

Interactive comment on “Thick- and thin-skinned basin inversion in the Danish Central Graben, North Sea – the role of deep evaporites and basement kinematics” by Torsten Hundebøl Hansen et al.

Leonardo Muniz Pichel (Referee)

l.muniz-pereira@imperial.ac.uk

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Dear authors,

The manuscript presents some excellent data and seismic interpretation that demonstrate new concepts and details on the role of Zechstein salt on inversion and decoupling sub- and post-salt deformation in the North Sea. The text is overall well-written and nicely structured, and the figures (both maps and sections) are of very high quality. There are, however some issues, mostly minor, that need to be addressed before the

C1

paper can be formally accepted for publication. These are highlighted in the annotated and I leave here my main, more general comments:

1) The authors need to state more clearly in the introduction and abstract what are the novel concepts of the study and its general implications. I would suggest using your main discussion points as a framework/mirror for that.

2) The paper would benefit immensely from having two new figures: i) A composite section showing some of the wells used for seismic stratigraphic correlation in the methods section, which would add more confidence in your seismic stratigraphic interpretation. ii) A schematic diagram or adapted figure from Stewart (2014) illustrating the concept of a triangle zone and how that applies to your case-study

3) My main issue with the text is that many important statements in the results and discussion lack direct references to their related figures, in special to your beautiful cross-sections (which I think are largely under-used). This makes your descriptions very hard to follow and what is worse is that this may lead some of your key statements to lose credibility. The reader does not know where to look most of the time. Also, some figures are cited out of order.

4) The discussion is confusing in places. It presents some good points but others are not well explained (perhaps due to the lack of references to figures) or, in more extreme cases, unrealistic such as for example, salt flowing updip(!) during rifting. But, perhaps, I was just confused about what you were describing because I didn't know where to look at (previous comment).

5) The paper needs to describe and discuss better the whole of gravity-driven deformation and its interaction with thick-skinned extension and later inversion, and explore alternative scenarios involving these (more details in the annotated pdf).

I sincerely hope these comments are helpful and contribute to improving the quality of the manuscript, which I truly hope to see published soon. If the authors have any

C2

queries please do not hesitate to contact me.

Congratulations for the work! Leonardo

Please also note the supplement to this comment:

<https://se.copernicus.org/preprints/se-2020-127/se-2020-127-RC1-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-127>, 2020.