

Interactive comment on “Linking Alpine deformation in the Aar Massif basement and its cover units – the case of the Jungfrau-Eiger Mountains (Central Alps, Switzerland)” by David Mair et al.

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We thank the anonymous Referee for the constructive, insightful and detailed comments, which were very helpful to improve the manuscript. We did so by carefully addressing all the comments and following all suggestions (see line by line response below). In particular, Reviewer 1 raises 2 major points: First, the distinction of the deformation phases (“[...] difficulties with the detailed distinction of numerous deformation and fabric events [...]”) and “The distinction between phases of deformation in the basement, based on their orientation doesn’t seem to be very robust, especially between

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SZ2 and SZ3 [...]”). We base the distinction on more criteria than just the orientation (i.e. cross-cutting relation, spatial distribution of thrusts; as already pointed out in the original manuscript). We thus see the need to clarify our observations and arguments, where we present the deformation structures (Sect. 4.2 mainly). We address this by improving the aforementioned section and additionally consider the comments by reviewer 1 regarding Lines 183 to 266. We provide now a clearer and more detailed description of the cross-cutting relationships, orientation and field-based data that led us to the subdivision of the deformation stages. In doing so, we add a new figure (now Fig. 10) to better illustrate not only the crosscutting but also overprinting relationships (following reviewer 1’s suggestion; see comments on Lines 210 to 240). Second, reviewer 1 states “that the valuable data and interpretations of this paper should be presented to a more regionally-focused, Alpine journal. This is also reflected by the conclusions of the paper whose essence is that the observed structures are consistent with a previously published model.” We appreciate the general positive perception of our work. As for the relevance, we emphasize that although much work has previously been published on the different deformation models (“Grindelwald phase”; i.e. Burkhard, 1988; vertical versus horizontal exhumation, Herwegh et al., 2018), we document the first time how the exhumation processes affected the sedimentary cover and the crystalline basement in a different way. In particular, the first phase of thin-skinned tectonics affected the sedimentary cover only, while Alpine tectonic structures in the basement were related the subsequent thick-skinned deformation and the exhumation of the Aar massif only. To enhance the readability for readers working outside of the Alps we follow the recommendations of Reviewer 2 and discuss the more general framework for the Aar massif exhumation and the specific significance of the discussed evolution in the discussion (Sect. 5.4).

For our line-by-line response and the changes made to the manuscript we refer to the Supplementary of this comment.

Please also note the supplement to this comment:

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<https://www.solid-earth-discuss.net/se-2018-49/se-2018-49-AC2-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2018-49>, 2018.