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Solid Earth Discussions

Interactive comment on "Lithospheric image of the Central Iberian Zone (Iberian Massif) using Global-Phase Seismic Interferometry" *by* Juvenal Andrés et al.

Anonymous Referee #1

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Title: Lithospheric image of the Central Iberian Zone (Iberian Massif) using Global-Phase Seismic Interferometry Author(s): Juvenal Andrés et al. MS No.: se-2019-107 MS Type: Research article

Juvenal et al. image the lithosphere using the recordings from distant earthquakes collected from a set of receivers from distant earthquakes along a 320 km transect of the Iberian Massif. A method that takes advantage of the availability of global phases, the globalâĂŘphase seismic interferometry was applied to obtain a reflectivity profile through the surveyed area. The subject addressed in this article is very interesting in order to enhance the knowledge of the lithosphere of the intraplate domain of Iberia,

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where Variscan and Alpine signatures can be found. Transect crosses the most outstanding Alpine structure of Iberia interior. That is the Central System, where mountainous alignment, higher than 2500m, are carved on the old rocks of an extensive exposure of the Variscan basement that forms the Iberian Massif. This study gives first insights into the crust characteristics of the west part of this chain. At the same time it extends north and south far from the Central System imaging the lithosphere structure of the Central Iberian Zone (CIZ), a tectonostratigraphic zone of Variscan Iberian Segment. The paper applied new tools covering the lack of data of CIZ and allowing the analysis of similarity and difference between distinct tectonostratigraphic zones of Iberia and the European Variscan Orogen.

I think that scientific problems posed belong to the scope of SE and provide new and important new data about Iberia lithosphere.

The methodology is properly exposed, explaining method restrictions due to, for example, the presence of a thick Cenozoic sedimentary cover.

Exposition of results are clear and well-illustrated in figures 4 and 5.

Discussion paragraph is not clear.

Differences between Upper and Lower Crust reflectivity let to outline its limit.

The authors distinguish three zones within the upper crust related to the volume of granites forming the crust. In my opinion there is no a so significative difference to need a differentiation in three zones with distinct lithology except to the north where upper crust reflectivity changes.

Furthermore, the authors discuss the upper-lower crust limit as a Variscan detachment level. It is almost impossible to regret the role of Variscan deformation on west Iberia lithosphere but it is also important taking in mind that the Central System could uplift up to 2.5km in the last 20My (De Vicente et al., 2007) and more than 4km of vertical displacement during Alpine tectonic events. Deformation accommodation in a

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pop-up model may need a detachment level or a reactivation of a former detachment. De Vicente et al., 2018 discuss this problem. These discussions do not increase the quality of the paper. In my opinion discussion must be shorter and differentiate clearly Variscan and Alpine proposals.

Conclusions are correct highlighting the relevant results.

The figures are appropriate and correctly drawn. I would appreciate some references in figure 1. In the legend, basement (grey colour) refers to Alpine chains Variscan basement outcrops. It would be worth so indicate.

References are correct.

Some comments are added to the manuscript pdf. (se-2019-107-manuscript-review.pdf)

New Reference: de Vicente, G., Cunha, P. P., Muñoz-Martín, A., Cloetingh, S. A. P. L., Olaiz, A., & Vegas, R. (2018). The Spanish-Portuguese Central System: An example of intense intraplate deformation and strain partitioning. Tectonics, 37, 4444–4469. https://doi. org/10.1029/2018TC005204

Please also note the supplement to this comment:
https://www.solid-earth-discuss.net/se-2019-107/se-2019-107-RC1-supplement.pdf

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