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Solid Earth
Discussions

Interactive comment on "Chronostratigraphic framework and provenance of the Ossa-Morena Zone Carboniferous basins (SW Iberia)" *by* M. Francisco Pereira et al.

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The paper entitled "Chronostratigraphic framework and provenance of the Ossa-Morena Zone Carboniferous basins (SW Iberia)" co-authored by M. Francisco Pereira and collaborators presents new U-Pb zircon geochronology (LA-ICP-MS and SIMS) both from igneous and detrital rocks. The new dataset contains valuable absolute ages for several volcano-clastic and plutonic rocks, which in turn help to date the uplift and exhumation history of a basing and constrain the timing for a local-to-regional late Carboniferous unconformity.

In general terms, the paper is well written and easy to understand. I have only identified

a few typos and some sentences that I felt repetitive or adding superfluous information (see attached annotated PDF). In my opinion, the section 3 (Rationale and analytical methods) is unnecessarily long and tangled in a way that reads apologetic. You may consider rewording some paragraphs to enhance it and remark why this dataset is important and of general interest for the Paleozoic in Iberia and Europe (and I think it is).

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.

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 con 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. 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. 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 fine any) I recommend to move the K-S to the repository and treat it as a proof of concept instead.

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 9ËŽ and 18ËŽ (assuming dehydration happens up to 200 km which is quite optimistic). Even a Puna style slab (with an initial steeper 30ËŽ slope to become later flat) dehydrates at some point 300-350 km far from the trench resulting in no more volcanism.

I have annotated other minor details in the annotated PDF.

I hope my comments are helpful to improve the paper.

Daniel Pastor-Galán

Please also note the supplement to this comment:
https://www.solid-earth-discuss.net/se-2020-26/se-2020-26-RC2-supplement.pdf

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