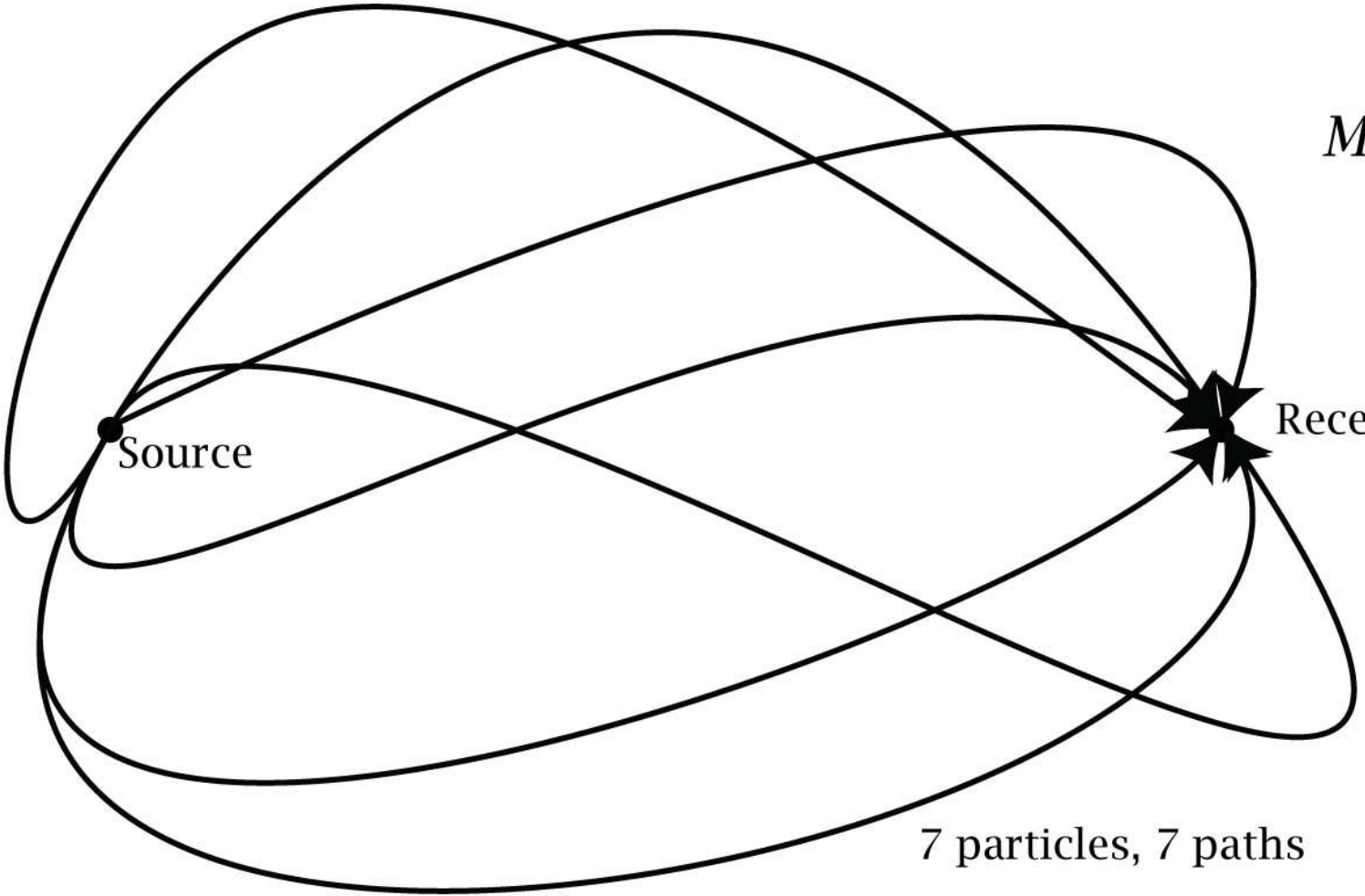
Sensitivity Kernels for coda-wave interferometry in a 3D scalar scattering media

Andres Barajas, Ludovic Margerin,

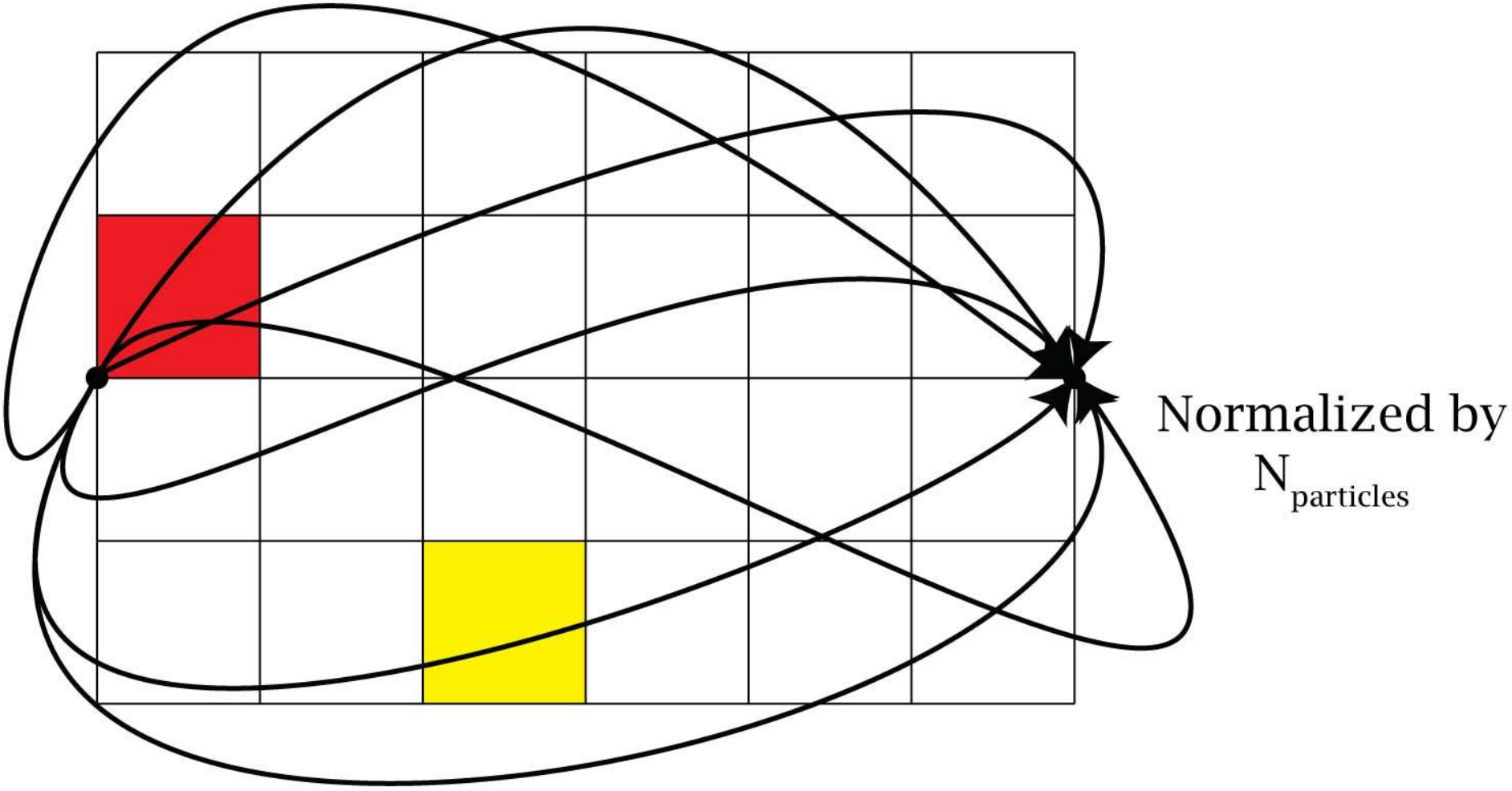
Michel Campillo

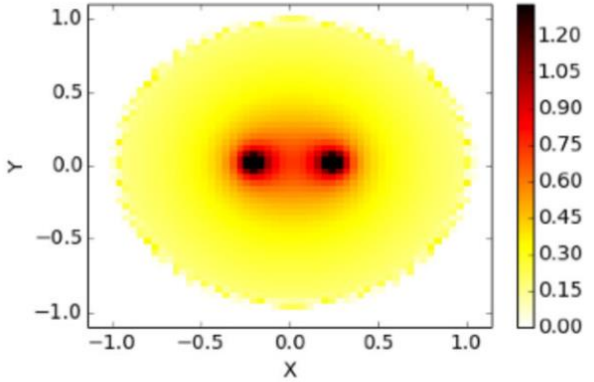
SM1.3/NH4.17

Egu2020-20890

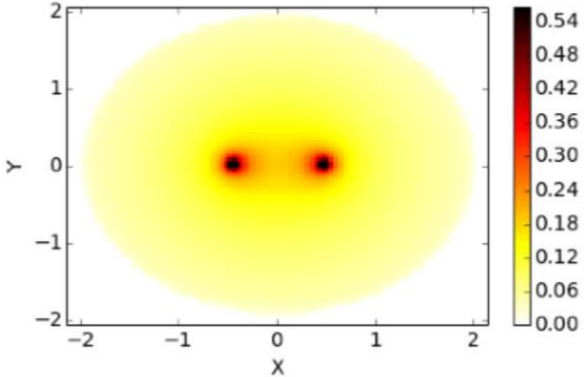


Must do it in a fixed time: lapse time

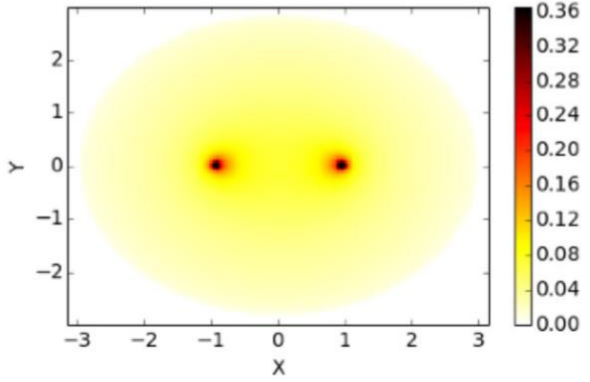

Normalized by
$N_{particles}$



$R = 0.48l,\ t = 2\tau_s$



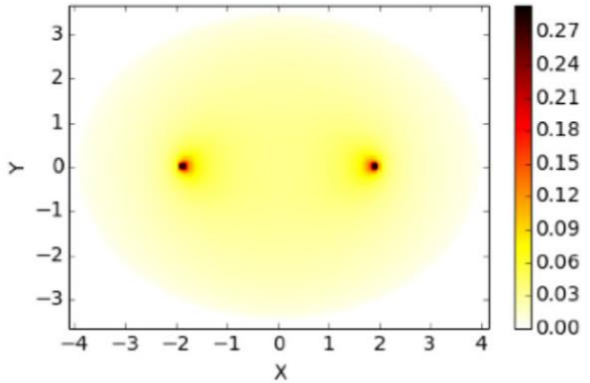
$R = 0.96l,\ t = 4\tau_s$



$R = 1.92l,\ t = 6\tau_s$

Sensitivity kernels for coda-wave interferometry and scattering tomography: theory and numerical evaluation in two-dimensional anisotropically scattering media

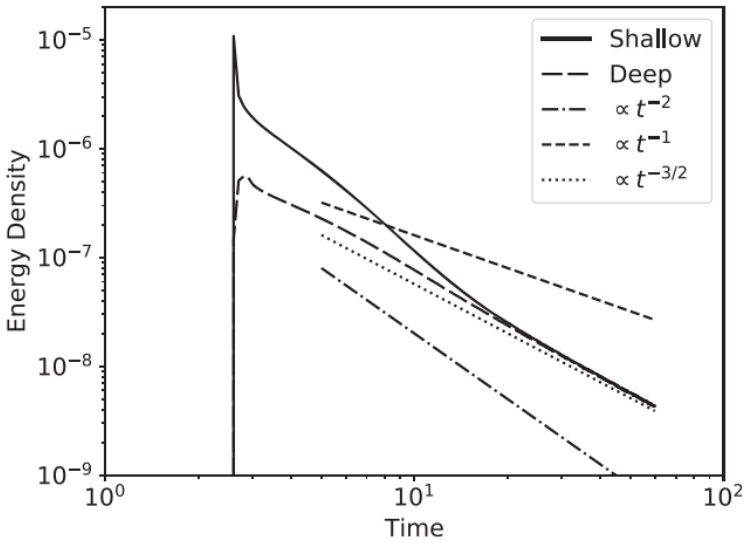
Ludovic Margerin,[1] Thomas Planès,[2] Jessie Mayor[1] and Marie Calvet[1]

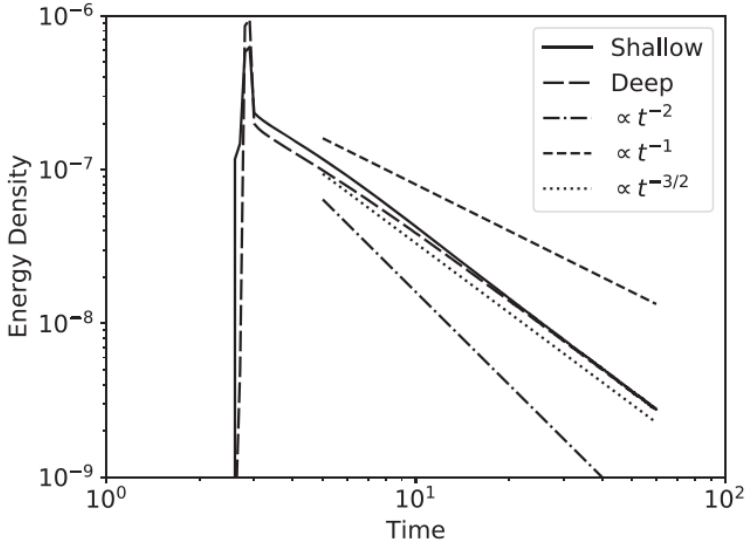


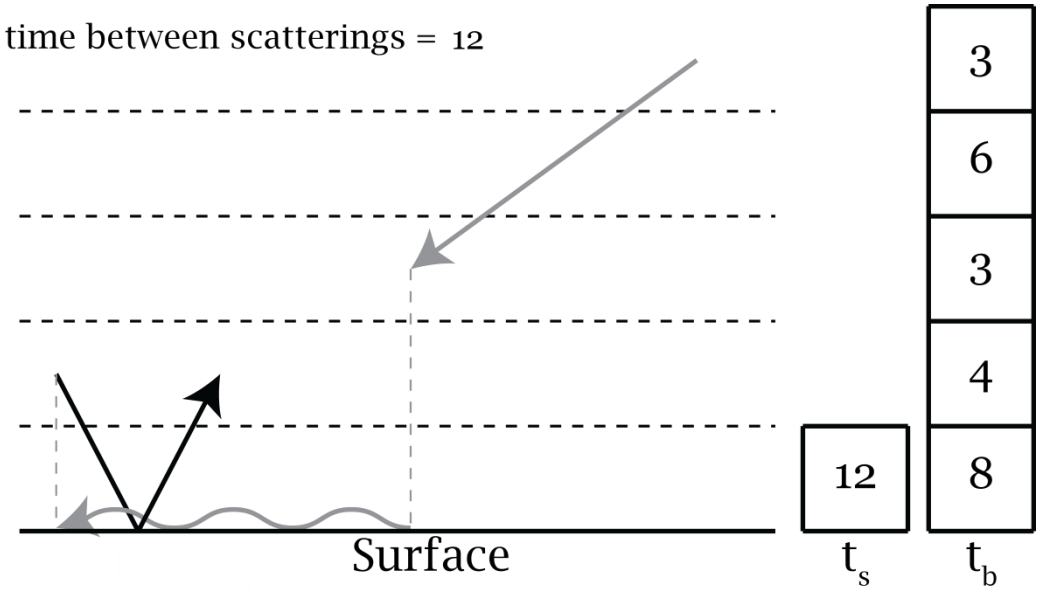
$R = 3.84l,\ t = 8\tau_s$

A scalar radiative transfer model including the coupling between surface and body waves

Ludovic Margerin,[1] Andres Bajaras[2] and Michel Campillo[2]







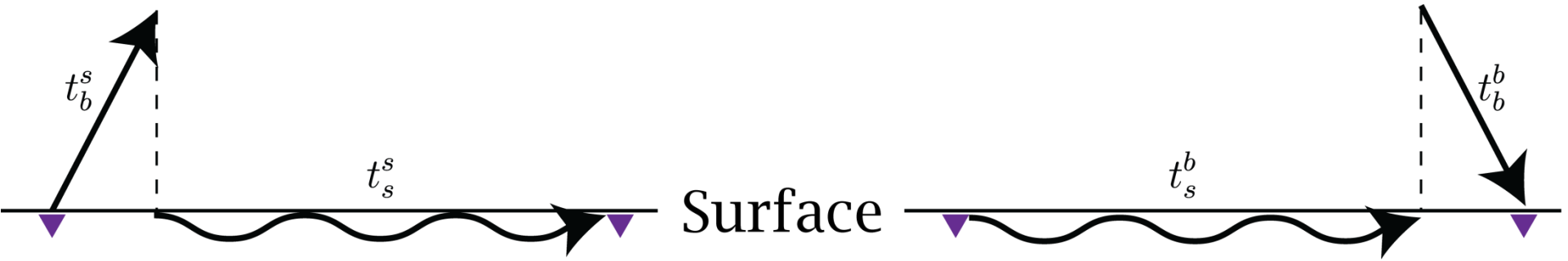
$$t = t_s + t_b = t_s + \int_0^\infty t_b(z', t'; r)dz'.$$

$$\langle \tau(t) \rangle = -\langle t_s \rangle \frac{\delta c_R}{c_R} - \int_0^\infty \langle t_b(z', t'; r) \rangle \frac{\delta c}{c}(z')dz'$$

$$\varepsilon = \frac{\langle t_s \rangle}{t} \frac{\rho c^2}{2k_\parallel^2 I_2} \int_0^\infty \left[k_\parallel^2 h^2(z') + \left(\frac{dh(z')}{dz'} \right)^2 \right] \frac{\delta c}{c}(z')dz' + \frac{1}{t} \int_0^\infty \langle t_b(z', t'; r) \rangle \frac{\delta c}{c}(z')dz'$$

Detected as surface wave

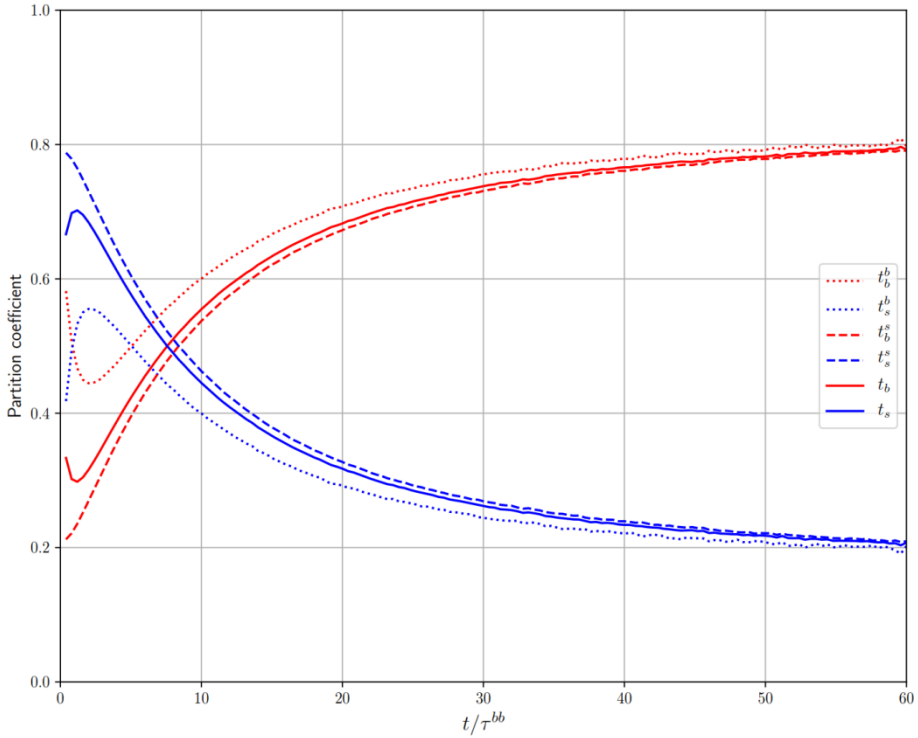
Detected as body wave

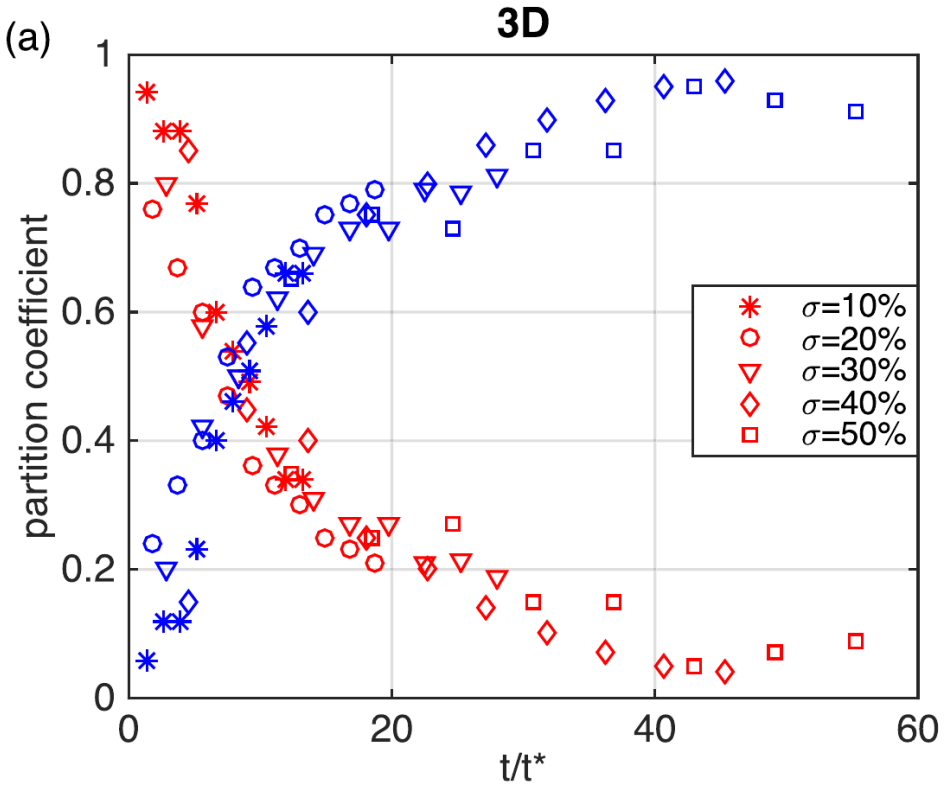


$$t_s = \frac{E^b(r,t,z)}{E(r,t,z)t} t_s^b + \frac{E^s(r,t,z)}{E(r,t,z)t} t_s^s$$

$$t_b = \frac{E^b(r,t,z)}{E(r,t,z)t} t_b^b + \frac{E^s(r,t,z)}{E(r,t,z)t} t_b^s$$

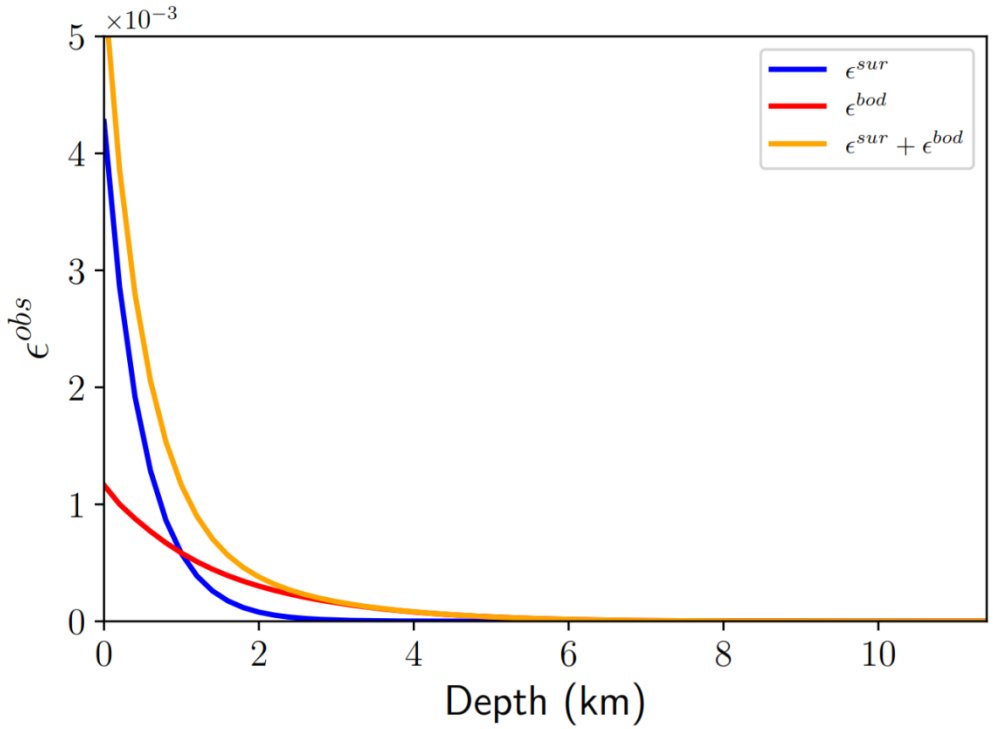
$$\begin{aligned}\epsilon(z) =& \frac{E^b(r,t,z)}{E(r,t,z)t} \left(\langle t_s^b(r,z,t) \rangle \int K_{C_{ph}}(z') \frac{\delta c}{c}(z') dz' + \int \langle t_b^b(r,z,z',t) \rangle \frac{\delta c}{c}(z') dz' \right) \\ &+ \frac{E^s(r,t,z)}{E(r,t,z)t} \left(\langle t_s^s(r,t) \rangle \int K_{C_{ph}}(z') \frac{\delta c}{c}(z') dz' + \int \langle t_b^s(r,z',t) \rangle \frac{\delta c}{c}(z') dz' \right)\end{aligned}$$

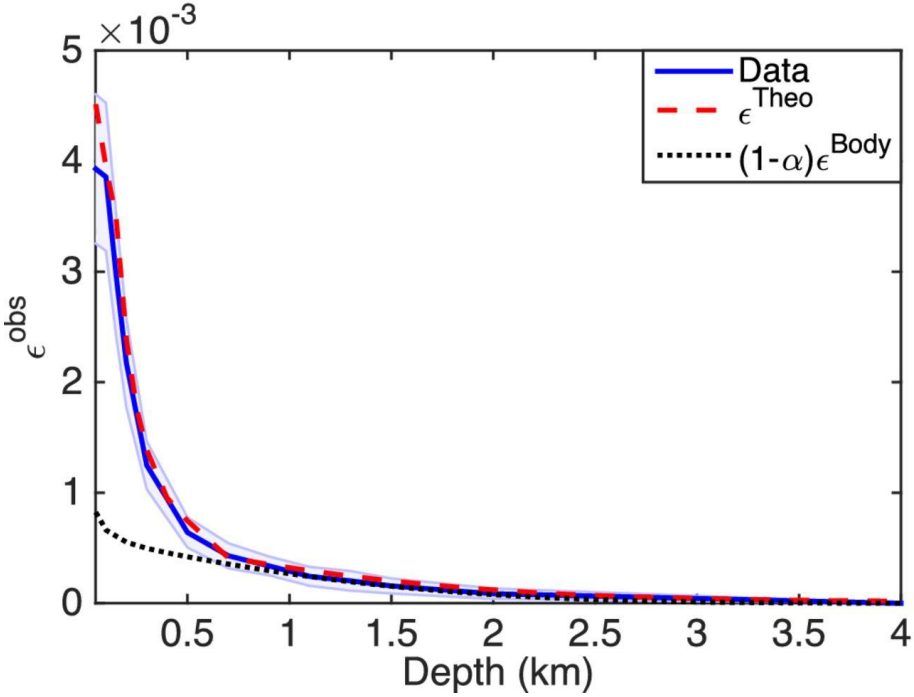




Lapse-time-dependent coda-wave depth sensitivity to local velocity perturbations in 3-D heterogeneous elastic media

Anne Obermann,[1] Thomas Planès,[2] Céline Hadziioannou[3] and Michel Campillo[4]


×10−3
5
4
3
2
1
0
ϵ^{obs}
0
2
4
6
8
10
Depth (km)
ϵ^{sur}
ϵ^{bod}
$\epsilon^{sur} + \epsilon^{bod}$


×10-3
5
4
3
2
1
0
ϵ^{obs}
0.5
1
1.5
2
2.5
3
3.5
4
Depth (km)
Data
ϵ^{Theo}
(1-α)ϵ^{Body}

Depth sensitivity of seismic coda waves to velocity perturbations in an elastic heterogeneous medium

Anne Obermann,[1] Thomas Planès,[1] Eric Larose,[1] Christoph Sens-Schönfelder[1,2] and Michel Campillo[1]