

Progetto S4 INGV

UR4 Politecnico di Torino

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(1) DISTR – Politecnico di Torino

(2) DITAG – Politecnico di Torino



Politecnico di Torino

SURFACE WAVE RESEARCH GROUP

A Multidisciplinary research group involving people of Environmental-Engineering Geophysics Lab (DITAG) and Geomechanics Lab (DISTR)

Daniele Boiero, Cesare Comina, Sebastiano Foti, Margherita Maraschini, Claudio Piatti, Laura Valentina Socco, Ken Tokeshi

From 1998:

- ✓ 5 PhD Theses and more than 20 bachelor and master theses;
- ✓ 12 Journal Papers and 18 International Conferences
- ✓ Several research projects (experiments in more than 50 sites for near surface characterization)

EQUIPMENT:



Seismic:

Seismograph Geometrics Geode 48 channels and Abem

Terraloc Mark 6 24 channels

Vertical Geophones 2 Hz, 4.5 Hz, 40 Hz

Horizontal Swyphone 20 Hz

Triaxial Geophones 2Hz

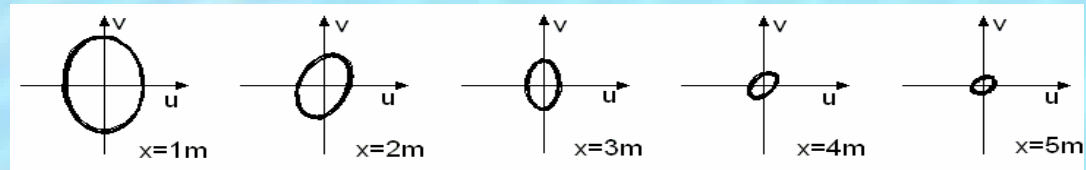
Borehole Triaxial Geophones 4 x 2 Hz, 8 x 10 Hz

Hydrophones

Impulsive and vibrating sources

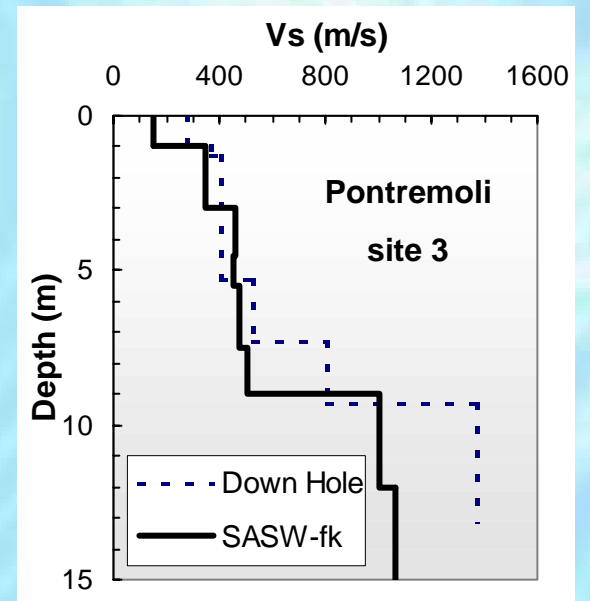
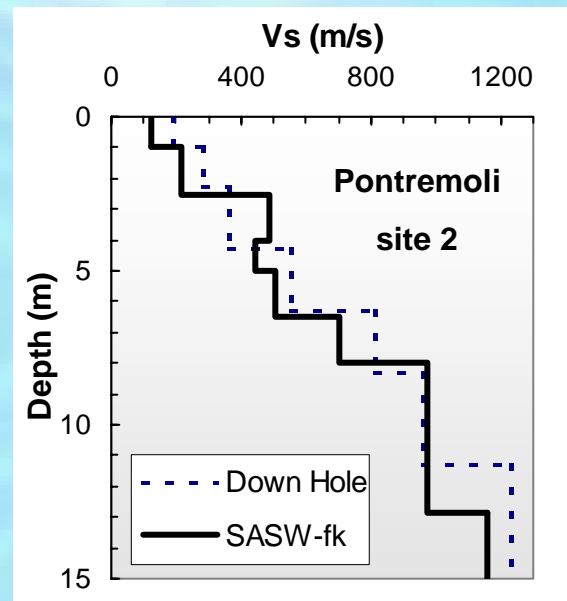
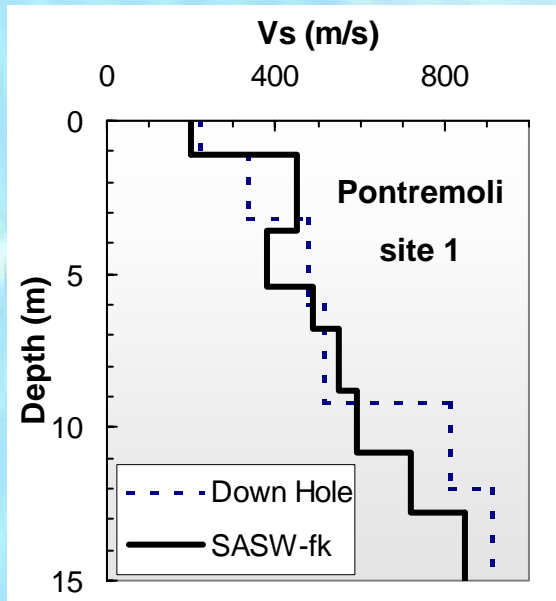
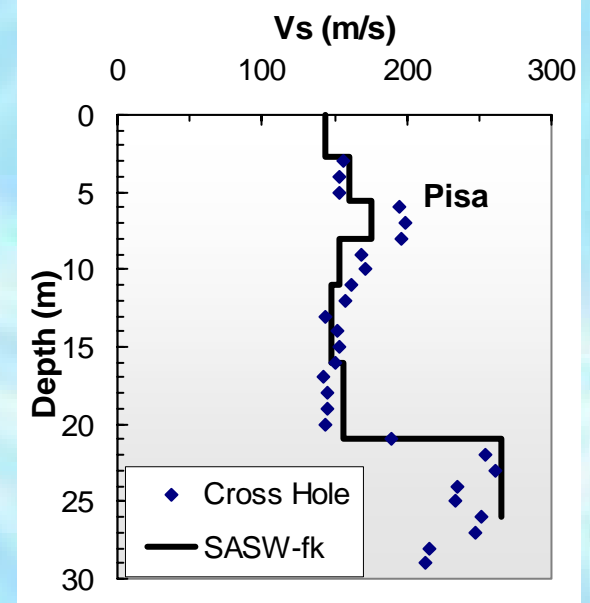
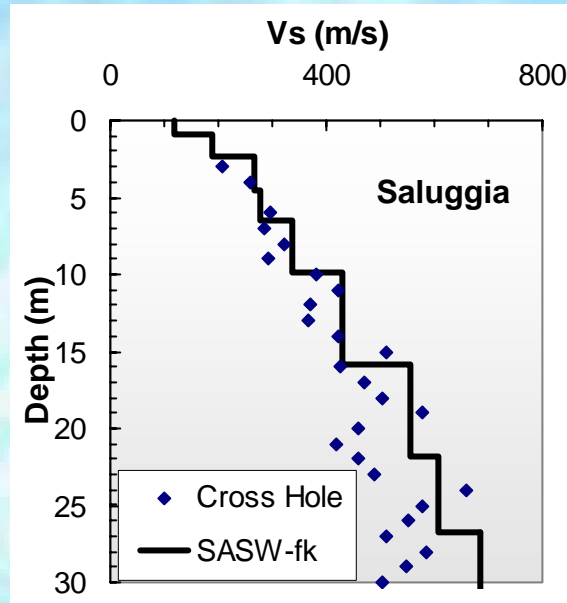
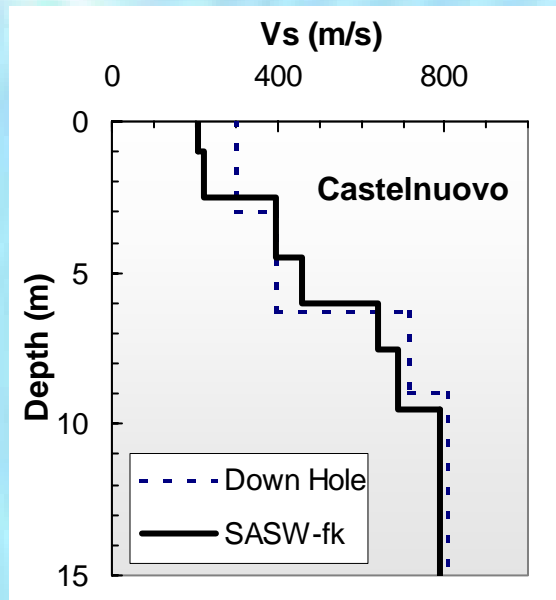


Sources

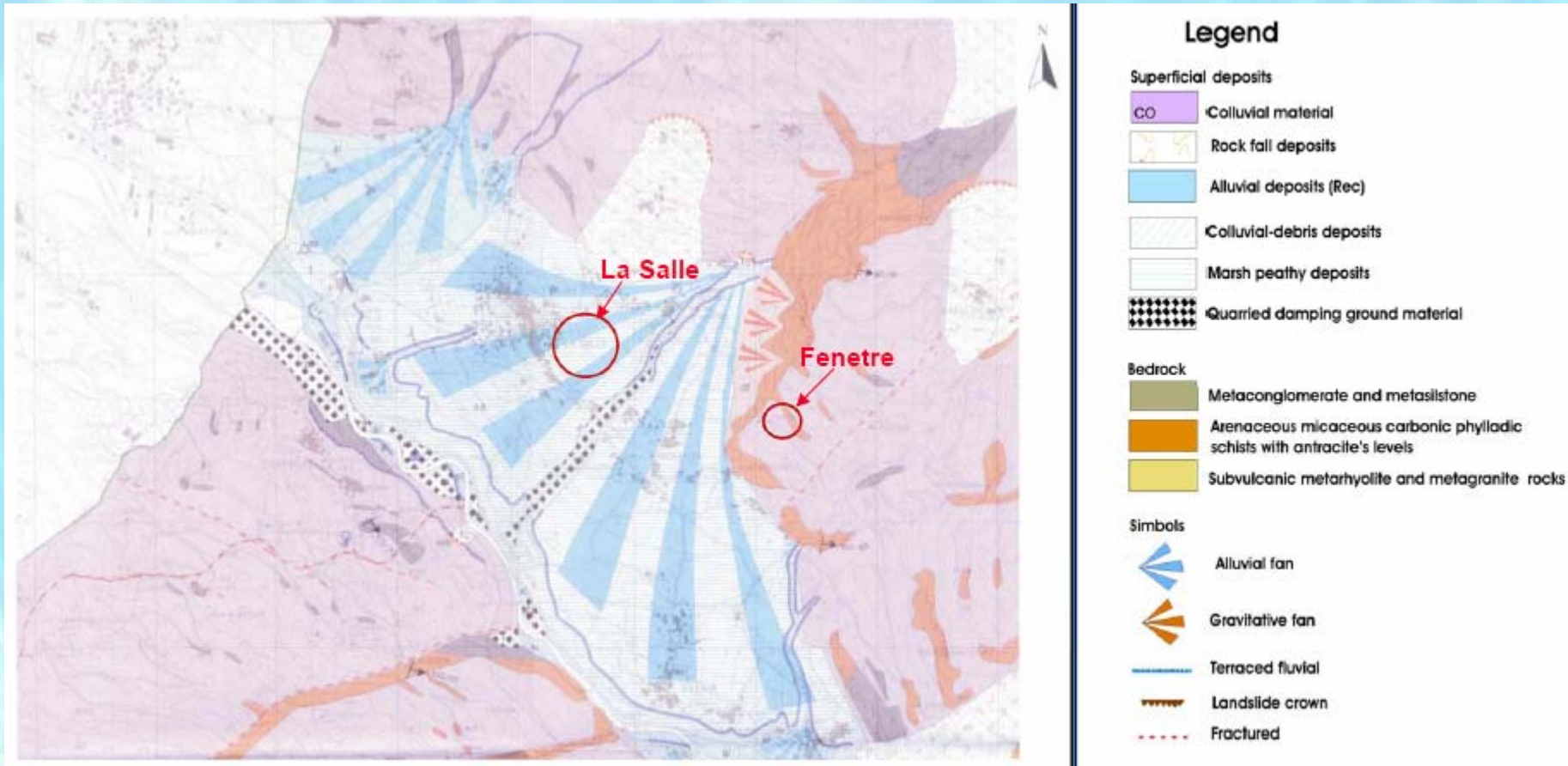


Electro-mechanical Shaker (APS-Dynamics)

Comparison with Borehole Seismic Methods



La Salle (Val d'Aosta)



EU Interreg III B - Alpinespace - Sismovalp Project

“Seismic hazard and alpine valley response analysis”

The Site – Methodologies

Methods 1D:

For Vs profile of sediments and bedrock depth:

A B C D E - Active and Passive SW tests.

DH1 DH2 –Down Hole Tests (P and Sh waves).

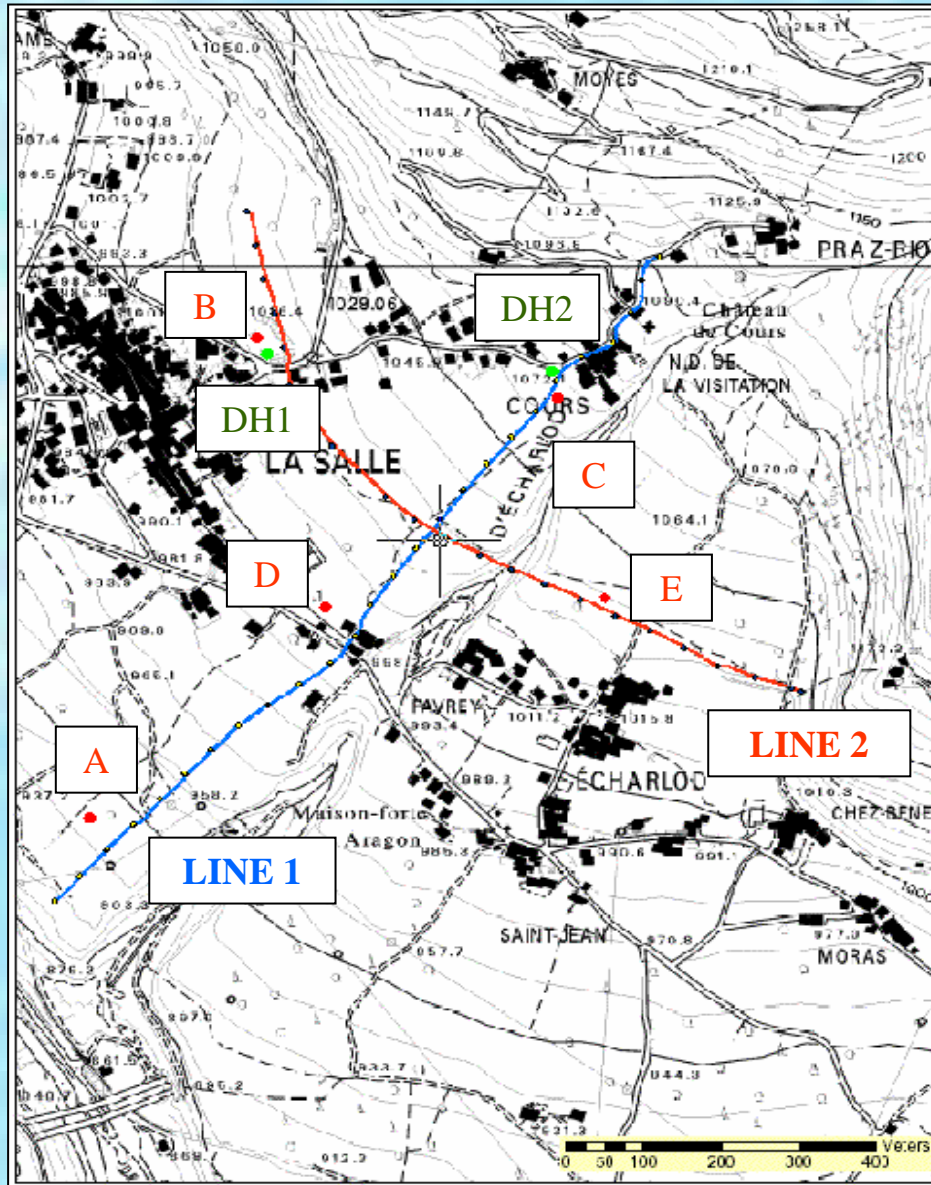
Methods 2D:

For bedrock depth and morphology:

LINE 1 e LINE 2 seismic reflection tests.

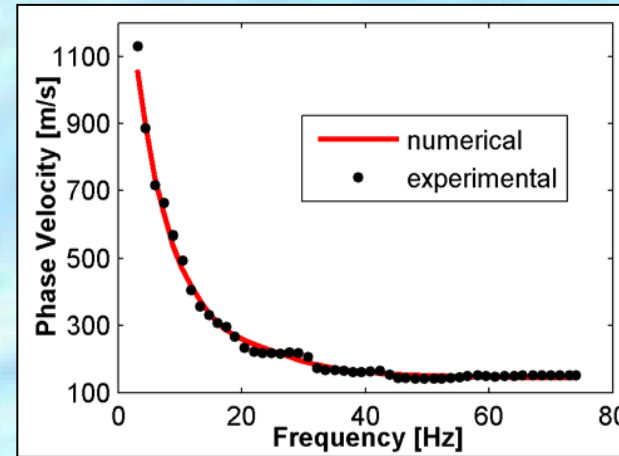
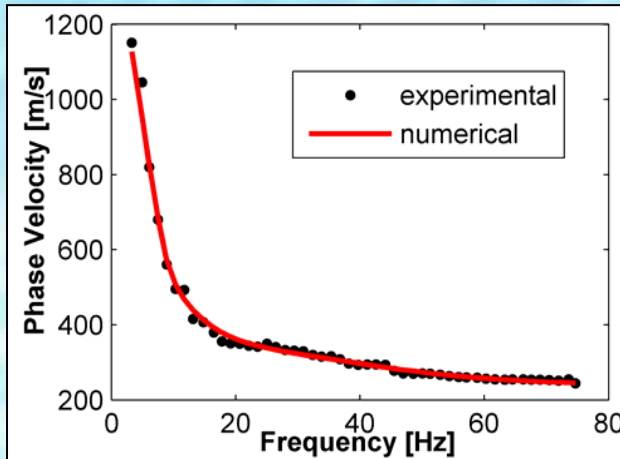


LCI on Ground-Roll

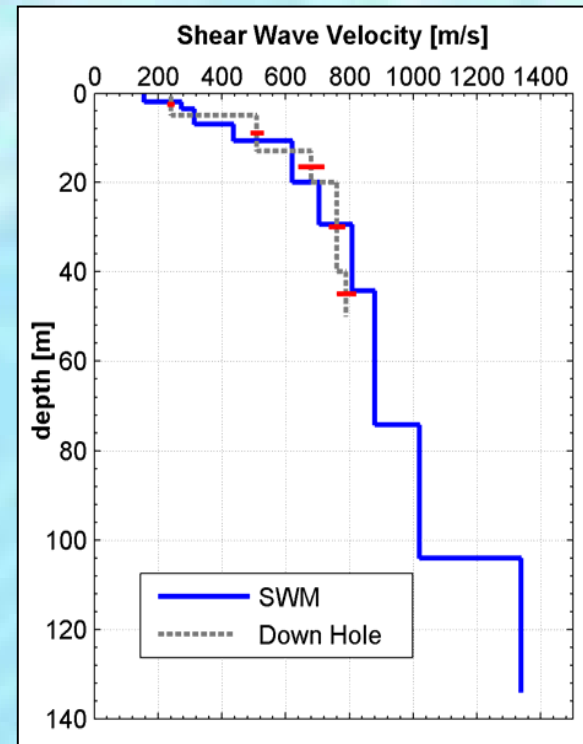
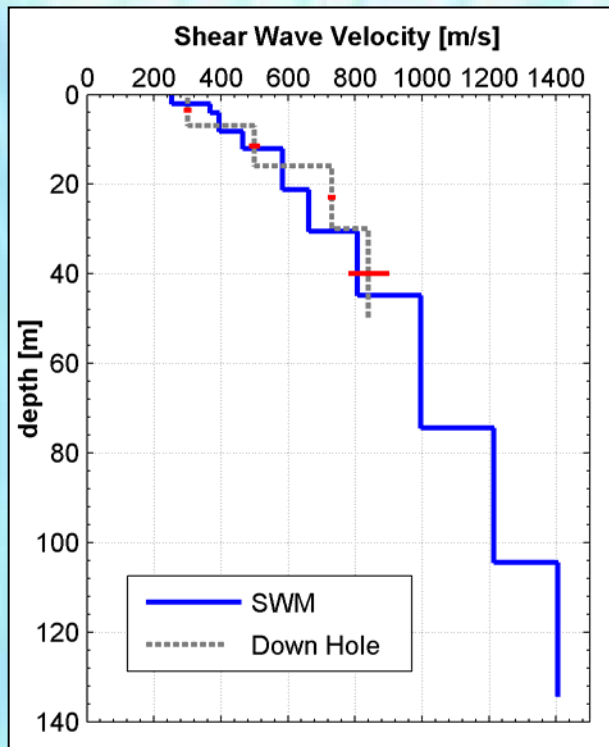


A + P - SW Tests

Site B



Site C

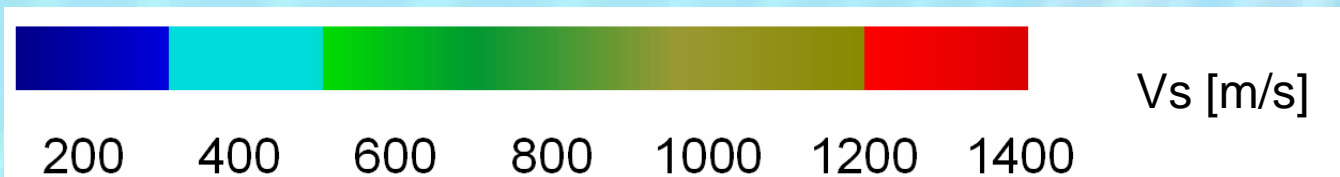
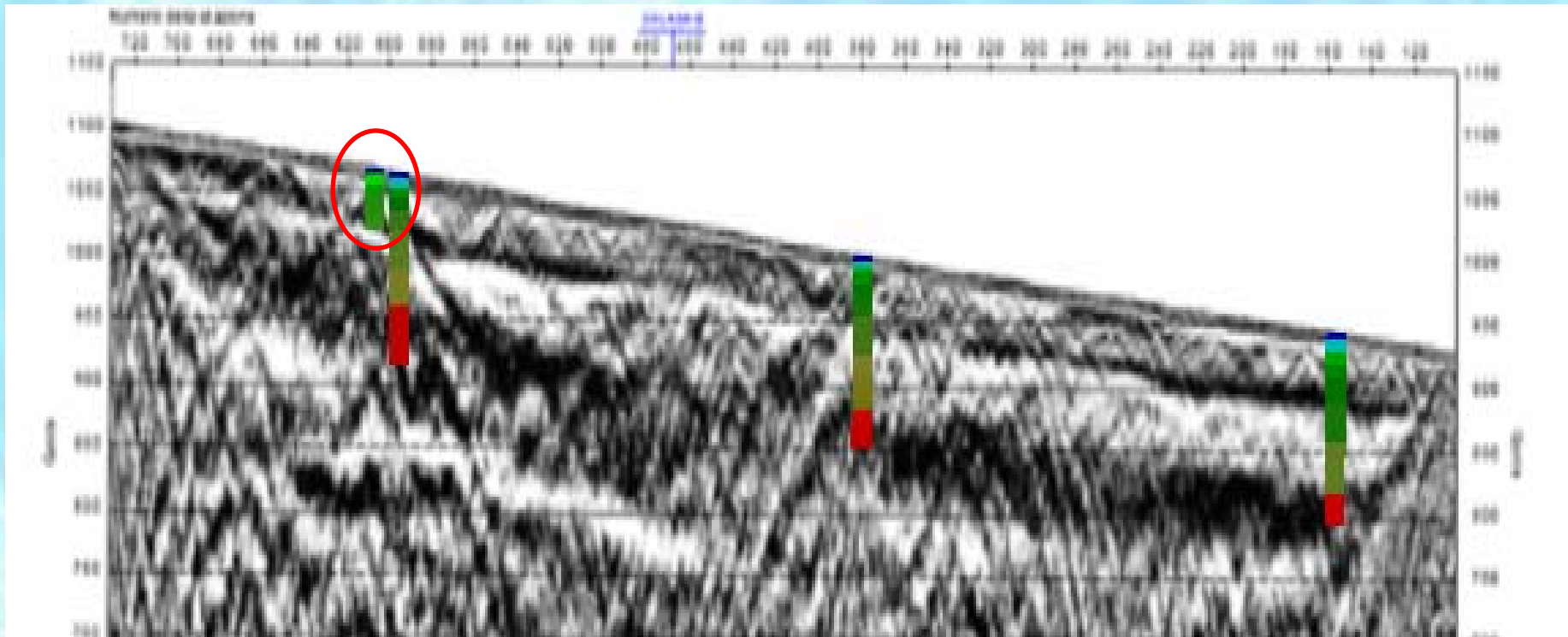


(Foti et al., 2007)

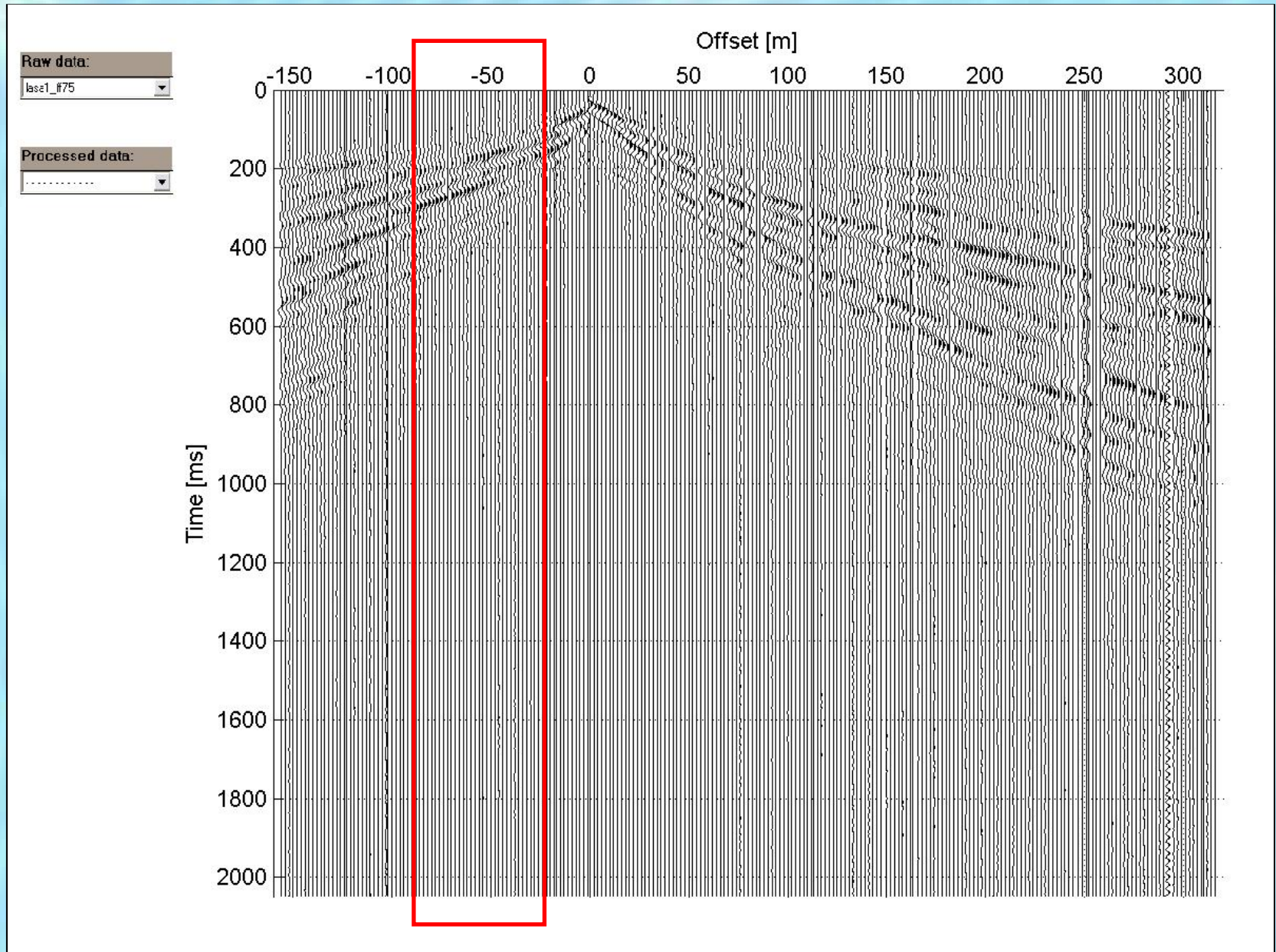
Results - V_s

Line 1

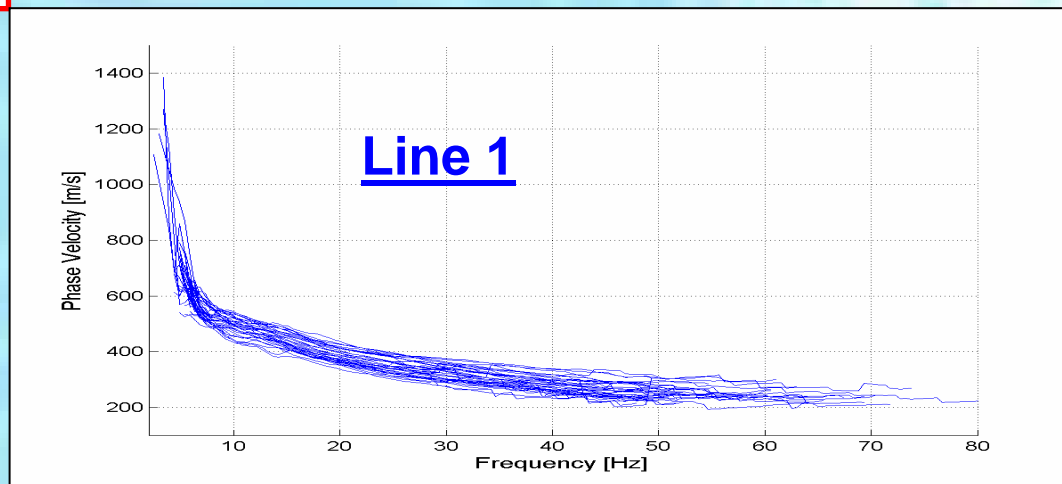
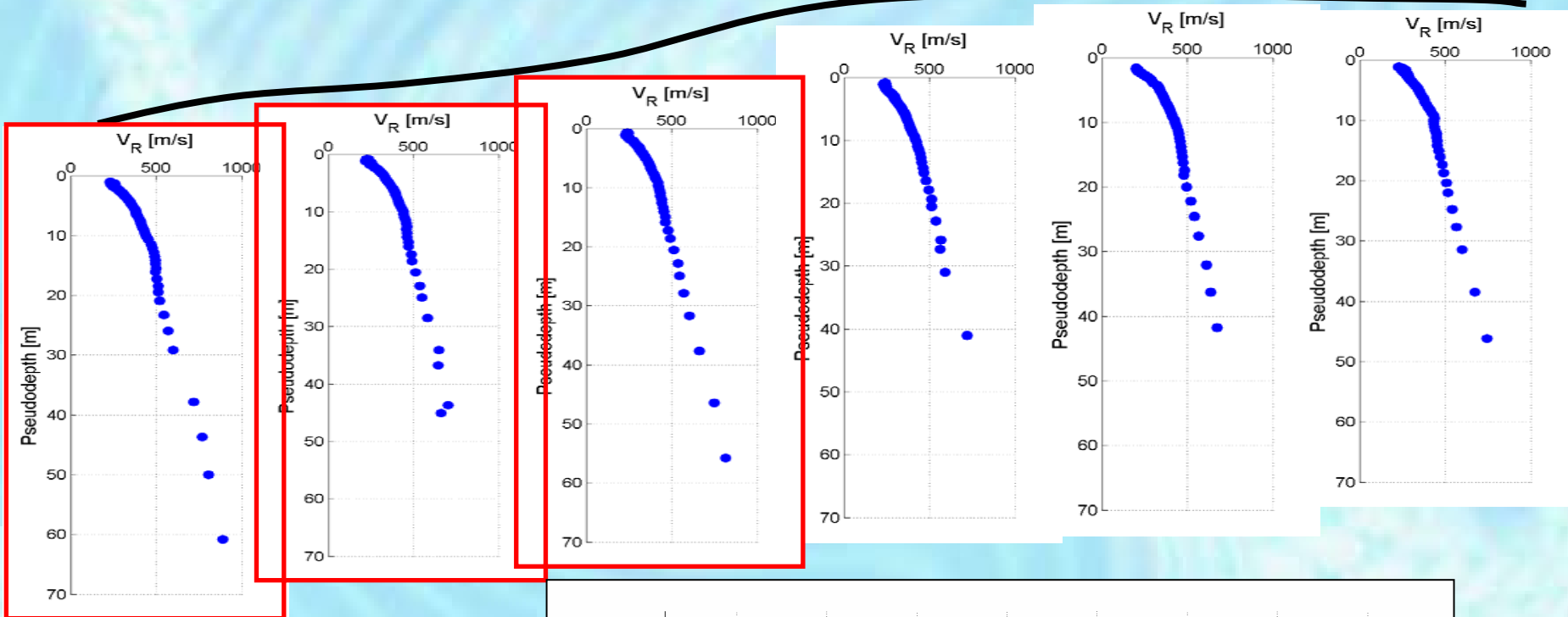
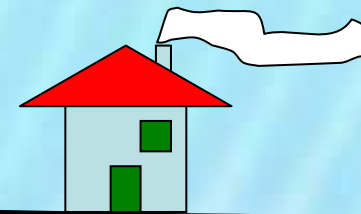
(Socco et al., 2008)



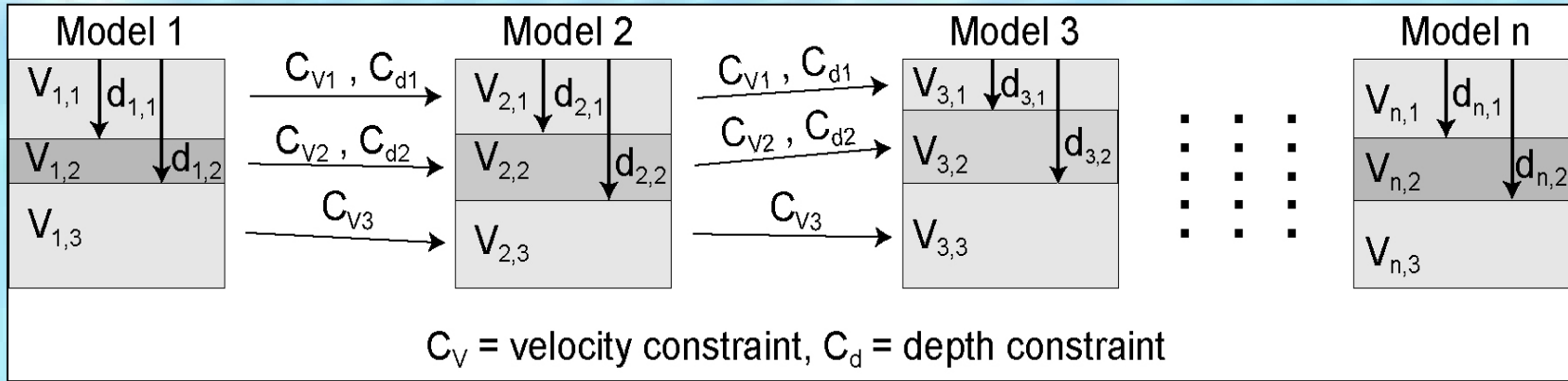
LCI – Dati di Gound Roll



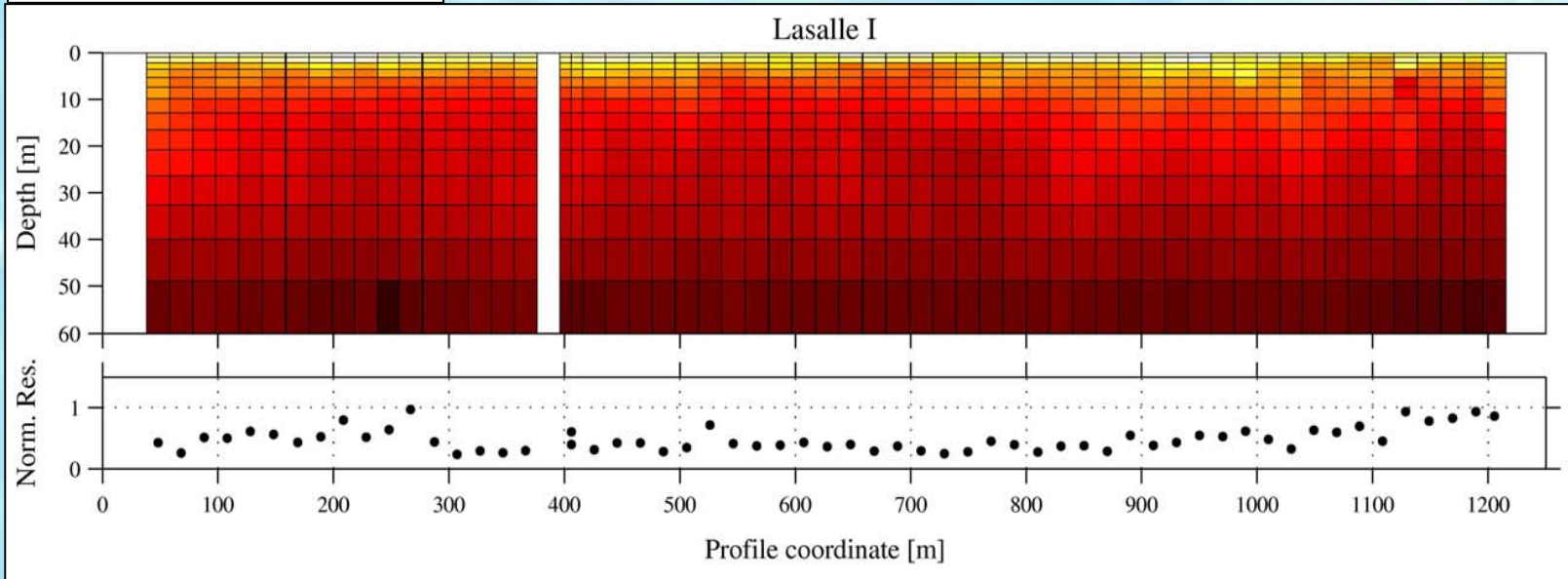
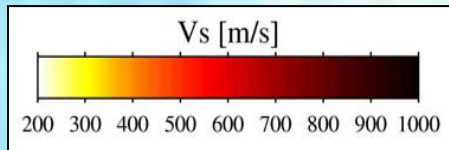
LCI – Dati di Gound Roll



LCI - Metodologia

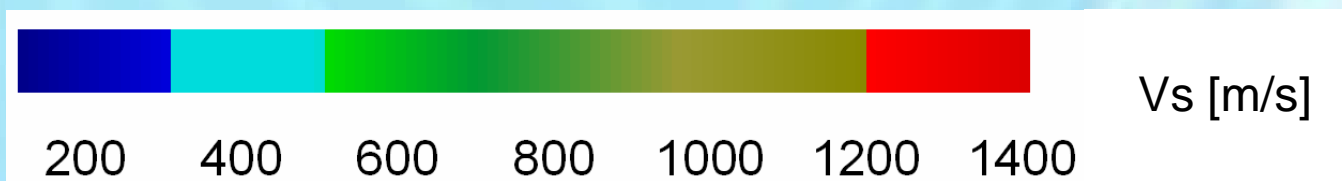
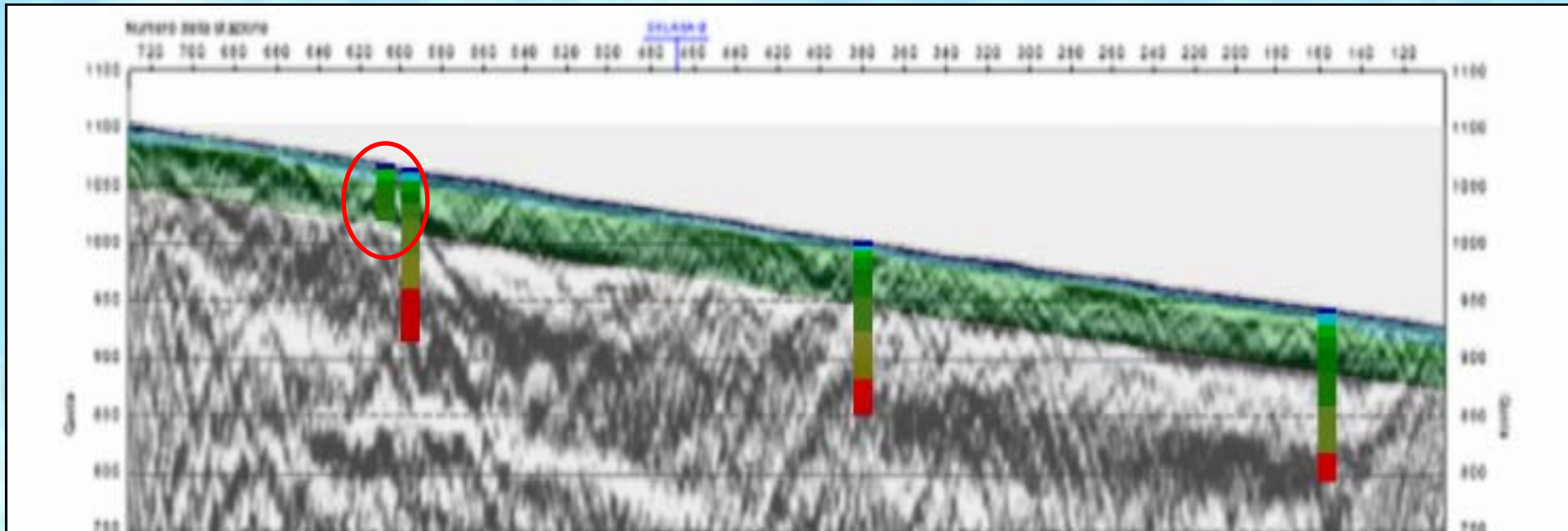


[Auken and Christiansen, 2004]

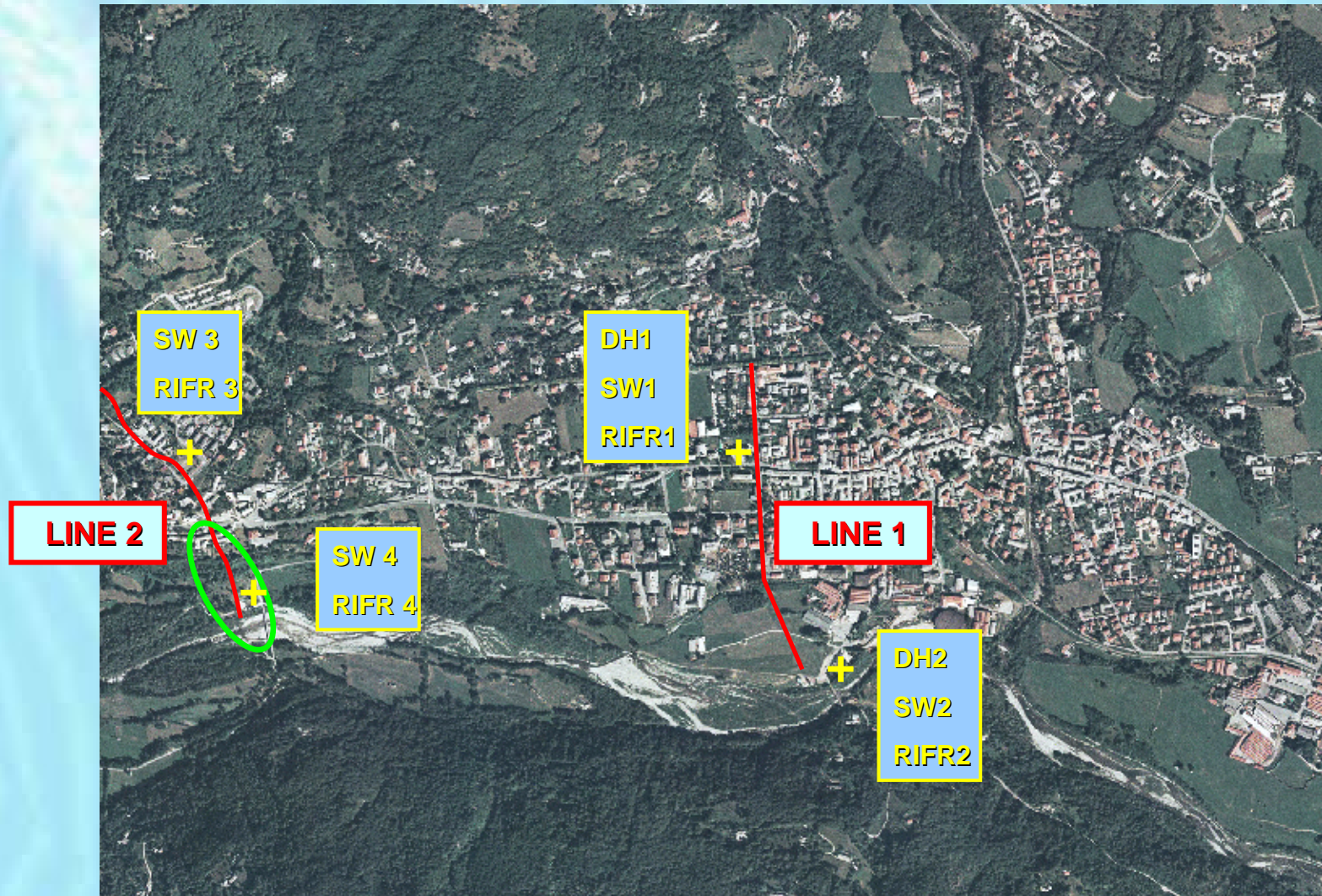


Confronto tra i Metodi - Vs

Line 1

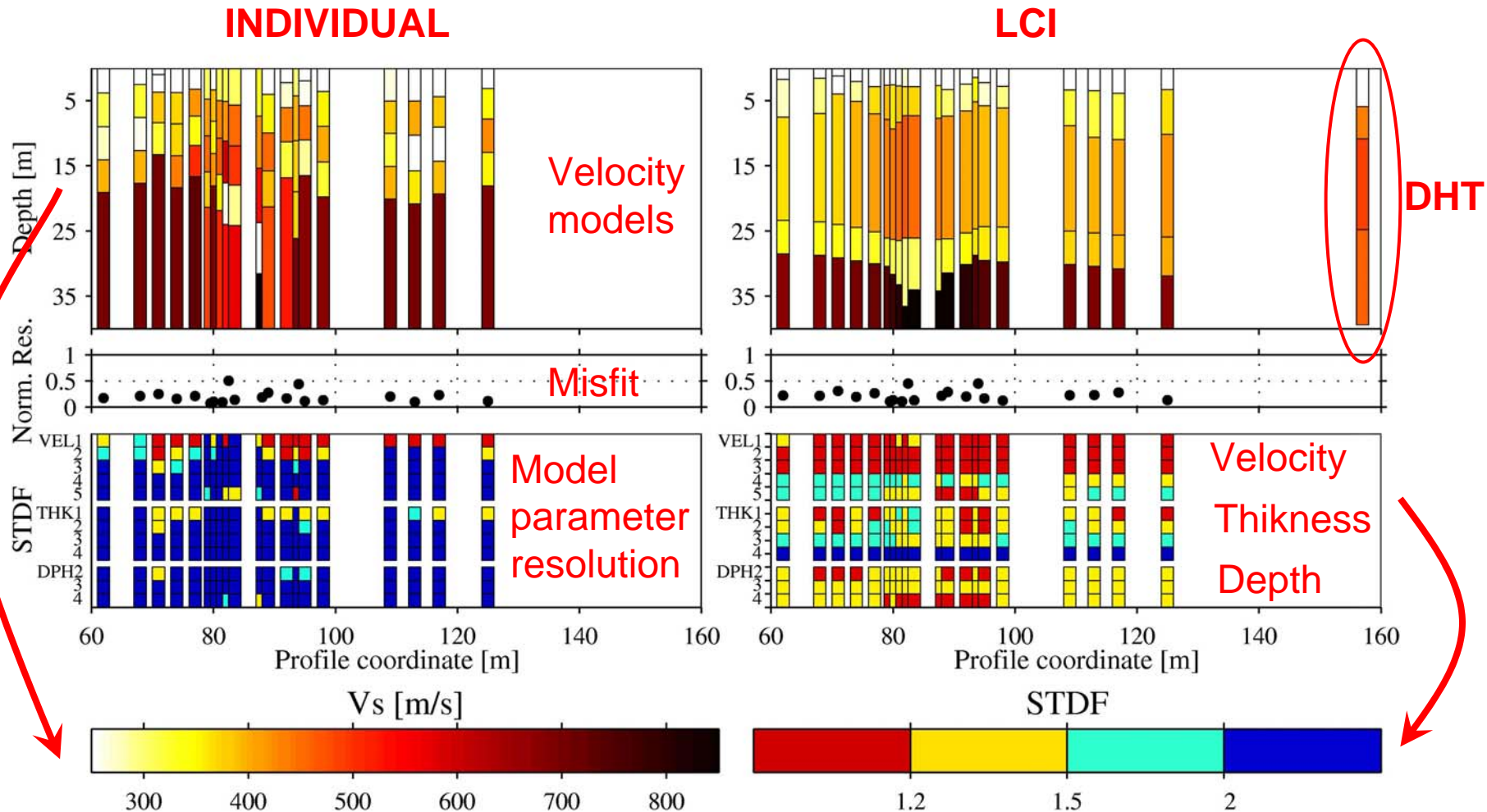


Torre Pellice (Piemonte)



***EU Interreg III B - Alpinespace - Sismovalp Project
“Seismic hazard and alpine valley response analysis”***

Individual Least Square Inversion vs. LCI



[Tarantola and Vallette, 1982]