

Imaging the crust and the upper mantle of Cumbre Vieja volcano (La Palma, Canary Islands) through receiver function analysis.

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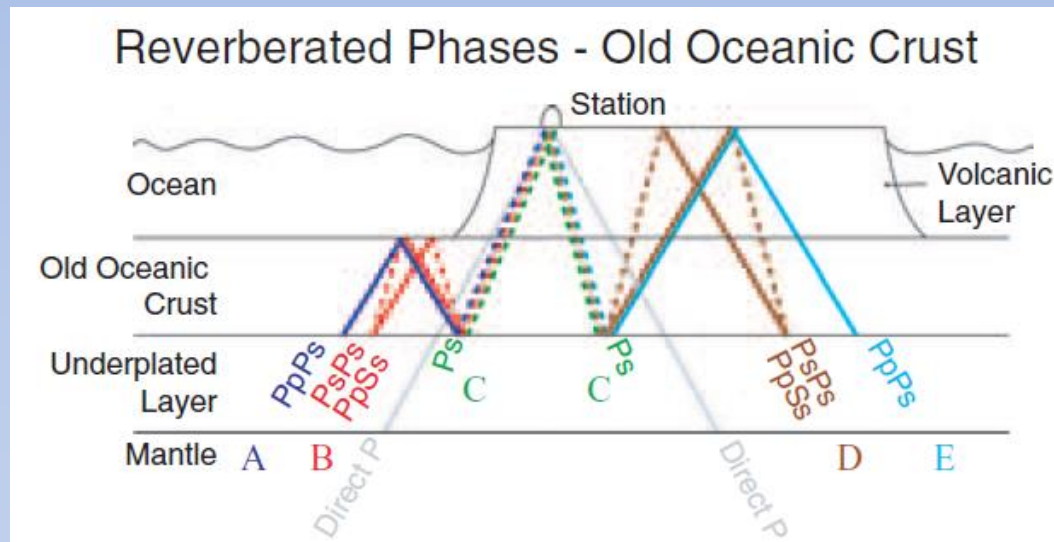
OBJECTIVES

Why?

- Study the internal structure of the crust and of the upper mantle beneath Cumbre Vieja volcano.
- In particular: study the location and nature of seismic discontinuities.
- Detection and characterization of possible magmatic reservoirs.

Method: Receiver Functions

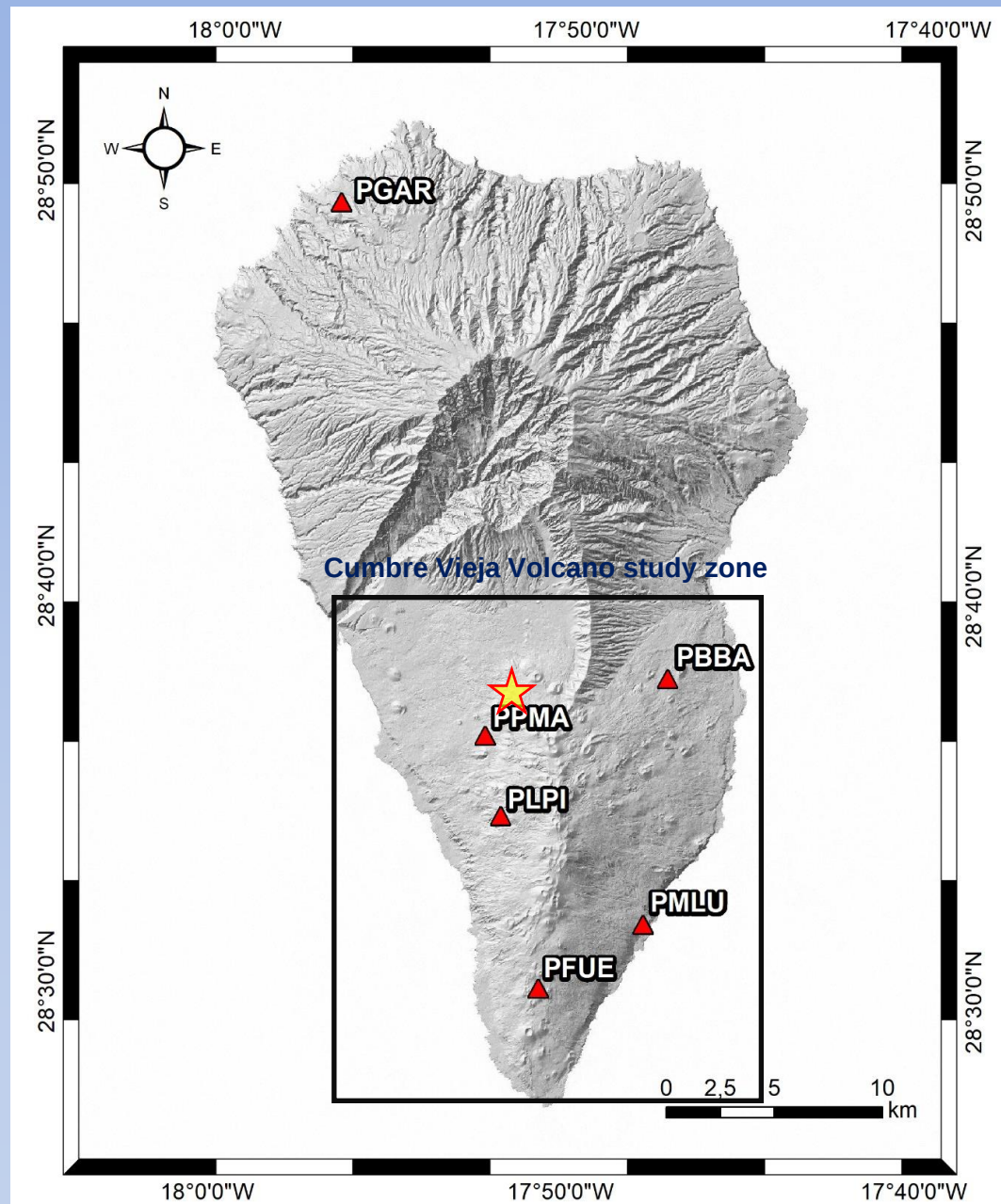
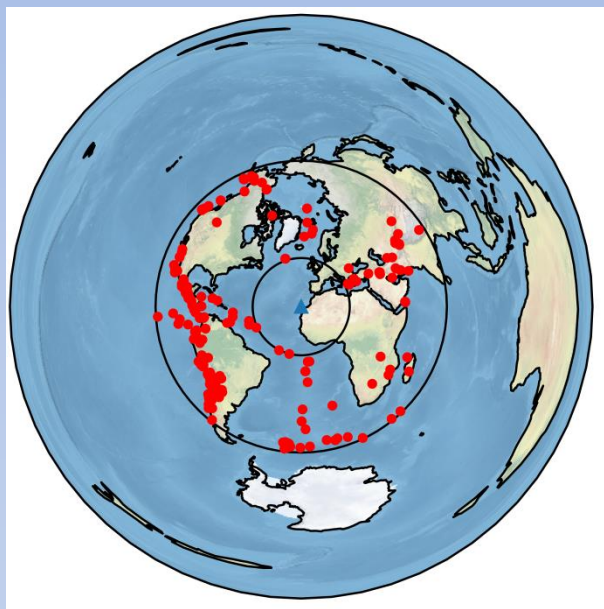
Eliminate the influence of the seismic source and the instrumental response, to obtain a **receiver function** related only to the seismic discontinuities that the waves cross along its path.



Leahy and Park (2005)

DATASET

More than **509** teleseismic events recorded from 2017 to 2021 by Red Sísmica Canaria operated by INVOLCAN.



METHODS

Receiver functions from multitaper spectral correlation

Park and Levin (2000)



Synthetic receiver functions

Levin and Park, 1997

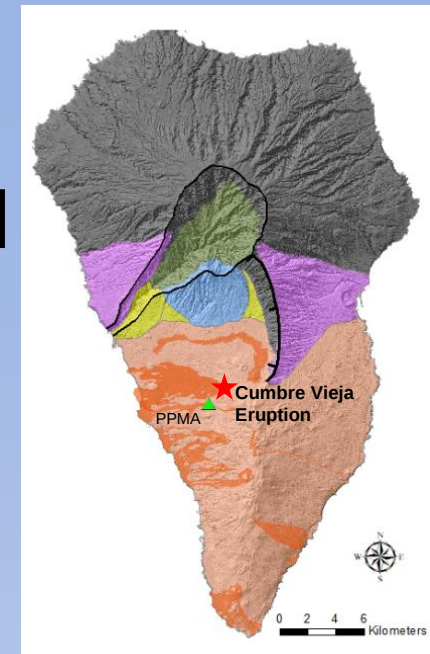
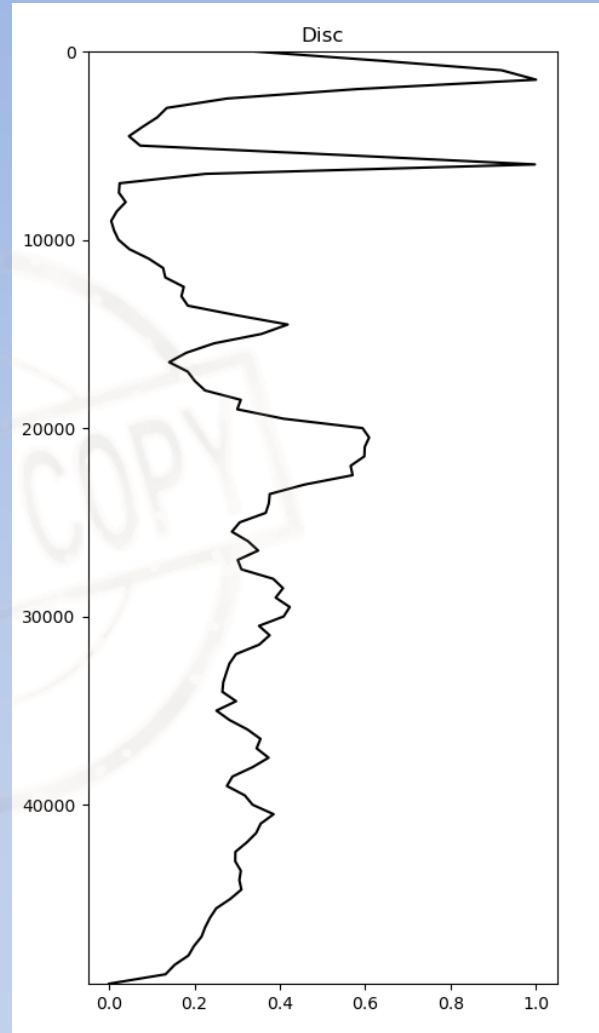
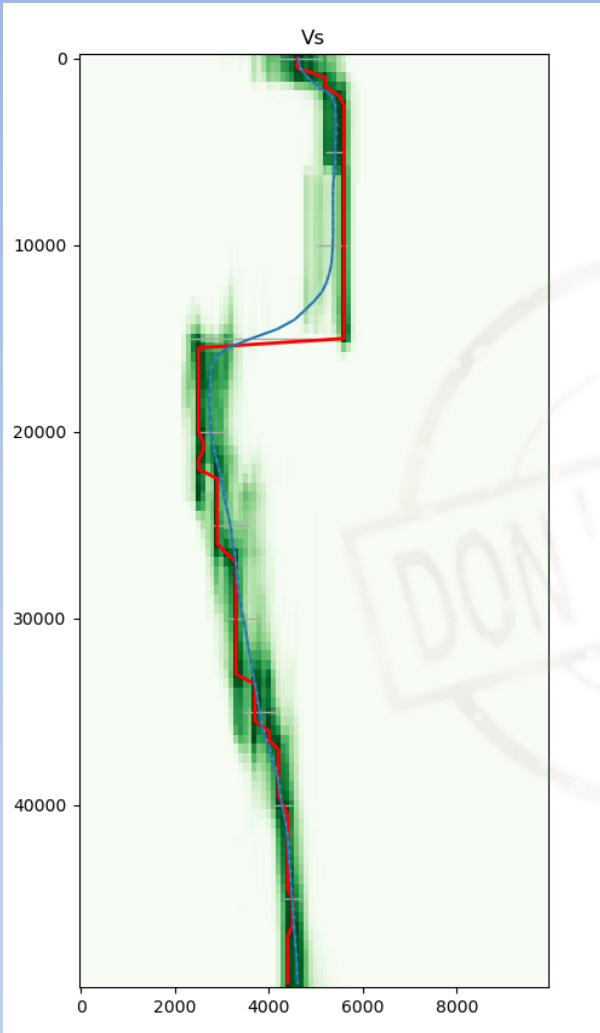


Transdimensional inversion approach

Bodin et al., 2012

Results of

TRANSDIMENSIONAL INVERSION

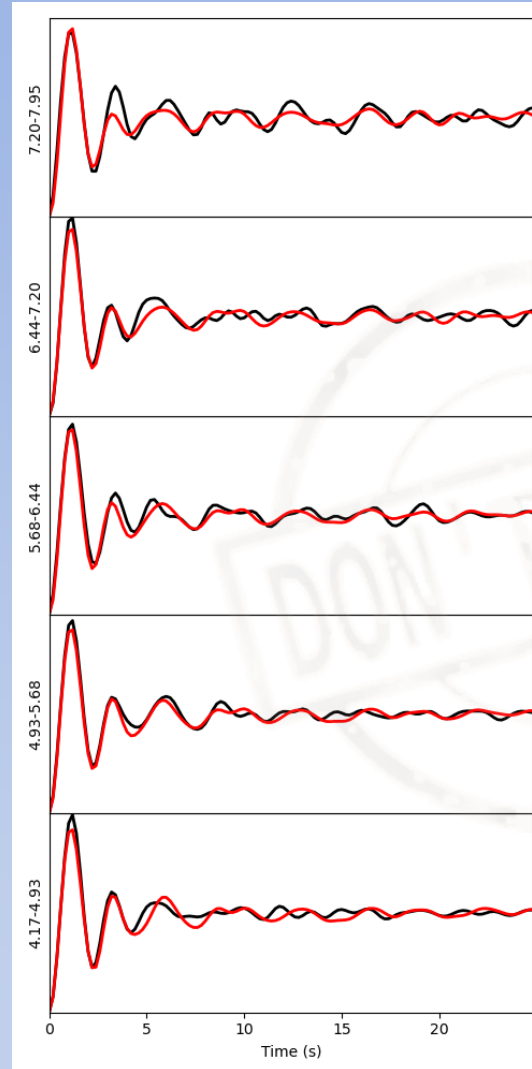
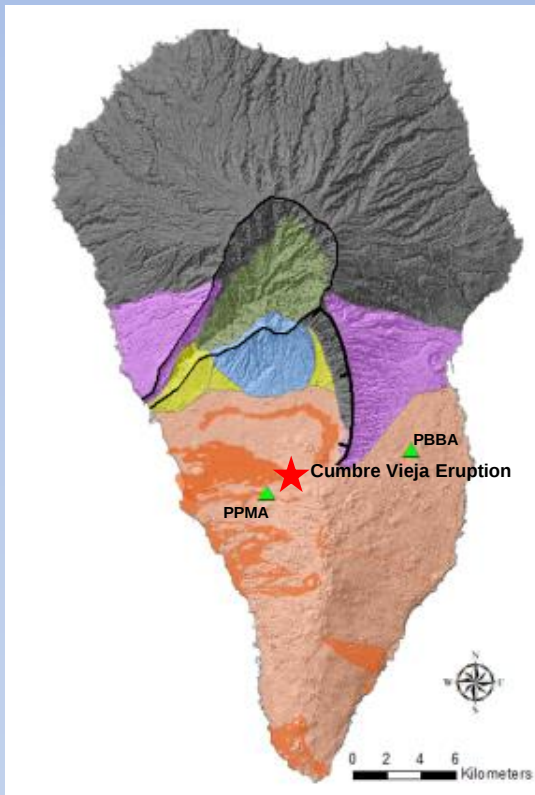


PPMA

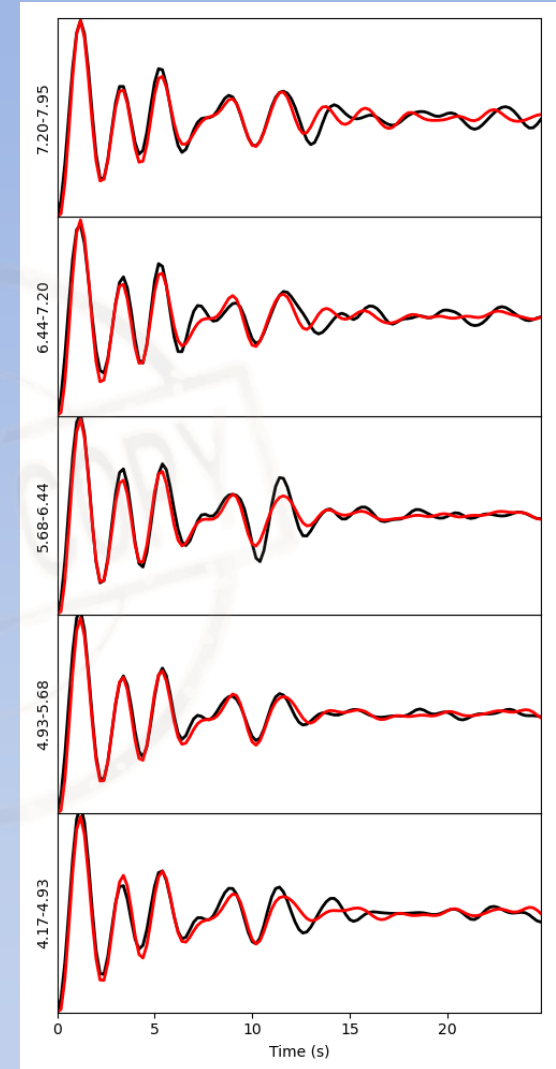
TRANSDIMENSIONAL INVERSION

Observed receiver function

Synthetic receiver functions
(Best fit)

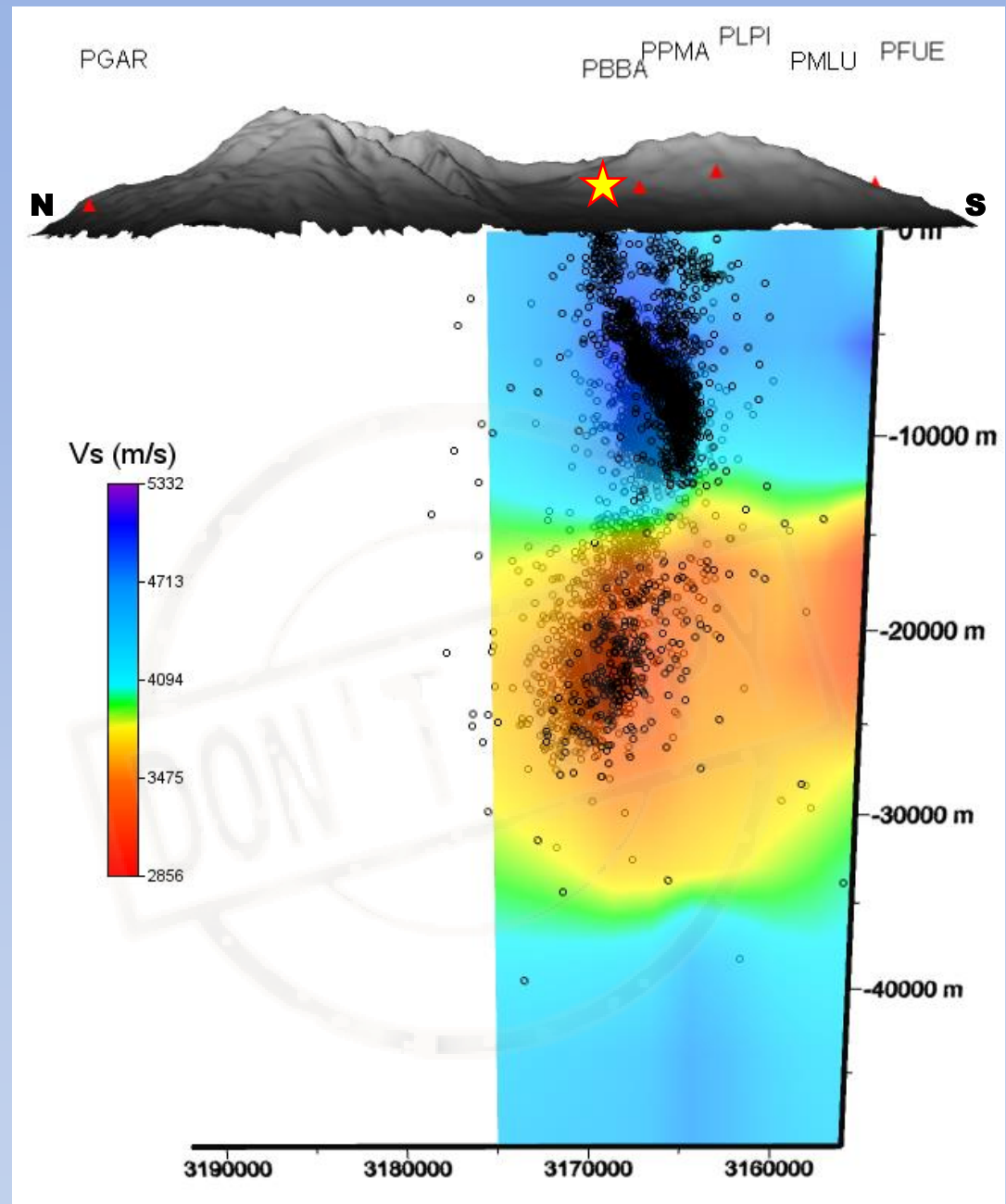
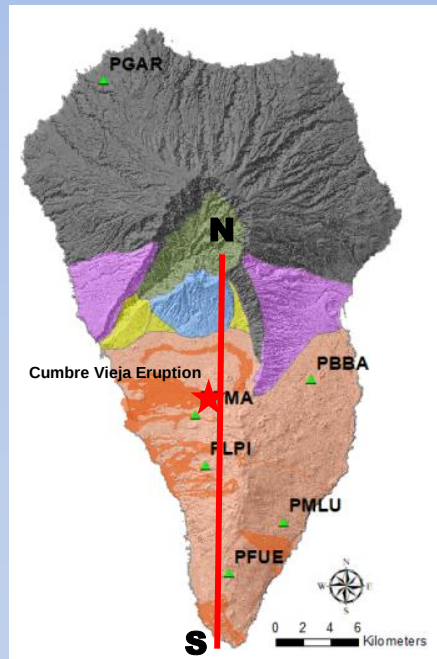


PPMA



PBBA

Results of TRANSDIMENSIONAL INVERSION



CONCLUSIONS

- Marked change in seismic velocities around 12-15 km depth that possibly marks the discontinuity between the oceanic crust and the upper mantle (Moho?).
- Velocity decreasing below the Moho (?), coincides with a zone of intense seismicity, indicating a possible large magmatic reservoir. This agrees with the results of local-earthquake tomography!
- Velocity changes within the crust, reflects layering of volcanic rocks, old sediments and oceanic crust.

Thank you for your attention

