

Interactive comment on “The Subhercynian Basin: An example of an intraplate foreland basin due to a broken plate” by David Hindle and Jonas Kley

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n general: The paper is very interesting, because it solves the question, how such narrow basins in intraplate settings may develop. The proposed model is not only relevant for the single case of the Subhercynian Basin but the can be extended probably to most of the marginal troughs (it should be tested if the case of the thick-skinned tectonics in the Tianshan or in the Rocky Mountains works in such a way too). It should be published in every case, but possibly with some more discussion of the old models. Questions and suggestions: 1. The geological situation of the northern Harz and the adjacent Subhercynian basin show in most places a complete succession of weathered metamorphic rocks, overlain by either early Permian (Rotliegend) or late Permian (Zechstein) rocks, indicating that the Harz mountains form a basement an-

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ticline with a steep front. The related basement thrust reaches the surface and cuts through the Mesozoic cover in the western Harz and in some segments of the eastern Harz. Close to Thale, the Harznordrand Thrust is exposed between Lower Carboniferous greywackes and granites of the Ramberg pluton. The granites do not occur before the Campanian. Question 1: Does the proposed model of an initially broken plate fits to this observation? Sediment data indicate that the “break-through” of the thrust occurred not before the late Santonian, but formation of the foreland basin occurred already during the early Coniacian (about 3 Ma earlier). 2. Question 2: I would assume that the HNF started as a basement fold with a steep limb, does it make any difference in behaviour during compression? Could the northern margin of the Harz start as a fault-propagation fault also in this model, or is it simply a thrust?

3. Does something like a forebulge develops in the model? 4. The marginal trough of the Harz has some obvious differences to a foreland basin in fold- and thrust belts, concerning the steepness of the thrust and propagation into the foreland. Should it therefore named as foreland basin or should it considered as a different basin type (namely “marginal trough”)? 5. Nielsen and Hansen modelled already the Danish Trough, I think only on the base of the load of thickened crust without considering thrusting. Is the load of the thickened lithosphere sufficient to produce a marginal trough, especially if you take the narrow shape into account? 6. Does it mean that the plate was already broken before compression started – reactivation of a normal fault? 7. Would a variation in rock density and viscosity of the mantle and the lower lithosphere make any difference? How certain are the assumed values? Some of the figures should be polished with the help of the publications of the co-author. Some additional remarks are in the text.

Please also note the supplement to this comment:

<https://se.copernicus.org/preprints/se-2020-185/se-2020-185-RC1-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-185>, 2020.

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