

Universidade de Évora, 9-5-2020

Dear Topic Editor of SOLID EARTH
Special Issue: The Iberian Massif in the frame of the European Variscan Belt
Dr. Emilio González-Clavijo

Subject:

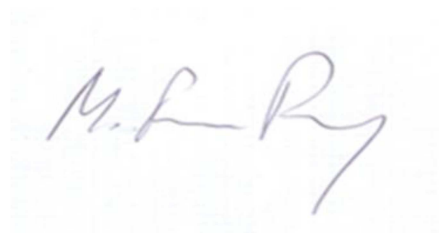
Submission of revision manuscript se-2020-26 by M. Francisco Pereira (myself-corresponding author), Cristina Gama, Ícaro Dias da Silva, José B. Silva, Mandy Hofmann, Ulf Linnemann and Andreas Gartner.

Please find attached the electronic revised version of: “Chronostratigraphic framework and provenance of the Ossa-Morena Zone Carboniferous basins (SW Iberia)””.

This new version includes suggestions from reviewers #1 and #2 (changes marked in blue).
Figures 1, 3, 6, 7, 9 and 10 were improved and uploaded.
Tables 1 and 2 from supplementary material were changed.
Figure 9a was moved to supplementary material as Figure S1.

We hope that this new revised version could be accepted for publication in SOLID EARTH

Sincerely yours,



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Reviewer #1

Referee's comment 1: "The manuscript is well written and clearly exposed in the most important principles and methodology. It can be improved by making some minor changes in several parts of the text. For instance, the Introduction can be improved by reorganizing the text and set the focus rather on the regional problem than the methodology. Thus, Introduction must start on line 64, and the first paragraph (47-63) can move to item 3 (Methods). Lines 88-89 must go at the very beginning of the Introduction, as this a tribute volume.

- We have considered very useful this suggestion of reviewer#1 and we change the text accordingly.

Referee's comment 2: "Because the paper is a regional contribution, the item "Geological setting" can be moved in part to the Introduction. A description of the sampled sedimentary units can be given in this second item after the introduction (like a material description)."

- This amendment suggested by reviewer#1 is not essential and therefore we have not adopted it.

Referee's comment 3: "About the Discussion and interpretations. If there are implications of these new data on one of the most debated topics of SW Iberia, namely the polarity of subduction during the closure of the Rheic Ocean, this must be discussed in this paper. Only a few lines refer to this problem (446-461). For instance, if subduction was beneath the Laurussian margin, why the coeval arc magmatism is in the passive margin (Gondwana)? Subduction to the north (beneath Ossa-Morena, the active Gondwana margin) is a more realistic interpretation according to structural and petrologic data."

- In order to satisfy the suggestions of reviewer#1, which we think are very pertinent, we extended the discussion of the geodynamic model and improved figure 10 to illustrate the text now presented.

Reviewer #2

Most of the notes presented by this reviewer were followed in the attached pdf that he made available; some of their observations coincide with their main recommendations that follow:

Referee's comment 1: "From the studied datasets, I am happy with the study, statistical treatment and age interpretation of the igneous rocks. It is robust and well reasoned. However, you give and thoroughly describe U/Th but you never discuss them. Potential readers not familiar with zircon geochronology will wonder why is U/Th ration important at all and what is the meaning of those numbers you give and their average (does the average have any meaning considering some of the zircons are inherited?). I encourage you to discuss the meaning of the U/Th ratios and their implications to understand the origin of the zircons (metamorphic vs. igneous and the prospective igneous provenance of zircons - higher or lower temperatures). Otherwise, you may opt to not discuss at all the results, but once the results are there, I think it is interesting to give the whole picture."

- After thinking about reviewer#2 considerations we decided to remove from the text the information related to the Th/U ratios of the zircon grains to avoid widening the discussion about the source of the melts from which they crystallized, whose theme is complex and quite controversial;

Referee's comment 2: "I am a little less happy with the results of the detrital samples. I have noticed several minor but relevant issues (see the annotated PDF). Among them the relatively low number of analyzed zircons (some cases <40) in samples with too many peaks. In such cases, every single zircon can turn easily the distribution. You are comparing these datasets with others to check their provenance, and with such short datasets, the results can be misleading. I think the limitations of your new datasets should be, at least, mentioned in the paper."

- We agree with the observation of reviewer#2 that the number of ages of detrital zircon grains used in the analysis of provenance does not comply with the minimum established by recent studies on the subject. However, being aware of the limitation that this brings us to the data discussion, we want to publish them as a preliminary approach. In this sense, we decide to write a statement in the text to alert the reader to our limitation, as suggested by reviewer#2. Still, in order to satisfy some doubts, presented by the reviewer in his annotated pdf.file, about the calculation of the crystallization age of the Baleizão porphyry we added more data to make the result more robust; We also gathered geochronology data from a new sample of volcanic rock from the Cabrela basin that allowed us to consolidate the age of Early Carboniferous volcanism.

Referee's comment 3: "Also, treatment of the minimum depositional age, which sometimes is an average of several zircons (still don't get why the youngest zircons in a detrital sample do not need to come all from the same rock and/or age) instead of giving the youngest concordant zircon with its uncertainty."

- We didn't find any reason for this criticism from reviewer#2, because we only applied the term "minimum depositional age" for referring zircon crystallization age of igneous rocks (sample SCV-30), and not for detrital zircon ages from siliciclastic rocks.

Referee's comment 4: "Finally, I am unsure of how the K-S test gives any further or better information compared to MDS. MDS is basically the same but compares all the samples together and plots a really easy to understand graphics. Unless there are some relevant differences (not discussed in the txt right now, and I could not find any) I recommend to move the K-S to the repository and treat it as a proof of concept instead."

- Following this suggestion of reviewer#2 we move to supplementary material the tables with K-S results presented in Fig. 9a of the previous version;

Referee's comment 5: "Finally, as a curious note since I know it is not a major conclusion of this paper. I have problems to see how the subduction of the Paleotethys more than 600 km to the east (in present day coordinates and following Pereira's 2014; 2017a paleogeography) could cause arc magmatism in the sampled area. The average dip of the slab would be between 9° and 18° (assuming dehydration happens up to 200 km which is quite optimistic). Even a Puna style slab (with an initial steeper 30° slope to become later flat) dehydrates at some point 300-350 km far from the trench resulting in no more volcanism."

- As requested by the previous reviewer#1, this reviewer#2 also asked us to deepen the discussion of the evolutionary model and we did so.