Solid Earth Discussions

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Comment on se-2021-105

Gabor Tari (Referee)

Referee comment on "Together but separate: decoupled Variscan (late Carboniferous) and Alpine (Late Cretaceous–Paleogene) inversion tectonics in NW Poland" by Piotr Krzywiec et al., Solid Earth Discuss., https://doi.org/10.5194/se-2021-105-RC1, 2021

This is a very fitting paper into the Special Issue devoted to inversion tectonics. My comments are captured in the attached annotated manuscript, here I just repeat some of the more important general ones:

1. The manuscript suggests a very important departure from the standard definition of inversion tectonics which requires basement involvement and excludes mobile substratums such as salt or shale (see many landmark papers by Mark Cooper). Regardless whether it is a good or bad idea, I suggest to have it emphasized stronger in the text. Figure 1. does a good job in this regard, but still. One argument for this broadening of the definition of positive structural inversion could be the aim to include large salt basins where basin-scale inversion (like in the Zechstein region) manifests itself very dramatically and folks use the term already for a long time (incorrectly, by the existing definition!), anyhow.

2. Personally, I think negative inversion is a useful term and it should be kept. The word reactivation is the really general one which is being used typically not with inversion in mind, but rather refering to a fault which keeps reactivating in the same sense. Perhaps it would be good to add a few sentences to the manuscript in this regard, either pro or contra.

3. It is good to see that the authors claim that they only speculate about the extensional reactivation of Caledonian thrust planes during the late Paleozoic in the Study Area. If there is a convincing subsurface example for this proposition anywhere in NW Europe, it would be worth to show it... with a seismic line and/or wells. I have my doubts that there is a bullet-proof example out there, but I am might be wrong (hopefully!)

All in all, it is a solid manuscript and therefore I suggest only minor revision and looking forward to seeing the final product.

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Please also note the supplement to this comment:
https://se.copernicus.org/preprints/se-2021-105/se-2021-105-RC1-supplement.pdf