ALLEGATO 1

==o== SECTION#1
dataset: 5maswserra2dx.dat
minimum offset (m): 5
geophone spacing (m): 2
sampling (ms): 0.125
Dispersion curve: 5 MASW SERRAPETRONA REV2.cdp
Number of individuals: 30
Number of generations: 31

Adopted search space (minimum Vs & thickness): 116.2 1.4 322.7 3.01 340.9 2.31 700
Adopted search space (maximum Vs & thickness): 215.8 2.6 599.3 5.59 633.1 4.29 1300
Adopted Poisson values: 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: -66.1712 -15.8917
Optimizing Vs & Thickness - generation: 2; average & best misfits: -66.9636 -15.8917
Optimizing Vs & Thickness - generation: 3; average & best misfits: -52.1782 -15.8917
Optimizing Vs & Thickness - generation: 4; average & best misfits: -51.6824 -15.8917
Optimizing Vs & Thickness - generation: 5; average & best misfits: -52.7829 -15.8917
Optimizing Vs & Thickness - generation: 6; average & best misfits: -58.1929 -15.1267
Optimizing Vs & Thickness - generation: 7; average & best misfits: -43.0834 -15.1267
Optimizing Vs & Thickness - generation: 8; average & best misfits: -58.3422 -15.1267
Optimizing Vs & Thickness - generation: 9; average & best misfits: -51.8995 -15.1267
Optimizing Vs & Thickness - generation: 10; average & best misfits: -56.7914 -14.5544
Optimizing Vs & Thickness - generation: 11; average & best misfits: -55.1018 -14.5544
Optimizing Vs & Thickness - generation: 12; average & best misfits: -45.6312 -12.62
Optimizing Vs & Thickness - generation: 13; average & best misfits: -53.182 -12.62
Optimizing Vs & Thickness - generation: 14; average & best misfits: -56.4579 -12.62
Optimizing Vs & Thickness - generation: 15; average & best misfits: -52.1352 -10.6775
Optimizing Vs & Thickness - generation: 16; average & best misfits: -43.6101 -10.6775
Optimizing Vs & Thickness - generation: 17; average & best misfits: -47.6805 -9.31311
Optimizing Vs & Thickness - generation: 18; average & best misfits: -62.6964 -9.31311
Optimizing Vs & Thickness - generation: 19; average & best misfits: -68.0112 -9.31311
Optimizing Vs & Thickness - generation: 20; average & best misfits: -66.5012 -9.31311
Optimizing Vs & Thickness - generation: 21; average & best misfits: -67.05 -9.31311
Optimizing Vs & Thickness - generation: 22; average & best misfits: -55.4347 -9.31311
Optimizing Vs & Thickness - generation: 23; average & best misfits: -60.756 -9.31311
Optimizing Vs & Thickness - generation: 24; average & best misfits: -65.0669 -9.31311
Optimizing Vs & Thickness - generation: 25; average & best misfits: -59.8592 -9.31311

Optimizing Vs & Thickness - generation: 26; average & best misfits: -63.5328 -9.31311
Optimizing Vs & Thickness - generation: 27; average & best misfits: -46.3296 -9.31311
Optimizing Vs & Thickness - generation: 28; average & best misfits: -65.2197 -9.31311
Optimizing Vs & Thickness - generation: 29; average & best misfits: -51.3877 -9.31311
Optimizing Vs & Thickness - generation: 30; average & best misfits: -47.7808 -9.31311
Optimizing Vs & Thickness - generation: 31; average & best misfits: -47.6214 -8.46121

Now a finer search around the most promising search space area

Rayleigh wave analysis
Optimizing Vs & Thickness - generation: 1; average & best misfits: -66.4613 -8.46121
Optimizing Vs & Thickness - generation: 2; average & best misfits: -54.2998 -8.46121
Optimizing Vs & Thickness - generation: 3; average & best misfits: -60.7799 -8.46121
Optimizing Vs & Thickness - generation: 4; average & best misfits: -49.7726 -8.46121
Optimizing Vs & Thickness - generation: 5; average & best misfits: -47.8823 -6.66223
Optimizing Vs & Thickness - generation: 6; average & best misfits: -57.5271 -6.66223
Optimizing Vs & Thickness - generation: 7; average & best misfits: -62.8095 -6.66223
Optimizing Vs & Thickness - generation: 8; average & best misfits: -53.1199 -6.66223
Optimizing Vs & Thickness - generation: 9; average & best misfits: -48.9346 -6.66223

Model after the Vs & Thickness optimization (fixed Poisson values):
Vs (m/s): 167 407 531 1236
Poisson: 0.35 0.35 0.35 0.3
Thickness (m): 1.9 4.9 3.1

Number of models considered to calculate the average model: 2

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

Dataset: 5maswserra2dx.dat
Analyzed curve: 5 MASW SERRAPETRONA REV2.cdp
Posterior Probability Density (deviazioni standard) not defined because of insufficient data

==o== SECTION#3

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

VS (m/s): 167 407 542 1236
Standard deviations (m/s): 0 0 0 0

Thickness (m): 1.9 4.9 3.2
Standard deviations (m): 0.0 0.0 0.0

Approximate values for Vp, density & elastic moduli
Vp (m/s): 348 847 1128 2312
Density (gr/cm3): 1.80 2.01 2.08 2.26
Vp/Vs ratio: 2.08 2.08 2.08 1.87
Poisson: 0.35 0.35 0.35 0.30
Young modulus (MPa): 135 901 1652 8968
Sjear modulus (MPa): 50 334 612 3449
Lamé (MPa): 117 778 1427 5170
Bulk modulus (MPa): 151 1000 1835 7470

Fundamental mode
Mean model
f(Hz) VR(m/s)
19.7086 553.535
21.227 479.1929
22.7454 424.6924
24.2638 391.4011
26.216 364.6434
28.602 343.1866
30.6627 328.1628

First higher mode
Mean model
30.2289 393.7531
33.0487 358.0956
35.7601 337.8549
39.4476 324.6299
48.2325 310.4509

==o== SECTION#4

==========
BEST MODEL

Vs (m/s): 166.58889 406.95115 530.82728 1235.6617
thickness (m): 1.9042 4.8887 3.1189

Approximate values for Vp, density & elastic moduli
Vp (m/s): 347 847 1105 2312
Density (gr/cm3): 1.80 2.01 2.08 2.26
Vp/Vs ratio: 2.08 2.08 2.08 1.87
Poisson: 0.35 0.35 0.35 0.30
Young modulus (MPa): 135 901 1582 8967
Shear modulus (MPa): 50 334 586 3449
Lamé (MPa): 116 778 1366 5170

Bulk modulus (MPa): 150 1000 1756 7470

dispersion curve (frequency - Rayleigh phase velocity)

Fundamental mode)
best model

| F(Hz) | VR(m/s) |
|---|---|
| 19.7086 | 551.1518 |
| 21.227 | 475.8715 |
| 22.7454 | 421.7579 |
| 24.2638 | 389.0645 |
| 26.216 | 362.8785 |
| 28.602 | 341.8807 |
| 30.6627 | 327.102 |

First higher mode)
best model

| | |
|---|---|
| 30.2289 | 392.0666 |
| 33.0487 | 356.578 |
| 35.7601 | 336.6339 |
| 39.4476 | 323.6908 |
| 48.2325 | 309.7144 |

VS5 (mean model): 263 m/s
VS5 (best model): 263 m/s

VS20 (mean model): 534 m/s
VS20 (best model): 534 m/s

VS30 (mean model): 659 m/s
VS30 (best model): 659 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".

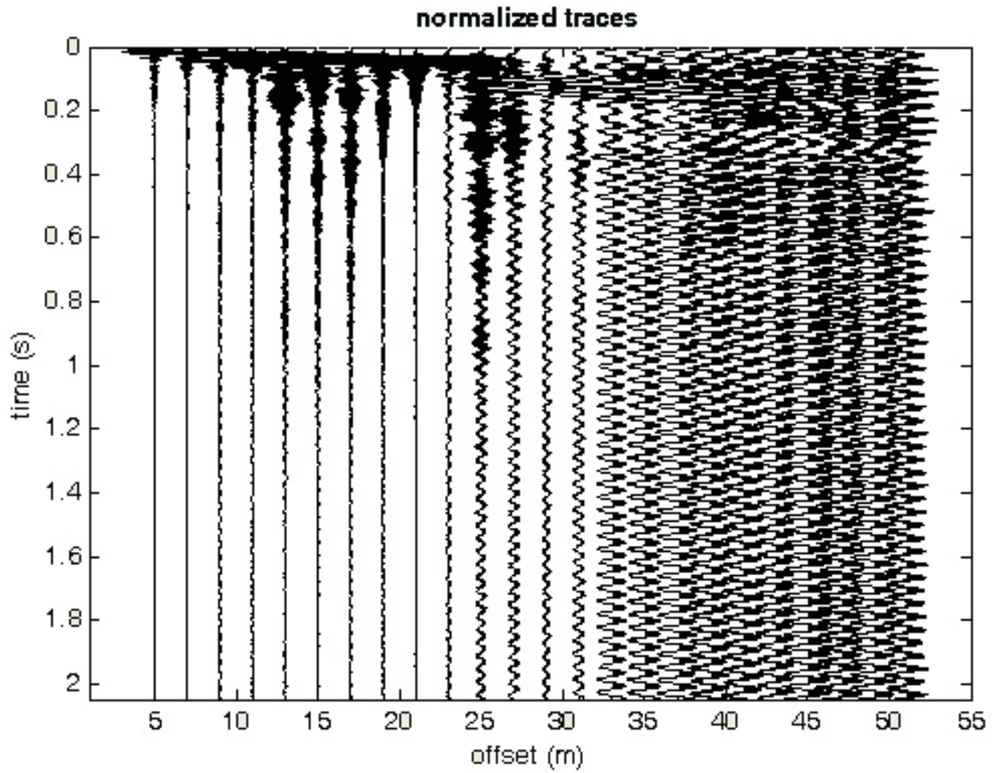
==========

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

www.eliosoft.it

## #1: uploading & processing (MASW analyses)

dataset: 5maswserra2dx.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

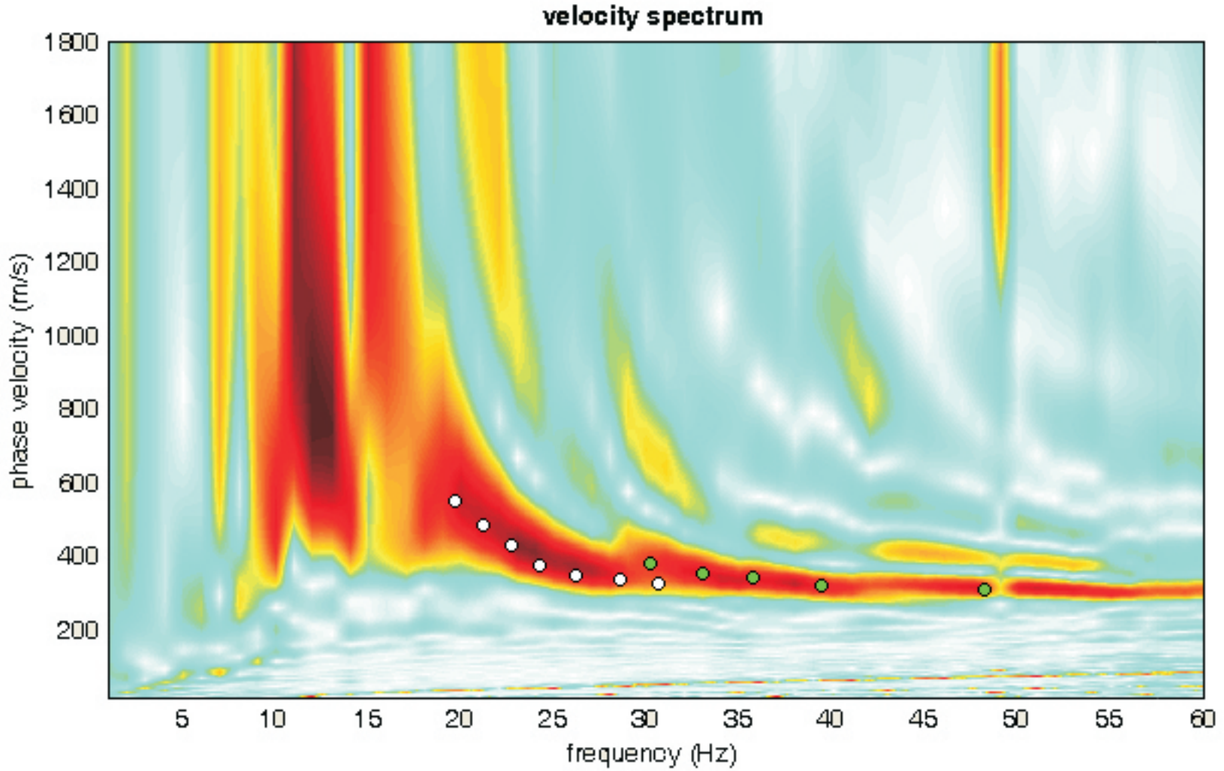
refraction
Professional version

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

MASW
calculate spectrum Tau - v

ReMi
Professional version

visualize curves
input curve ?



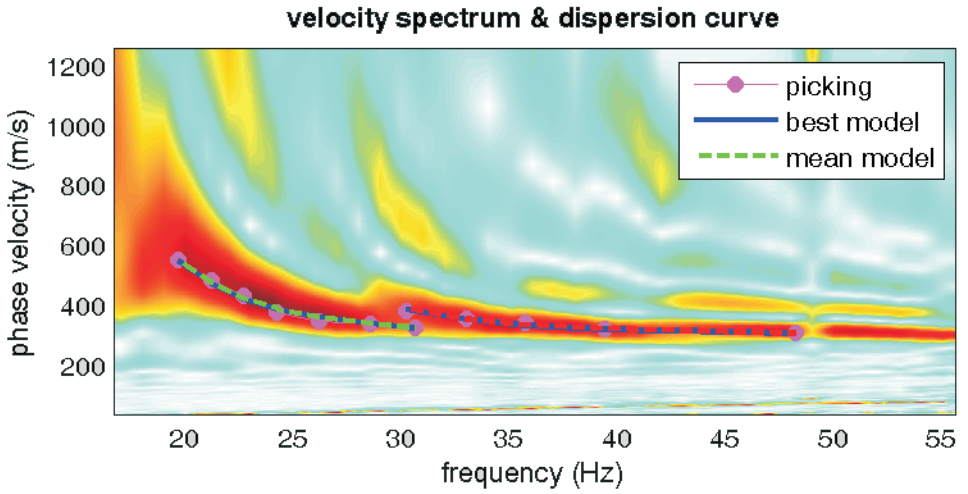

explore spectrum

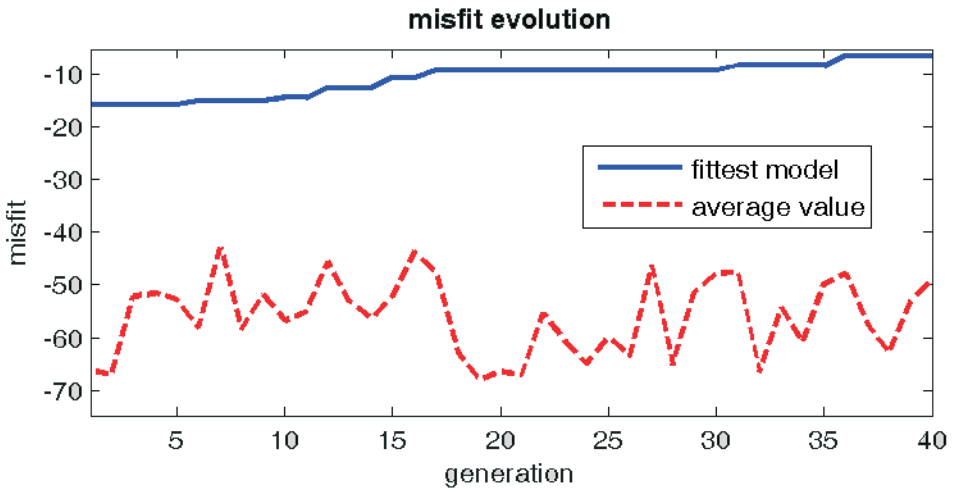
5MASW SERRAPETRONA REV2.cdp

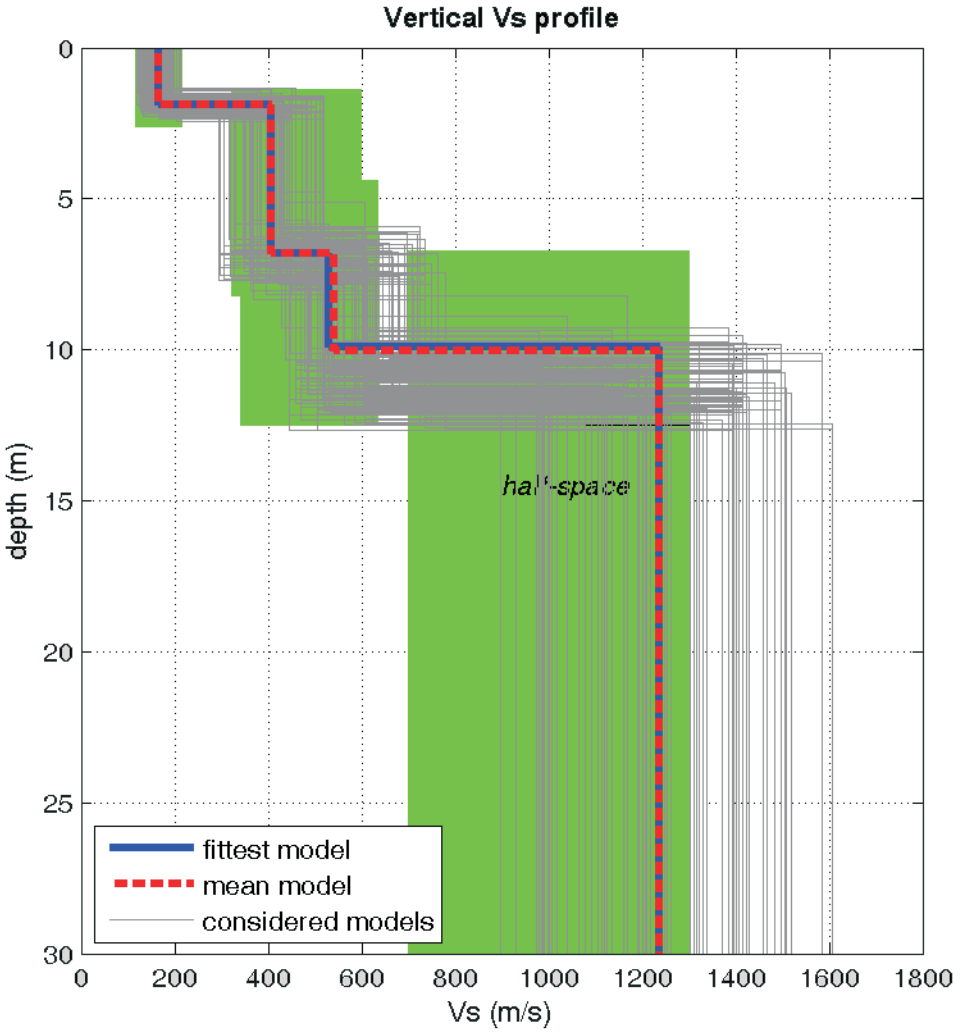
modelling
parameters save model
upload model 3
Love analysis:
Professional version
eigen period refresh ?

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

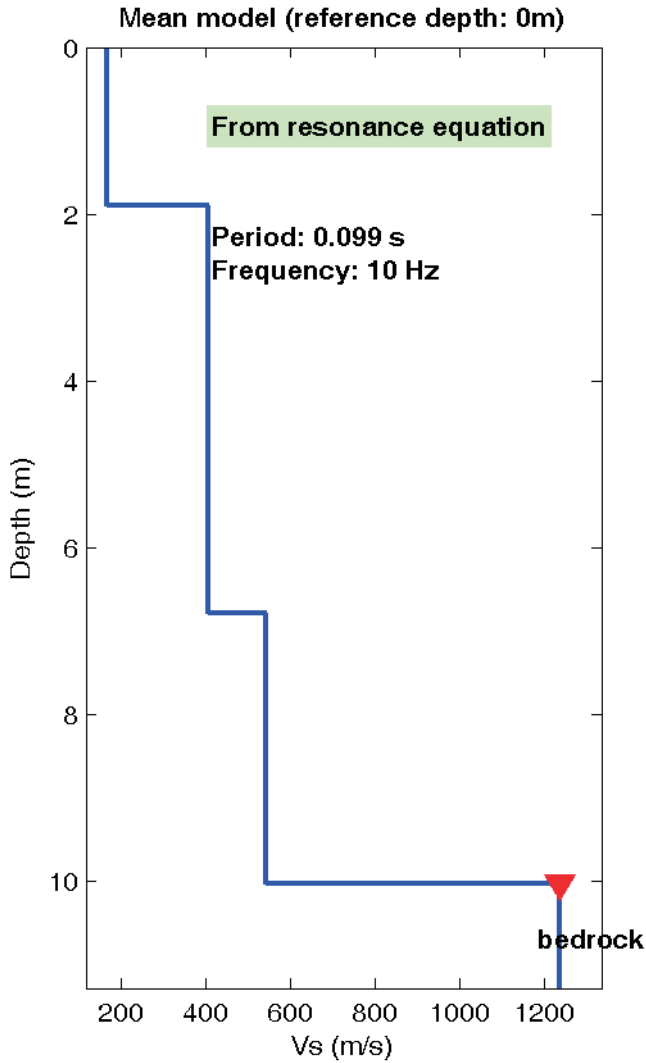
inversion
exit

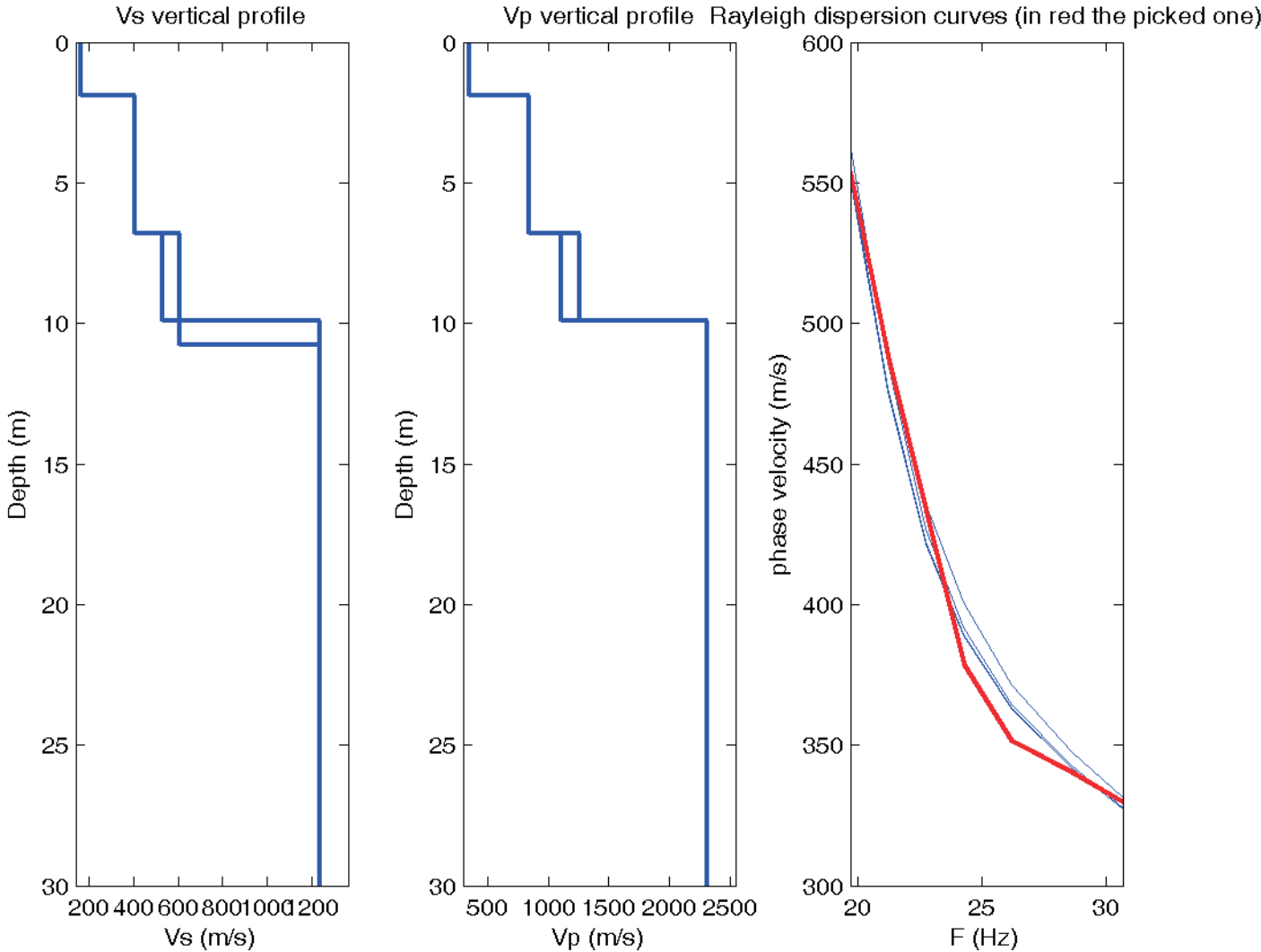


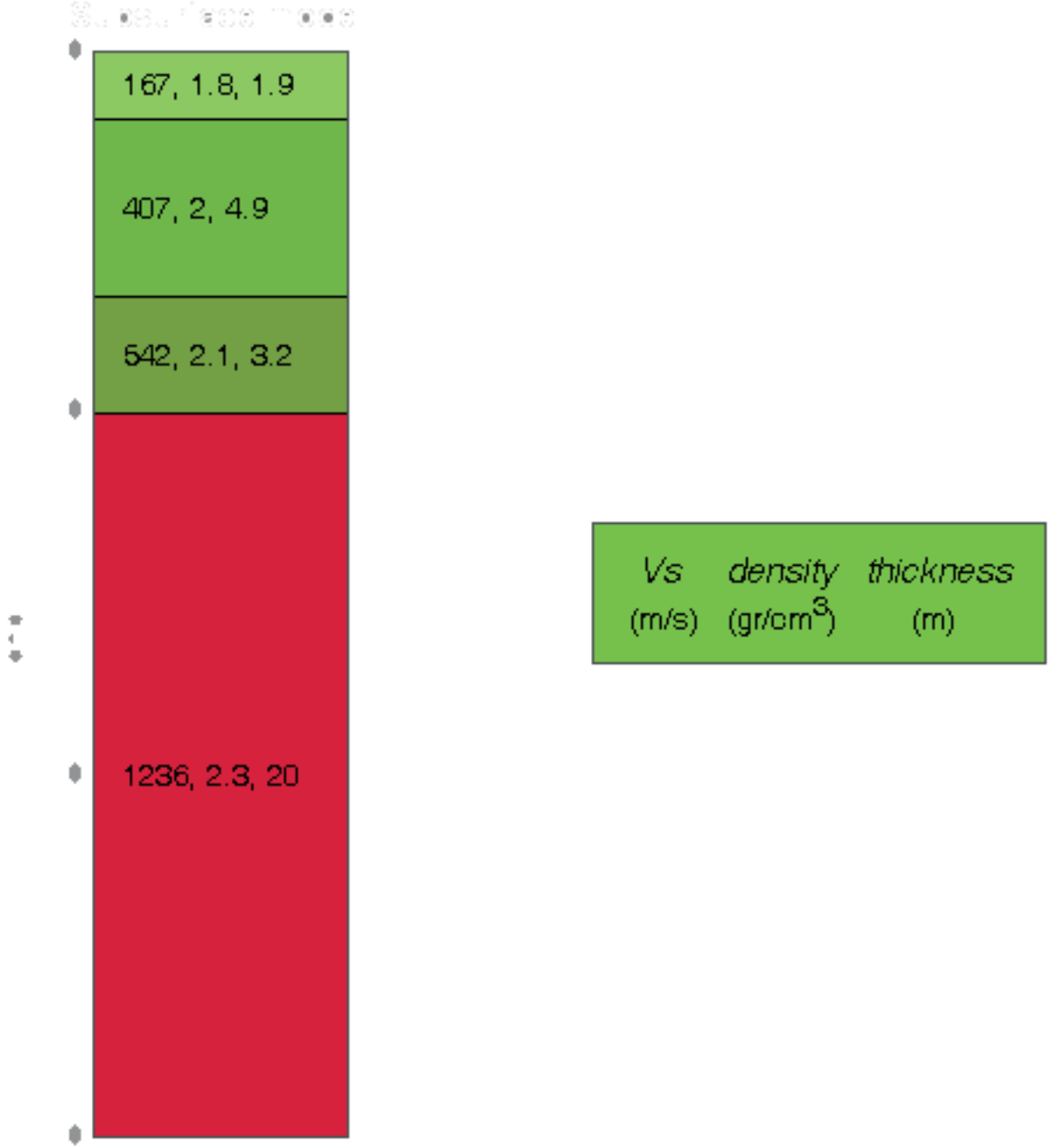




**dataset: 5maswserra2dx.dat**
**dispersion curve: 5 MASW SERRAPETRONA REV2.cdp**
**VS30 (best model): 659 m/s**
**VS30 (mean model): 659 m/s**


Mean model (reference depth: 0m)
From resonance equation
Period: 0.099 s
Frequency: 10 Hz
bedrock
Depth (m)
Vs (m/s)
0
2
4
6
8
10
200
400
600
800
1000
1200


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
200 400 600 800 1000 1200
500 1000 1500 2000 2500
600
550
500
450
400
350
300
20
25
30


167, 1.8, 1.9
407, 2, 4.9
542, 2.1, 3.2
1236, 2.3, 20
Vs (m/s)
density (gr/cm3)
thickness (m)