

Authors' response to the referee comment #2

We appreciate the positive comments of the reviewer 2 on our manuscript entitled "Oblique collision and deformation partitioning in the SW Iberian Variscides".

1) A first issue raised by this reviewer refers to the uncertainty of our estimates, thus recommending the inclusion of \pm displacement errors. Regarding this suggestion, we must firstly state that at the current state of knowledge, there is an unavoidable need of providing reasonable values for a number of parameters. Thus, the inclusion of \pm errors is not *rigorously* possible, while forcing in that way the expression of our calculations would be more misleading than helpful. Nevertheless, we will introduce in our revised manuscript a number of alternative calculations that may help to get an idea on the consistency of our numbers:

- Concerning deformation inside the OMZ, we will check: i) the influence of considering simple shear instead of transpression; ii) the consequence of taking a greater orthogonal transpressional shortening; iii) the influence of a lower mean strain; and iv) the result obtained if global shortening is estimated from a cross-section.

- Concerning the subduction/exhumation path at the southern OMZ margin, we will add simple calculations for different convergence angles.

In our opinion, performing exhaustively all of these alternative calculations can be inconvenient for two reasons: first, the manuscript would become overloaded bit wordy; second, since methods and assumptions are clearly explained, the interested reader can easily recalculate displacements by assuming different values of the parameters.

Finally, we would like to reiterate that the main purpose of our paper, as it is recognized by the reviewer, is to provide with a reasonable figure for left-lateral displacements in SW Iberia, because this particular feature of this transect of the Variscan orogen is sometimes forgotten in tectonic reconstructions.

2) Reviewer 2 considers that the reasons to choose some values for the parameters used in our calculations are not clearly explained. In the revised version we will clarify this issue in the following paragraphs of the manuscript:

- (Page 3781, line 2) γ value in the BCSZ. In this case, it is previously stated in the text that deformed orthogneissic bodies warrant $\gamma = 3$, this value being probably conservative

because rheological contrast exists with the surrounded schists. Thus, $\gamma = 4$ is a reasonable mean value for our calculations. However, the reader can perform very simple calculations to obtain the results with other reasonable values, such as $\gamma = 3.5$ or $\gamma = 4.5$.

- (Page 3781, line 5) The original thickness of the BCSZ has been estimated to be 20-25 km because a maximum of 15 km is observed at outcrop, but the boundaries of this ductile mega-shear zone appear cut by brittle faults. A new reference to the IBERSEIS seismic profile (Simancas et al., 2003) will be introduced, since the faults obliquely cutting the internal fabric of the BCSZ were clearly imaged in that profile.
- (Page 3781, line 22). Obviously, the dip of the subduction zone between the OMZ and CIZ is unknown. We have chosen 45° in our calculations simply because this is an intermediate and reasonable value.
- (Page 3783, line 18) We will rewrite the paragraph in order to give a better explanation of the obtained value of ~ 56 km for the left-lateral component of displacement (first Carboniferous stage).
- (Page 3784, line 1) We realize that some additional explanation is needed about the value $\alpha^1 = 0.7$ used in the transpressional equation. Accordingly, in the revised manuscript we will first argue about our assumption that deformation must involve a dominant shear component. On this basis, we will take a modest value of orthogonal shortening ($\alpha^1 = 0.7$) as a reasonable estimation to perform calculations. Finally, we will conclude commenting on the effect of having chosen a simple shear model (instead of a transpressional one) or an orthogonal shortening greater than $\alpha^1 = 0.7$.
- (Page 3789, line 20) the finite strain ellipsoids of the SPZ have been taken from Simancas (1986), already quoted in the paragraph.

3) Another concern of reviewer 2 is that some figures related to regional geology are nearly identical to others in a recent paper published by Pérez-Cáceres et al. (2015) in *Tectonics*. We completely agree with the reviewer. As already said in our response to reviewer 1, at the time of submitting this manuscript, the one in *Tectonics*, devoted to the regional geology of SW Iberia, was not published yet. Thus, it is now possible to eliminate the overlapping figures (Figs. 6, 7, 9 and 10 in the first version), quoting when necessary Pérez-Cáceres et al. (2015).

Finally, some minor and formal corrections suggested by reviewer 2 will be taken into account in the revised version (e.g. orthogonal instead of frontal).

Pérez-Cáceres, I., MartínezPoyatos, D., Simancas, J.F. and Azor, A.: The elusive nature of the Rheic Ocean suture in SW Iberia. *Tectonics* 34 (12), 2429–2450, doi: 10.1002/2015TC003947, 2015.

Simancas, J. F.: La deformación en el sector oriental de la zona Surportuguesa, *Boletín Geológico y Minero*, 82, 239–268, 1986.