

Interactive comment on “A tectonic carpet of Variscan flysch at the base of an unrooted accretion prism in NW Iberia: U-Pb zircon age constrains from sediments and volcanic olistoliths” by Emilio González Clavijo et al.

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Summary Comment: This interesting paper integrates U-Pb zircon data and field relationships to analyze detrital sediment sources in a synorogenic basin, as well as the progression of deformation that followed deposition. This appears to me to be a potentially valuable paper that will be of broad interest to researchers in orogenic processes and their geologic record. I suggest that a moderate level of revision is required for publication. In my opinion most of the suggested revision concerns improving the writing (English). In general, the English is of sufficiently high quality so that the scientific

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meaning of the writing can be discerned through grammatical errors and non-standard word usage. However, the paper will be easier to read and have a greater impact if the English is improved. I have made some annotations on parts of the attached pdf, but these are by no means complete. These are examples that serve to illustrate that types of changes that should be made throughout the text, figure captions, and figure text labels. There are some technical comments in the annotations as well.

Additional (not among annotations in attached pdf) Technical Comment(s): Although describing block-in-matrix units is not the main goal of this paper, the field and petrographic observations are important because they are relevant to global debates on *mélange* origins. For this reason, I request that the authors add a bit more to their map scale, outcrop scale, and petrographic scale observations. Owing to the detail and quality of the existing observations, I suspect these additions can be made easily.

The types of observations I recommend are those that show the similarities and differences between tectonic *mélanges* and olistostromes. For example, the metamorphic assemblages in the rocks (if metamorphosed) should be described. Based on the existing descriptions it seems to me that some of the olistostromal blocks in the study area are higher in metamorphic grade than the matrix and that there is a range of metamorphic grade encompassed by the blocks in the olistostrome. Specific details should be given. In contrast it seems to me that the tectonic *mélanges* in the study area do not have blocks of higher metamorphic grade than the matrix or flanking units and there all of the blocks are isofacial, but the details are not given in the paper: they should be. These details are a subset of the larger relationship: exotic versus native blocks. The reason why I mentioned metamorphism, is that it can be difficult to tell if a block is exotic whereas, a block of higher metamorphic grade than flanking units or matrix is clearly so. In the paper it seems as if exotic blocks are confined to the olistostromes, whereas the tectonic *mélange* contains only blocks derived from the flanking units (or the specific disrupted zone) so that the blocks are entirely native. This should be clarified in the paper.

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It seems to me that authors assume that readers will see the relationships summarized above as being clearly connected to origins as olistostromes or tectonic mélanges, hence they do not see the need to expand further on their observations. Yet there are many researchers who assert that the presence of exotic blocks is evidence for tectonic incorporation of blocks into matrix.

This brings up a still broader issue/concept, which is the definition of tectonic versus sedimentary versus “polygenetic” mélange. These terms are connected with the primary mode of mixing of blocks into matrix. In an olistostrome (sedimentary mélange), the blocks are mixed by sedimentary process, whereas a tectonic mélange, mixing of blocks into matrix (and creation of blocks) is a result of tectonic strain. For most readers, the meaning of “polygenetic” is not so easy to grasp in the sense of block-matrix relationships. It seems to me that many people mistakenly believe that this is simply the imposition of deformation on a sedimentary mélange but “polygenetic” means that additional blocks are created by deformation within and on the flanks of a sedimentary mélange: this can happen because of the creation of tectonic block creation by faulting of intact units bordering the sedimentary mélange and/or as a result of tectonic strain fragmenting some olistostromal blocks. A short explanation of the definitions of sedimentary, tectonic, and polygenetic mélanges should be given early in the paper, rather than simply referring to the definitions given in the cited papers.

Please also note the supplement to this comment:

<https://se.copernicus.org/preprints/se-2020-173/se-2020-173-RC2-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-173>, 2020.