Velocity and attenuation models of Tenerife and La Palma (Canary Islands, Spain) through Ambient Noise Tomography.

Iván Cabrera-Pérez [1,3] ,Jean Soubestre [1] ,Luca D'Auria [1,2],
Edoardo Del Pezzo [4,5], José Barrancos [1,2], Germán D. Padilla [1,2],
Germán Cervigón [1], Monika Przeor [1,3], Garazi Bidaurrazaga-Aguirre [1],
David Martínez van Dorth[1], Alba Martín-Lorenzo[2], Nemesio M. Pérez [1,2]

(1) Instituto Volcanológico de Canarias (INVOLCAN), San Cristóbal de La Laguna, Tenerife, Spain (icabrera@iter.es),
(2) Instituto Tecnológico y de Energías Renovables (ITER), Granadilla de Abona, Tenerife, Spain
(3) Universidad de La Laguna, (ULL), San Cristóbal de La Laguna, Tenerife, Canary Islands, Spain
(4) INGV Osservatorio Vesuviano. Via Diocleziano 328, 80124 Naples, Italy
(5) Instituto Andaluz de Geofisica. Universidad de Granada. Calle Profesor Clavera s/n, Campus de Cartuja, Granada, Spain

- Objetives
- Methodology
- Results of La Palma
- Results of Tenerife

The main objective of this work is the use of **Ambient Noise Tomography (ANT)** to retrieve high-resolution **seismic velocity** and **attenuation models** of the first few kilometers of the crust, in order to detect anomalies potentially related to active **geothermal reservoirs** in **La Palma and Tenerife islands.**

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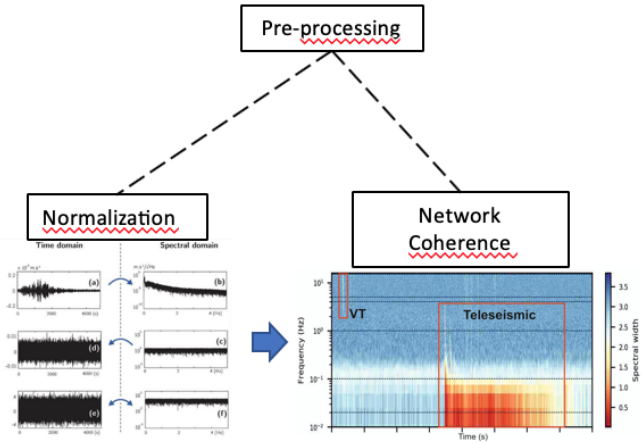
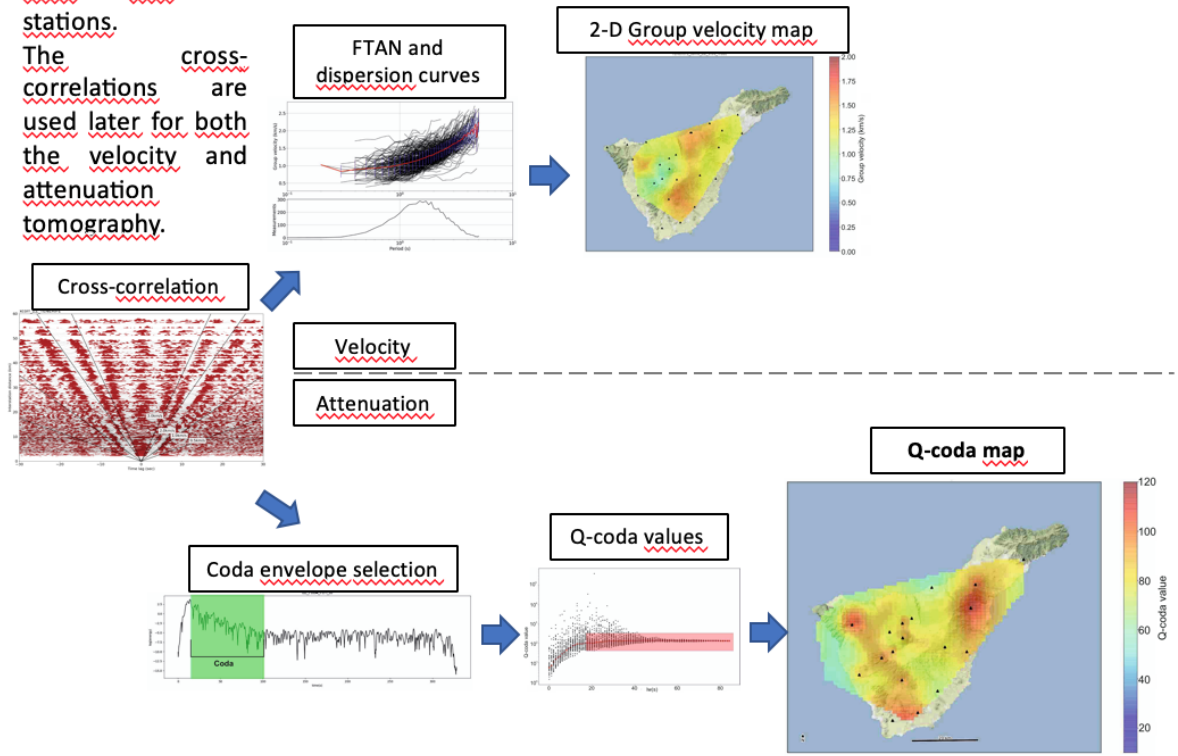


First, we apply a spectral and temporal **normalization** to raw data.

Subsequently we use the **Network Coherence method** (Seydoux et al., 2016) to remove time windows containing earthquakes.

The second step is perform the **cross-correlation** for each pair of stations.
The cross-correlations are used later for both the velocity and attenuation tomography.

We obtained dispersion curves through the **Frequency Time ANalysis (FTAN)** and we realized **2D inversions** to obtain Rayleigh wave group velocity maps, by using a novel **non-linear multiscale approach** with a forward modeling based on a modified version of the Shortest Path algorithm (Moser 1991).



To map the seismic attenuation we computed the **Q-coda of the smoothed energy** corresponding to causal and acausal noise cross-correlations (green rectangle). The smoothed-energy slope was estimated for each combination of moving time-window starting point (tw) and length (lw) parameters, using a least-square linear fit (Aki & Chouet, 1975; Calvet et al., 2013). The Q coda value is finally determined as the **mean of the final flat part** of for the highest lw values. This ensures the computed Q-coda to correspond to the **intrinsic attenuation Qi**. The **spatial distribution of Q-coda values** corresponding to each station pair were mapped using the **empirical sensitivity kernels** developed by Del Pezzo & Ibáñez (2019)

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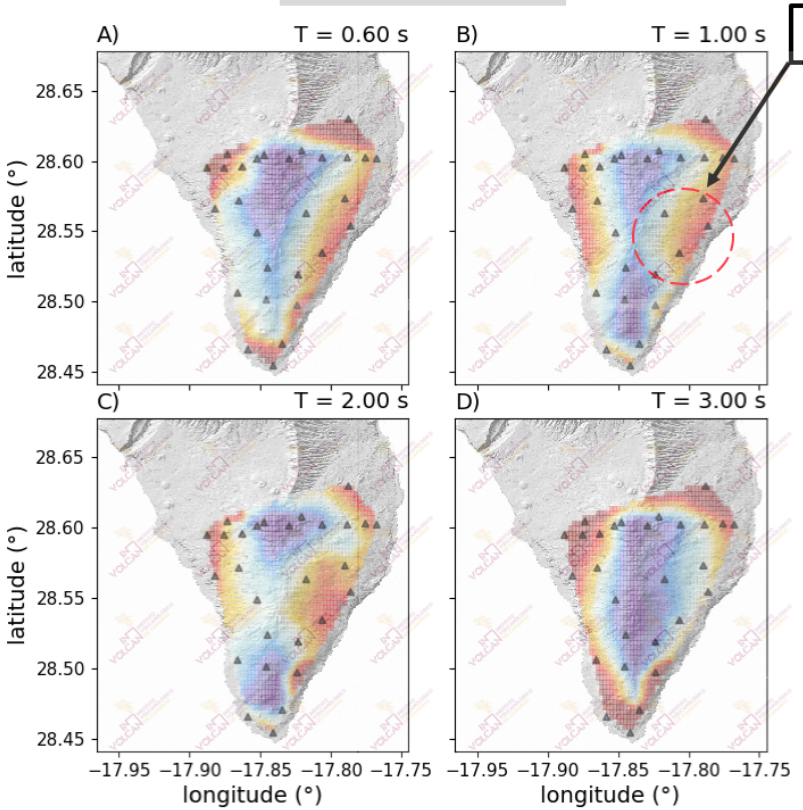
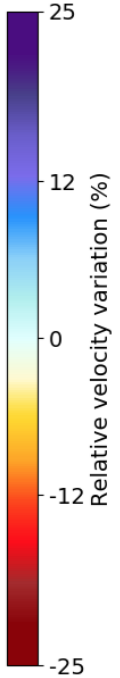
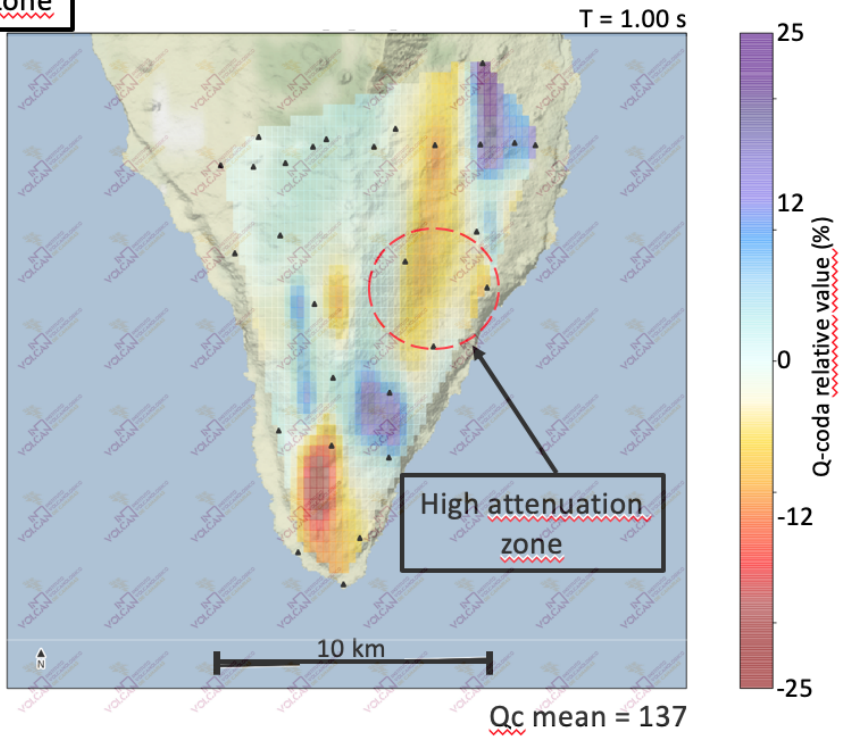
Velocity model



Low velocity zone



Attenuation model



A **Low velocity** and **high attenuation zone** in the eastern flank of the volcano

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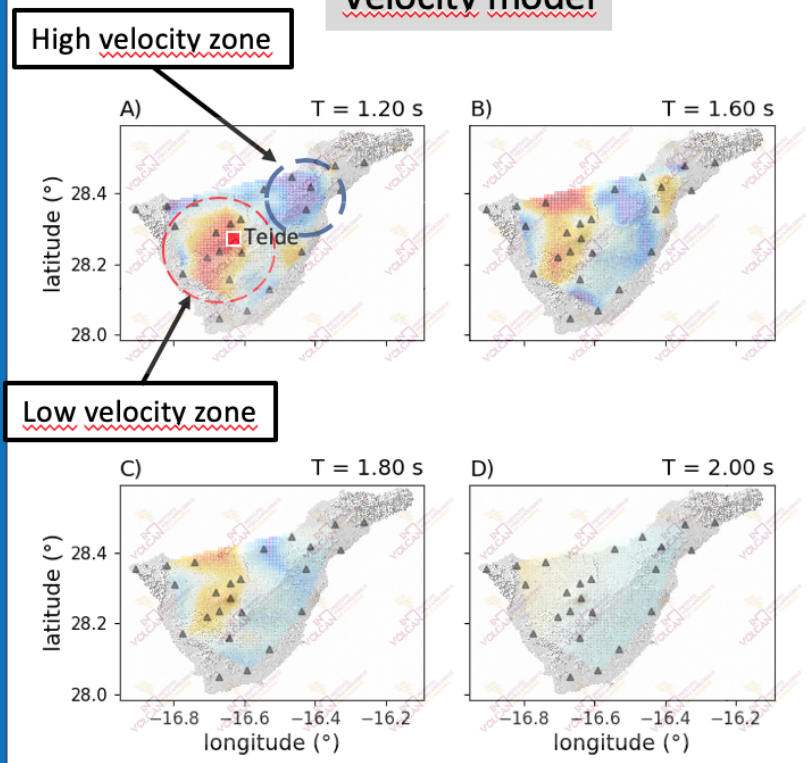
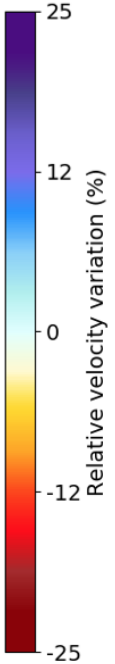
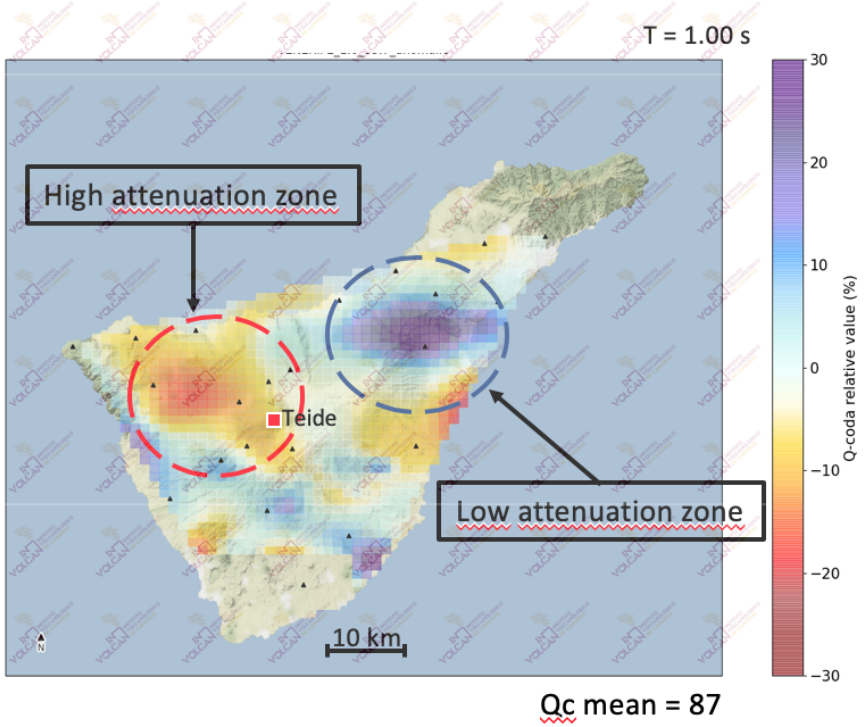
Velocity model





Attenuation model



Qc mean = 87

A **low velocity** and **high attenuation zone** in the Teide volcano
An **high velocity** and **low attenuation zone** beneath the northwest ridge system

THANK YOU VERY MUCH

Acknowledgements: This research was financially supported by the projects:

- **TFgeotermia**, financed by Cabildo Insular de Tenerife
- **LPgeotermia**, financed by Cabildo Insular de La Palma
- **TERMOVOLCAN** (RTC-2017-6627-3), cofinanced by the Spanish Ministry of Science and Innovation.
- "**Impulso a la Energía Geotérmica de Alta Entalpía en Canarias**" financed by Gobierno de Canarias, Consejería de Economía, Industria, Comercio y Conocimiento