

RISULTATI INDAGINE MASW

Manutenzione straordinaria del fabbricato denominato "Podere Arzillaia"

Comune di Pomarance - Sig. Federico Picci

dispersion curve: number of frequency-velocity points=8

dataset: 2colpi - 2metri.SGY

minimum offset (m): 2

geophone spacing (m): 1.5

sampling (ms): 0.131

Dispersion curve: picking 2 metri.cdp

Number of individuals: 30

Number of generations: 41

Adopted search space (minimum Vs & thickness): 430 3 400 1 390 1 390 2 450 8 780

Adopted search space (maximum Vs & thickness): 630 5 620 3 600 3 620 5 870 14 1400

Adopted Poisson values: 0.25 0.25 0.35 0.35 0.35 0.35

Rayleigh wave analysis

Optimizing Vs & Thickness - generation: 1; average & best misfits: -43.5385 -21.9107
 Optimizing Vs & Thickness - generation: 2; average & best misfits: -43.979 -21.9107
 Optimizing Vs & Thickness - generation: 3; average & best misfits: -37.115 -18.1907
 Optimizing Vs & Thickness - generation: 4; average & best misfits: -32.7718 -16.8331
 Optimizing Vs & Thickness - generation: 5; average & best misfits: -27.4664 -13.4853
 Optimizing Vs & Thickness - generation: 6; average & best misfits: -32.4685 -13.4853
 Optimizing Vs & Thickness - generation: 7; average & best misfits: -32.2955 -13.4853
 Optimizing Vs & Thickness - generation: 8; average & best misfits: -31.5101 -13.4853
 Optimizing Vs & Thickness - generation: 9; average & best misfits: -27.8366 -13.2313
 Optimizing Vs & Thickness - generation: 10; average & best misfits: -34.0664 -13.2313
 Optimizing Vs & Thickness - generation: 11; average & best misfits: -33.6639 -12.6152
 Optimizing Vs & Thickness - generation: 12; average & best misfits: -30.9461 -11.1276
 Optimizing Vs & Thickness - generation: 13; average & best misfits: -26.0775 -11.1276
 Optimizing Vs & Thickness - generation: 14; average & best misfits: -31.9649 -11.1276
 Optimizing Vs & Thickness - generation: 15; average & best misfits: -32.2559 -11.1276
 Optimizing Vs & Thickness - generation: 16; average & best misfits: -31.8905 -11.1276
 Optimizing Vs & Thickness - generation: 17; average & best misfits: -32.3985 -11.1276
 Optimizing Vs & Thickness - generation: 18; average & best misfits: -26.6744 -11.1276
 Optimizing Vs & Thickness - generation: 19; average & best misfits: -31.4701 -11.1276
 Optimizing Vs & Thickness - generation: 20; average & best misfits: -27.8824 -11.1276
 Optimizing Vs & Thickness - generation: 21; average & best misfits: -30.1634 -11.1276
 Optimizing Vs & Thickness - generation: 22; average & best misfits: -33.123 -10.2318
 Optimizing Vs & Thickness - generation: 23; average & best misfits: -27.768 -10.2318
 Optimizing Vs & Thickness - generation: 24; average & best misfits: -31.2822 -10.2318
 Optimizing Vs & Thickness - generation: 25; average & best misfits: -27.2362 -10.2318
 Optimizing Vs & Thickness - generation: 26; average & best misfits: -33.662 -10.2318
 Optimizing Vs & Thickness - generation: 27; average & best misfits: -26.9807 -10.0928
 Optimizing Vs & Thickness - generation: 28; average & best misfits: -26.3224 -10.0928
 Optimizing Vs & Thickness - generation: 29; average & best misfits: -27.8712 -10.0928
 Optimizing Vs & Thickness - generation: 30; average & best misfits: -28.8087 -10.0928
 Optimizing Vs & Thickness - generation: 31; average & best misfits: -26.0066 -9.9717
 Optimizing Vs & Thickness - generation: 32; average & best misfits: -30.1785 -9.9717
 Optimizing Vs & Thickness - generation: 33; average & best misfits: -29.7616 -9.95322
 Optimizing Vs & Thickness - generation: 34; average & best misfits: -26.9589 -9.95322
 Optimizing Vs & Thickness - generation: 35; average & best misfits: -26.1216 -9.95322
 Optimizing Vs & Thickness - generation: 36; average & best misfits: -29.5849 -9.95322
 Optimizing Vs & Thickness - generation: 37; average & best misfits: -36.0613 -9.95322
 Optimizing Vs & Thickness - generation: 38; average & best misfits: -34.0188 -9.95322
 Optimizing Vs & Thickness - generation: 39; average & best misfits: -38.308 -9.95322
 Optimizing Vs & Thickness - generation: 40; average & best misfits: -32.8125 -9.55158
 Optimizing Vs & Thickness - generation: 41; average & best misfits: -32.3409 -9.55158

Rayleigh wave analysis

Optimizing Vs & Thickness - generation: 1; average & best misfits: -24.4302 -9.55158
 Optimizing Vs & Thickness - generation: 2; average & best misfits: -28.9777 -9.55158
 Optimizing Vs & Thickness - generation: 3; average & best misfits: -31.0873 -9.55158
 Optimizing Vs & Thickness - generation: 4; average & best misfits: -37.2654 -9.55158
 Optimizing Vs & Thickness - generation: 5; average & best misfits: -34.2723 -9.55158
 Optimizing Vs & Thickness - generation: 6; average & best misfits: -36.6046 -9.55158
 Optimizing Vs & Thickness - generation: 7; average & best misfits: -31.7403 -9.55158
 Optimizing Vs & Thickness - generation: 8; average & best misfits: -32.2896 -9.55158
 Optimizing Vs & Thickness - generation: 9; average & best misfits: -32.0781 -9.55158
 Optimizing Vs & Thickness - generation: 10; average & best misfits: -30.6844 -9.55158
 Optimizing Vs & Thickness - generation: 11; average & best misfits: -30.4321 -9.55158

Model after the Vs & Thickness optimization (fixed Poisson values):

Vs (m/s): 613 432 504 589 827 1150

Poisson: 0.25 0.25 0.35 0.35 0.35 0.35

Thickness (m): 3.6 2.3 2.3 3.8 11

Number of models considered to calculate the average model: 31

RESULTS winMASW Pro
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MEAN MODEL

VS (m/s): 612 436 496 573 828 1148
Standard deviations (m/s): 10 23 29 23 9 12
Thickness (m): 3.6 2.2 2.2 3.6 11.1
Standard deviations (m): 0.2 0.2 0.3 0.3 0.8
Approximate values for Vp, density & elastic moduli
Vp (m/s): 1060 755 1033 1193 1724 2390
Density (gr/cm3): 2.07 1.99 2.06 2.10 2.19 2.27
Vp/Vs ratio: 1.73 1.73 2.08 2.08 2.08 2.08
Poisson: 0.25 0.25 0.35 0.35 0.35 0.35
Young modulus (MPa): 1936 944 1370 1859 4047 8063
Shear modulus (MPa): 775 378 507 688 1499 2986
Lamè (MPa): 775 377 1186 1607 3500 6971
Bulk modulus (MPa): 1291 629 1524 2066 4499 8961

Fundamental mode - Mean model

f(Hz)	VR(m/s)
9.93107	922.5581
11.3833	888.9632
15.159	744.0989
20.2417	581.7431
27.2123	510.7968
38.2491	492.8443
49.5763	496.8001
60.6131	503.9434

BEST MODEL

Vs (m/s): 613.1889 431.85541 504.45487 588.73797 826.65624 1149.5728
Thickness (m): 3.59816 2.30629 2.2946 3.75383 10.6527
Approximate values for Vp, density & elastic moduli
Vp (m/s): 1062 748 1050 1226 1721 2393
Density (gr/cm3): 2.07 1.98 2.07 2.10 2.19 2.27
Vp/Vs ratio: 1.73 1.73 2.08 2.08 2.08 2.08
Poisson: 0.25 0.25 0.35 0.35 0.35 0.35
Young modulus (MPa): 1943 925 1417 1970 4036 8091
Shear modulus (MPa): 777 370 525 730 1495 2997
Lamè (MPa): 778 369 1228 1702 3484 6983
Bulk modulus (MPa): 1297 616 1578 2189 4481 8981

Fundamental mode - Best model

f(Hz)	VR(m/s)
9.93107	924.234
11.3833	890.9197
15.159	744.8087
20.2417	581.9449
27.2123	510.9519
38.2491	492.5589
49.5763	496.46
60.6131	503.7007

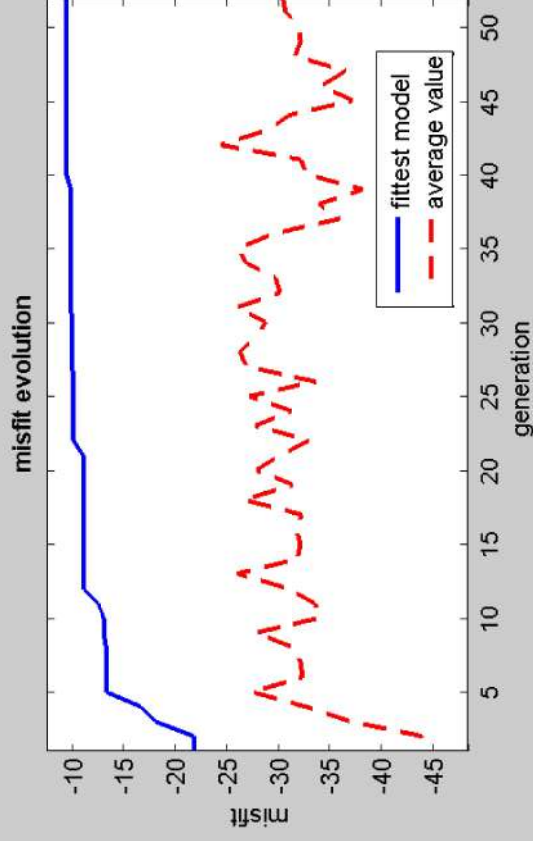
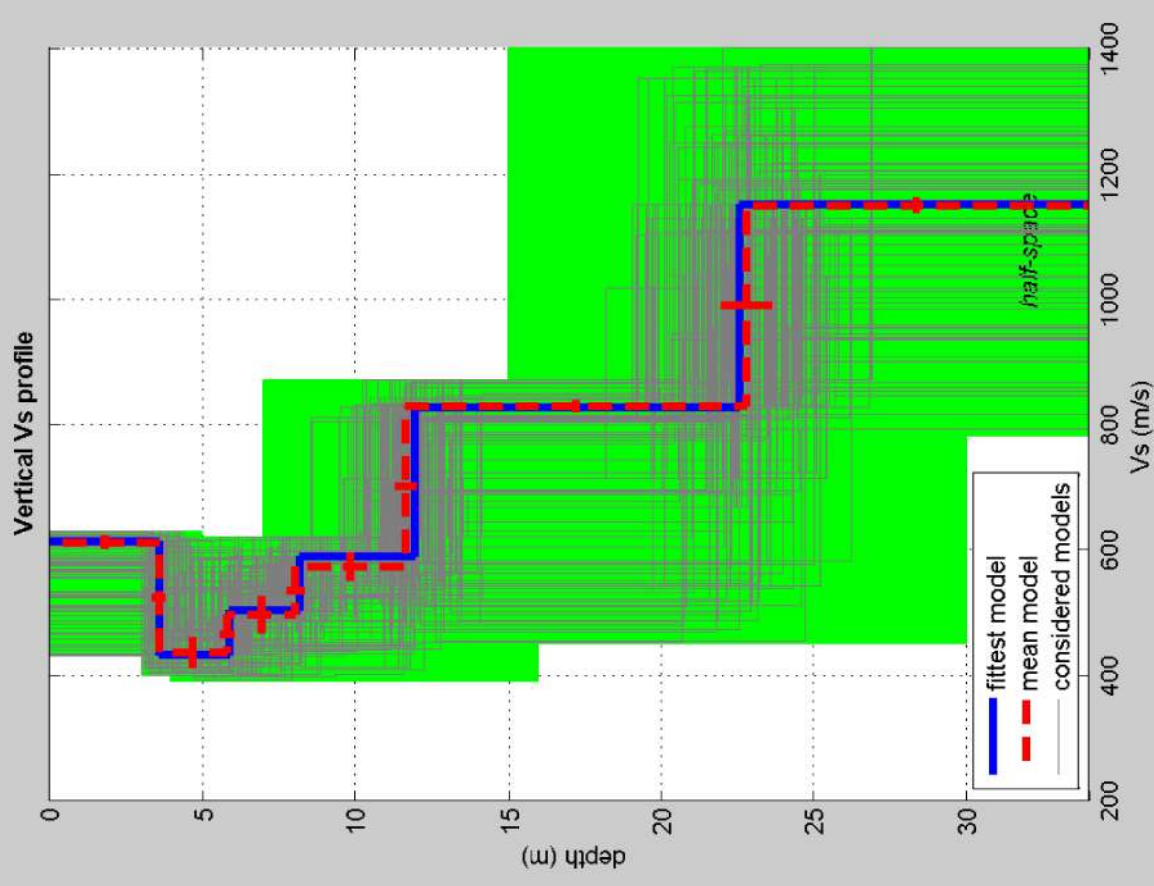
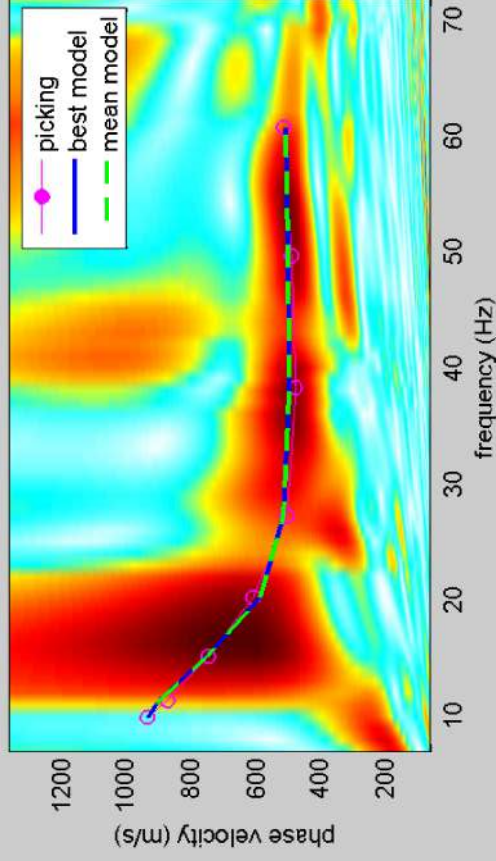
Maximum penetration depth according to the "Steady State Rayleigh Method": 37 m
Inversion quality: very good

VS5 (mean model): 550 m/s VS5 (best model): 549 m/s
VSeq (mean model): 647.60 m/s VSeq (best model): 645.518 m/s

Possible Soil Type: B (based on the mean model)

winMASW 4.2 Pro Surface Wave Analysis
via MASW - Multichannel Analysis of Surface Waves
www.eliosoft.it

velocity spectrum & dispersion curve



dataset: 2colpi - 2metri.SGY
 dispersion curve: picking 2 metri.cdp
 VS30 (best model): 724 m/s
 VS30 (mean model): 723 m/s