Aotea Quay (AQ)

Before utilizing the Vs profiles or the experimental dispersion data presented herein, it is strongly recommended that the user read and understand the document titled "Analysis Methodology", particularly the section titled "Limitation of Inversion Derived Vs Profiles", for a short discussion of the relevant limitations of the data presented.

Reference Location Aotea Quay (AQ)

Figure 1: Site plan indicating locations of individual three-component, 20-s seismometers composing the 2D array for Microtremor Array Measurements (MAM) and the linear arrays of 24, 4.5-Hz geophones used for Multichannel Analysis of Surface Waves (MASW) testing. MAM and MASW arrays are denoted in the legend by their largest extent/aperture. Note station 20, located in the southwest corner of the port, is not shown in Figure 1.

Table 1: Latitude and longitude coordinates for MAM seismometer locations.

Station Identifier	Latitude (°)	Longitude (°)
AQ_T11	-41.267877	174.786445
AQ_T12	-41.267823	174.786221
AQ_T14	-41.267883	174.786134
AQ_T15	-41.267968	174.786156
AQ_T16	-41.267767	174.785994
AQ_T17	-41.267940	174.786041
AQ_T18	-41.268116	174.786093
AQ_T19	-41.268643	174.786241
AQ_T20	-41.281759	174.784768

Note: A .kmz with the location of each MAM seismometer is provided.

Reference Location Aotea Quay (AQ)

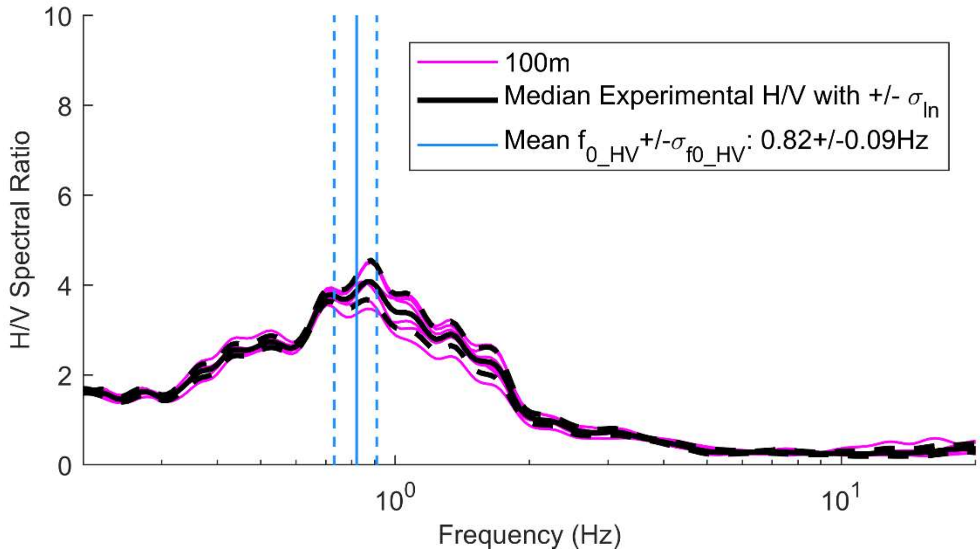

Figure 2: Horizontal-to-Vertical (H/V) Spectral Ratio curves derived from all single station seismometer recordings from the MAM array. The lognormal median experimental H/V curve with +/- one standard deviation curves determined from all single station measurements are shown. The fundamental frequency for the site is represented by the mean fundamental frequency peak ($f_{0\_H/V}$) calculated from all single station measurements and +/- one standard deviation ($\sigma_{f0\_H/V}$).

Reference Location Aotea Quay (AQ)

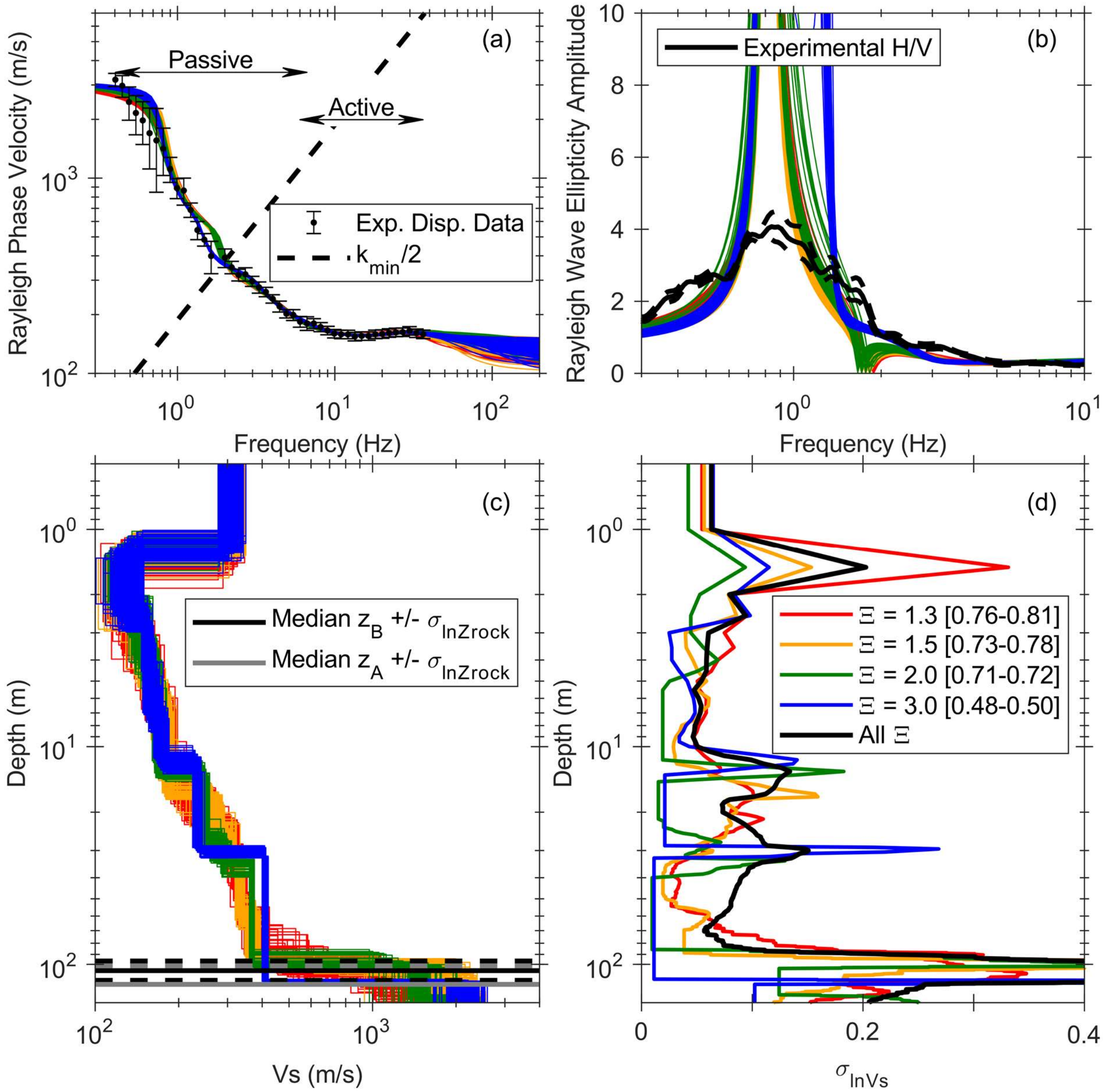

Figure 3: Inversion results. Shown for each layering ratio (Ξ) inversion parameterization are the 100 lowest misfit: (a) theoretical fundamental mode Rayleigh wave dispersion curves with the experimental dispersion data; (b) theoretical Rayleigh wave ellipticity with the lognormal median and +/- one standard deviation experimental H/V data; (c) shear wave velocity (Vs) profiles with the lognormal median depth to soft (Vs>760m/s) and hard (Vs>1500m/s) rock; and (d) standard deviation of the natural logarithm of Vs (σ_{lnVs}). The range of misfit values associated with the 100 lowest misfit velocity profiles for each Ξ inversion parameterization are shown in brackets in the figure's legend. Note the 1000 lowest misfit and statistical median Vs profiles for each Ξ inversion parameterization and reference location are provided in text format in the sub-directory Vs Profiles.

Reference Location Aotea Quay (AQ)

Table 2: Resolution depth (d_{res}) and maximum depth (d_{max}) for the Vs profiles as determined by the array geometry and experimental dispersion data. See document Analysis Methodology for details. Even though the experimental dispersion data for this reference location was combined with data from the BIG array prior to inversion, d_{res} and d_{max} have been solely based on the reference location array and data extracted therefrom.

Resolution Depth (d_{res})	Maximum Depth (d_{max})
94m	150m

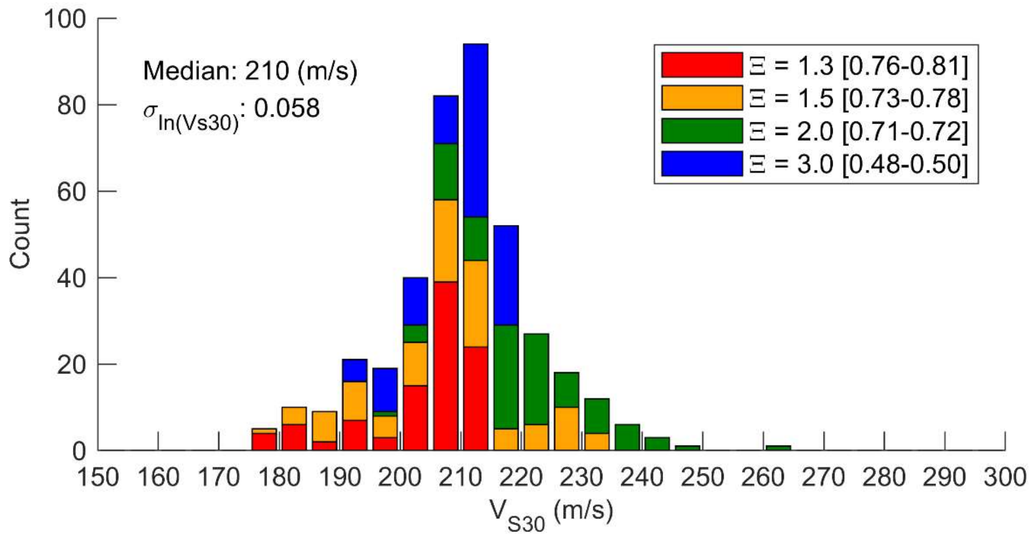

Figure 4: Distribution of the time averaged shear wave velocity in the upper thirty meters (Vs30) for the 100 lowest misfit velocity profiles from each layering ratio (Ξ) inversion parameterization. The lognormal median Vs30 value and corresponding standard deviation of the natural logarithm of Vs30 (σ_{lnVs30}) are provided in the figure.

Table 3: Experimental dispersion data in the form of the mean and standard deviation Rayleigh phase velocity discretized in terms of frequency. The approximate intersection of the theoretical array resolution limit ($k_{min}/2$) for the largest MAM array and the fundamental mode Rayleigh experimental dispersion data has been indicated with a dashed line. Dispersion data with frequencies below the dashed line are less certain and should be used with caution. See document Analysis Methodology for more information.

Frequency (Hz)	Rayleigh Phase Velocity (m/s)	Velocity Standard Deviation (m/s)
36	159	8
33	161	8
30	165	8
27	163	8
24	162	8
22	161	8

Reference Location Aotea Quay (AQ)

20	159	8
18	159	8
16	155	8
15	155	8
13	154	8
12	158	8
11	158	8
9.9	160	8
9.0	166	8
8.1	173	9
7.3	180	10
6.6	180	14
6.0	184	12
5.4	199	13
4.9	202	10
4.5	220	14
4.0	241	12
3.6	261	14
3.3	276	18
3.0	296	18
2.7	322	26
2.4	319	22
2.2	349	25
2.0	391	43
1.6	399	75
1.5	484	36
1.3	542	58
1.2	687	58
1.1	864	136
1.0	889	104
0.90	1114	163
0.81	1417	386
0.73	1559	713
0.66	1699	585
0.60	1975	488
0.54	2156	489
0.49	2454	475
0.45	2971	379
0.40	3192	246

Reference Location Aotea Quay (AQ)

Table 4: Lognormal median depth to the National Earthquake Hazards Reduction Program (NEHRP) Site Class B (“soft rock” = 760 m/s) and Site Class A (“hard rock” = 1500 m/s) boundaries determined from surface wave inversion Vs profiles.

	Lognormal Median (m)	Lognormal Standard Deviation (#)
BC Boundary	107	0.10
AB Boundary	124	0.20