Supporting Information for: Marine sediments Characterization by Fiber-Optic Seismology

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Supporting figures

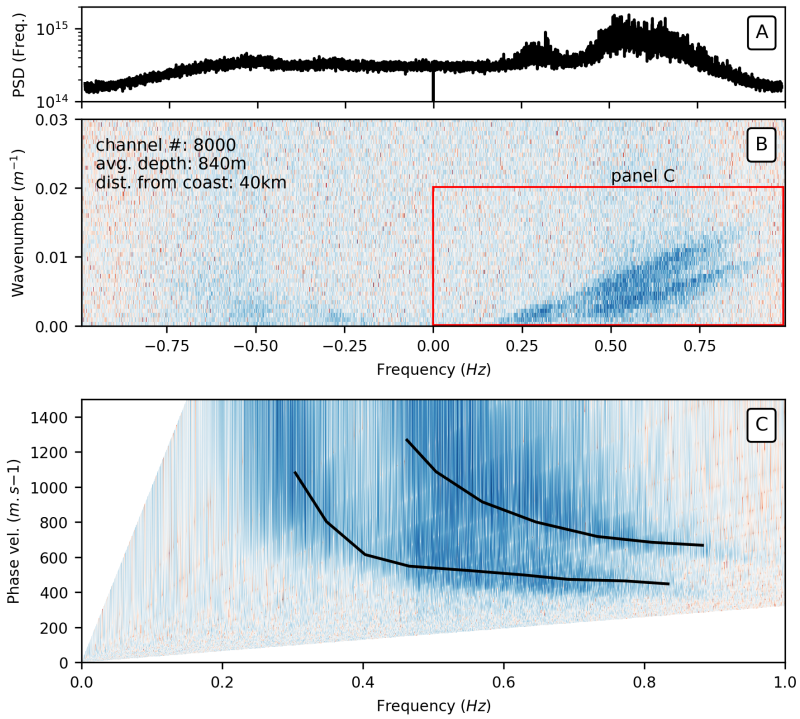

Figure S1: A) Power Spectral Density of panel B. B) FK power spectrum of a subset of 1000 channels centered on channel #8000. The red box highlight the region used to compute panel C. C) Same as the red region in B but after conversion to the phase velocity frequency domain. Black lines depict the fundamental and 1st higher modes of the Scholte waves for a known velocity model of the region as described in the main text.

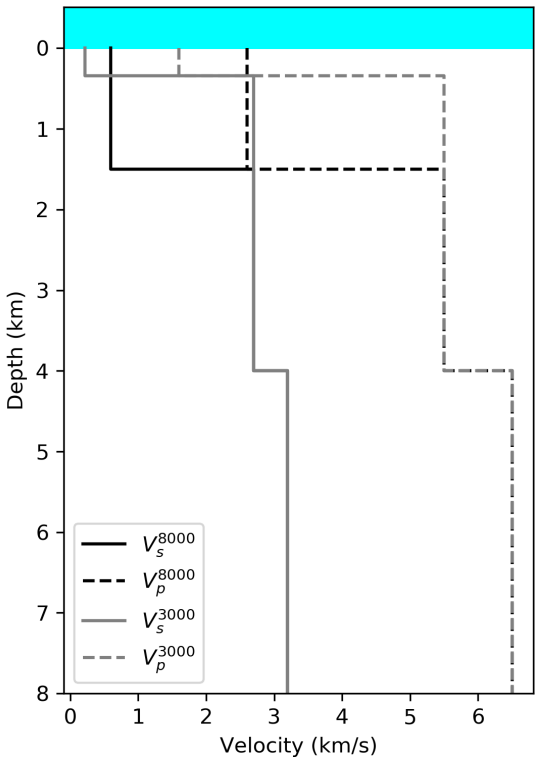

Figure S2: Velocity models used to compute theoretical dispersion curves as shown in Figs. 2 (#3000) and S1 (#8000). Please see further references in the main text.

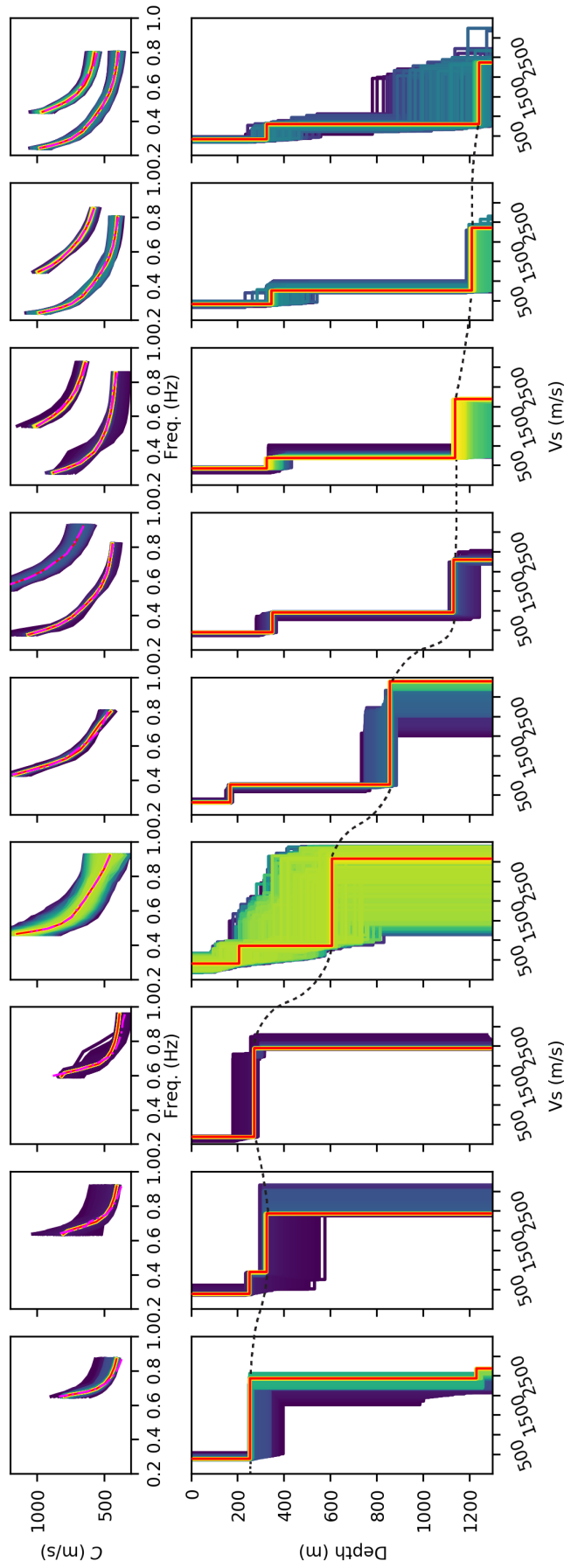

Figure S3: Examples of inversion result for channel multiple of 1000. Top panels: Phase velocity dispersion curves. The pink dashed-line curves are the observed dispersion curves, extracted from the FK power spectra. Bottom panels: inverted velocity models. In both top and bottom panels, the red lines depict the best inverted models (lower misfit). Brighter colors (yellow) represent lower misfit and dark colors (dark blue) represent higher misfit.

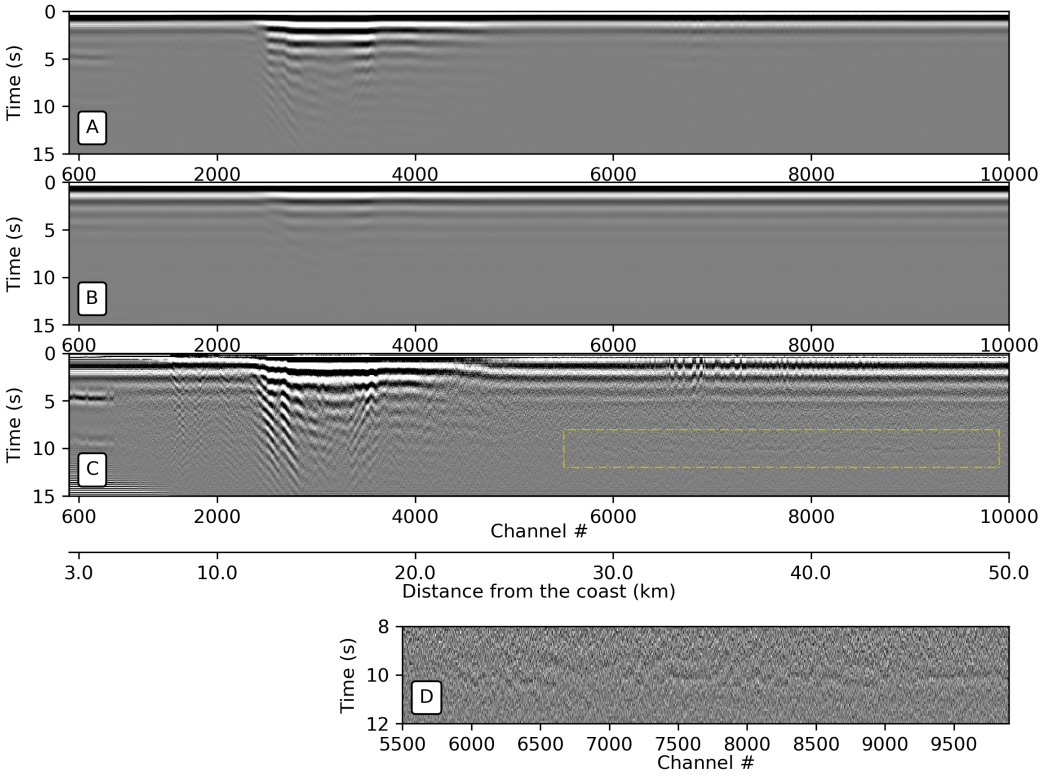

Figure S4: A) raw auto-correlation functions at each channel. B) Auto-correlation functions after applying a 500-channel moving window average centered on each channel. C) Reflection image obtained by deconvolving panel A by panel B. D) Zoom in the yellow box in C.

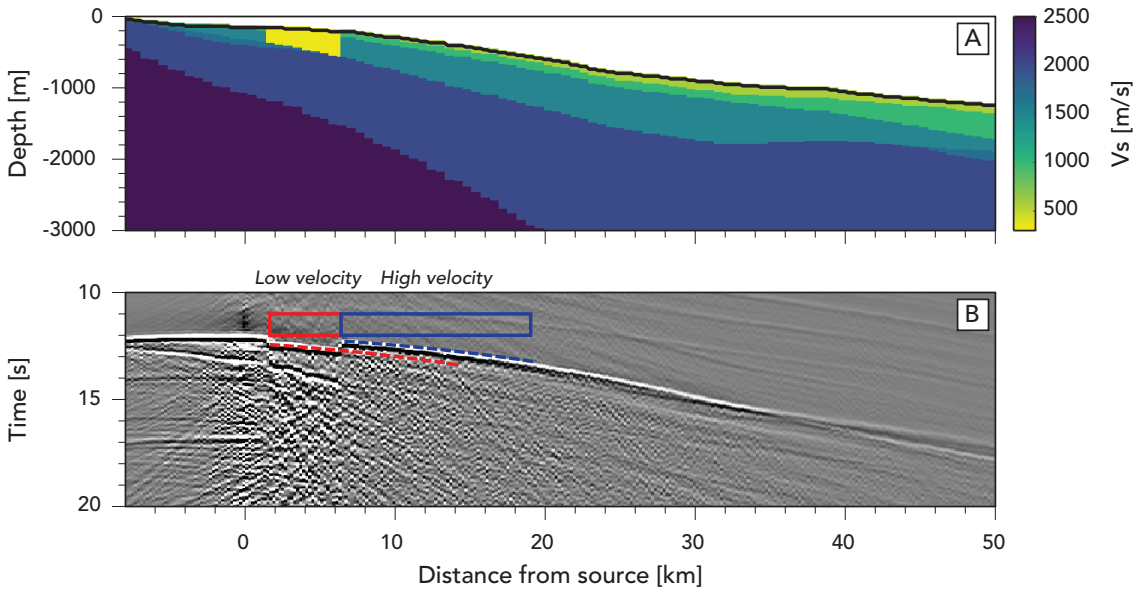

Figure S5: A) 2D velocity model used for the calculation of the synthetic seismograms. It corresponds to the Japan integrated velocity structure model (version 1) (Koketsu et al., 2012) along the fiber-optic cable and to which we added a shallow, thin low-velocity layer (yellow region). B) Synthetic waveforms computed for each horizontal DAS channel using a 2-D finite-difference method (Li et al., 2014). The source parameters are reported in table S1. The low-velocity region delays the S arrivals and the edge of the low-velocity micro basin creates strong scattering of the wavefield.

Table S1: Source parameters used for the computation of the synthetic seismograms shows in Fig. S5B.

Parameters	Values
Source Frequency (Hz)	2
Source Coordinate (lat)	38.8875
Source Coordinate (lon)	141.9670
Source Depth (km)	45
Strike	17.4589
Dip	190.8910
Rake	90