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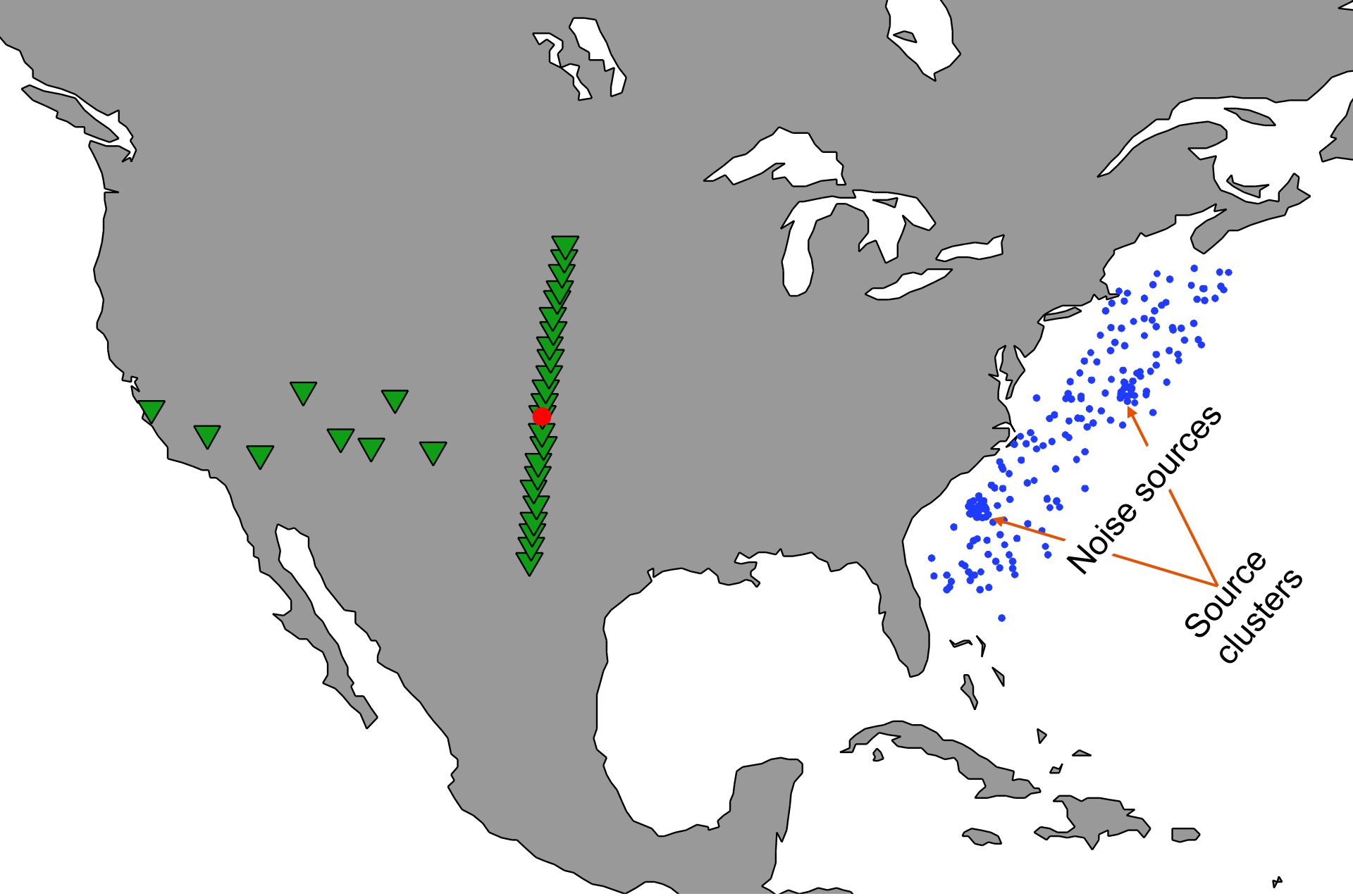
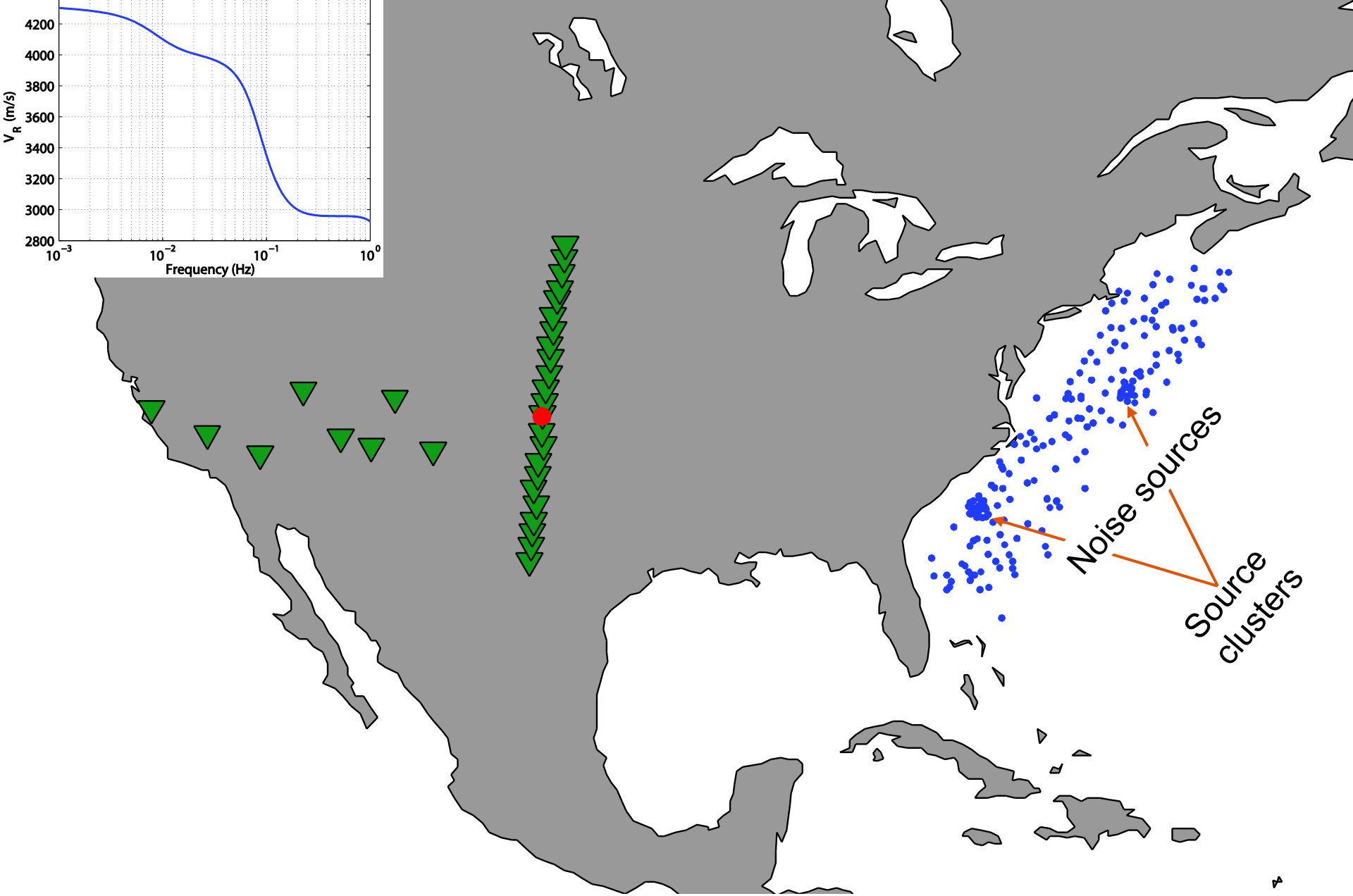
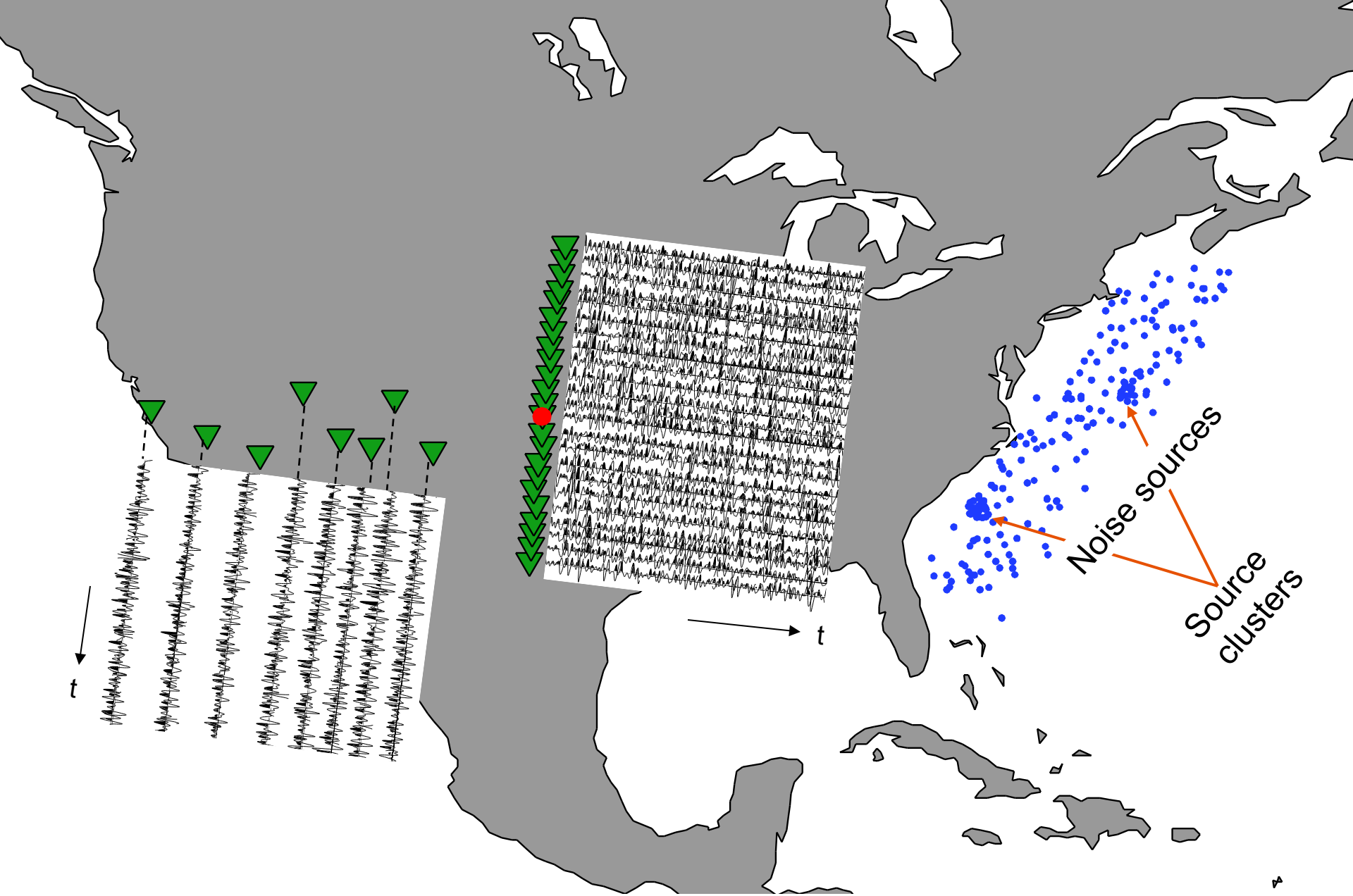
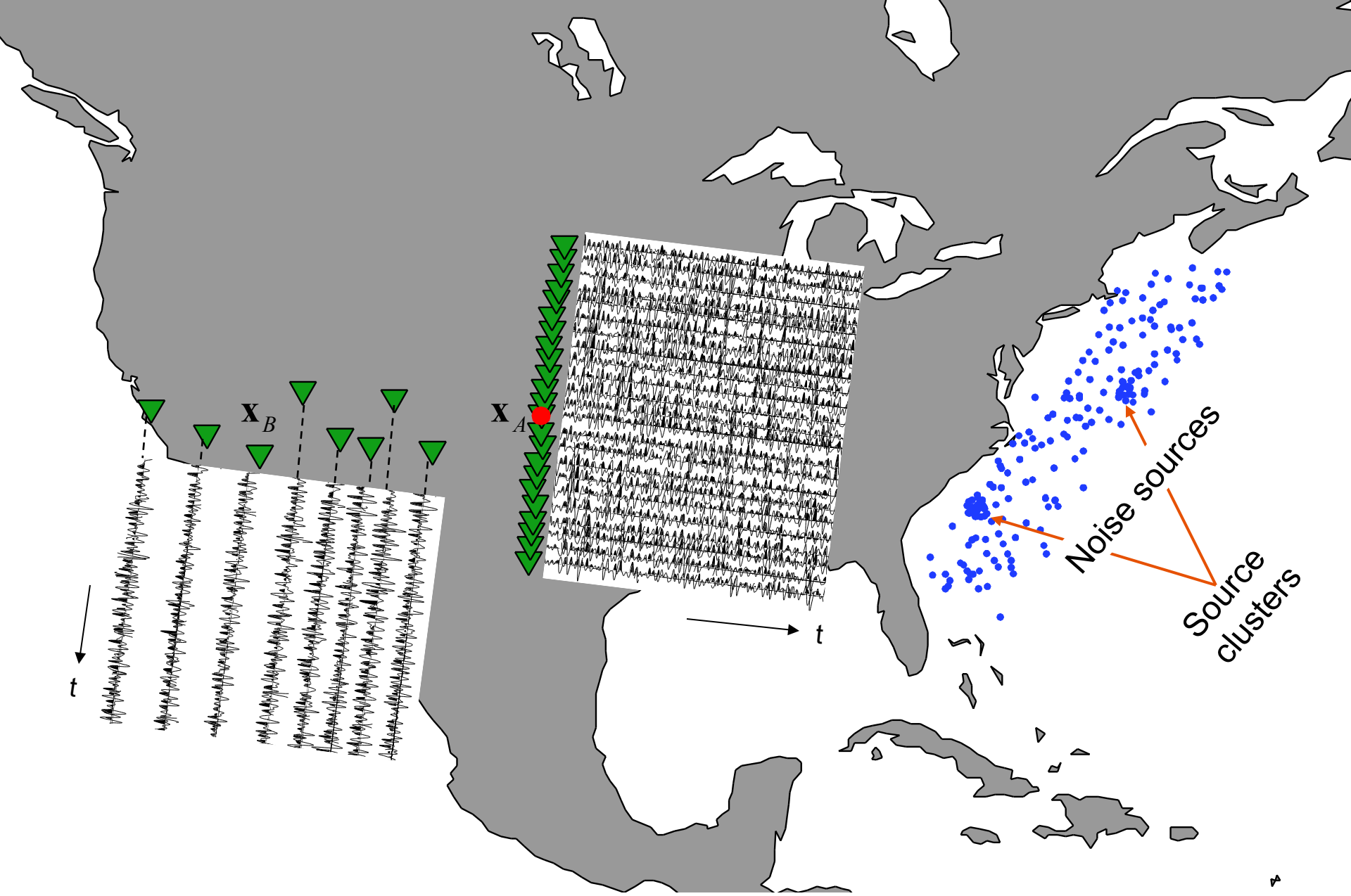
- Part II: Seismic interferometry by multi-dimensional deconvolution (MDD)
- Part III: Beyond seismic interferometry

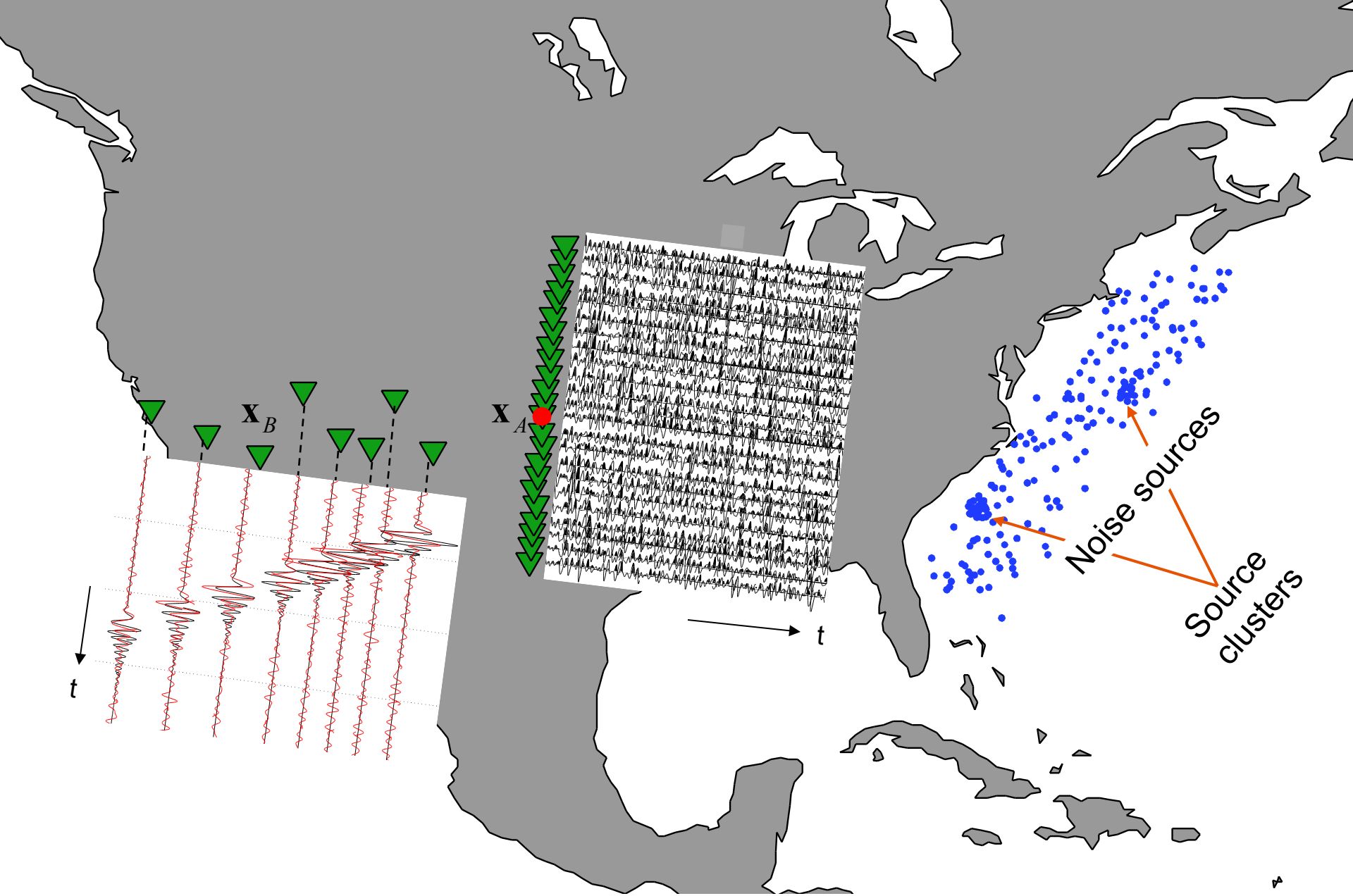

Noise sources
Source clusters


4200
4000
3800
3600
3400
3200
3000
2800
V_R (m/s)
10^{-3}
10^{-2}
10^{-1}
10^{0}
Frequency (Hz)
Noise sources
Source clusters

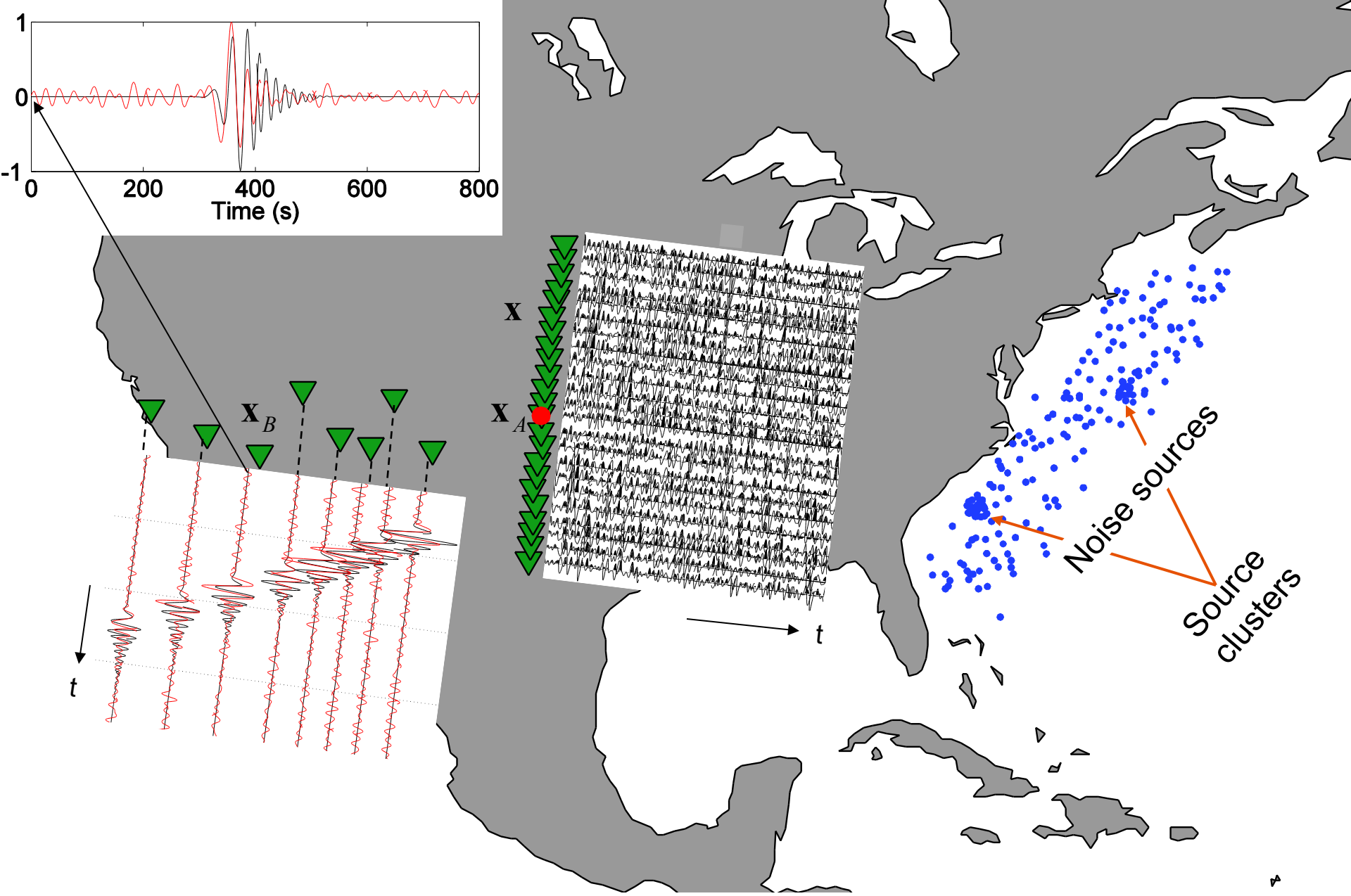

t
t
Noise sources
Source clusters



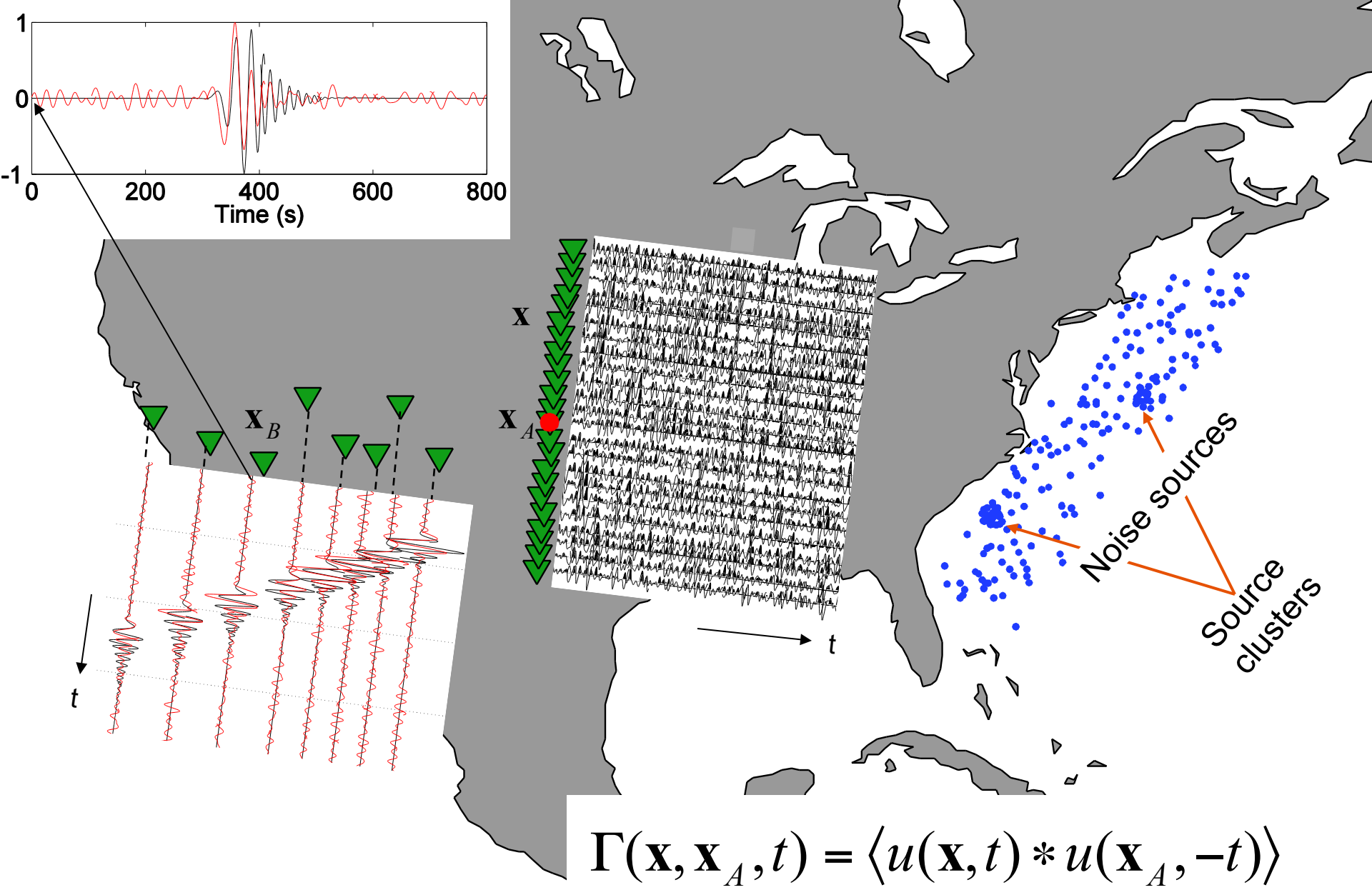
$$C(\mathbf{x}_B, \mathbf{x}_A, t) = \langle u(\mathbf{x}_B, t) * u(\mathbf{x}_A, -t) \rangle$$



$$C(\mathbf{x}_B, \mathbf{x}_A, t) = \langle u(\mathbf{x}_B, t) * u(\mathbf{x}_A, -t) \rangle$$

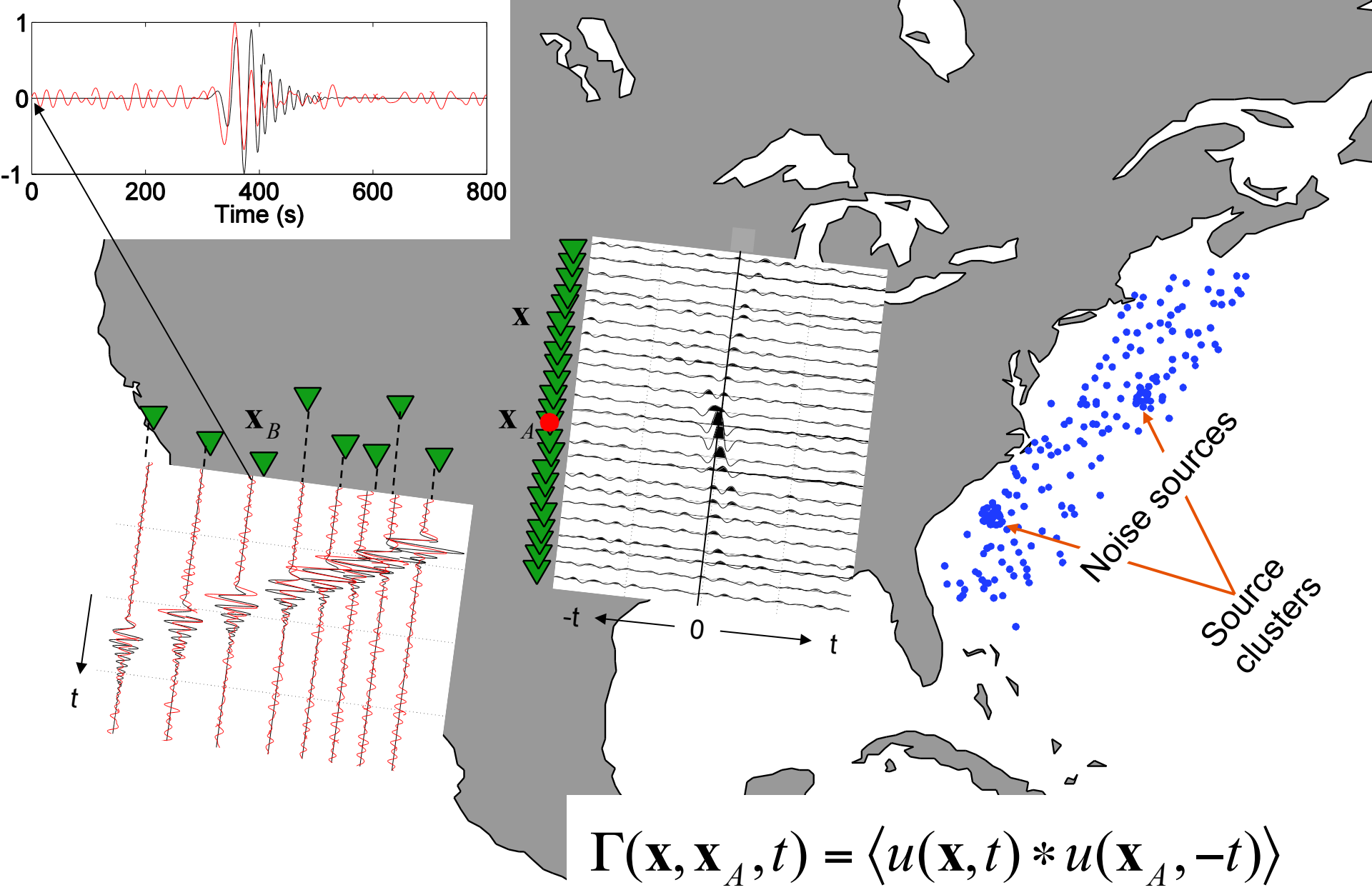


$$C(\mathbf{x}_B, \mathbf{x}_A, t) = \langle u(\mathbf{x}_B, t) * u(\mathbf{x}_A, -t) \rangle$$



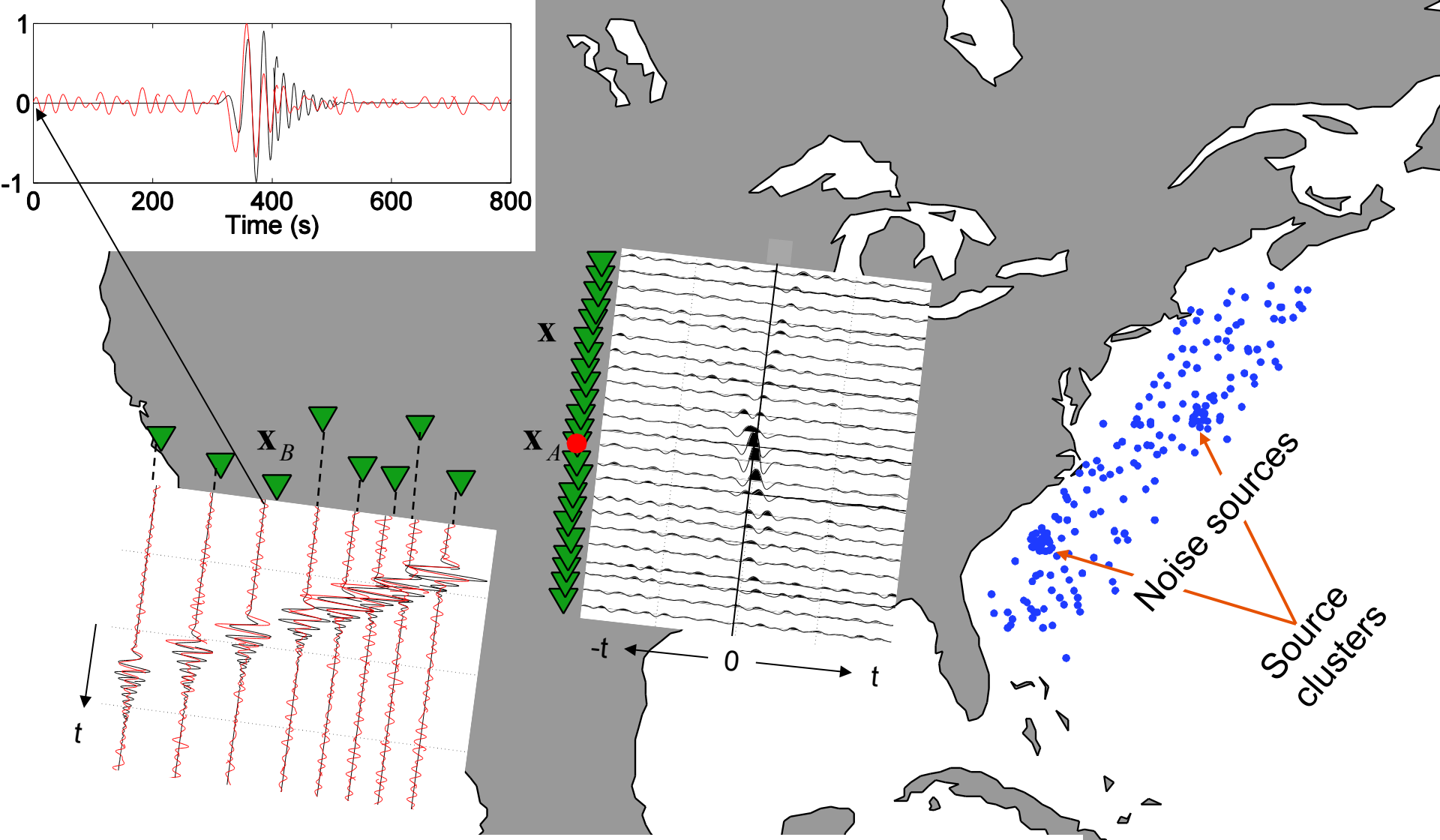
$$\Gamma(\mathbf{x}, \mathbf{x}_A, t) = \langle u(\mathbf{x}, t) * u(\mathbf{x}_A, -t) \rangle$$

$$C(\mathbf{x}_B, \mathbf{x}_A, t) = \langle u(\mathbf{x}_B, t) * u(\mathbf{x}_A, -t) \rangle$$

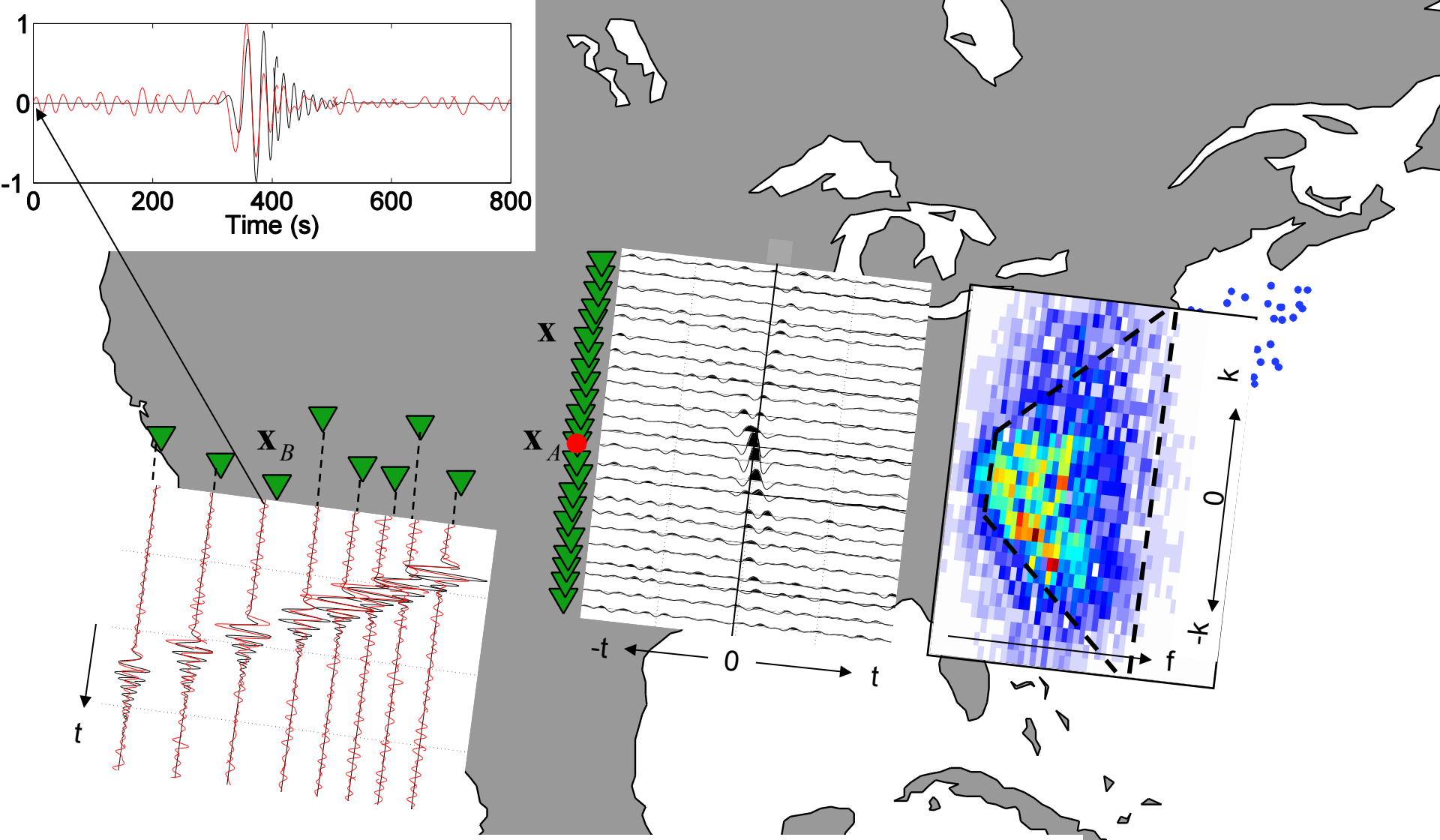


$$\Gamma(\mathbf{x},\mathbf{x}_A,t) = \langle u(\mathbf{x},t) * u(\mathbf{x}_A,-t) \rangle$$

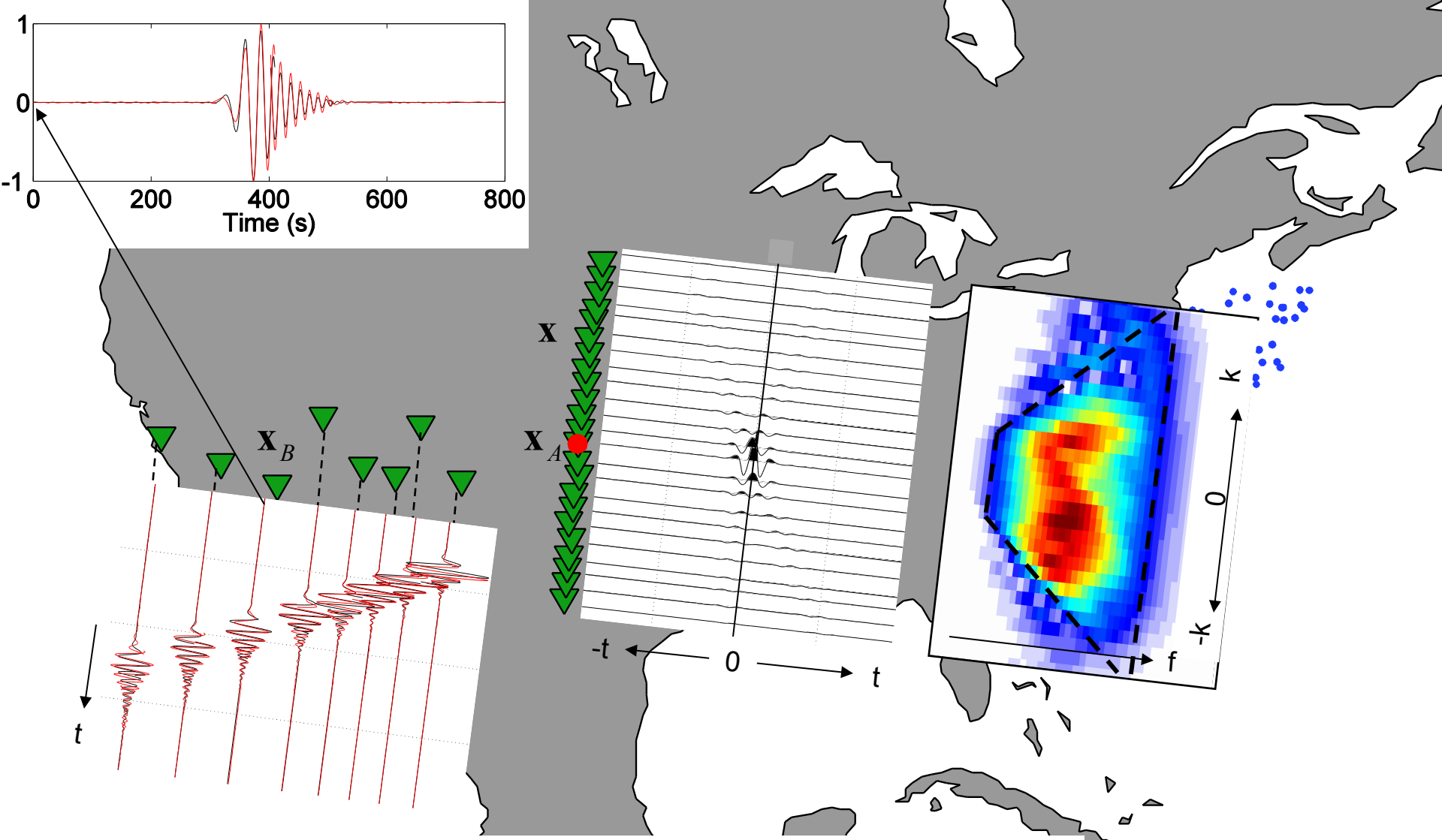
$$C(\mathbf{x}_B,\mathbf{x}_A,t) = \langle u(\mathbf{x}_B,t) * u(\mathbf{x}_A,-t) \rangle$$



$$C(\mathbf{x}_B, \mathbf{x}_A, t) = \int_S G_d(\mathbf{x}_B, \mathbf{x}, t) * \Gamma(\mathbf{x}, \mathbf{x}_A, t) d\mathbf{x}$$



$$C(\mathbf{x}_B, \mathbf{x}_A, t) = \int_S G_d(\mathbf{x}_B, \mathbf{x}, t) * \Gamma(\mathbf{x}, \mathbf{x}_A, t) d\mathbf{x}$$



$$G_d(\mathbf{x}_B, \mathbf{x}_A, t) = \int_S C(\mathbf{x}_B, \mathbf{x}, t) * \Gamma^{inv}(\mathbf{x}, \mathbf{x}_A, t) d\mathbf{x}$$

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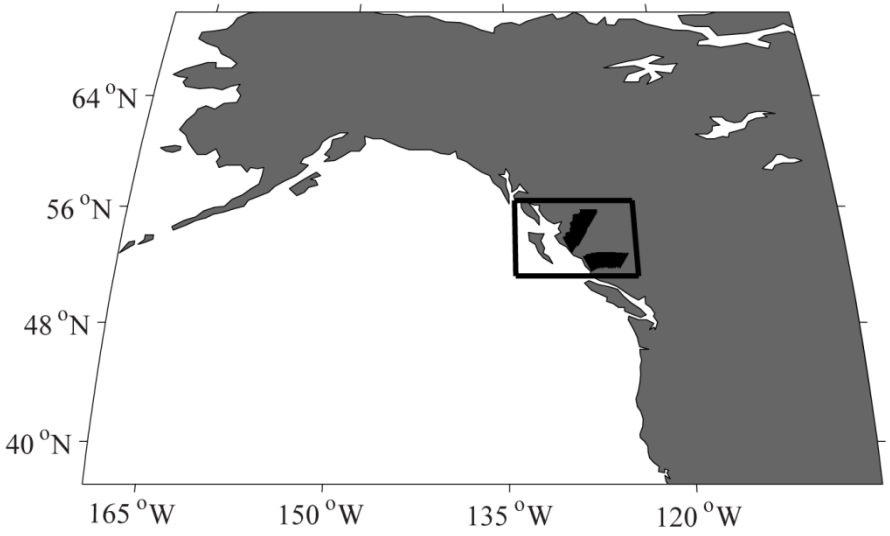
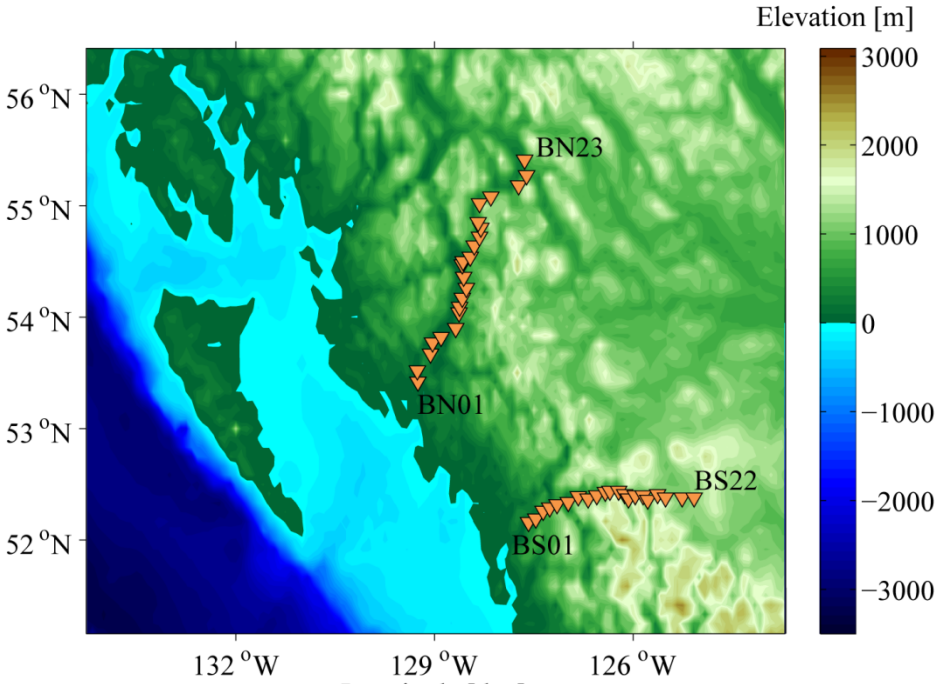
RESEARCH ARTICLE

10.1002/2014JB011262

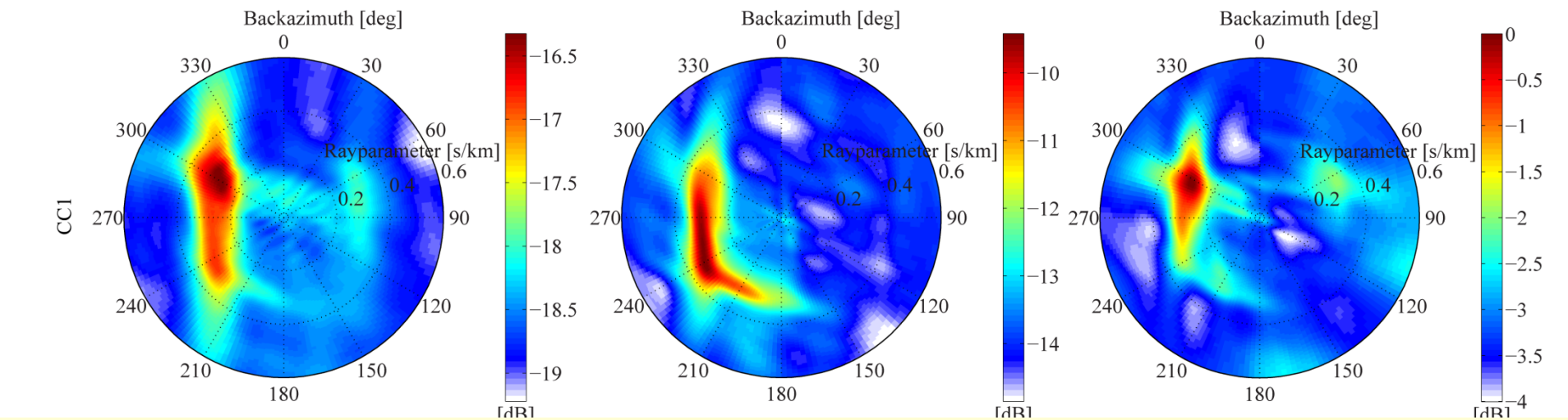
Retrieving surface waves from ambient seismic noise using seismic interferometry by multidimensional deconvolution

Karel N. van Dalen[1], T. Dylan Mikesell[2,3], Elmer N. Ruigrok[1], and Kees Wapenaar[1]

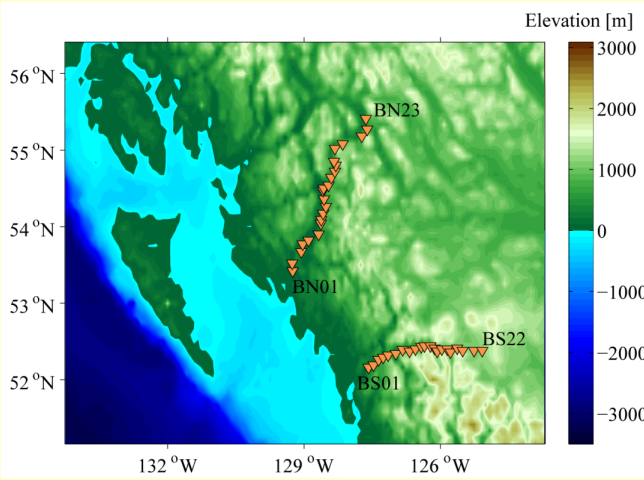


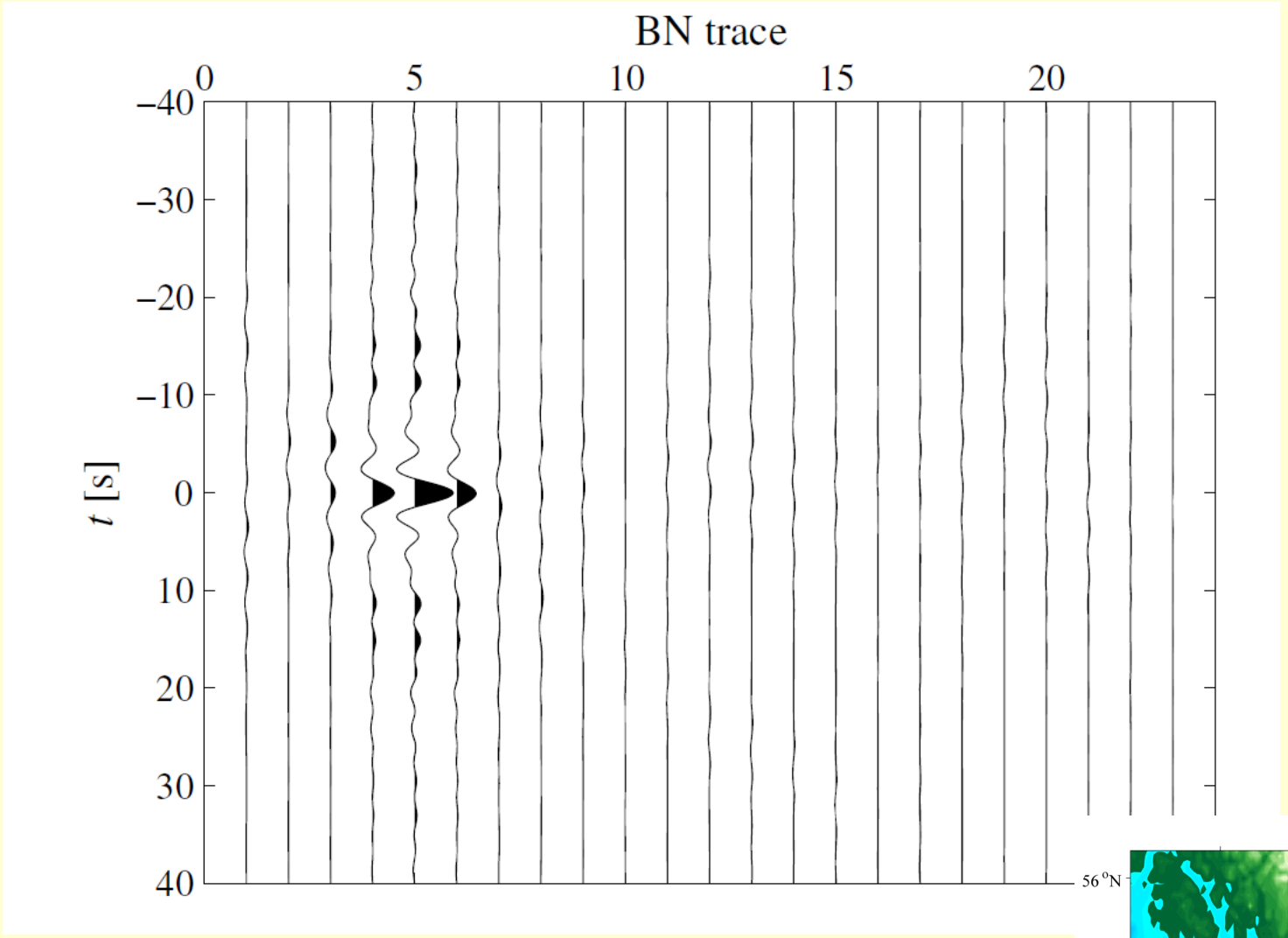


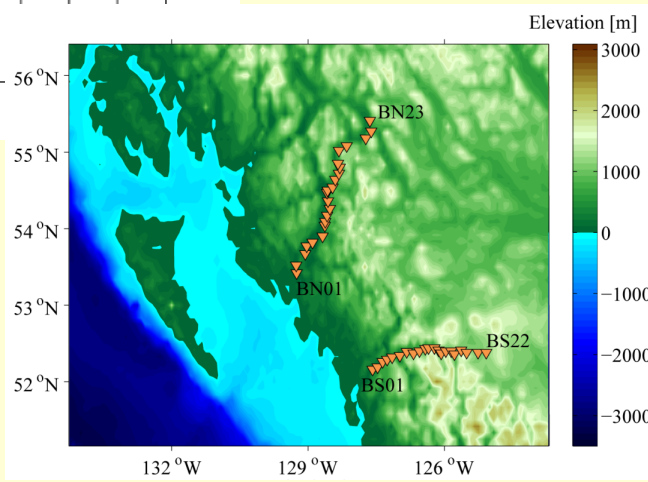
Directional analysis
(from selected subset of data)



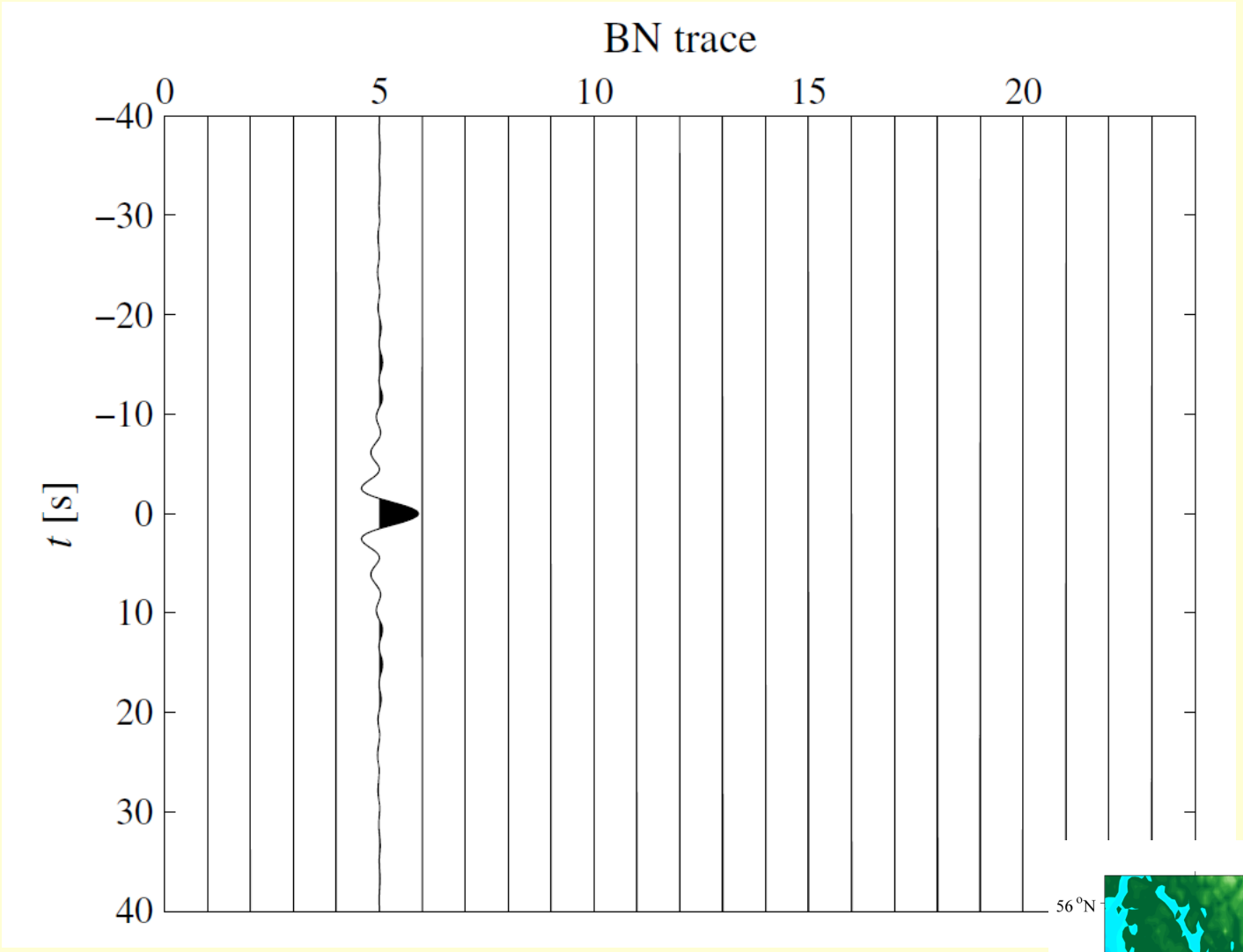
Increasing frequency

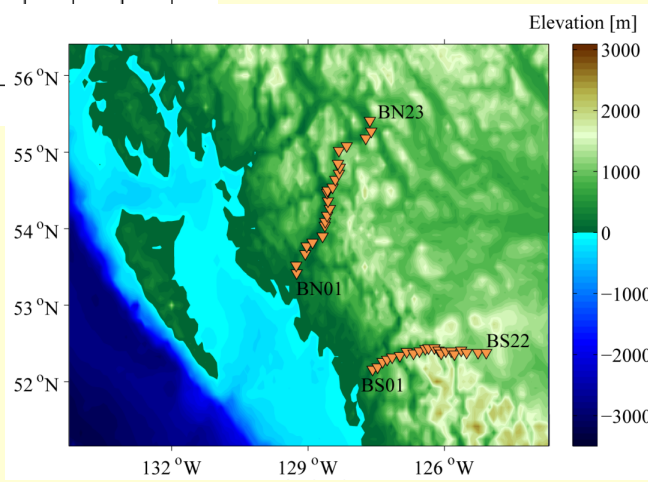




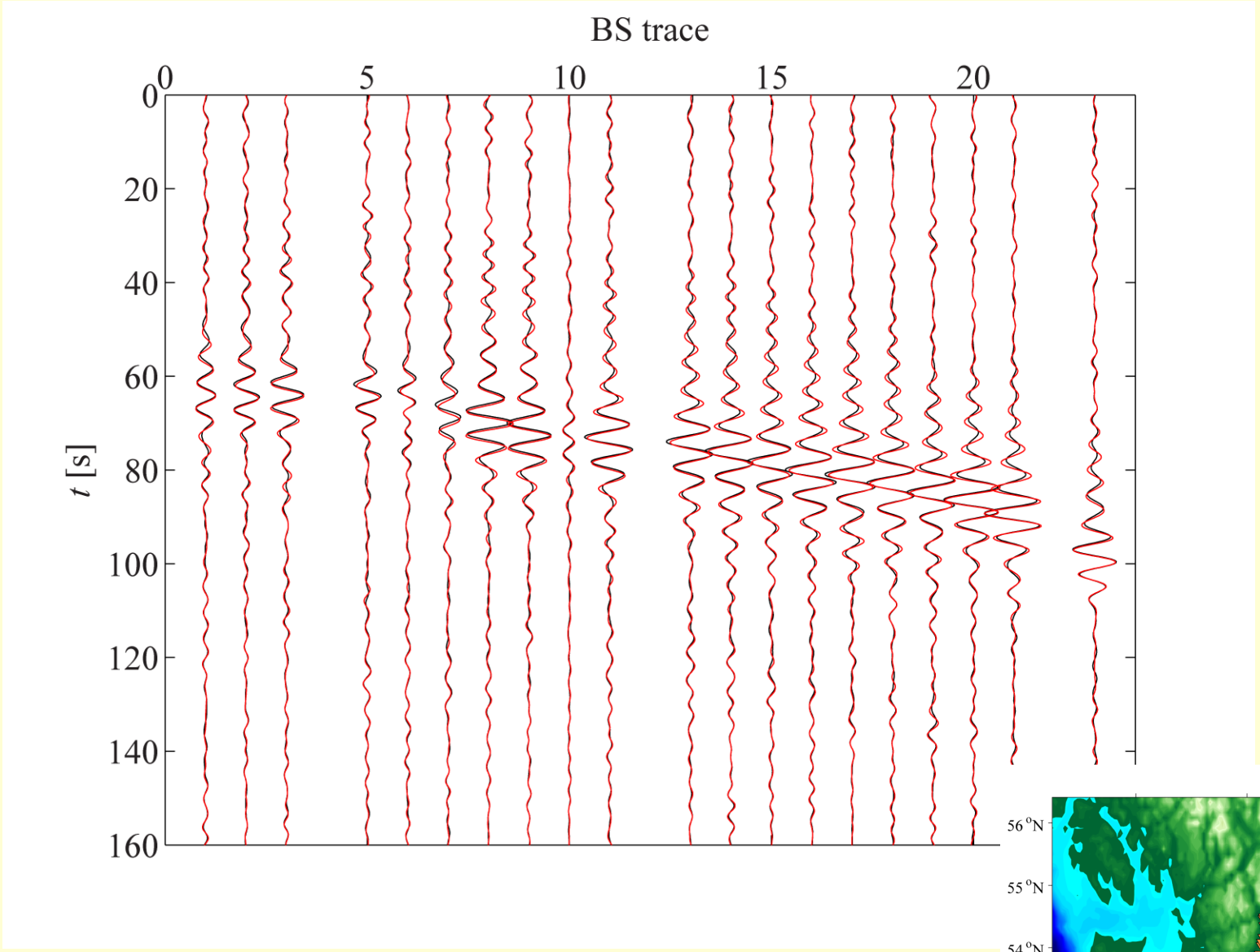


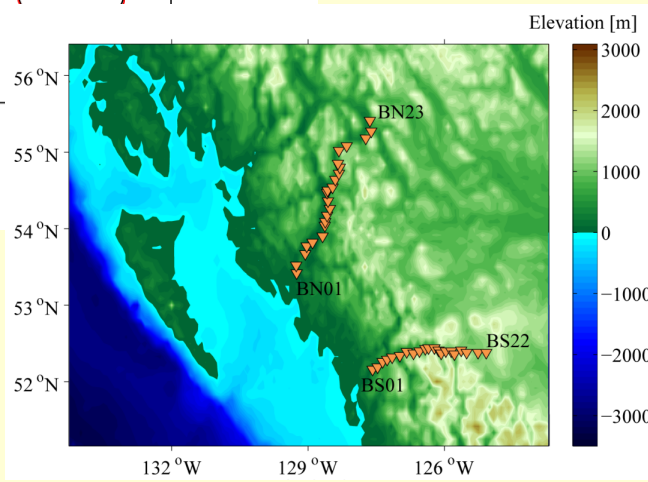
Point-spread function
(virtual source before MDD)



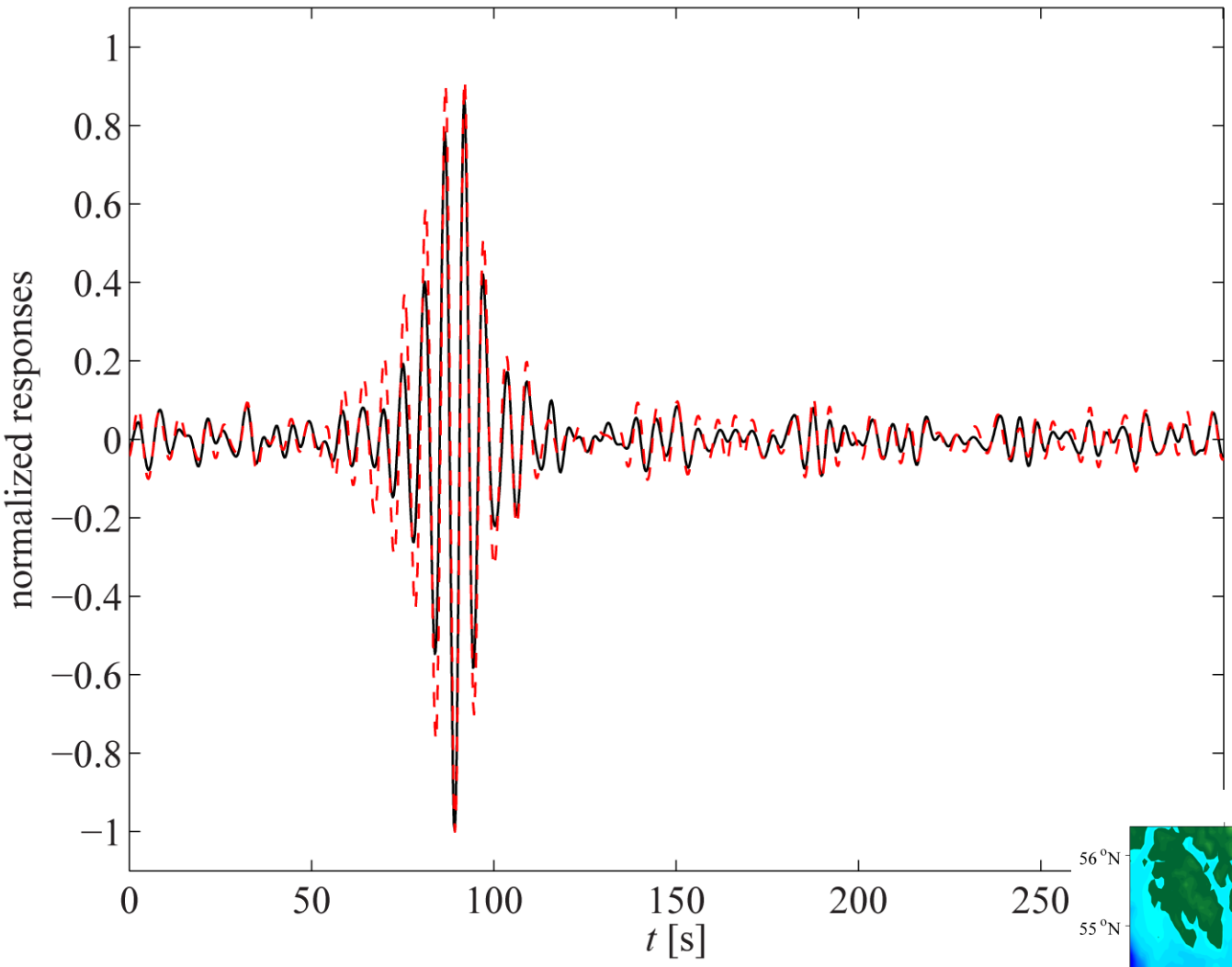


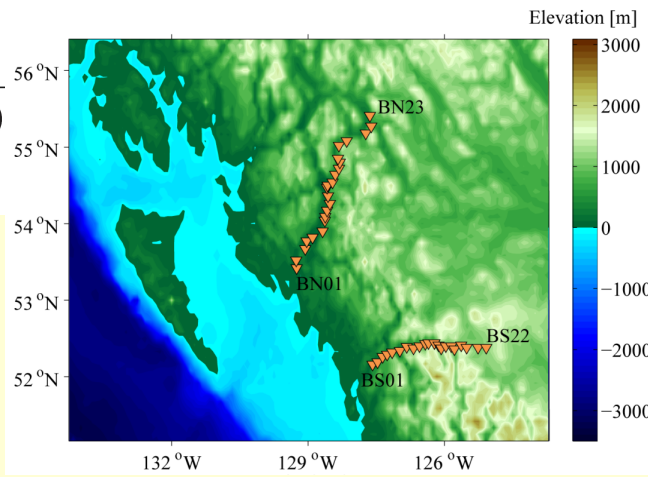
Virtual source after MDD



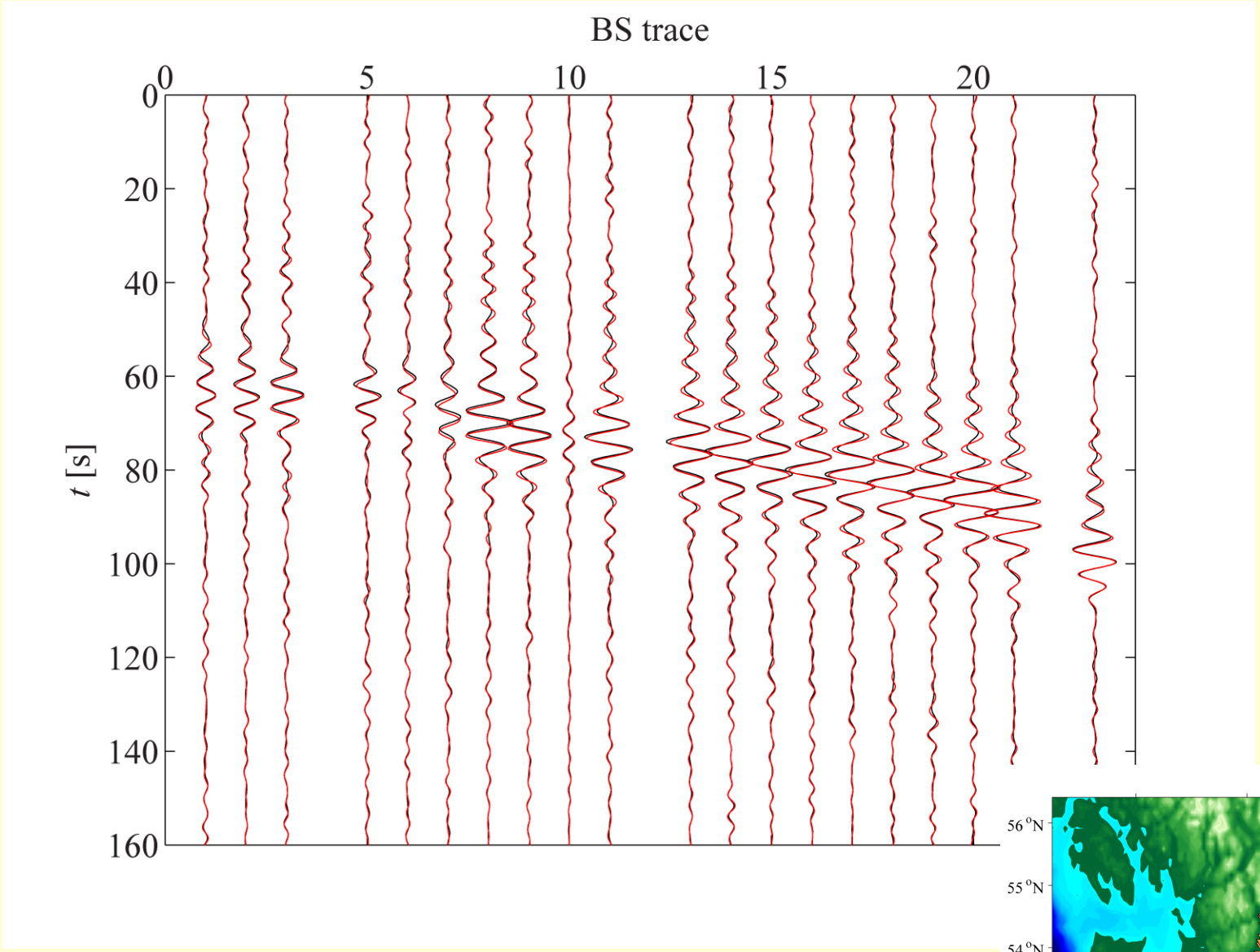


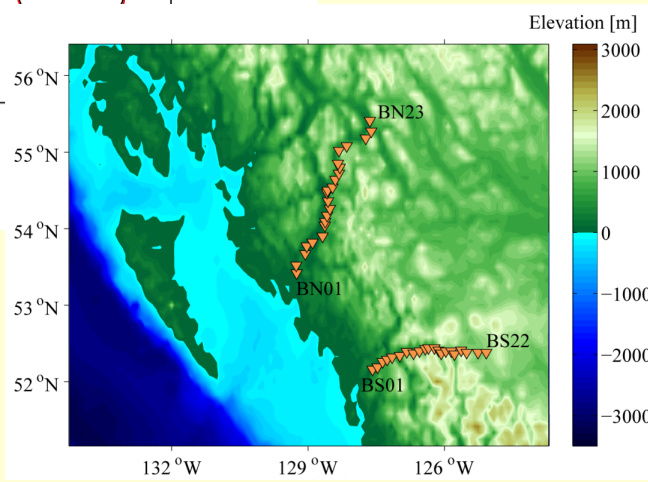
MDD (black) and cross-correlation (red)



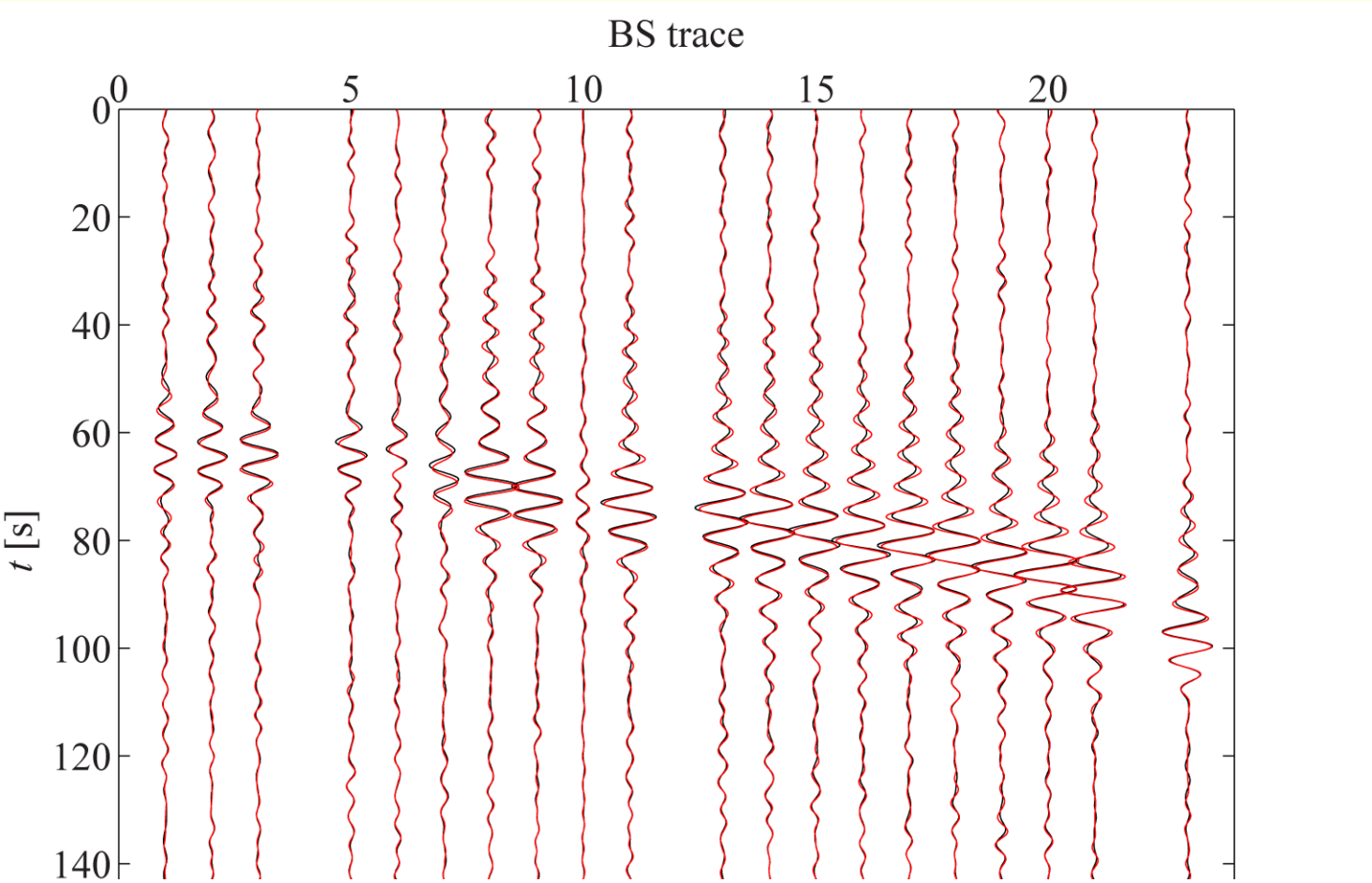


MDD (black) and cross-correlation (red)

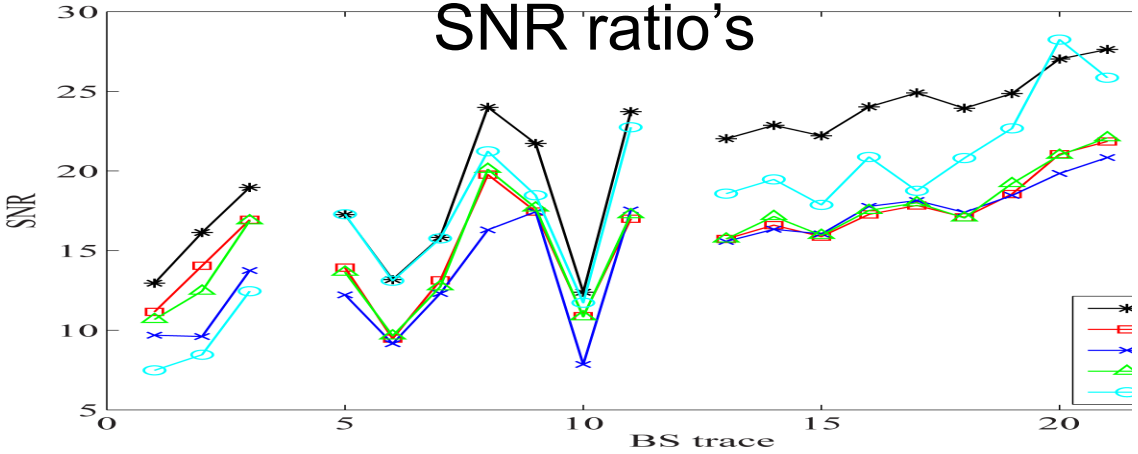


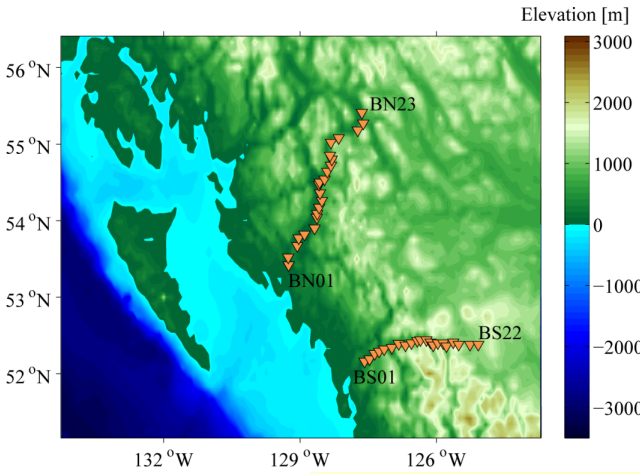


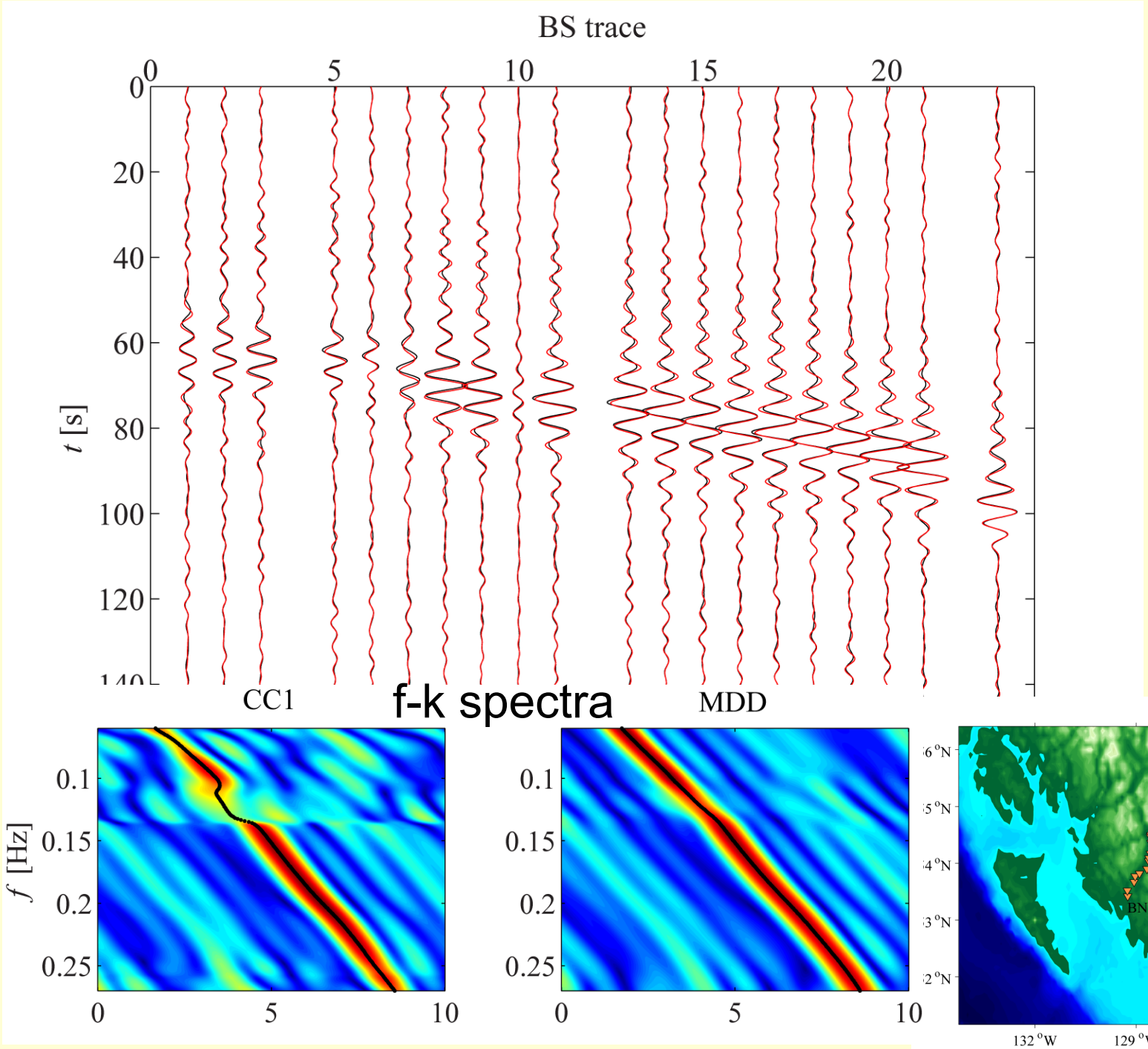
MDD (black) and cross-correlation (red)

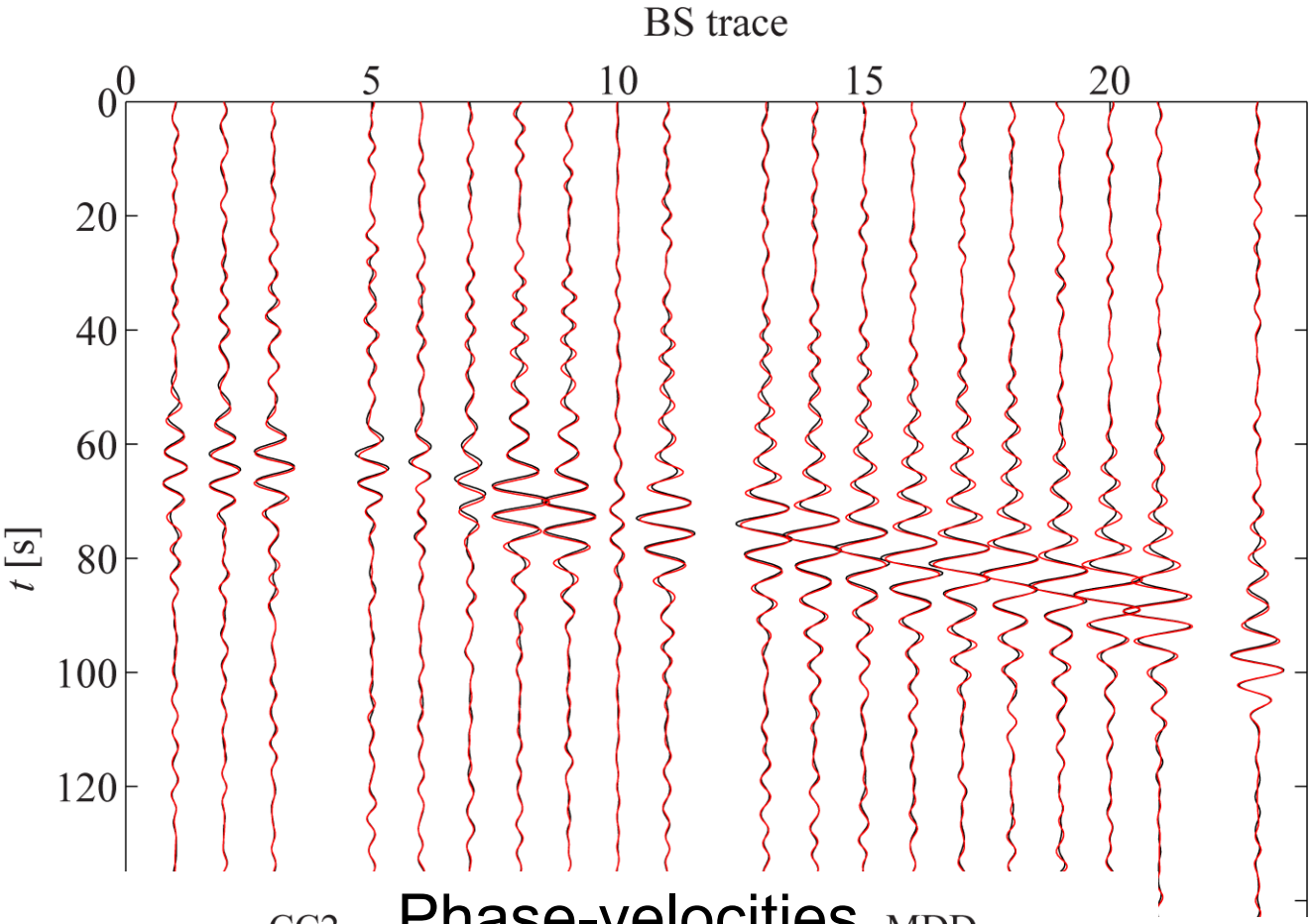

BS trace
t [s]

SNR ratio's

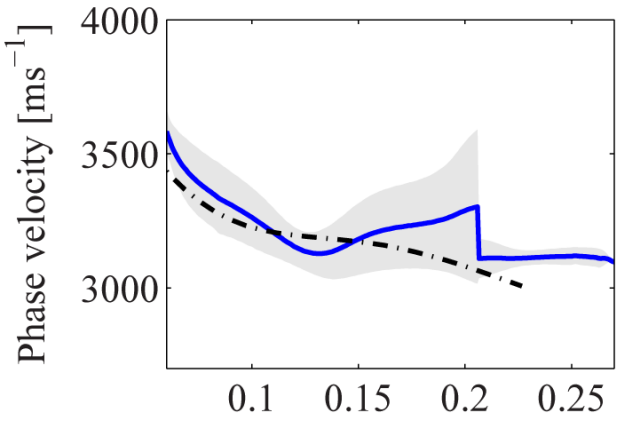

SNR
BS trace

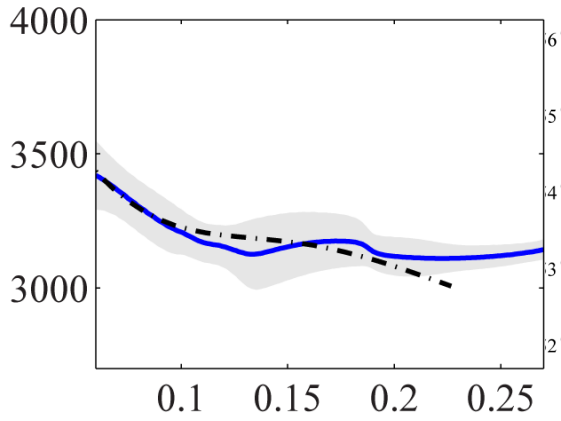

Elevation [m]
BN23
BN01
BS22
BS01
56 °N
55 °N
54 °N
53 °N
52 °N
132 °W
129 °W
126 °W

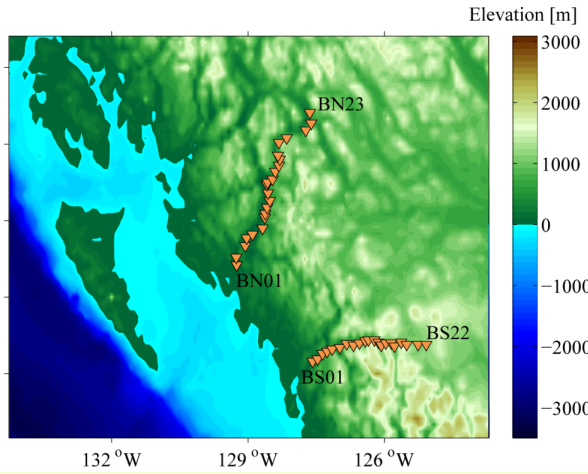

BS trace
t [s]
CC1
MDD
f-k spectra
f [Hz]
Elevation [m]
BN23
BN01
BS22
BS01
132 °W
129 °W
126 °W



CC2 **Phase-velocities** MDD







- See also the poster of Kees Weemstra