ALLEGATO 1

dataset: bocci_s02.dat
minimum offset (m): 5
geophone spacing (m): 2
sampling (ms): 0.125
Dispersion curve: 6 MASW SERRAPETRONA.cdp
Number of individuals: 30
Number of generations: 31

Adopted search space (minimum Vs & thickness): 210 4.2 560
Adopted search space (maximum Vs & thickness): 390 7.8 1040
Adopted Poisson values: 0.35 0.3

Output folder: C:\WINMAS~1\output

==o== SECTION#2

Rayleigh wave analysis
Optimizing Vs & Thickness - generation: 1; average & best misfits: -70.2158 -9.67483
Optimizing Vs & Thickness - generation: 2; average & best misfits: -68.2424 -9.67483
Optimizing Vs & Thickness - generation: 3; average & best misfits: -66.9336 -9.67483
Optimizing Vs & Thickness - generation: 4; average & best misfits: -48.3242 -9.67483
Optimizing Vs & Thickness - generation: 5; average & best misfits: -53.6105 -9.67483
Optimizing Vs & Thickness - generation: 6; average & best misfits: -50.1435 -8.17697
Optimizing Vs & Thickness - generation: 7; average & best misfits: -55.4832 -8.17697
Optimizing Vs & Thickness - generation: 8; average & best misfits: -47.6571 -8.17697
Optimizing Vs & Thickness - generation: 9; average & best misfits: -57.9591 -8.17697
Optimizing Vs & Thickness - generation: 10; average & best misfits: -64.7048 -8.17697
Optimizing Vs & Thickness - generation: 11; average & best misfits: -77.9271 -8.17697
Optimizing Vs & Thickness - generation: 12; average & best misfits: -59.6834 -8.17697
Optimizing Vs & Thickness - generation: 13; average & best misfits: -55.0775 -8.17697
Optimizing Vs & Thickness - generation: 14; average & best misfits: -56.9801 -8.17697
Optimizing Vs & Thickness - generation: 15; average & best misfits: -47.1162 -8.17697
Optimizing Vs & Thickness - generation: 16; average & best misfits: -43.3409 -8.17697
Optimizing Vs & Thickness - generation: 17; average & best misfits: -47.5891 -7.96949
Optimizing Vs & Thickness - generation: 18; average & best misfits: -49.7096 -7.96949
Optimizing Vs & Thickness - generation: 19; average & best misfits: -56.6833 -7.96949
Optimizing Vs & Thickness - generation: 20; average & best misfits: -51.7591 -7.96949
Optimizing Vs & Thickness - generation: 21; average & best misfits: -47.1065 -7.96949
Optimizing Vs & Thickness - generation: 22; average & best misfits: -46.1942 -7.96949
Optimizing Vs & Thickness - generation: 23; average & best misfits: -41.5388 -7.96949
Optimizing Vs & Thickness - generation: 24; average & best misfits: -38.3488

```
-7.96949
Optimizing Vs & Thickness - generation: 25; average & best misfits: -33.3141
-7.40007
Optimizing Vs & Thickness - generation: 26; average & best misfits: -36.4689
-7.40007
Optimizing Vs & Thickness - generation: 27; average & best misfits: -38.1746
-7.40007
Optimizing Vs & Thickness - generation: 28; average & best misfits: -55.9831
 -7.2413
Optimizing Vs & Thickness - generation: 29; average & best misfits: -37.5767
 -7.2413
Optimizing Vs & Thickness - generation: 30; average & best misfits: -46.0788
 -7.2413
Optimizing Vs & Thickness - generation: 31; average & best misfits: -36.2865
 -6.6439

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: -67.5215
-6.6439
Optimizing Vs & Thickness - generation: 2; average & best misfits: -63.4382
-6.6439
Optimizing Vs & Thickness - generation: 3; average & best misfits: -56.6674
-6.6439
Optimizing Vs & Thickness - generation: 4; average & best misfits: -44.8521
-6.6439
Optimizing Vs & Thickness - generation: 5; average & best misfits: -53.3433
-6.6439
Optimizing Vs & Thickness - generation: 6; average & best misfits: -54.8731
-6.6439
Optimizing Vs & Thickness - generation: 7; average & best misfits: -49.7321
-6.58796
Optimizing Vs & Thickness - generation: 8; average & best misfits: -44.0362
-6.58796
Optimizing Vs & Thickness - generation: 9; average & best misfits: -55.1212
-6.58796

Model after the Vs & Thickness optimization (fixed Poisson values):
Vs (m/s): 300  830
Poisson: 0.35       0.3
Thickness (m): 6

Number of models considered to calculate the average model: 4


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

Dataset: bocci_s02.dat
Analyzed curve: 6 MASW SERRAPETRONA.cdp


==o== SECTION#3

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

VS (m/s):                   300  832
Standard deviations (m/s): 1  8

Thickness (m):            6.0
Standard deviations (m): 0.1
```

Approximate values for Vp, density & elastic moduli
Vp (m/s): 624 1557
Density (gr/cm3): 1.94 2.16
Vp/Vs ratio: 2.08 1.87
Poisson: 0.35 0.30
Young modulus (MPa): 471 3891
Sjear modulus (MPa): 175 1496
Lamé (MPa): 406 2247
Bulk modulus (MPa): 523 3245

Fundamental mode
Mean model

f(Hz)	VR(m/s)
19.7086	587.1772
21.6608	476.3925
23.5046	391.8004
26.5414	334.6388
30.9881	305.4506
36.4108	292.1867
41.3998	286.8393

==o== SECTION#4

==========

BEST MODEL

Vs (m/s): 300.3487 830.0229
thickness (m): 6.0188

Approximate values for Vp, density & elastic moduli
Vp (m/s): 625 1553
Density (gr/cm3): 1.94 2.16
Vp/Vs ratio: 2.08 1.87
Poisson: 0.35 0.30
Young modulus (MPa): 472 3871
Shear modulus (MPa): 175 1489
Lamé (MPa): 409 2234
Bulk modulus (MPa): 525 3227

dispersion curve (frequency - Rayleigh phase velocity)

Fundamental mode)
best model

F(Hz)	VR(m/s)
19.7086	582.8757
21.6608	470.7015
23.5046	389.0717
26.5414	333.8279
30.9881	305.3253
36.4108	292.3076
41.3998	287.0512

==o== SECTION#5

Maximum penetration depth according to the "Steady State Rayleigh Method": 12 m

Inversion quality: very good

VS5 (mean model): 300 m/s
VS5 (best model): 300 m/s

VS20 (mean model): 543 m/s

VS20 (best model): 542 m/s

VS30 (mean model): 614 m/s
VS30 (best model): 613 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".

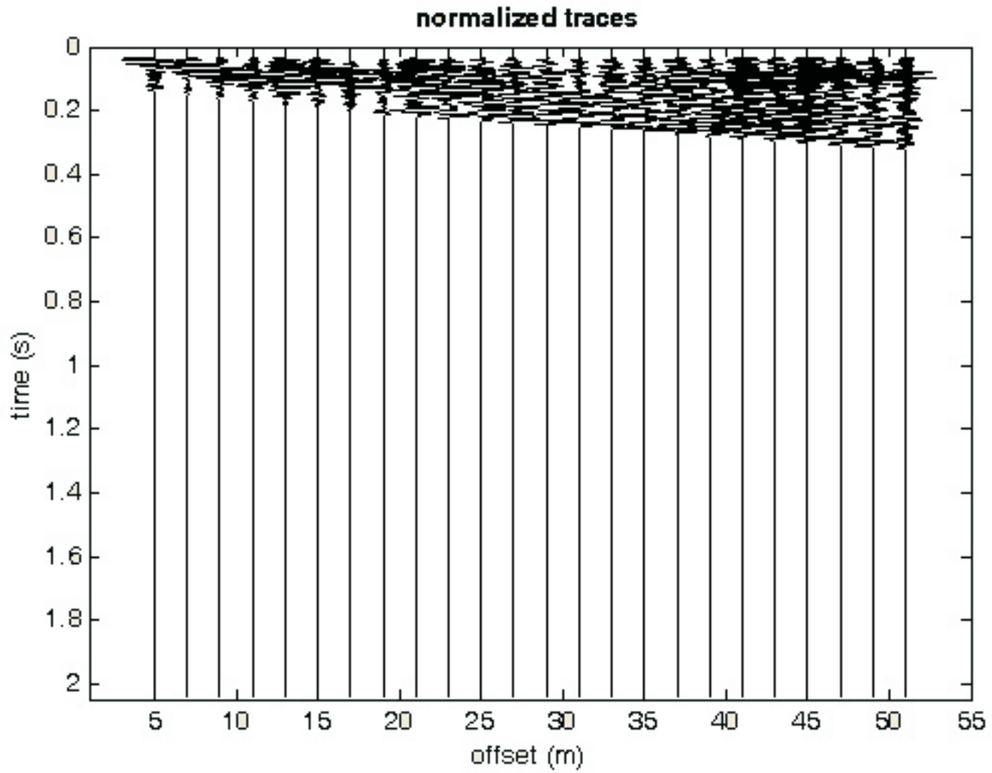
==========

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

www.eliosoft.it

#1: uploading & processing (MASW analyses)

dataset: bocci_02.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

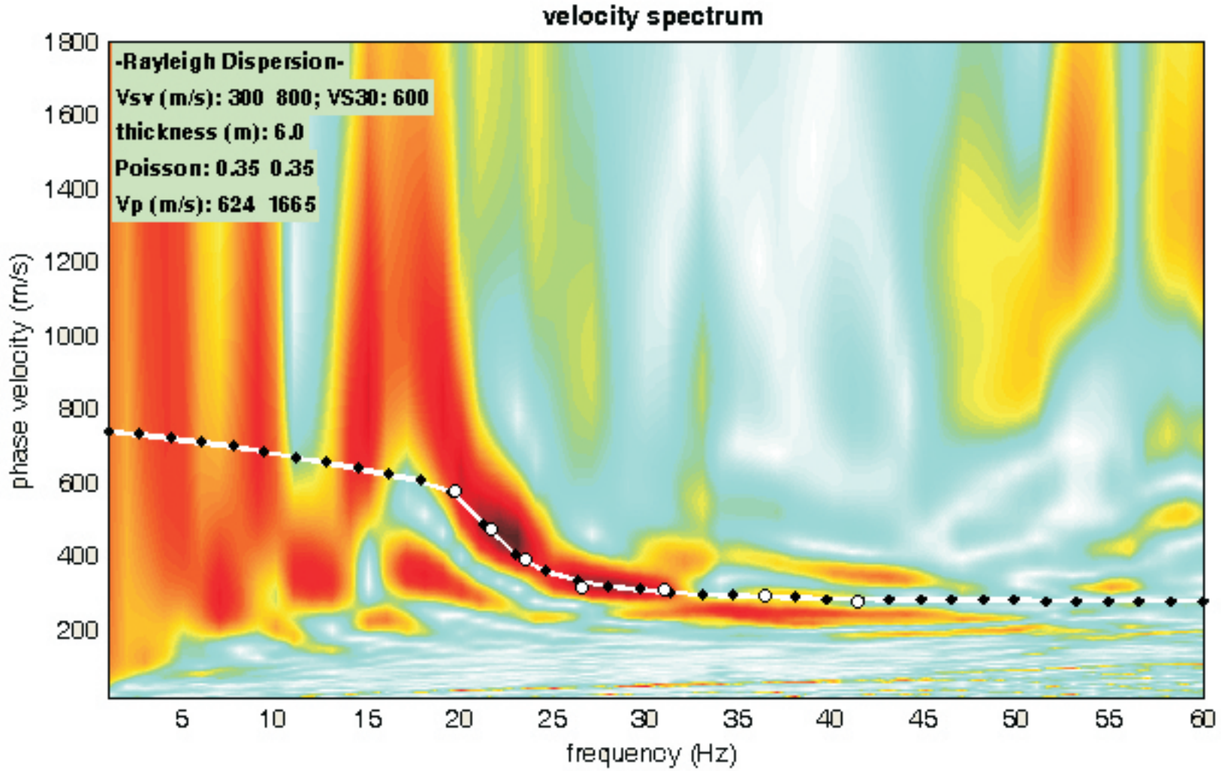
refraction
Professional version

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

MASW
calculate spectrum
Tau - v

ReMi
Professional version

visualize curves
input curve
?



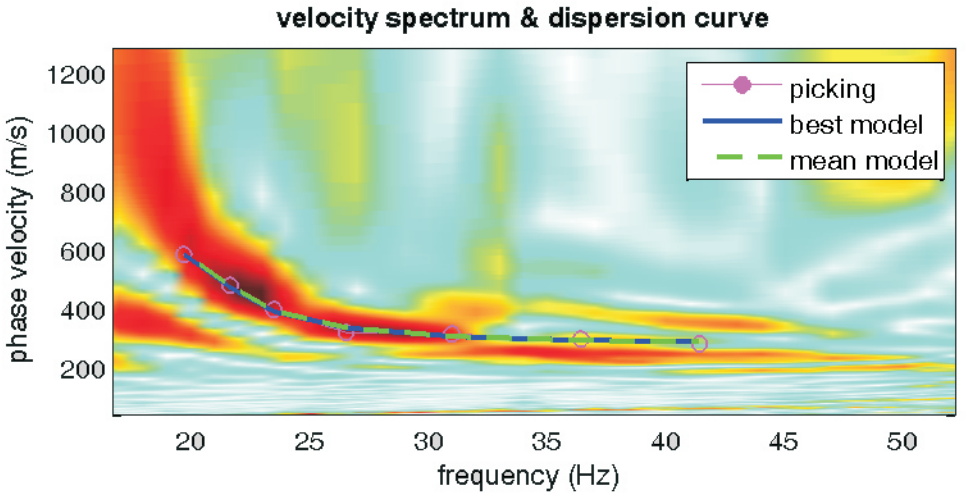
explore spectrum

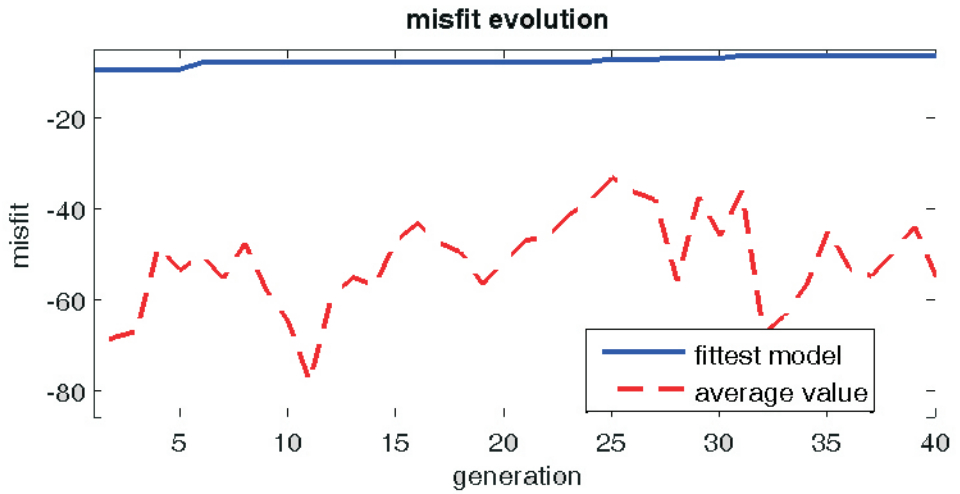
6 MASW SERRAPETRONA.cdp

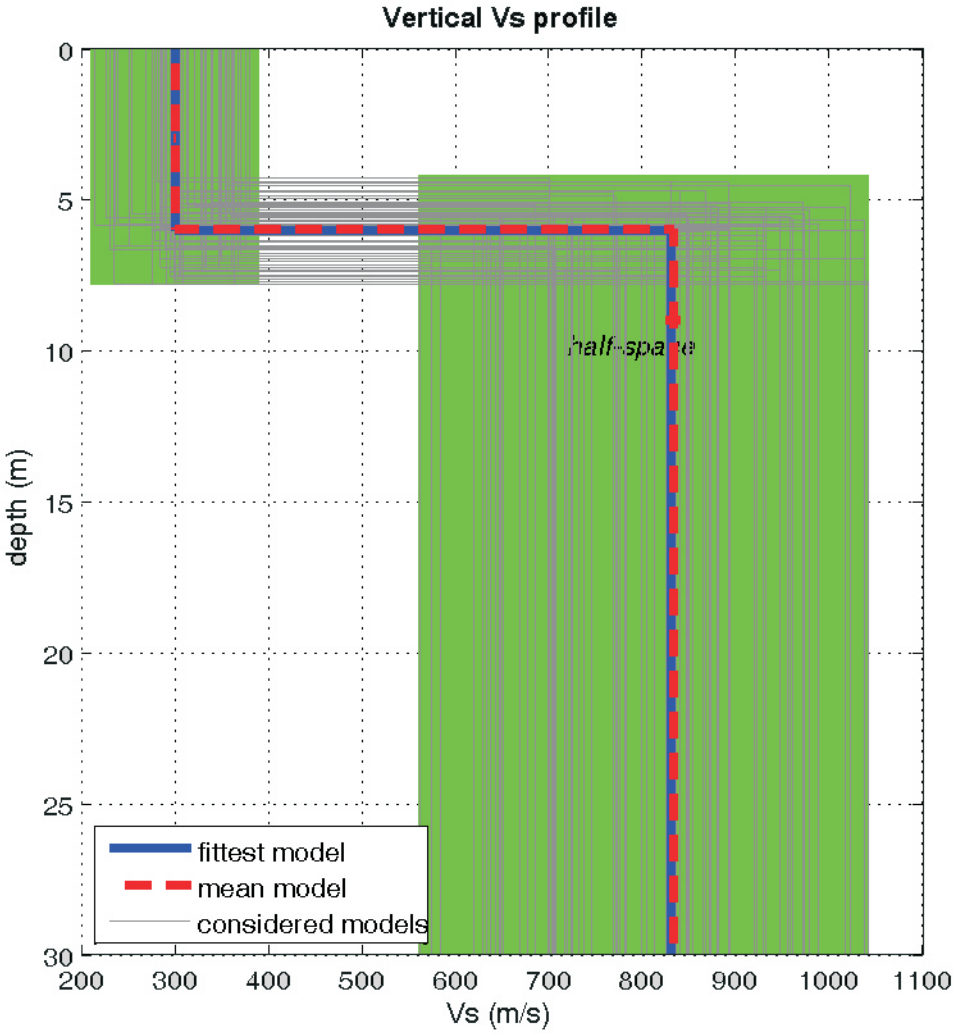
modelling
parameters
save model
upload model
3
Love analysis:
Professional version
eigen period
refresh
?

picking
fundamental
?
use the right button to select the
last point of the considered mode
save picking
?
cancel picking

inversion
exit





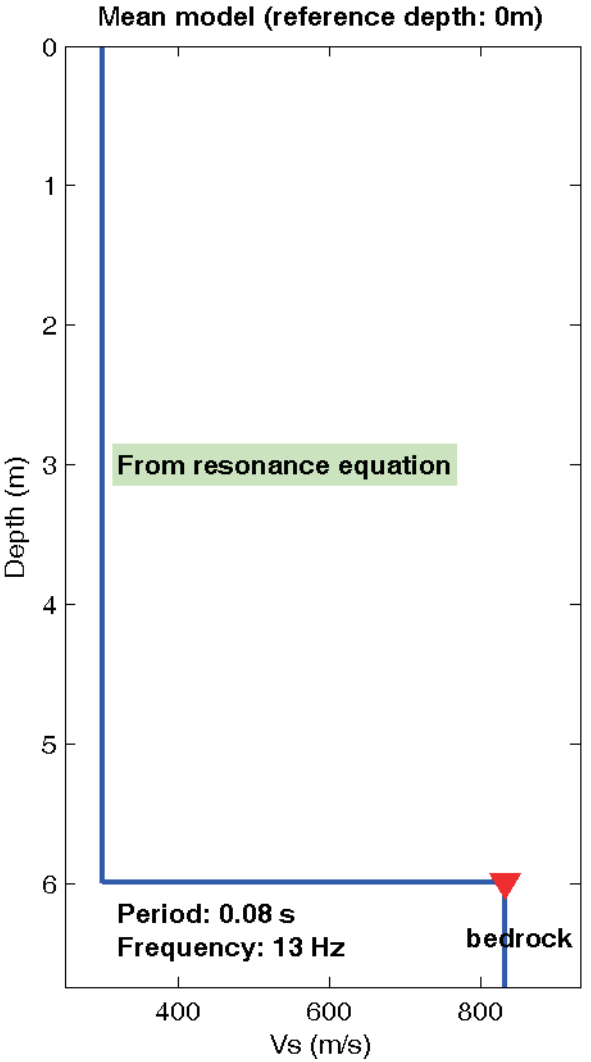


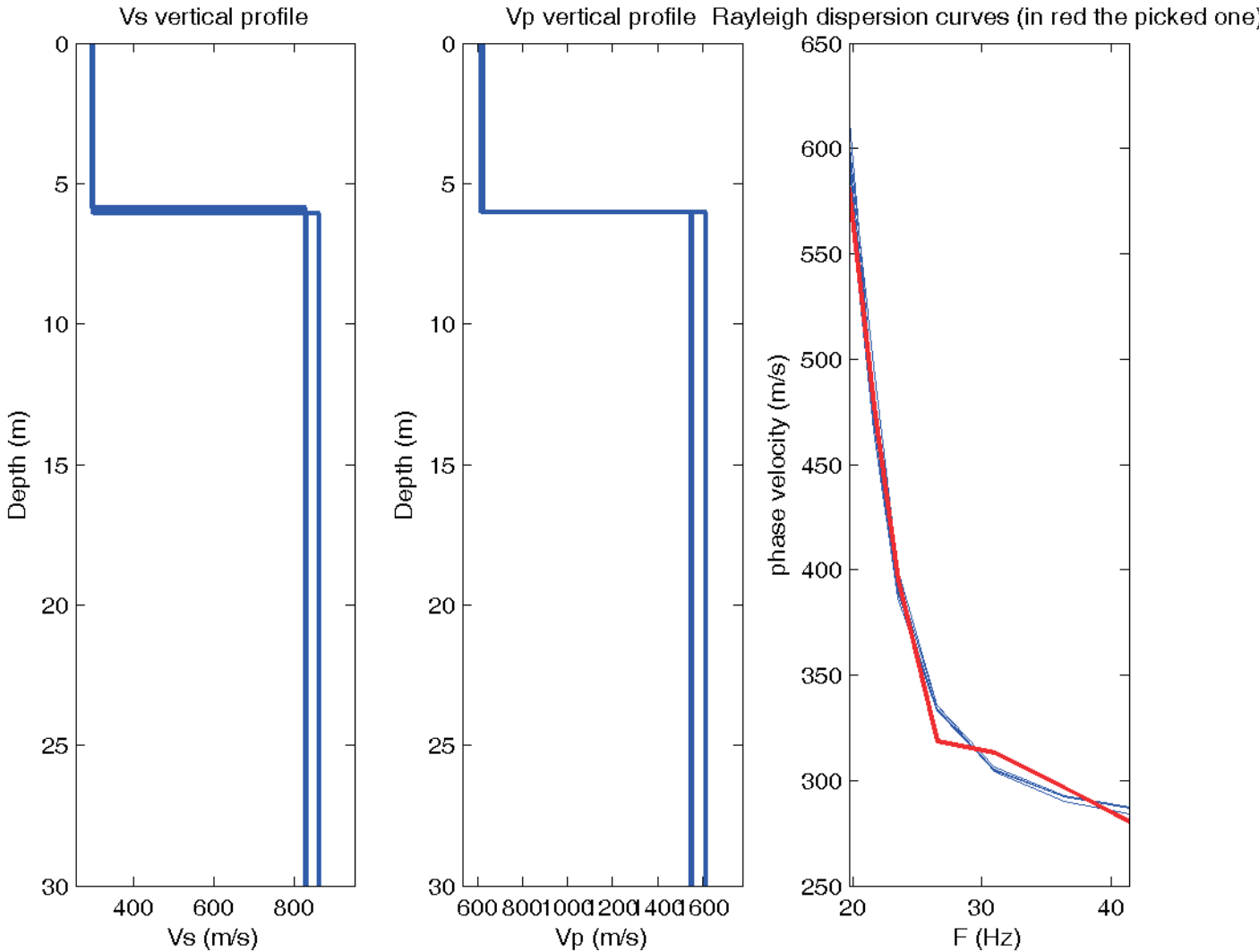
dataset: bocci $_s$02.dat

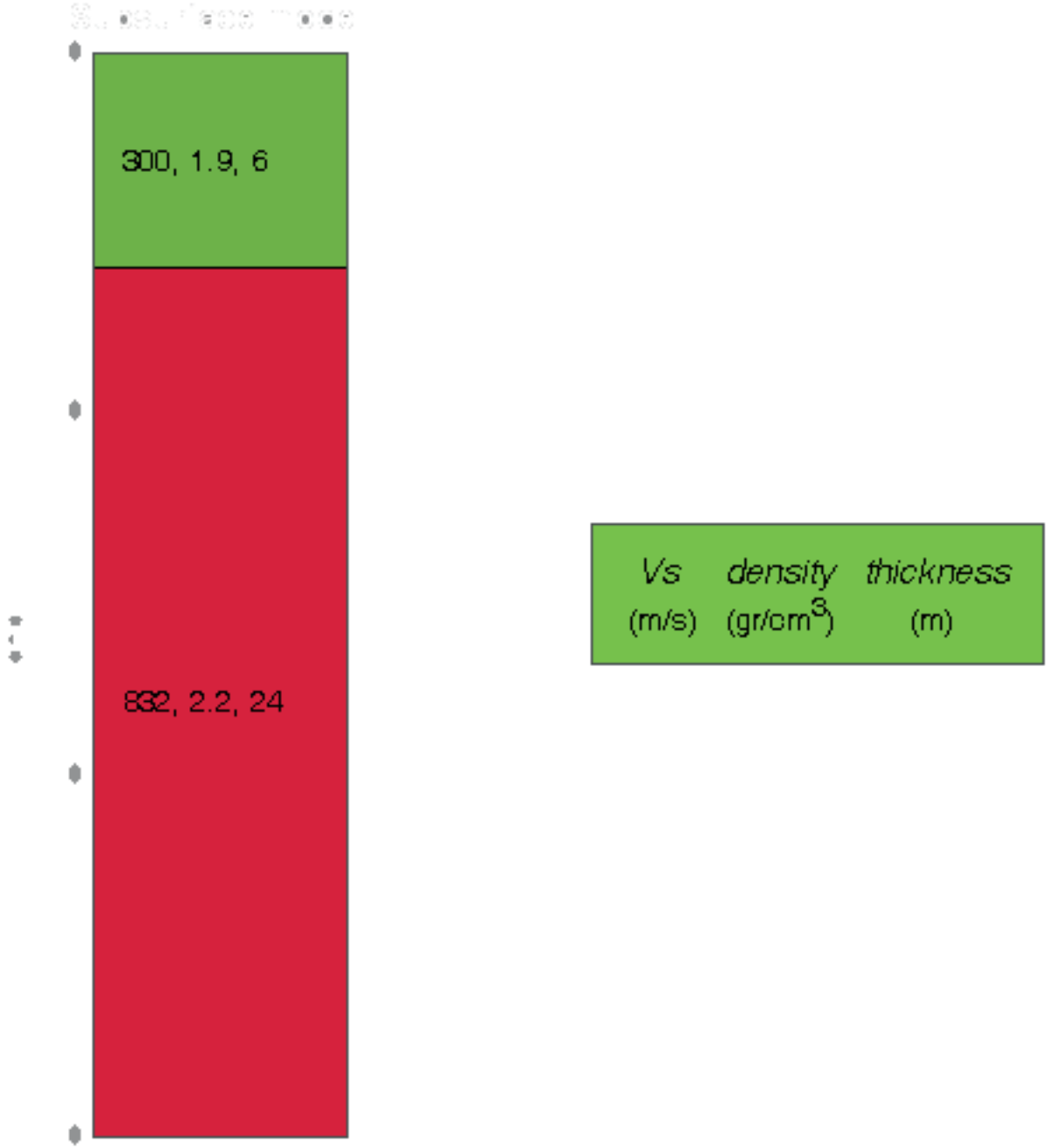
dispersion curve: 6 MASW SERRAPETRONA.cdp

VS30 (best model): 613 m/s

VS30 (mean model): 614 m/s


Mean model (reference depth: 0m)
0
1
2
3
4
5
6
Depth (m)
From resonance equation
Period: 0.08 s
Frequency: 13 Hz
bedrock
400
600
800
Vs (m/s)


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
600
800
1000
1200
1400
1600
650
600
550
500
450
400
350
300
250
20
30
40


300, 1.9, 6
832, 2.2, 24
Vs (m/s)
density (gr/cm3)
thickness (m)