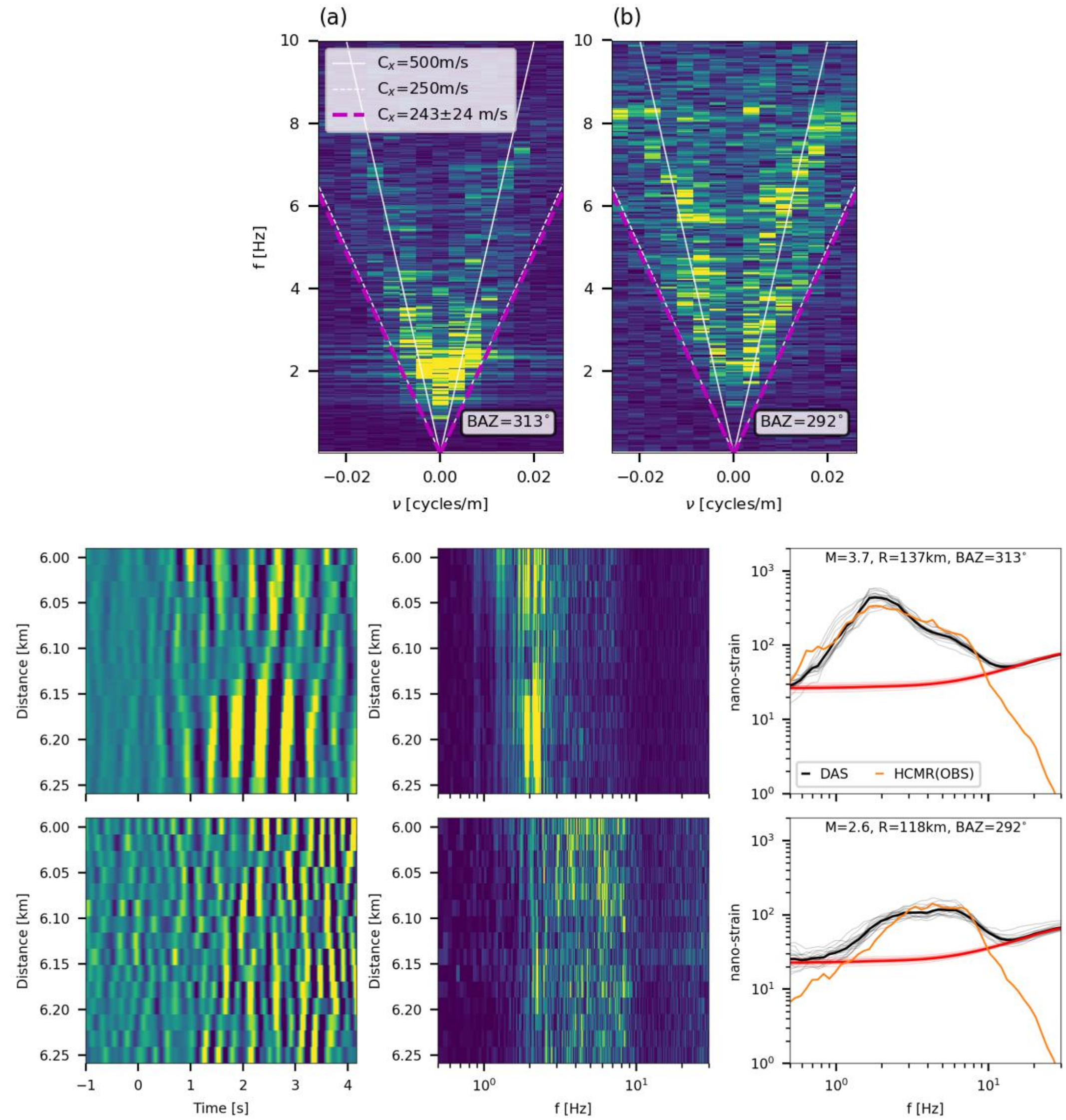

Figure S5. As in figures 5 (top) and 6 (bottom) for 2 earthquakes recorded by HCMR between 6 and 6.3 km from the interrogator, at a depth of 160 m.

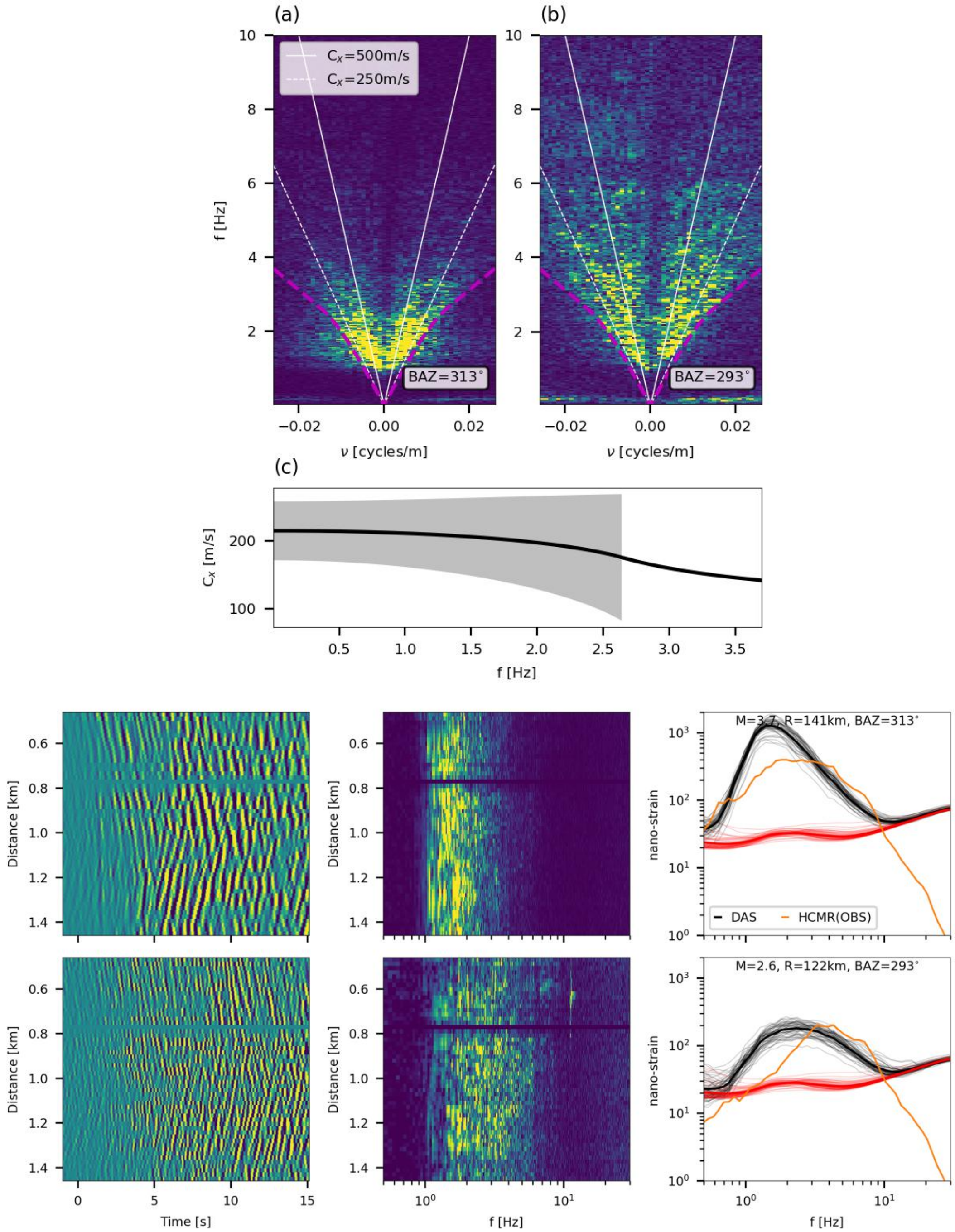

Figure S6. As in figures 5 (top) and 6 (bottom) for 2 earthquakes recorded by HCMR between 0.5 and 1.5 km from the interrogator, between 3 and 18 m depth.

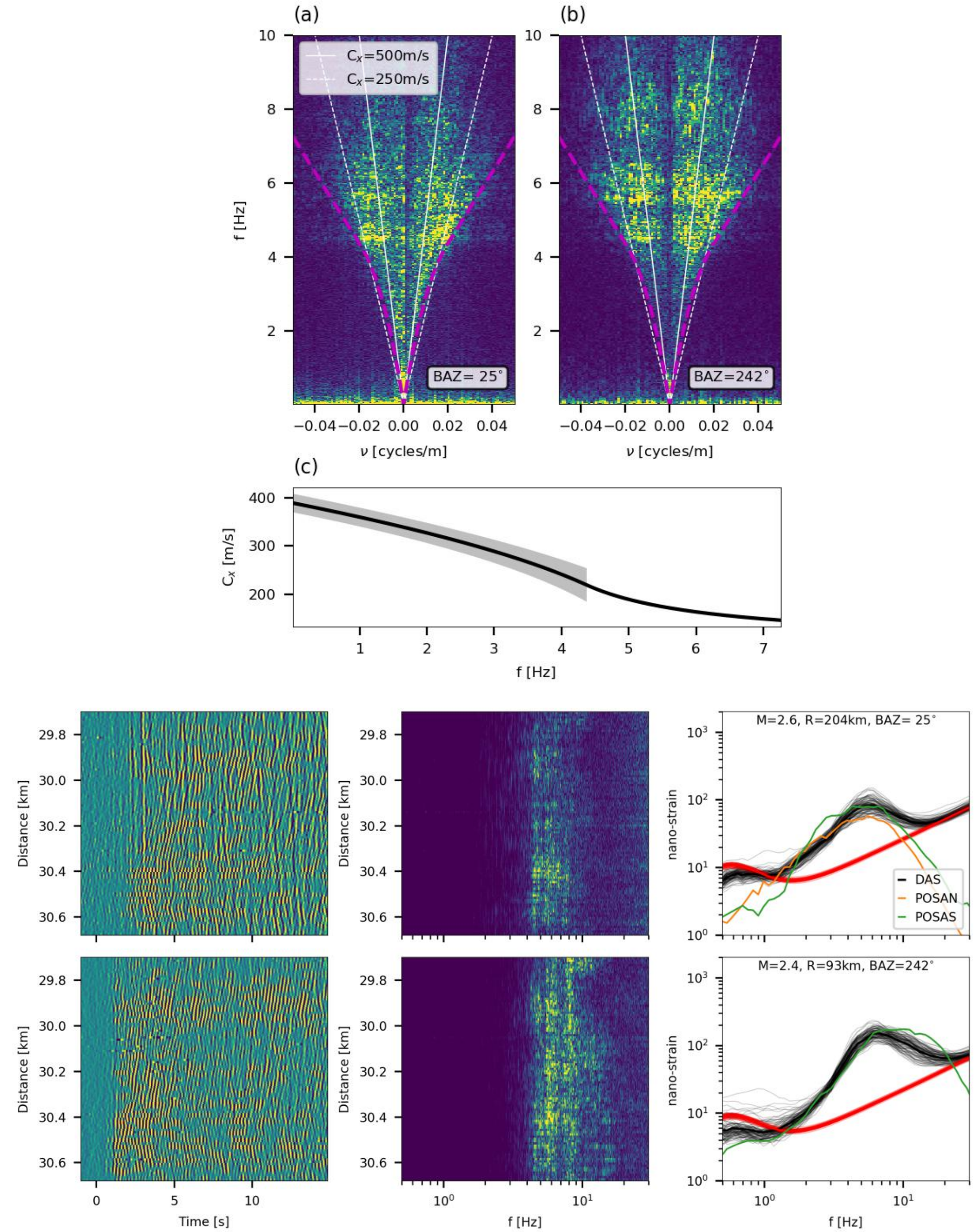

Figure S7. As in figures 5 (top) and 8 (bottom) for 2 earthquakes recorded by MEUST between 29.7 and 30.7 km from the interrogator, at a depth of 2.35 km.

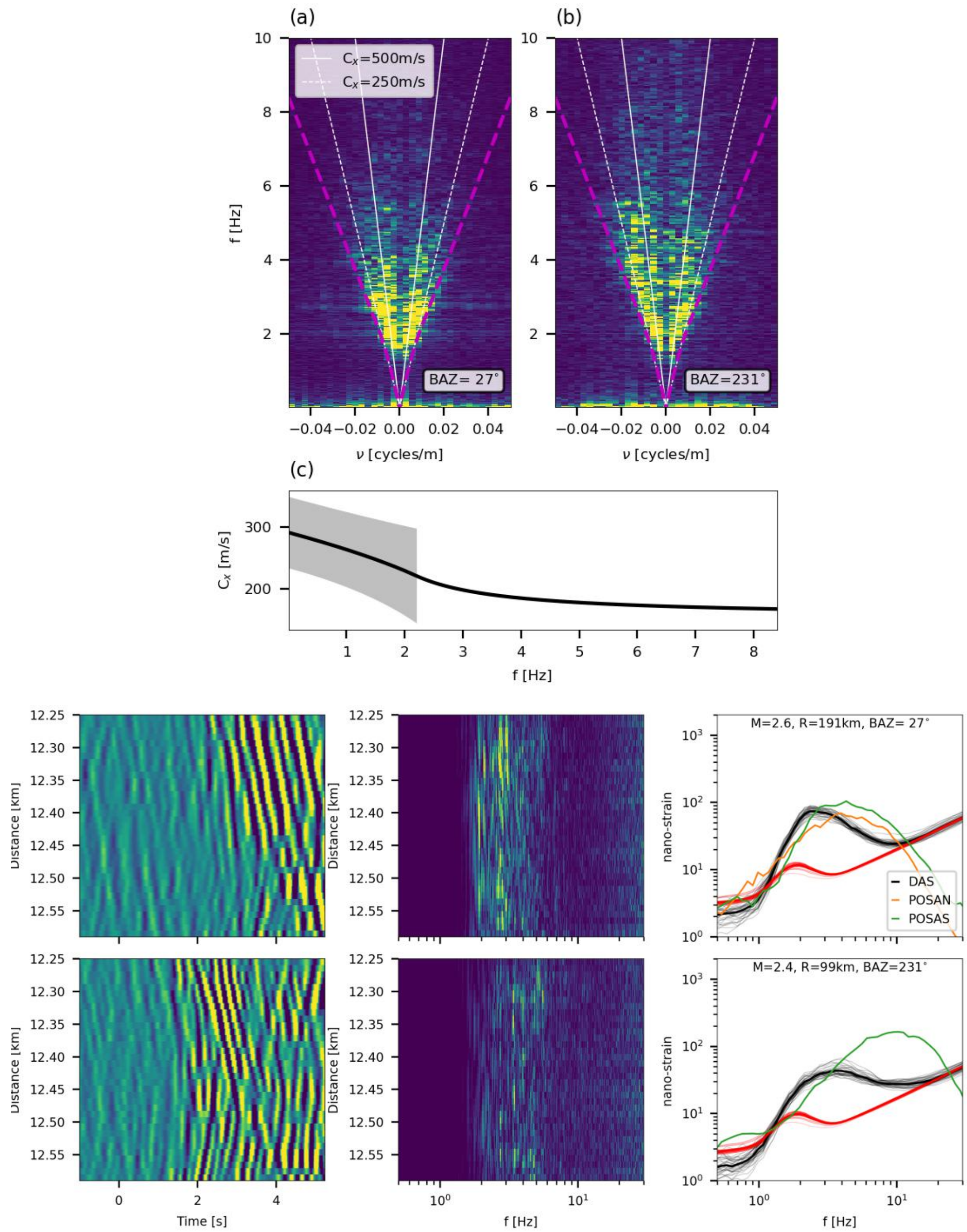

Figure S8. As in figures 5 (top) and 8 (bottom) for 2 earthquakes recorded by MEUST between 12.2 and 12.6 km from the interrogator, at a depth of 550 m.

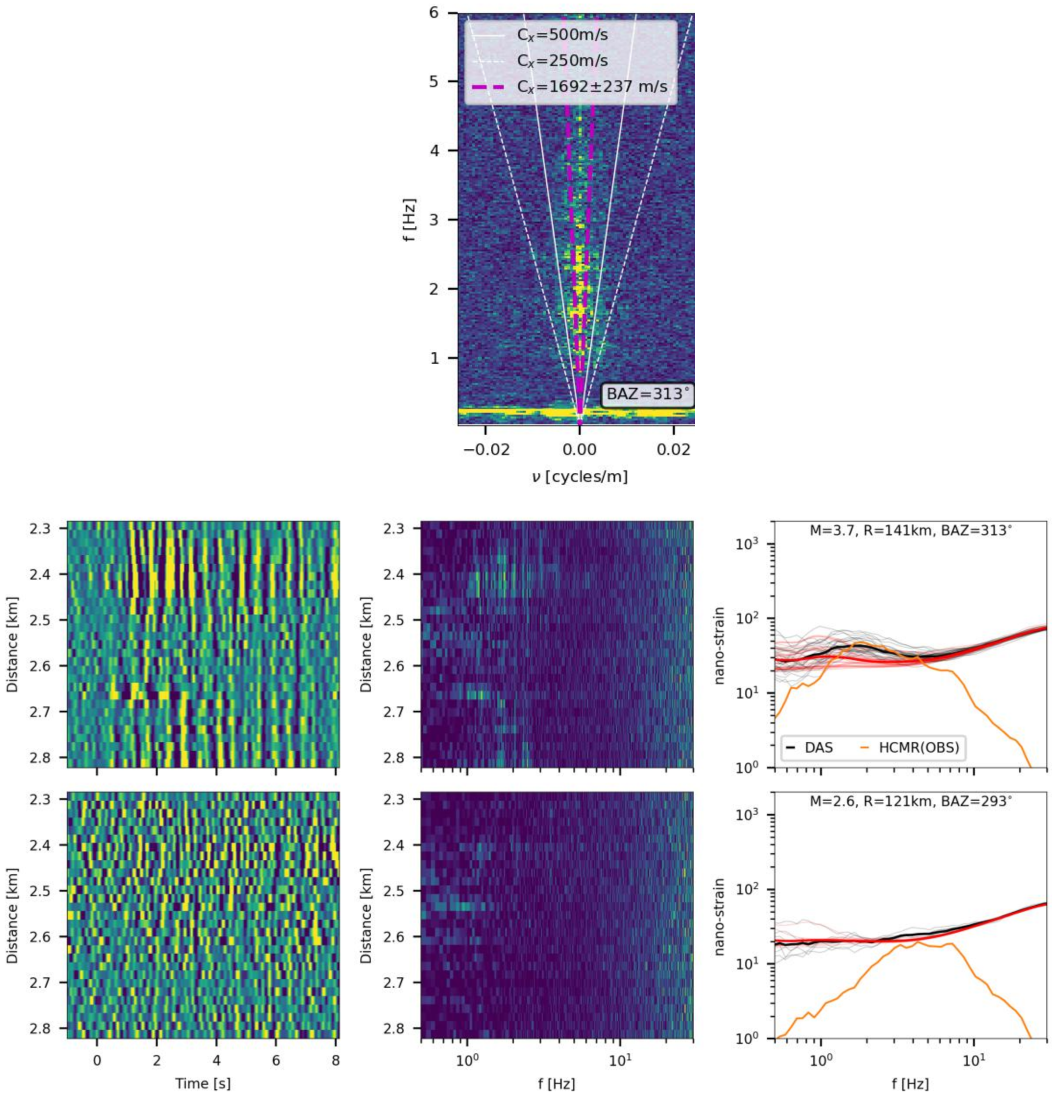

Figure S9. As in figures 5 (top) and 8 (bottom) for 2 earthquakes recorded by HCMR between 2.3 and 2.85 km from the interrogator, between 15 and 60 m depth. The earthquake in top panels is detected while that in the bottom panels is not detected.

Text S1.

S-wave ground accelerations were modeled using the omega-squared model (Brune, 1970). This model describes the far-field body-wave radiation in the frequency domain:

$$\ddot{\Omega}(f) = (2\pi f)^2 \frac{\Omega_0}{1+\left(\frac{f}{f_0}\right)^2}, \tag{S1}$$

Where $\ddot{\Omega}(f)$ is acceleration spectra, f is frequency, f_0 is the source corner frequency, and Ω_0 is the low frequency displacement value. The parameters Ω_0 and f_0 are related to the seismic moment, M_0, and the stress drop, $\Delta\tau$ (Eshelby, 1957):

$$\Omega_0 = \frac{M_0 U_{\varphi\theta} F_s}{4\pi\rho C_S^3 R}, \tag{S2a}$$

and:

$$f_0 = k C_S \left(\frac{16}{7}\frac{\Delta\tau}{M_0}\right)^{1/3}, \tag{S2b}$$

where $U_{\varphi\theta}$ is the radiation pattern, F_s is the free-surface correction factor, C_S is the S-wave velocity, R is the hypocentral distance, ρ is the density and k is a constant. The f_0-$\Delta\tau$ relation assumes a circular fault, and is a sufficient approximation for many earthquakes, including those analyzed in the manuscript. High frequency attenuation is modeled by multiplying the omega-squared source model (Equation S1) with a decaying exponent:

$$\ddot{\Omega}(f) = (2\pi f)^2 \frac{\Omega_0}{1+\left(\frac{f}{f_0}\right)^2} \exp(-\pi\kappa f), \tag{S3}$$

where κ is an attenuation parameter.

The following parameter tuning was set when modeling ground motion accelerations:

Parameter	Value
$\Delta\tau$	$4 MPa$
κ	$0.04\ sec$
ρ	$2600\ kg/m^3$
C_S	$3200\ m/s$
$U_{\phi\theta}$	0.63
F_S	2
k	0.37