ALLEGATO 1

dataset: 3maswserra2dx.dat
minimum offset (m): 5
geophone spacing (m): 2
sampling (ms): 0.125
Dispersion curve: 3 MASW SERRAPETRONA.cdp
Number of individuals: 30
Number of generations: 31

Adopted search space (minimum Vs & thickness): 189 2.8 245
5.6 420
Adopted search space (maximum Vs & thickness): 351 5.2 455
10.4 780
Adopted Poisson values: 0.35 0.35 0.35

Output folder: C:\WINMAS~1\output

==o== SECTION#2

Rayleigh wave analysis
Optimizing Vs & Thickness - generation: 1; average & best misfits: -39.5013
-18.6439
Optimizing Vs & Thickness - generation: 2; average & best misfits: -38.3539
-17.5158
Optimizing Vs & Thickness - generation: 3; average & best misfits: -36.0222
-17.283
Optimizing Vs & Thickness - generation: 4; average & best misfits: -27.7207
-17.0415
Optimizing Vs & Thickness - generation: 5; average & best misfits: -28.2398
-17.0415
Optimizing Vs & Thickness - generation: 6; average & best misfits: -29.0877
-16.7852
Optimizing Vs & Thickness - generation: 7; average & best misfits: -29.7024
-16.3406
Optimizing Vs & Thickness - generation: 8; average & best misfits: -30.6186
-16.3406
Optimizing Vs & Thickness - generation: 9; average & best misfits: -33.7012
-16.3406
Optimizing Vs & Thickness - generation: 10; average & best misfits: -32.3765
-16.3406
Optimizing Vs & Thickness - generation: 11; average & best misfits: -34.9179
-16.3406
Optimizing Vs & Thickness - generation: 12; average & best misfits: -38.024
-16.3406
Optimizing Vs & Thickness - generation: 13; average & best misfits: -37.6438
-16.3406
Optimizing Vs & Thickness - generation: 14; average & best misfits: -37.5184
-16.3406
Optimizing Vs & Thickness - generation: 15; average & best misfits: -34.8023
-16.3406
Optimizing Vs & Thickness - generation: 16; average & best misfits: -32.7579
-16.3406
Optimizing Vs & Thickness - generation: 17; average & best misfits: -31.87
-16.3406
Optimizing Vs & Thickness - generation: 18; average & best misfits: -31.2411
-16.3406
Optimizing Vs & Thickness - generation: 19; average & best misfits: -30.7046
-16.3406
Optimizing Vs & Thickness - generation: 20; average & best misfits: -30.9538
-16.3406
Optimizing Vs & Thickness - generation: 21; average & best misfits: -34.0656
-16.3406
Optimizing Vs & Thickness - generation: 22; average & best misfits: -30.0865
-16.3406
Optimizing Vs & Thickness - generation: 23; average & best misfits: -30.9949

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-16.3406
Optimizing Vs & Thickness - generation: 24; average & best misfits: -30.4872
-16.3406
Optimizing Vs & Thickness - generation: 25; average & best misfits: -29.5378
-16.3406
Optimizing Vs & Thickness - generation: 26; average & best misfits: -26.9476
-16.3406
Optimizing Vs & Thickness - generation: 27; average & best misfits: -27.8392
-16.3323
Optimizing Vs & Thickness - generation: 28; average & best misfits: -29.1223
-16.2959
Optimizing Vs & Thickness - generation: 29; average & best misfits: -36.1713
-16.2959
Optimizing Vs & Thickness - generation: 30; average & best misfits: -30.2495
-16.2959
Optimizing Vs & Thickness - generation: 31; average & best misfits: -30.4515
-16.2959

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: -40.6017
-16.2959
Optimizing Vs & Thickness - generation: 2; average & best misfits: -33.3213
-16.2959
Optimizing Vs & Thickness - generation: 3; average & best misfits: -33.5392
-16.2959
Optimizing Vs & Thickness - generation: 4; average & best misfits: -33.7463
-16.2959
Optimizing Vs & Thickness - generation: 5; average & best misfits: -34.5167
-16.2959
Optimizing Vs & Thickness - generation: 6; average & best misfits: -31.7566
-16.2959
Optimizing Vs & Thickness - generation: 7; average & best misfits: -31.5617
-16.247
Optimizing Vs & Thickness - generation: 8; average & best misfits: -27.115
-16.247
Optimizing Vs & Thickness - generation: 9; average & best misfits: -29.9767
-16.247

Model after the Vs & Thickness optimization (fixed Poisson values):
Vs (m/s): 255  350  659
Poisson: 0.35      0.35      0.35
Thickness (m): 4.3        9

Number of models considered to calculate the average model: 75


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

Dataset: 3maswserra2dx.dat
Analyzed curve: 3 MASW SERRAPETRONA.cdp


==o== SECTION#3

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

VS (m/s):                   251  353  657
Standard deviations (m/s): 8   9  29

Thickness (m):            4.2         9.3
Standard deviations (m): 0.4         0.6
```

Approximate values for Vp, density & elastic moduli
Vp (m/s): 522 735 1368
Density (gr/cm3): 1.90 1.98 2.13
Vp/Vs ratio: 2.08 2.08 2.08
Poisson: 0.35 0.35 0.35
Young modulus (MPa): 323 666 2483
Sjear modulus (MPa): 120 247 919
Lamé (MPa): 278 576 2147
Bulk modulus (MPa): 358 740 2760

Fundamental mode
Mean model

f(Hz)	VR(m/s)
9.51379	482.4608
11.2491	415.2751
12.8759	364.4493
14.7197	333.0529
16.7803	313.3999
19.6002	296.3657
23.0708	280.5779
26.3244	268.2863
31.3134	254.6588
36.5193	246.3175

First higher mode
Mean model

28.2767	393.0617
30.8796	376.3292
35.4347	358.9828

==o== SECTION#4

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BEST MODEL

Vs (m/s): 254.8968 350 658.9493
thickness (m): 4.2549 8.9962

Approximate values for Vp, density & elastic moduli
Vp (m/s): 531 729 1372
Density (gr/cm3): 1.90 1.98 2.13
Vp/Vs ratio: 2.08 2.08 2.08
Poisson: 0.35 0.35 0.35
Young modulus (MPa): 334 654 2498
Shear modulus (MPa): 124 242 925
Lamé (MPa): 289 566 2160
Bulk modulus (MPa): 371 728 2777

dispersion curve (frequency - Rayleigh phase velocity)

Fundamental mode)
best model

F(Hz)	VR(m/s)
9.51379	487.4425
11.2491	420.1981
12.8759	366.4649
14.7197	333.3497
16.7803	313.0216
19.6002	295.9855
23.0708	280.9895
26.3244	269.7201
31.3134	257.2446
36.5193	249.4679

First higher mode)
best model
28.2767 396.6916
30.8796 378.7787
35.4347 360.0256

VS5 (mean model): 263 m/s
VS5 (best model): 266 m/s

VS20 (mean model): 378 m/s
VS20 (best model): 380 m/s

VS30 (mean model): 440 m/s
VS30 (best model): 442 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.

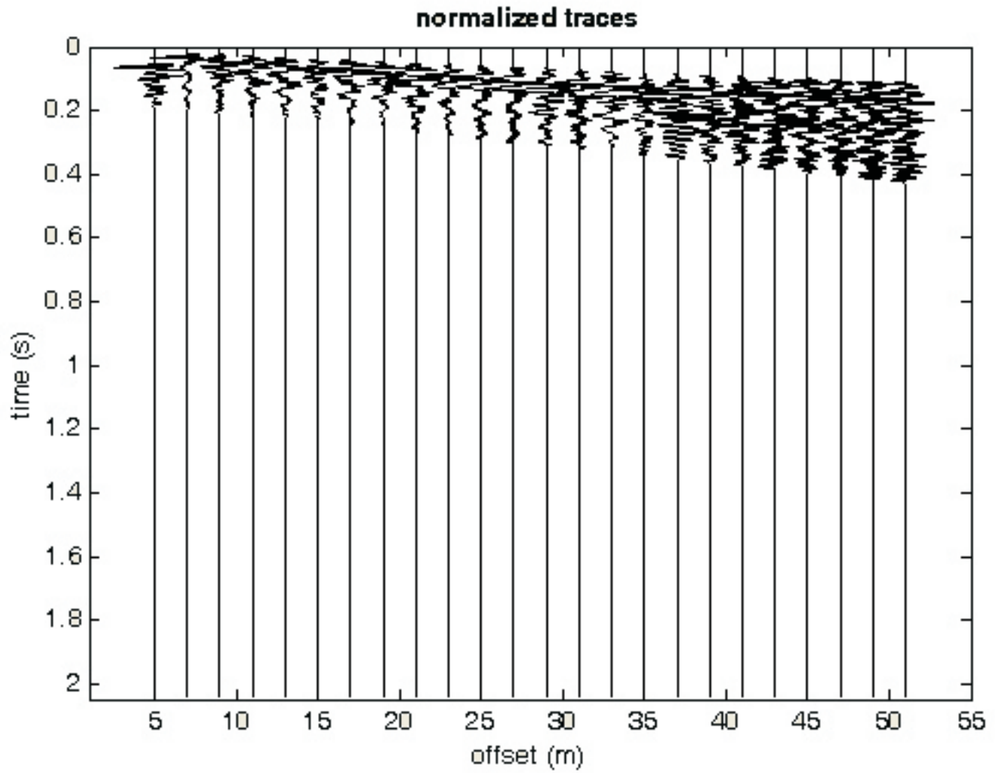
Results saved in the folder "C:\WINMAS~1\output".

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

#1: uploading & processing (MASW analyses)

dataset: 3maswserra2dx.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

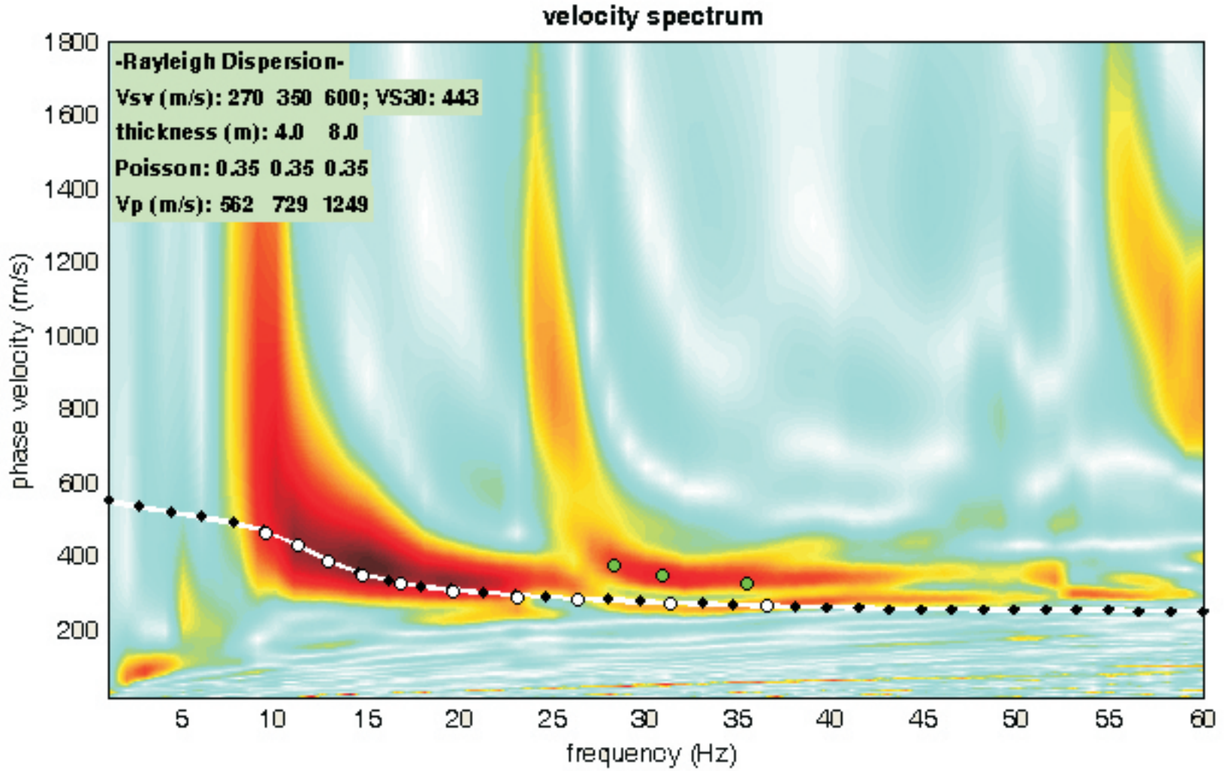
refraction
Professional version

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

MASW
calculate spectrum Tau - v

ReMi
Professional version

visualize curves
input curve ?



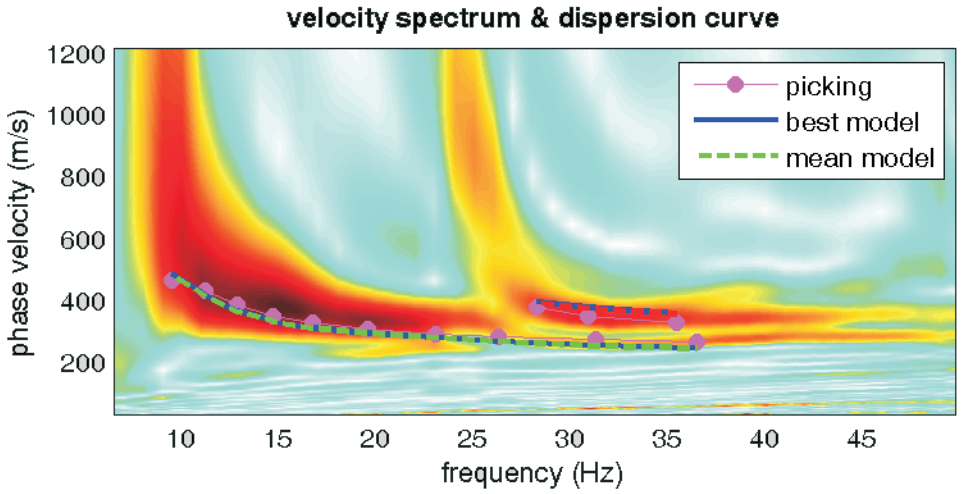
explore spectrum

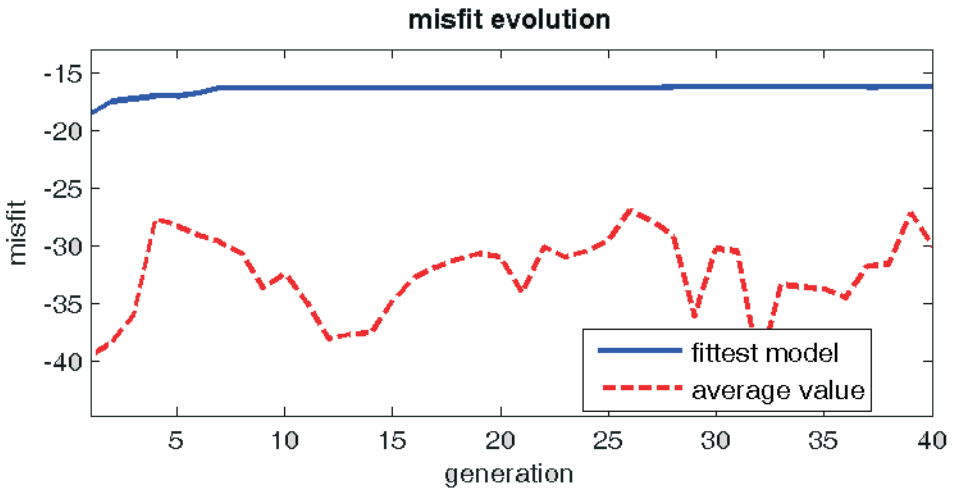
3 MASW SERRAPETRONA.cdp

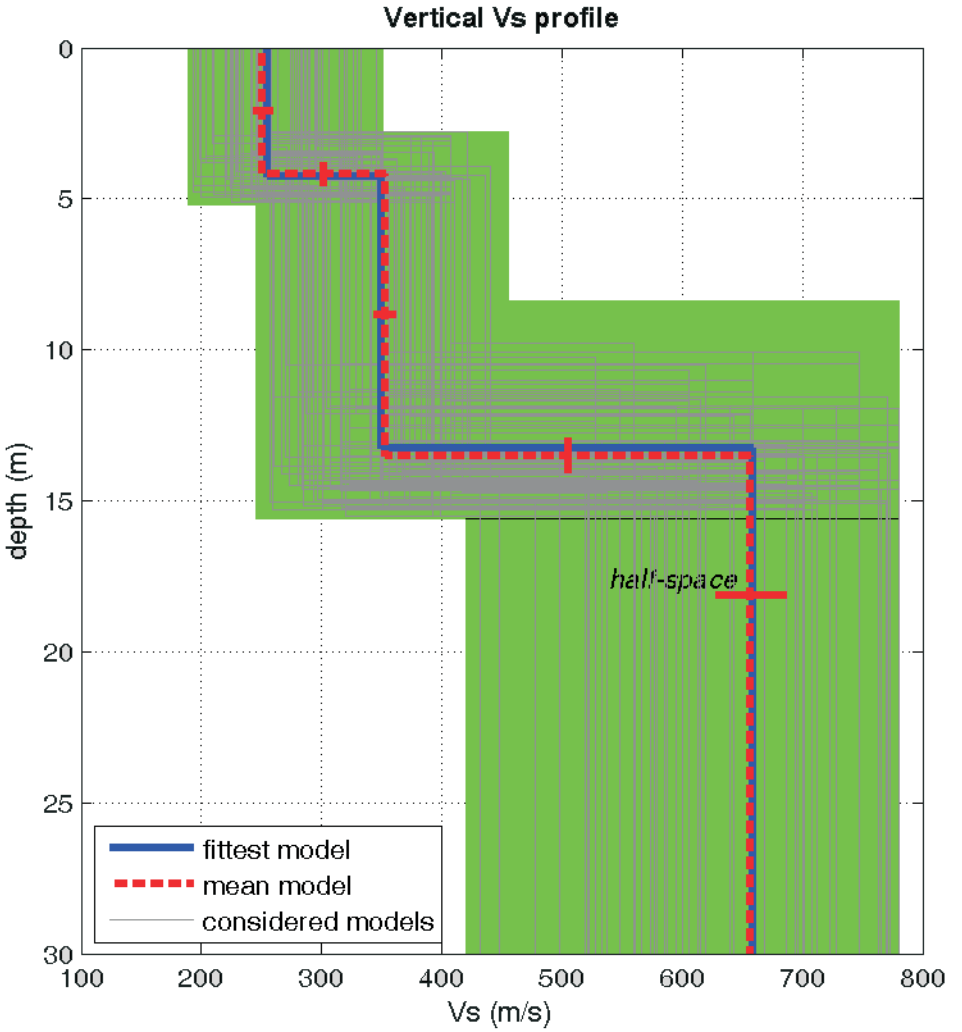
modelling
parameters save model
upload model 3 Love analysis: Professional version
eigen period refresh ?

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

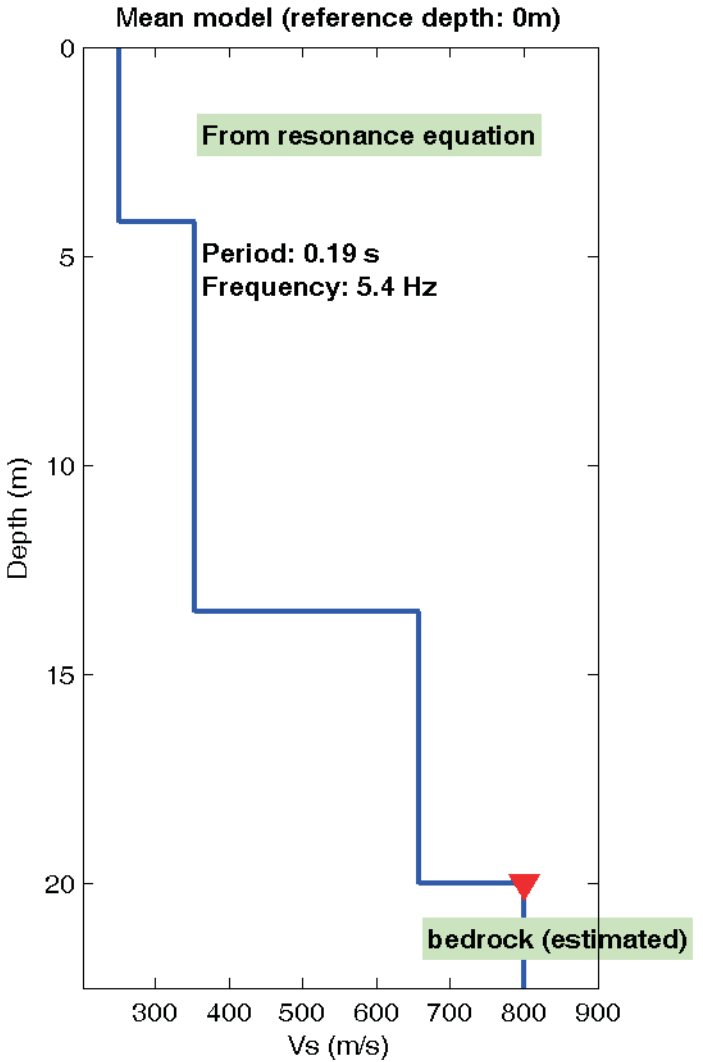
inversion
exit

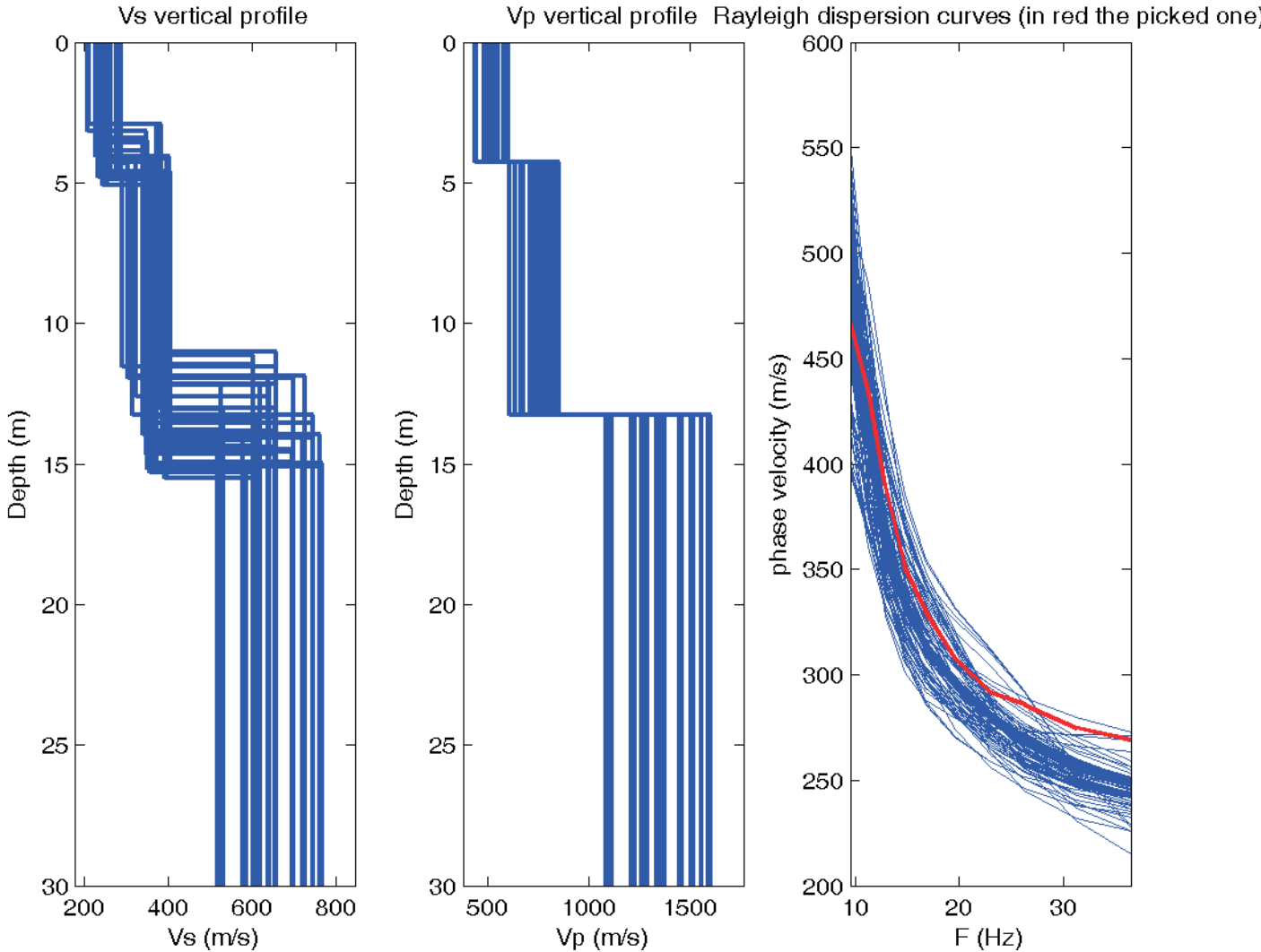


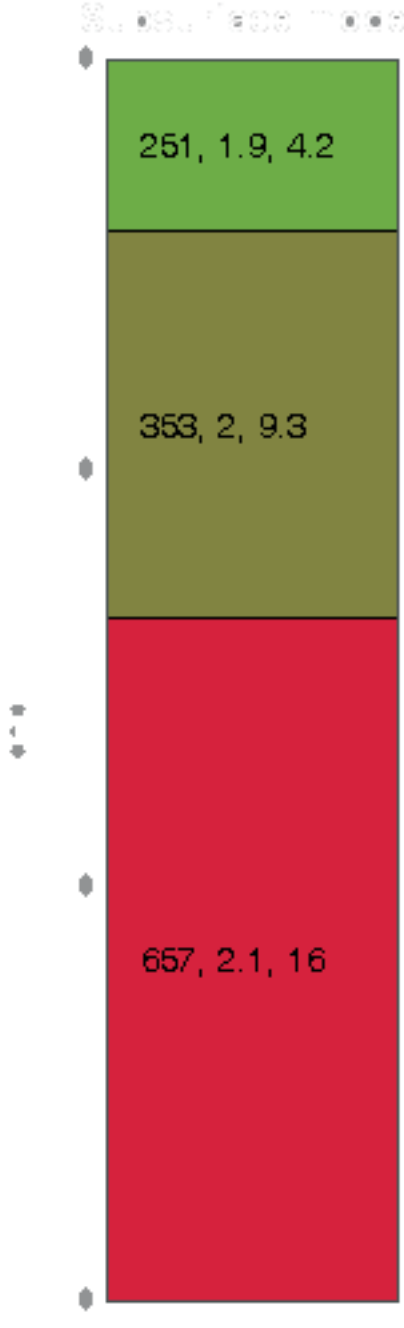




dataset: 3maswserra2dx.dat
dispersion curve: 3 MASW SERRAPETRONA.cdp
VS30 (best model): 442 m/s
VS30 (mean model): 440 m/s


Mean model (reference depth: 0m)
From resonance equation
Period: 0.19 s
Frequency: 5.4 Hz
bedrock (estimated)
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
200
400
600
800
500
1000
1500
550
450
350
300
250
10
20



Vs (m/s)	*density* (gr/cm^3)	*thickness* (m)