

Interactive comment on “Emplacement of “exotic” Zechstein slivers along the inverted Sontra Graben (northern Hessen, Germany): clues from balanced crosssections and geometrical forward modelling” by Jakob Bolz and Jonas Kley

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Dear Editors and authors,

first of all, I would like to thank you for the interesting manuscript (se-2020-133), which handles with the presence of “exotic slivers” along the Sontra Graben. These slivers are a fantastic example for very small but crucial details we have to consider during regional geologic observations. I highly recommend publishing the manuscript. It is (or should be) of great interest for a broad readership to learn how to integrate such

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detailed and sometimes confusing observations into a geological model. This is not only the case for these small slivers in the Sontra Graben but should be even applied to other extensional and contractional, thin-skinned and thick-skinned settings all over the world. That’s why I highly suggest thinking about what the international audience of SE can (and should) learn from “exotic Zechstein slivers” occurring in very small grabens in a restricted area in Central Germany.

Therefore, the most important improvement would be to clearly present the tectonic model in a more conceptional way. To end with such a conceptional model it would help to present and describe some of the slivers exemplarily. As the manuscript stands now the hypothesis of tectonic inversion is tested along one or two cross sections in close position. Why isn’t there any illustration of the other slivers (especially from the west)? Especially in areas where more than one sliver exists in the direction of transport, illustration or sketch of their structural position including their stratigraphic unit would significantly help to understand the situation.

Figure 7 is a perfect example how such a sliver can be presented. Nevertheless and unfortunately the authors missed to go into detail. As they used cross-section balancing techniques and forward modelling approaches, it would be great to show some geometric aspects that help us to understand fault zone kinematics. In my further detailed comments, I tried to illustrate such aspects a little bit more and hope the authors will find my comments useful.

In some chapters (e.g. “methods/workflow”) I suggest to restructure the manuscript a little bit. Until now it remains unclear for me why the authors start with a conceptional/synthetic forward model before cross-section construction and balancing was done. For me it would be rather intuitive to construct several cross sections and to find out the crucial details along-strike, apply balancing/restoration techniques to improve constructions and during a last step build the synthetic forward model.

As said above, I strongly suggest the publication of this work. As it stands now it is

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just a very local study. It is great to see that analysing these some meters wide slivers in such a local case study is indispensable to improve our understanding of inversion tectonics. Nevertheless, it would be great to see some more detailed analysis (fault geometry and cutoff analysis, geometrical reconstruction, etc.). This would even make the concept/model more robust and applicable for the international readership of Solid Earth.

Congratulations for that very interesting contribution. Kind regards, A. Malz

Please also note the supplement to this comment:

<https://se.copernicus.org/preprints/se-2020-133/se-2020-133-RC1-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-133>, 2020.