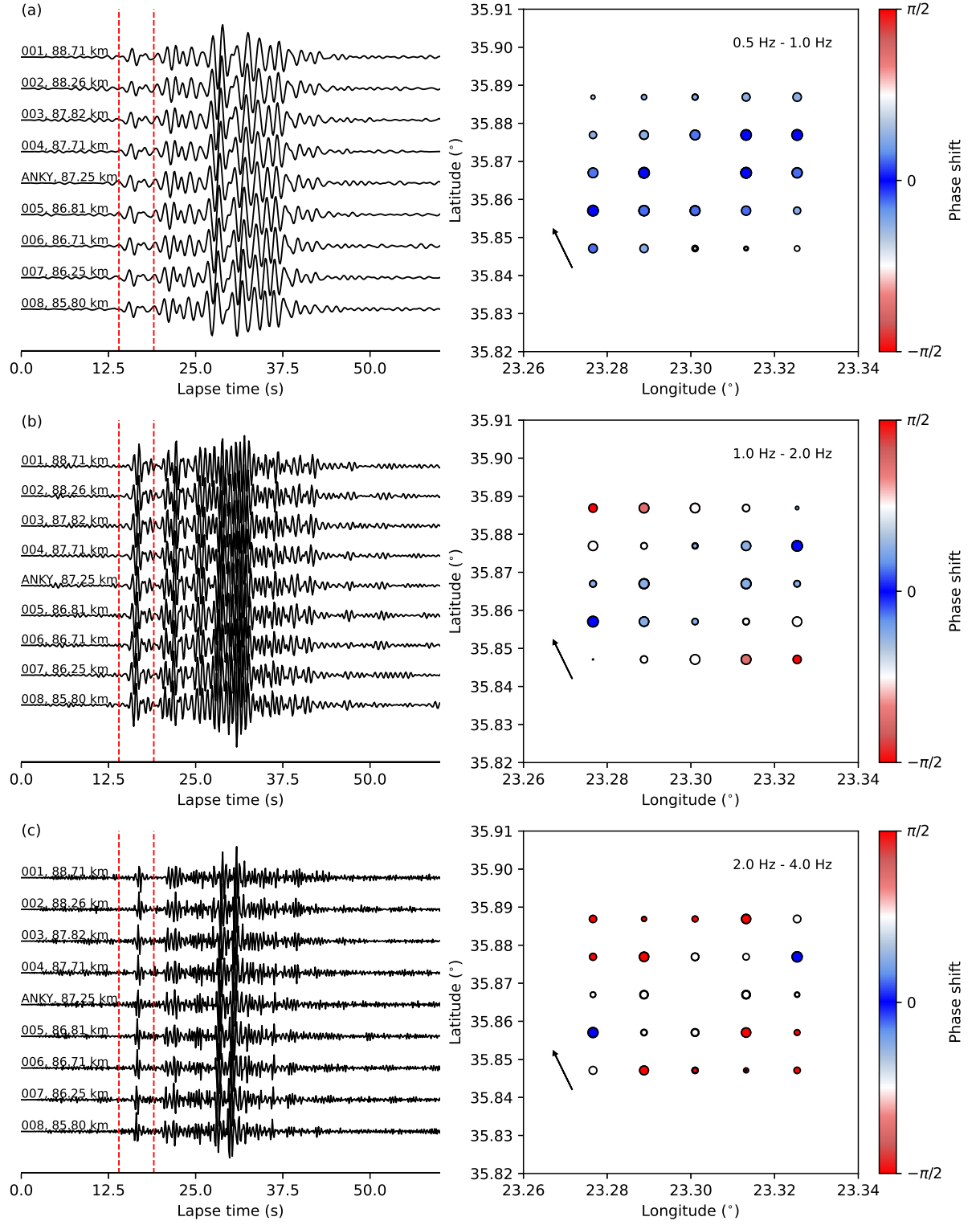


Figure S8