ALLEGATO 1

dataset: 1 caccamo 2sx.dat
minimum offset (m): 5
geophone spacing (m): 2
sampling (ms): 0.125
Dispersion curve: 1 MASW Serrapetrona_Caccamo.cdp
Number of individuals: 30
Number of generations: 31

Adopted search space (minimum Vs & thickness): 238 2.1 259
3.5 360.5 3.5 399 4.9
560
Adopted search space (maximum Vs & thickness): 442 3.9 481
6.5 669.5 6.5 741 9.1
1040
Adopted Poisson values: 0.35 0.35 0.35 0.35 0.3

Output folder: C:\WINMAS~1\output

==o== SECTION#2

Rayleigh wave analysis
Optimizing Vs & Thickness - generation: 1; average & best misfits: -27.0731
-3.876
Optimizing Vs & Thickness - generation: 2; average & best misfits: -28.8717
-3.876
Optimizing Vs & Thickness - generation: 3; average & best misfits: -27.1307
-3.876
Optimizing Vs & Thickness - generation: 4; average & best misfits: -26.0365
-3.876
Optimizing Vs & Thickness - generation: 5; average & best misfits: -25.9259
-3.876
Optimizing Vs & Thickness - generation: 6; average & best misfits: -23.1984
-3.876
Optimizing Vs & Thickness - generation: 7; average & best misfits: -22.9568
-2.80665
Optimizing Vs & Thickness - generation: 8; average & best misfits: -20.8887
-2.80665
Optimizing Vs & Thickness - generation: 9; average & best misfits: -26.7654
-2.80665
Optimizing Vs & Thickness - generation: 10; average & best misfits: -23.1579
-2.80665
Optimizing Vs & Thickness - generation: 11; average & best misfits: -25.8926
-2.80665
Optimizing Vs & Thickness - generation: 12; average & best misfits: -25.6085
-2.77947
Optimizing Vs & Thickness - generation: 13; average & best misfits: -28.3651
-2.77947
Optimizing Vs & Thickness - generation: 14; average & best misfits: -25.3722
-2.77947
Optimizing Vs & Thickness - generation: 15; average & best misfits: -27.6968
-2.77947
Optimizing Vs & Thickness - generation: 16; average & best misfits: -25.7948
-2.77947
Optimizing Vs & Thickness - generation: 17; average & best misfits: -27.2023
-2.07861
Optimizing Vs & Thickness - generation: 18; average & best misfits: -29.4828
-2.07861
Optimizing Vs & Thickness - generation: 19; average & best misfits: -26.81
-2.07861
Optimizing Vs & Thickness - generation: 20; average & best misfits: -28.9111
-2.07861
Optimizing Vs & Thickness - generation: 21; average & best misfits: -28.9368
-2.07861
Optimizing Vs & Thickness - generation: 22; average & best misfits: -26.1458

```
-2.07861
Optimizing Vs & Thickness - generation: 23; average & best misfits: -27.2455
-2.07861
Optimizing Vs & Thickness - generation: 24; average & best misfits: -25.1707
-2.07861
Optimizing Vs & Thickness - generation: 25; average & best misfits: -24.207
-2.07861
Optimizing Vs & Thickness - generation: 26; average & best misfits: -18.7855
-2.07861
Optimizing Vs & Thickness - generation: 27; average & best misfits: -21.7586
-2.07861
Optimizing Vs & Thickness - generation: 28; average & best misfits: -19.0036
-2.07861
Optimizing Vs & Thickness - generation: 29; average & best misfits: -22.7489
-2.07861
Optimizing Vs & Thickness - generation: 30; average & best misfits: -23.1137
-2.07861
Optimizing Vs & Thickness - generation: 31; average & best misfits: -22.9137
-2.07861

Checking the new search space (for the finer search)

Now a finer search around the most promising search space area

Rayleigh wave analysis
Optimizing Vs & Thickness - generation: 1; average & best misfits: -33.7888
-2.07861
Optimizing Vs & Thickness - generation: 2; average & best misfits: -34.1715
-2.07861
Optimizing Vs & Thickness - generation: 3; average & best misfits: -30.1753
-2.07861
Optimizing Vs & Thickness - generation: 4; average & best misfits: -31.0443
-2.07861
Optimizing Vs & Thickness - generation: 5; average & best misfits: -24.6356
-2.07861
Optimizing Vs & Thickness - generation: 6; average & best misfits: -24.3225
-2.07861
Optimizing Vs & Thickness - generation: 7; average & best misfits: -27.1661
-2.07861
Optimizing Vs & Thickness - generation: 8; average & best misfits: -22.9745
-2.07861
Optimizing Vs & Thickness - generation: 9; average & best misfits: -25.2086
-2.07861

Model after the Vs & Thickness optimization (fixed Poisson values):
Vs (m/s): 340  370  559  570  800
Poisson: 0.35      0.35      0.35      0.35       0.3
Thickness (m): 3.3      5.2      4.6      6.8

Number of models considered to calculate the average model: 1


######################################################################
RESULTS winMASW 4.1 Standard
######################################################################

Dataset: 1 caccamo 2sx.dat
Analyzed curve: 1 MASW Serrapetrona_Caccamo.cdp
Posterior Probability Density (deviazioni standard) not defined because of
insufficient data


==o== SECTION#3

================================================================================
MEAN MODEL

VS (m/s):                  340  370  559  570  800
```

Standard deviations (m/s): 0 0 0 0 0

Thickness (m): 3.3 5.2 4.6 6.8
Standard deviations (m): 0.0 0.0 0.0 0.0

Approximate values for Vp, density & elastic moduli
Vp (m/s): 708 770 1164 1187 1497
Density (gr/cm3): 1.97 1.99 2.09 2.10 2.15
Vp/Vs ratio: 2.08 2.08 2.08 2.08 1.87
Poisson: 0.35 0.35 0.35 0.35 0.30
Young modulus (MPa): 615 736 1764 1838 3581
Sjear modulus (MPa): 228 273 653 681 1377
Lamé (MPa): 532 635 1526 1591 2068
Bulk modulus (MPa): 684 817 1962 2045 2986

Fundamental mode
Mean model

f(Hz)	VR(m/s)
9.51379	610.4965
11.2491	565.4918
12.9844	516.176
14.7197	473.6504
17.3226	426.1133
20.1425	391.812
22.8539	370.9724
26.216	355.3158
33.591	338.9073
41.5083	331.1889

==o== SECTION#4

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BEST MODEL

Vs (m/s): 340 370 558.7452 570 800
thickness (m): 3.293 5.238 4.6061 6.8034

Approximate values for Vp, density & elastic moduli
Vp (m/s): 708 770 1163 1187 1497
Density (gr/cm3): 1.97 1.99 2.09 2.10 2.15
Vp/Vs ratio: 2.08 2.08 2.08 2.08 1.87
Poisson: 0.35 0.35 0.35 0.35 0.30
Young modulus (MPa): 615 736 1764 1838 3581
Shear modulus (MPa): 228 273 653 681 1377
Lamé (MPa): 532 635 1521 1591 2068
Bulk modulus (MPa): 684 817 1957 2045 2986

dispersion curve (frequency - Rayleigh phase velocity)

Fundamental mode)
best model

F(Hz)	VR(m/s)
9.51379	610.4706
11.2491	565.4388
12.9844	516.0926
14.7197	473.5567
17.3226	426.0357
20.1425	391.7639
22.8539	370.945
26.216	355.3022
33.591	338.9039
41.5083	331.188

==o== SECTION#5

Maximum penetration depth according to the "Steady State Rayleigh Method": 26 m

Inversion quality: very good

VS5 (mean model): 350 m/s
VS5 (best model): 350 m/s

VS20 (mean model): 454 m/s
VS20 (best model): 454 m/s

VS30 (mean model): 530 m/s
VS30 (best model): 530 m/s

==o== SECTION#6

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

For the 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:\WINMAS~1\output".

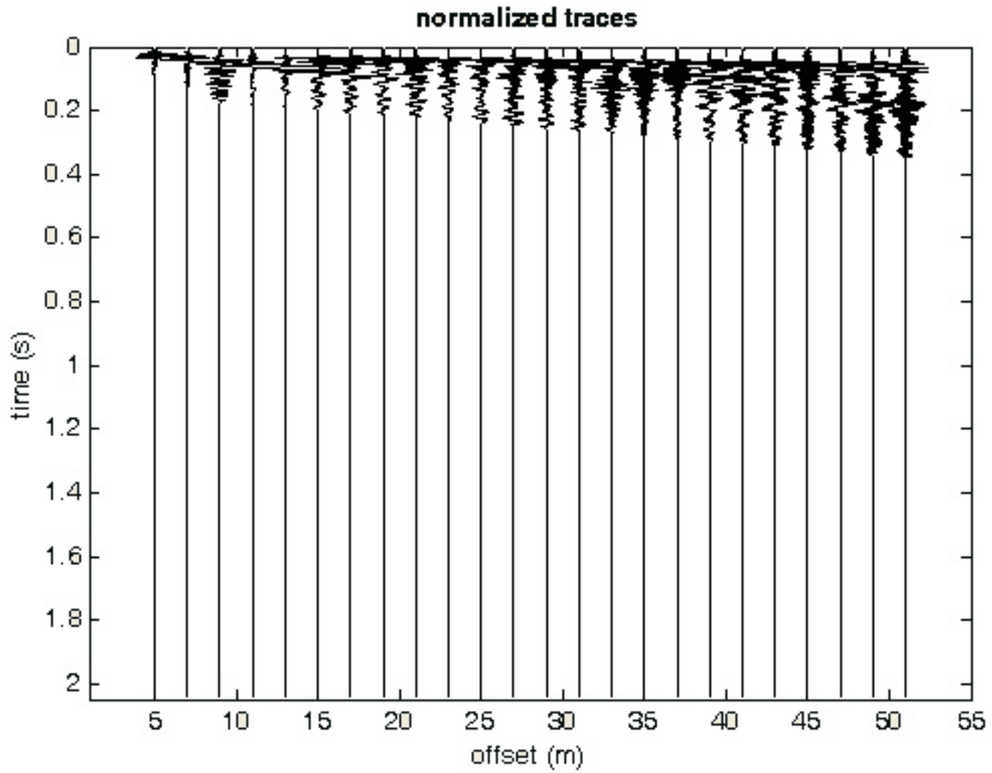
==========

winMASW 4.1 Standard
Surface Wave Analysis
via MASW - Multichannel Analysis of Surface Waves

www.eliosoft.it

#1: uploading & processing (MASW analyses)

dataset: 1 caccamo 2sx.dat
minimum offset: 5 m
geophone spacing: 2 m
sampling: 0.125 ms



utilities: flip traces | spectrum | *movie* | ?

data selection: activate | select | 20 | cancel | save

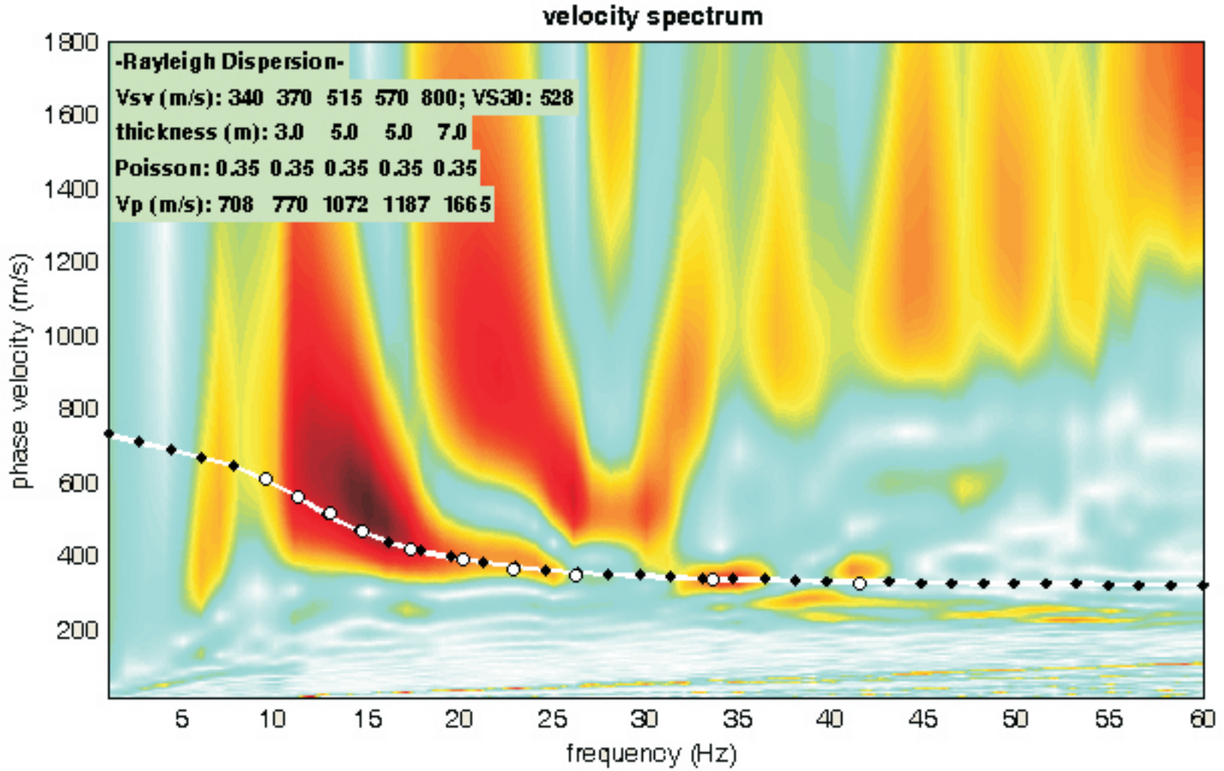
refraction: Professional version

#2: velocity spectrum, modelling & picking (MASW & ReMi analyses)

MASW: calculate spectrum | Tau - v

ReMi: Professional version

visualize curves: input curve | ?



explore spectrum

1 MASW Serrapetrona_c accamo.cdp

modelling: parameters | save model | upload model | 3 | Love analysis: Professional version | eigen period | refresh | ?

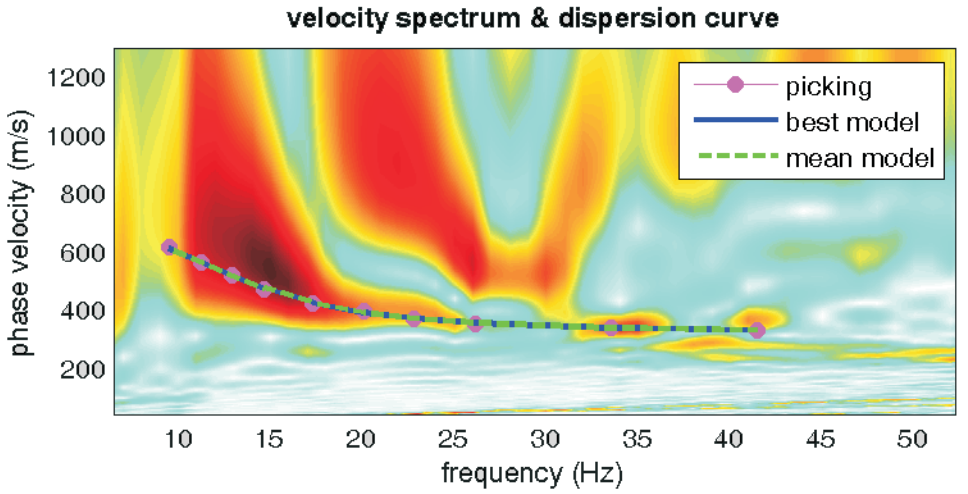
picking: fundamental | ?

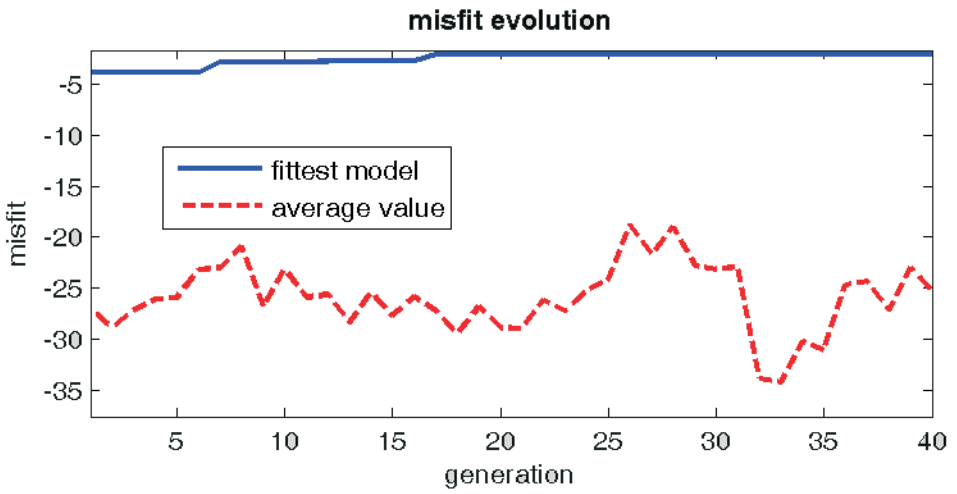
use the right button to select the last point of the considered mode

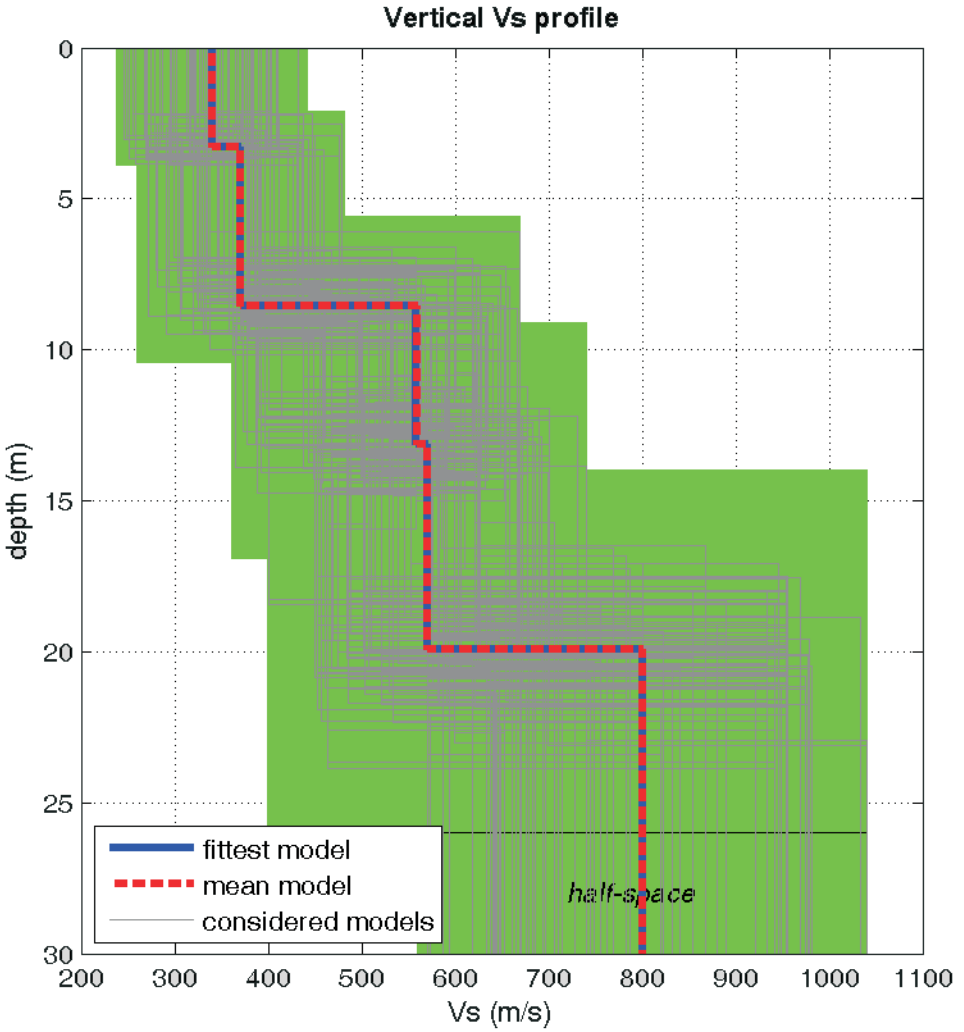
save picking | ? | cancel picking

inversion

exit



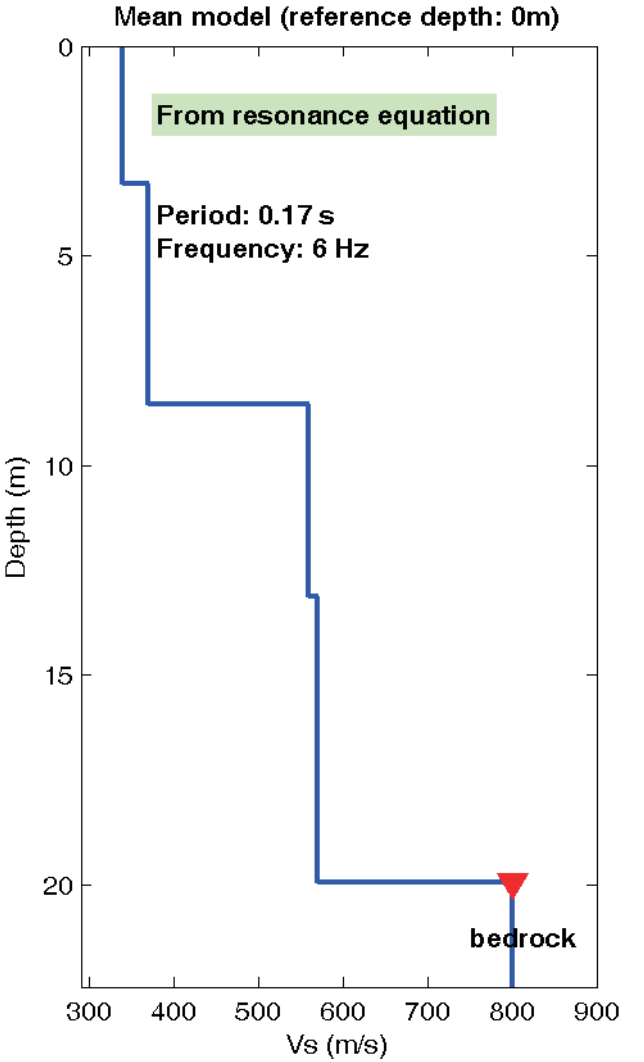


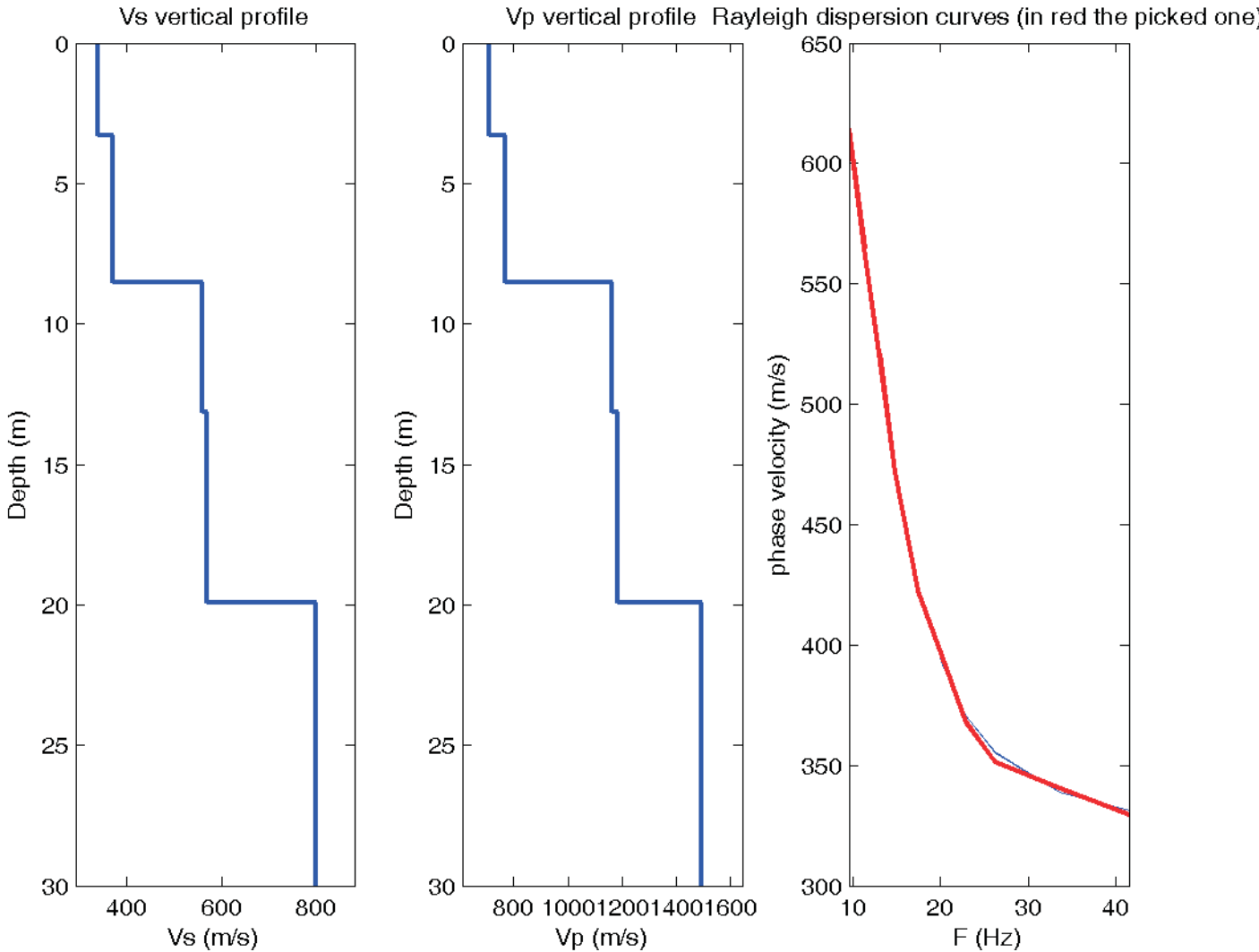


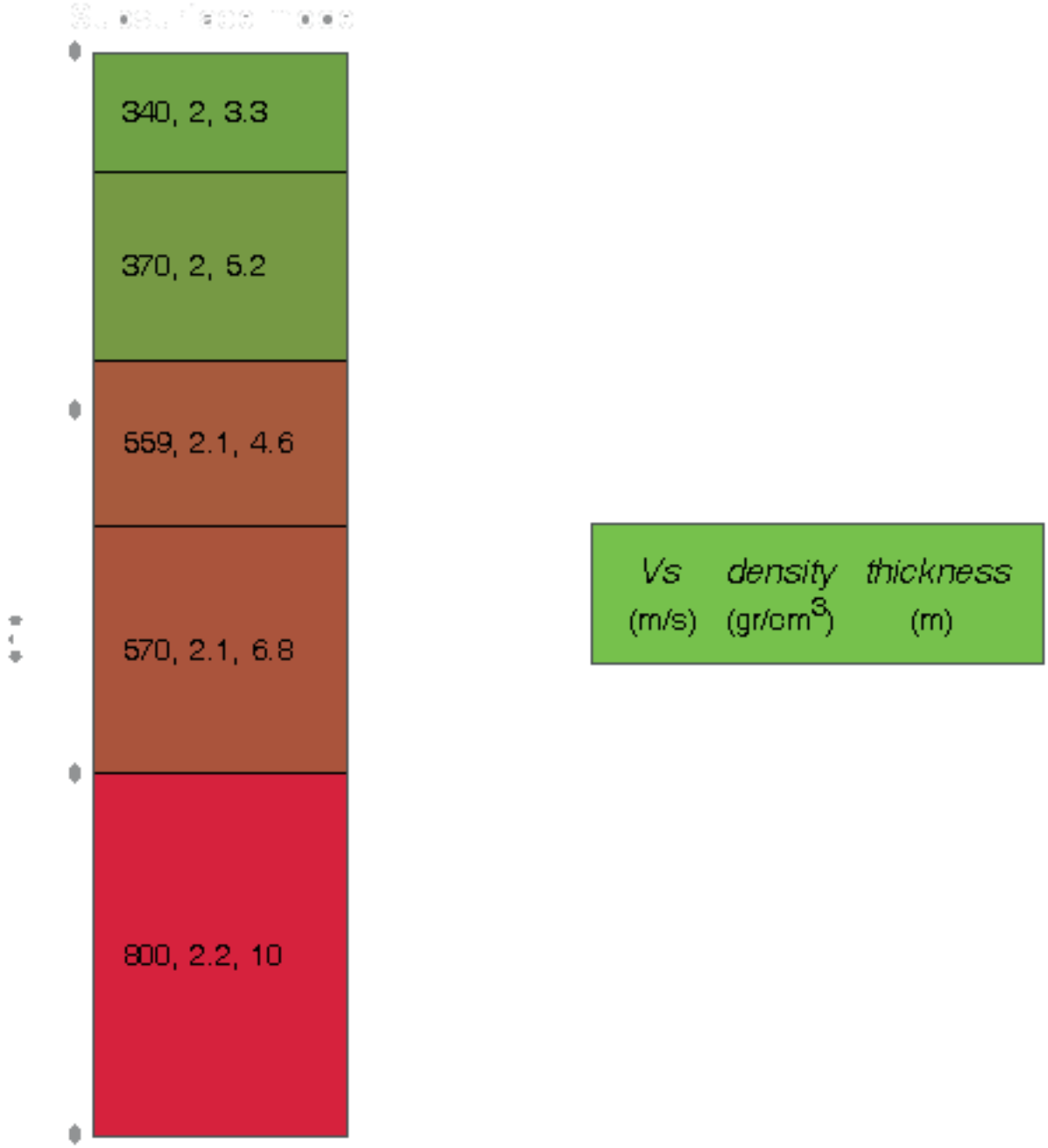
dataset: 1 caccamo 2sx.dat
dispersion curve: 1 MASW Serrapetrona_Caccamo.cdp

VS30 (best model): 530 m/s

VS30 (mean model): 530 m/s


Mean model (reference depth: 0m)
From resonance equation
Period: 0.17 s
Frequency: 6 Hz
bedrock
Depth (m)
Vs (m/s)
0
5
10
15
20
300
400
500
600
700
800
900


Vs vertical profile
Vp vertical profile
Rayleigh dispersion curves (in red the picked one)
Depth (m)
Vs (m/s)
Vp (m/s)
phase velocity (m/s)
F (Hz)
0
5
10
15
20
25
30
400
600
800
800
1000
1200
1400
1600
650
600
550
500
450
400
350
300
10
20
30
40


340, 2, 3.3
370, 2, 5.2
559, 2.1, 4.6
570, 2.1, 6.8
800, 2.2, 10
Vs (m/s)
density (gr/cm3)
thickness (m)