

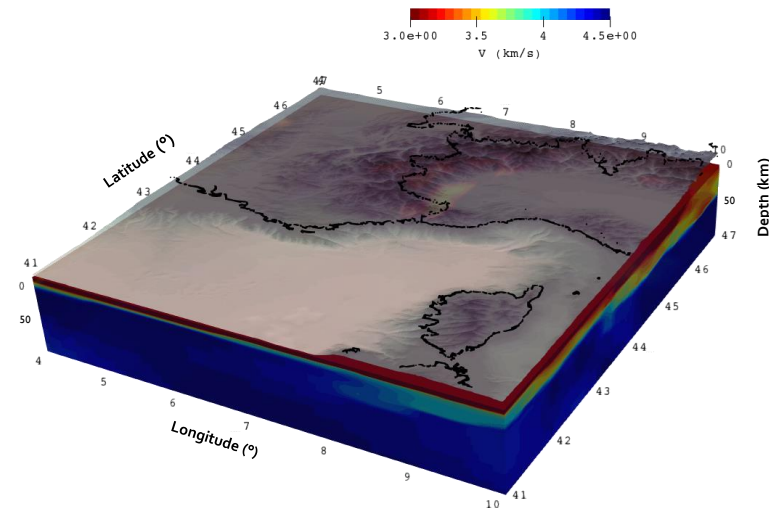
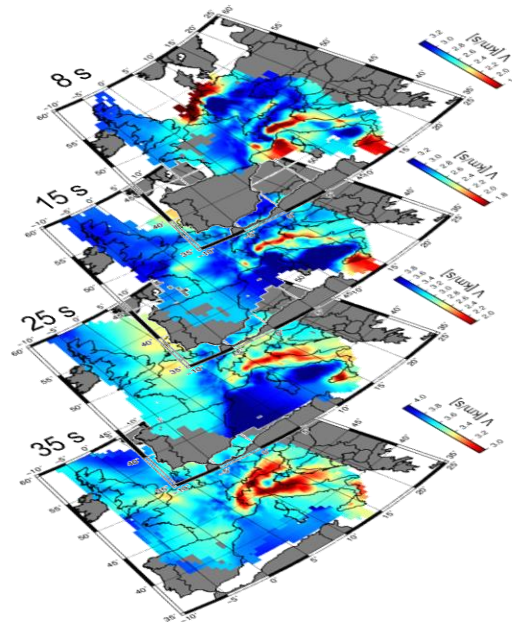
Towards an integrated model of geophysical and geological data of the Western Alps: seismic imaging of the Alpine lithosphere by Ambient Noise Tomography and Full Waveform Inversion

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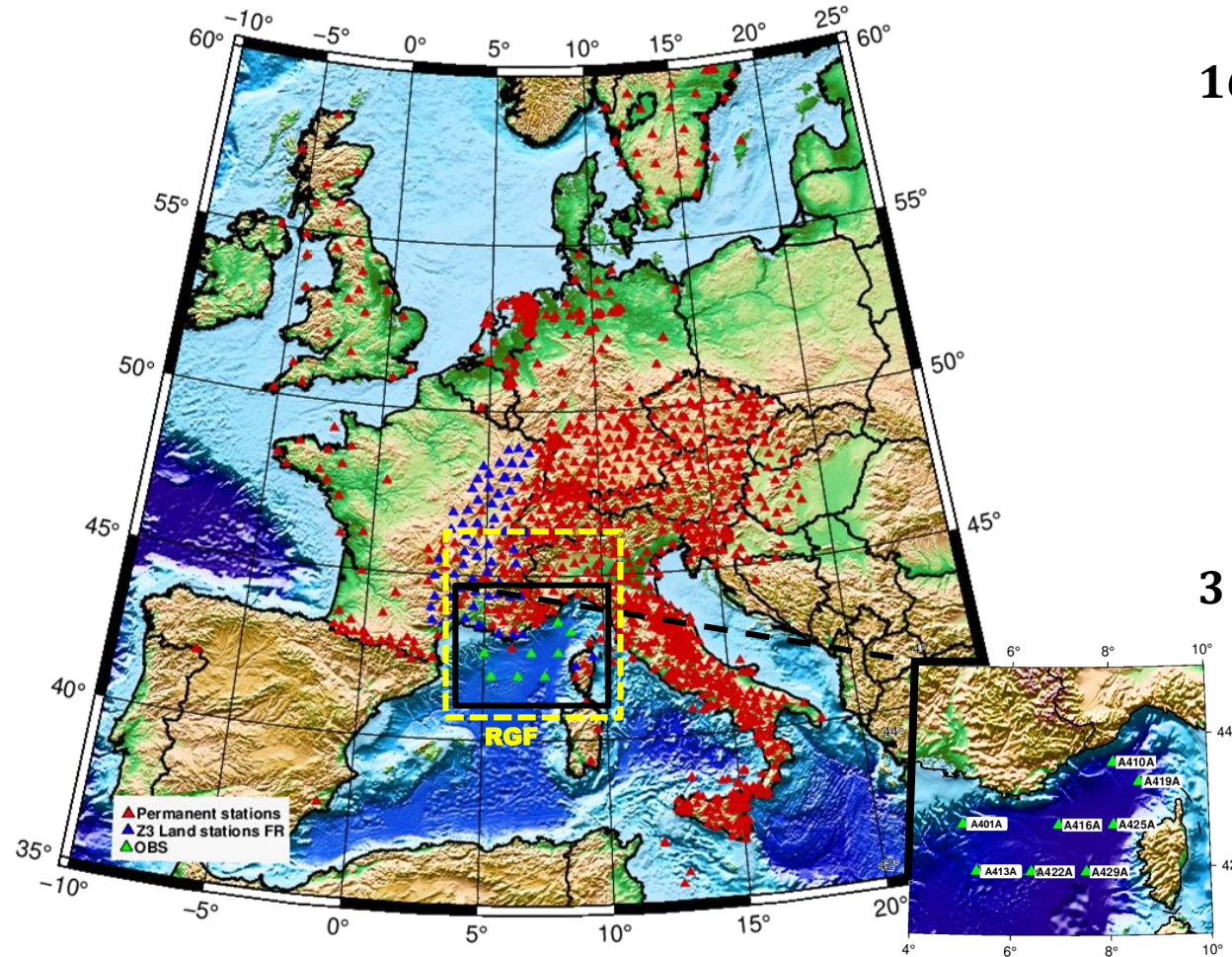
Participants: Marco Malusa (Université Milano-Bicocca), Nicolas Bellahsen, Claudio Rosenberg (ISTeP)



Approach

- ❑ **Derive a **probabilistic initial Vs model** from Ambient Noise Tomography**
 - Vs lateral variations
 - Moho depth map
- ❑ **Perform Full Wave Form Inversion to build a **Vp model** using the probabilistic Vs model and local earthquakes**
 - Vp/Vs model
 - Higher resolution of interfaces and intra-crustal heterogeneities
- ❑ **Throughout the PhD :**
 - Build a **3-D lithospheric geomodel** of the Western Alps
 - Work on the geological interpretation along the selected profiles

Dataset



Map of the 1600 broadband seismic stations used in this study

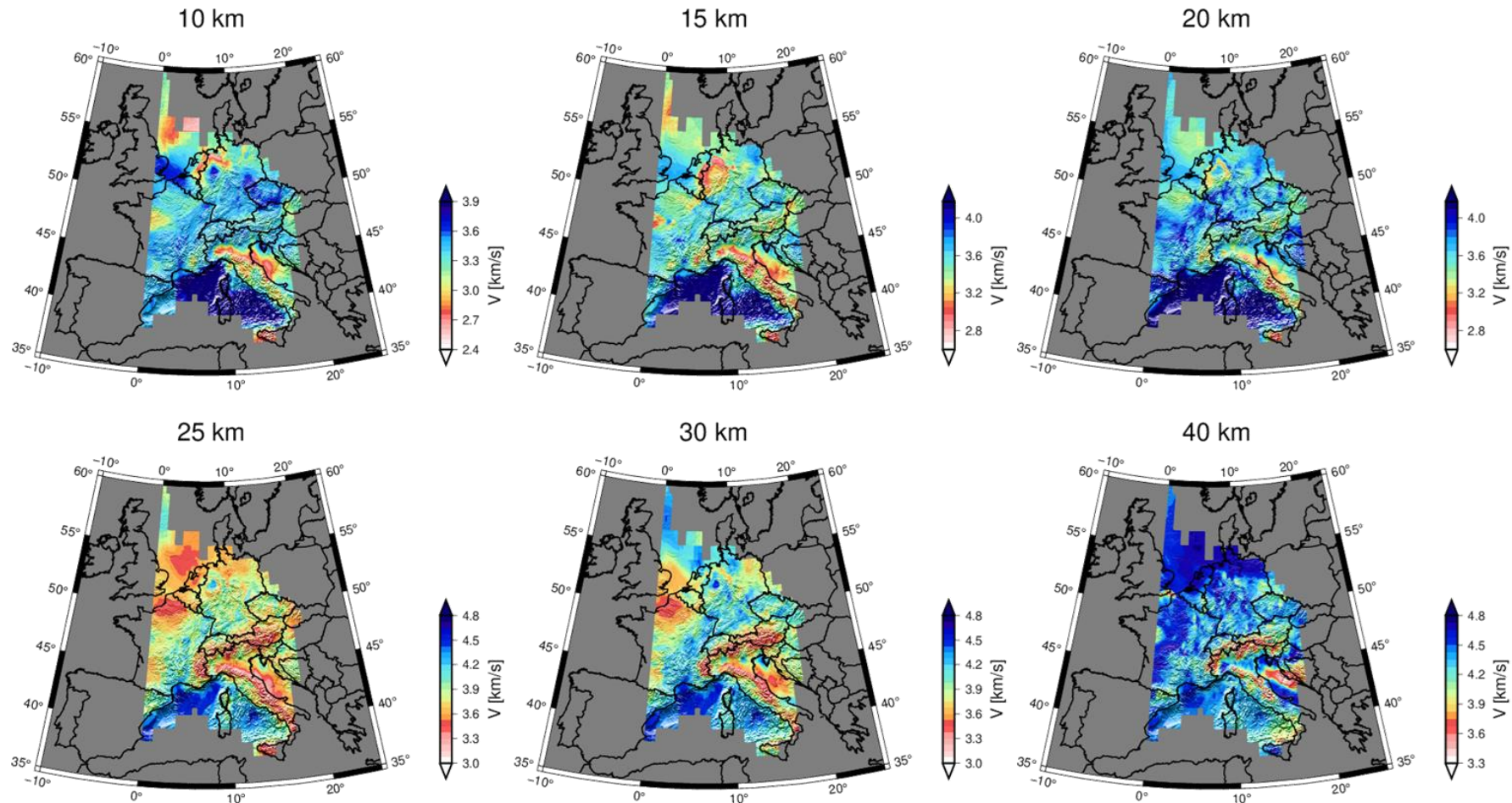
1600 broadband seismic stations including :

- Permanent seismic networks
- AlpArray temporary seismic network :
 - Cifalps 1 and 2
 - Ocean-Bottom-Seismometers (**OBS**)

3 years of daily seismic noise records (2015 – 2018)

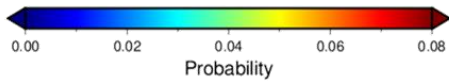
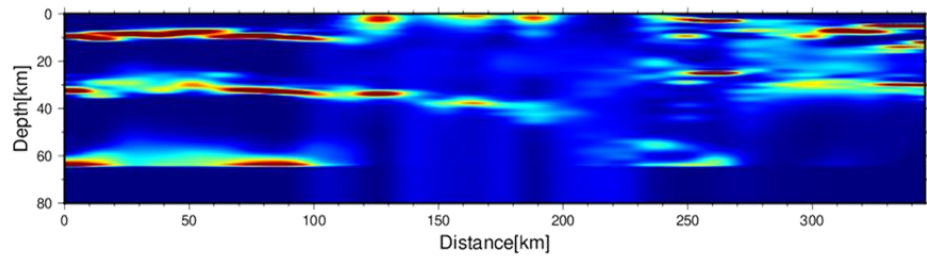
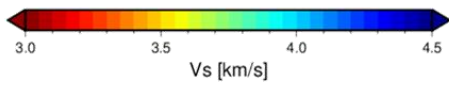
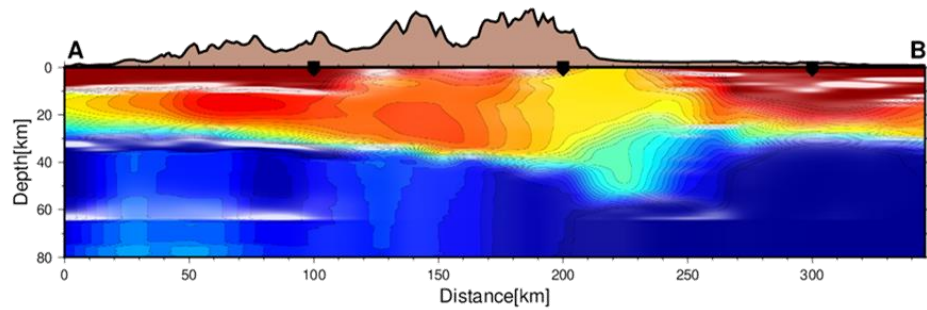
Ambient-noise tomography

3-D high-resolution Vs model from Semi-Bayesian Probabilistic Inversion



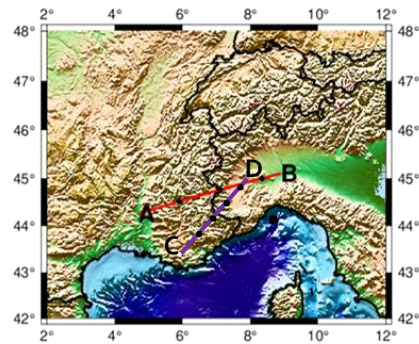
Depth slices in the 3-D Vs model

Ambient-noise tomography

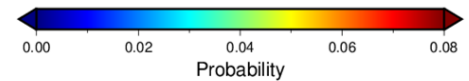
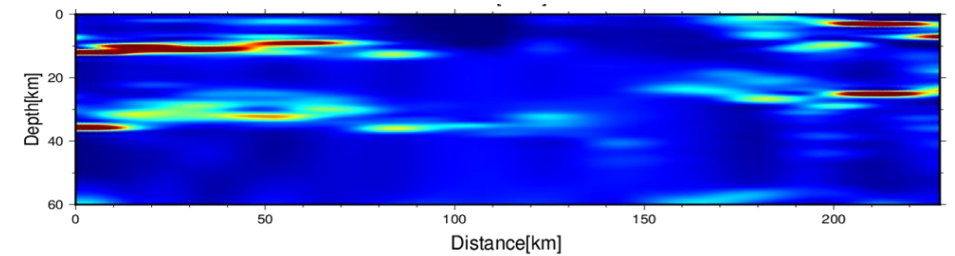
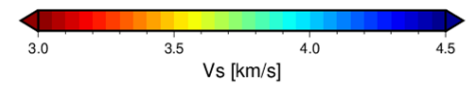
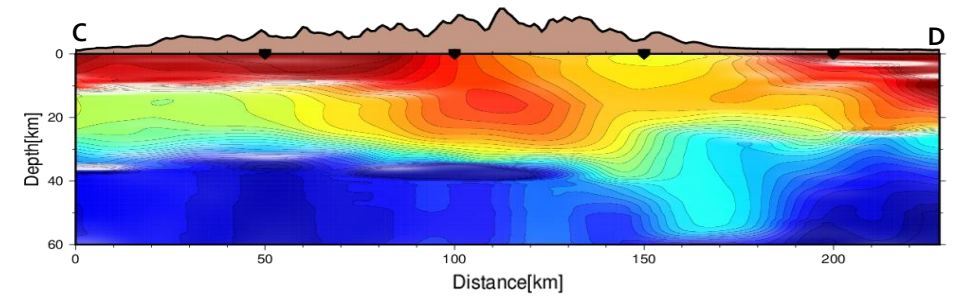
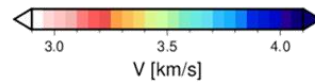
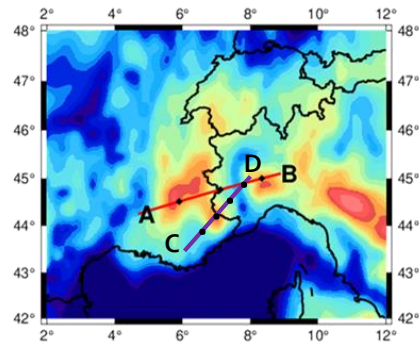


Depth section along the Cifalps profile

Profiles



20 km

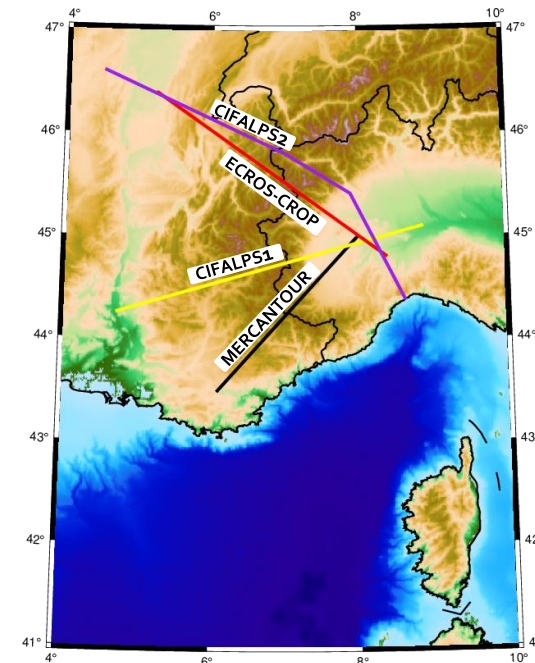


Depth section along the Mercantour profile

Perspectives

- **3-D Vp model from Full Wave Inversion of regional earthquake records with an updated Vs model from Ambient Noise Tomography as starting model.**
- **Integration of the Vp/Vs 3-D model, gravity data, topographic (DEM) and geological data (surface, cross-sections) in a 3-D lithospheric geomodel of the Western Alps using Geomodeller (BRGM).**

Your suggestions are welcome



Selected profiles