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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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A paper by David Hindle and Jonas Kley is certainly very interesting contribution, worth publishing. It brings a valuable numerical model, although its application to the case of Subhercynian Basin (SHB) in details brings some small puzzles. In a broad view a timing of tectonic loading and following subsidence seem to fit to each other. However, the match between thrusting and uplift of the Harz Mts versus syn-inversion subsidence in the SHB is not perfect. The main phase of syn-inversion subsidence is related to deposition of up to 1500 m of Coniacian to Santonian deposits (Voight et al., 2008), while the main phase of Harz Mts exhumation and erosion took place slightly later in Campanian (von Eynatten et al., 2019). Moreover, the Harznordrand Thrust modified facies patterns of the SHB only since middle Santonian, again rising question if tectonic loading was active already during Coniacian to early Santonian sedimentation (Voight et al., 2008). Angular unconformities developed in the southern SHB close to that fault, are recorded also in the middle Santonian to early Campanian (Voight et al., 2008). My impression is that the way authors refer to thermochronological data from the adjacent Harz Mts is slightly misleading. Referring the AFT ages in a range of 84-73 Ma (von Eynatten et al., 2019) is suggestive for exhumation and cooling restricted roughly to the Campanian, while their ZHe, AFT and AHe ages together assisted with modeling indicate longer thrusting, exhumation and erosion history (∼90-60 Ma), presumably more coherent with basin subsidence scenario presented in the current manuscript. The authors emphasize that some of foreland basin characteristics, such as progressive onlap further towards the foreland, it not clearly observed in the SHB, assuming that in this case it may be obscured by a combination of erosion and internal deformation. However, this phenomena in general is related to thin-skinned detachment and significant scale foreland-wards transportation of tectonic load, which is not a case in Harz Mts – SHB system. Thus, considerable progressive onlaps or depocetre migration towards foreland does not have be expected in this case, I guess. The same could refer to evolution from deeper marine underfilled (starved) stage of the basin, to sallower marine or lacustrine overfilled stage, typical of foreland basins, although not observed in the SHB. It is not quite obvious for me what modification of your model presented on Fig. 6 stands for. I presume that the geometry of the substratum of the Upper Cretaceous, including the Rotliegend and whole sedimentary succession dividing it from the Upper Cretaceous, developed prior to late Cretaceous due to lateral thickness changes, possibly some differential denudation, pre-late Cretaceous offsets on faults, or Zechstein salt movement. Presumably you might make this section more clear for a reader. I am not entirely sure if the numerical experiment presented on Fig. 7, presenting non valid alternative, brings additional value for the paper. In that experiment, it is difficult to envision a geological nature of the Harz Mts and the Flechtingen High acting as the loads emplaced on coherent plate. Few editorial remarks: Authors refer to Fig. 4e (page 4, line 11), while there is only Fig. 4 a – d. Figure 1 and Figure 2 – consider to place them in the manuscript in reverse order, since current Fig. 2 gives a broader view, while current Fig. 1 is a zoom to smaller area. For the advantage of the readers from outside of Europe, would you possibly consider to support current Fig. 2 with a small side picture showing location of the study against contours of Europe? Some explanations to Fig. 2 refers to abbreviation which are not used in this figure (OF, GF, HF, AF). Presumably, you might like to included abbreviation of these faults on the map. I presume that first reference to Fig. 6 is a mistake and it should be Fig. 5? (page 7, line 27). To avoid repetition of the explanations to Fig. 5 and 6, you could combine it into Fig. 5A and 5B.

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