Dispersion curve: number of frequency-velocity points=10

==o== SECTION#1

dataset: 2011-11-15_15-02-19_04000_0150_012_Acquis_SEG2.dat

minimum offset (m): 4

geophone spacing (m): 1

sampling (ms): 0.25

Dispersion curve: pick.cdp

Number of individuals: 30

Number of generations: 31

Rayleigh-wave dispersion analysis

Adopted search space (minimum Vs & thickness): 140 0.7 315 2.1 420 2.8 750

Adopted search space (maximum Vs & thickness): 260 1.3 585 3.9 780 5.2 1700

Adopted Poisson values: 0.35 0.35 0.35 0.3

Output folder: C:\winMASW43pro\output

==o== SECTION#2

Rayleigh wave analysis

Optimizing Vs & Thickness - generation: 1; average & best misfits: -68.9516 -30.5935

Optimizing Vs & Thickness - generation: 2; average & best misfits: -71.0382 -30.5935

Optimizing Vs & Thickness - generation: 3; average & best misfits: -73.5449 -30.5935

Optimizing Vs & Thickness - generation: 4; average & best misfits: -84.4784 -30.5935

Optimizing Vs & Thickness - generation: 5; average & best misfits: -65.0041 -30.5935

Optimizing Vs & Thickness - generation: 6; average & best misfits: -65.879 -30.5935

Optimizing Vs & Thickness - generation: 7; average & best misfits: -62.9456 -30.5935

Optimizing Vs & Thickness - generation: 8; average & best misfits: -74.6985 -30.5505

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Optimizing Vs & Thickness - generation: 9; average & best misfits: -73.6352 -30.5505

Optimizing Vs & Thickness - generation: 10; average & best misfits: -72.0406 -30.5505

Optimizing Vs & Thickness - generation: 11; average & best misfits: -65.4048 -28.5701

Optimizing Vs & Thickness - generation: 12; average & best misfits: -64.9734 -28.5701

Optimizing Vs & Thickness - generation: 13; average & best misfits: -75.2668 -28.5701

Optimizing Vs & Thickness - generation: 14; average & best misfits: -64.1038 -28.5701

Optimizing Vs & Thickness - generation: 15; average & best misfits: -57.4628 -28.5701

Optimizing Vs & Thickness - generation: 16; average & best misfits: -57.5066 -28.5701

Optimizing Vs & Thickness - generation: 17; average & best misfits: -57.7341 -28.5701

Optimizing Vs & Thickness - generation: 18; average & best misfits: -61.3348 -27.8952

Optimizing Vs & Thickness - generation: 19; average & best misfits: -61.8844 -27.8952

Optimizing Vs & Thickness - generation: 20; average & best misfits: -62.3556 -27.7797

Optimizing Vs & Thickness - generation: 21; average & best misfits: -64.4582 -27.7797

Optimizing Vs & Thickness - generation: 22; average & best misfits: -65.2058 -27.7797

Optimizing Vs & Thickness - generation: 23; average & best misfits: -69.1044 -27.7797

Optimizing Vs & Thickness - generation: 24; average & best misfits: -65.6149 -27.7797

Optimizing Vs & Thickness - generation: 25; average & best misfits: -59.5172 -27.5772

Optimizing Vs & Thickness - generation: 26; average & best misfits: -66.9727 -27.5772

Optimizing Vs & Thickness - generation: 27; average & best misfits: -64.3409 -27.5772

Optimizing Vs & Thickness - generation: 28; average & best misfits: -62.3816 -27.5772

Optimizing Vs & Thickness - generation: 29; average & best misfits: -77.4979 -27.5772

Optimizing Vs & Thickness - generation: 30; average & best misfits: -66.8375 -27.5772

Optimizing Vs & Thickness - generation: 31; average & best misfits: -60.723 -26.7583

Checking the new search space (for the finer search)

Now a finer search around the most promising search space area

Rayleigh wave analysis

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Optimizing Vs & Thickness - generation: 1; average & best misfits: -75.0901 -26.7583

Optimizing Vs & Thickness - generation: 2; average & best misfits: -64.476 -26.7583

Optimizing Vs & Thickness - generation: 3; average & best misfits: -74.1621 -26.7583

Optimizing Vs & Thickness - generation: 4; average & best misfits: -71.0881 -26.3476

Optimizing Vs & Thickness - generation: 5; average & best misfits: -73.7499 -26.3476

Optimizing Vs & Thickness - generation: 6; average & best misfits: -61.6193 -25.4859

Optimizing Vs & Thickness - generation: 7; average & best misfits: -65.8904 -25.4859

Optimizing Vs & Thickness - generation: 8; average & best misfits: -66.8264 -25.4859

Optimizing Vs & Thickness - generation: 9; average & best misfits: -62.0487 -25.4859

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

Vs (m/s): 225 438 615 1476

Poisson: 0.35 0.35 0.35 0.3

Thickness (m): 1.3 2.8 4.9

Number of models considered to calculate the average model: 24

######################################################################

RESULTS winMASW Pro

######################################################################

Dataset: 2011-11-15_15-02-19_04000_0150_012_Acquis_SEG2.dat

Analyzed curve: pick.cdp

==o== SECTION#3

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MEAN MODEL

VS (m/s): 225 438 615 1476

Standard deviations (m/s): 9 2 5 1

Thickness (m): 1.3 3.0 4.6

Standard deviations (m): 0.0 0.1 0.3

Approximate values for Vp, density & elastic moduli

Vp (m/s): 468 912 1280 2761

Density (gr/cm3): 1.87 2.03 2.11 2.30

Vp/Vs ratio: 2.08 2.08 2.08 1.87

Poisson: 0.35 0.35 0.35 0.30

Young modulus (MPa): 256 1052 2159 13034

Shear modulus (MPa): 95 390 800 5013

Lamé (MPa): 220 910 1864 7516

Bulk modulus (MPa): 283 1170 2397 10858

Fundamental mode

Mean model

f(Hz) VR(m/s)

9.12796 1268.6125

11.0318 1238.4528

16.7433 1100.5483

24.5052 865.85248

30.949 619.27611

38.4179 464.16927

43.8365 421.25087

48.8158 395.07959

52.4771 379.63978

55.5525 367.87479

==o== SECTION#4

Comune di Bonassola Prot. n. 6910 del 23-10-2017 in partenza

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BEST MODEL

Vs (m/s): 225 438 615 1476

thickness (m): 1.3 2.8343 4.9003

Approximate values for Vp, density & elastic moduli

Vp (m/s): 468 912 1280 2761

Density (gr/cm3): 1.87 2.03 2.11 2.30

Vp/Vs ratio: 2.08 2.08 2.08 1.87

Poisson: 0.35 0.35 0.35 0.30

Young modulus (MPa): 256 1052 2159 13034

Shear modulus (MPa): 95 390 800 5013

Lamé (MPa): 220 910 1864 7516

Bulk modulus (MPa): 283 1170 2397 10858

dispersion curve (frequency - Rayleigh phase velocity)

Fundamental mode)

best model

F(Hz) VR(m/s)

9.12796 1266.9278

11.0318 1236.4242

16.7433 1099.5284

24.5052 866.97308

30.949 612.09056

38.4179 469.52302

43.8365 426.58352

48.8158 398.864

52.4771 381.92447

55.5525 368.80569

==o== SECTION#5

Maximum penetration depth according to the "Steady State Rayleigh Method": 61 m

Inversion quality: very good

VS5 (mean model): 364 m/s

VS5 (best model): 366 m/s

VS20 (mean model): 726 m/s

VS20 (best model): 723 m/s

VS30 (mean model): 874 m/s

VS30 (best model): 872 m/s

==o== SECTION#6

Possible Soil Type: A

(based on the mean model)

For Italian Users:

Dalla normativa (modifiche del D.M. 14/09/2005 Norme Tecniche per le Costruzioni, emanate con D.M. Infrastrutture del 14/01/2008, pubblicato su Gazzetta Ufficiale Supplemento ordinario n° 29 del 04/02/2008):

A - Ammassi rocciosi affioranti o terreni molto rigidi,caratterizzati da valori di VS30 superiori a 800 m/s, eventualmente comprendenti in superficie uno strato di alterazione, con spessore massimo di 3 m.

B - Rocce tenere e depositi di terreni a grana grossa molto addensati o terreni a grana fine molto consistenti, con spessori superiori a 30 m, caratterizzati da graduale miglioramento delle proprietà meccaniche con la profondità e valori del VS30 compresi tra 360 m/s e 800 m/s (ovvero NSPT30 > 50 nei terreni a grana grossa e cu30> 250 kPa nei terreni a grana fina).

C - Depositi di terreni a grana grossa mediamente addensati o terreni a grana fine mediamente consistenti, con spessori superiori a 30 m caratterizzati da graduale miglioramento delle proprietà meccaniche con la profondità e valori del VS30 compresi tra 180 m/s e 360 m/s (ovvero 15 < NSPT30 < 50 nei terreni a grana grossa e 70 < cu30 < 250 kPa nei terreni a grana fina).

D - Depositi di terreni a grana grossa scarsamente addensati o terreni a grana fine scarsamente consistenti, con spessori superiori a 30 m caratterizzati da graduale miglioramento delle proprietà meccaniche con la profondità e valori del VS30 inferiori a 180 m/s (ovvero NSPT30 < 15 nei terreni a grana grossa e cu30 < 70 kPa nei terreni a grana fina).

E - Terreni dei sottosuoli dei tipi C o D per spessori non superiori a 20 m, posti sul substrato di riferimento (con VS > 800 m/s).

S1 - Depositi di terreni caratterizzati da valori di VS30 inferiori 100 m/s (ovvero 10 < cuS30 < 20 kPa) che includono uno strato di almeno 8 m di terreni a grana fina di bassa consistenza, oppure che includano almeno 3 m di torba o argille altamente organiche.

S2 - Depositi di terreni suscettibili di liquefazione, di argille sensitive, o qualsiasi altra categoria di sottosuolo non classificabile nei tipi precedenti.

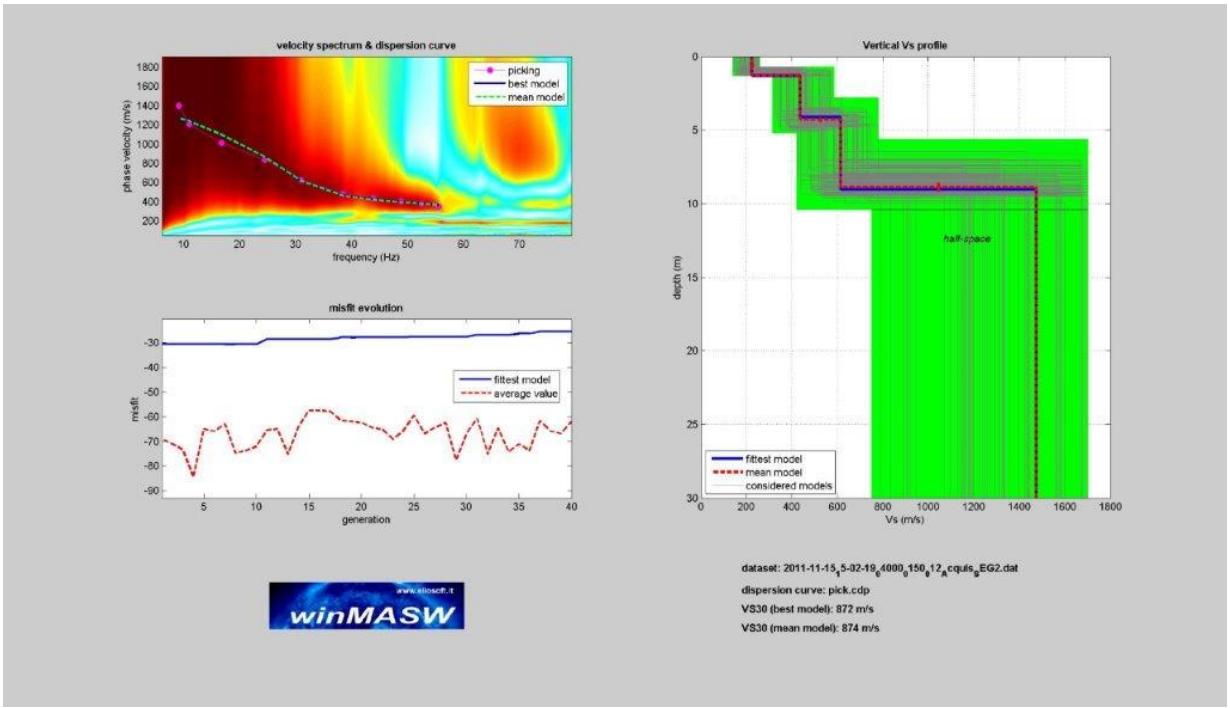
Results saved in the folder "C:\winMASW43pro\output".

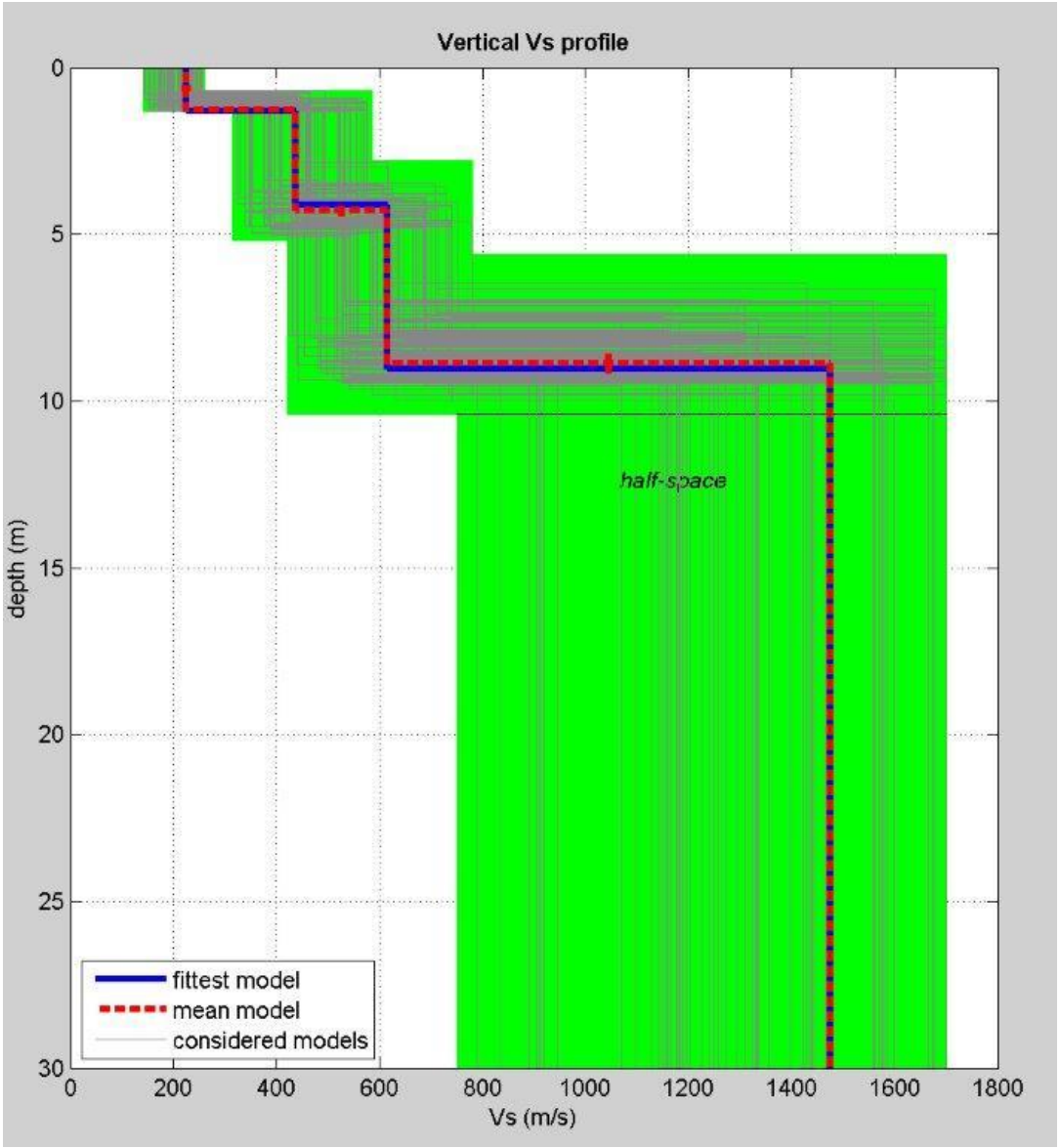
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winMASW Pro

Surface Wave Analysis

www.eliosoft.it




Vertical Vs profile
depth (m)
Vs (m/s)
half-space
fittest model
mean model
considered models
0
5
10
15
20
25
30
0
200
400
600
800
1000
1200
1400
1600
1800