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Interactive comment on "Fault interpretation in a vertically exaggerated seismic section: evidence of conceptual model uncertainty and anchoring" *by* Juan Alcalde et al.

Charlotte Botter (Referee)

c.d.botter@leeds.ac.uk

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Charlotte Botter – June 2019

This manuscript addresses a very interesting and useful problem, the bias we, as geologists, seismic interpreters or geophysicists, have when interpreting seismic data. This study has even more impact as no context at all was given to the interpreters and they were limited in time for their interpretation. The results highlight quite a variability in the finale interpretation with a majority of the students falling into the most common (easiest?) interpretation (extensional settings, with faults dipping towards the right). Does it reflect the background and familiarity of the students towards extensional over

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compressional tectonic settings? The title and the abstract are promising, however the content of the paper lacks of clarity, clear objectives and outcomes, and conclusions that support the initial statements. The two terms that require a clear definition are conceptual model and uncertainty (I think you are mixing uncertainty vs variability in the paper).

I recommend a better organisation of the manuscript and its content, and a title (the second part of the title 'evidence of conceptual model uncertainty and anchoring' is misleading in view of the results/conclusions) that reflects better the content before publication in Solid Earth.I have ticked major revisions but this could be considered as minor as it is mainly regarding the writing and presentation of the results rather than the scientific approach (I do believe that this type of study is very important and exciting!).

I have attached the manuscript pdf with specific comments at various locations of the text and Figures but you can find more general comments and questions below. The text is well written overall and I did not spot spelling mistake but highlighted some inconsistencies between Figures annotations, captions and text.

1. I think the paper requires a clear and exhaustive definition of a conceptual model and what goes into it. Then you can refine the possible and plausible conceptual models that are appropriate to this case study. By reading the manuscript I often got the impression that the conceptual model was the result of the final interpreted section but at the same time that the conceptual model influenced the interpretation. It is not clear what is the relationship between the conceptual model and the interpretation: - Does the conceptual model influence the interpretation (c. model => interpretation)? - Does the interpretation become the conceptual model (interpretation => c. model)? - Are the conceptual model and interpretation developed at the same time/simultaneously (c. model <=> interpretation)? This becomes quite important when you talk about uncertainty and anchoring of the conceptual model.

2. The title states "evidence of conceptual model uncertainty", however uncertainties

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are not clearly defined, addressed or dealt with within the manuscript. If there is no clear definition of uncertainty (qualitative and/or quantitative) and paragraph/section in the Discussion, this should be removed from the title. When at the end of the conclusions, you say “uncertain geological and geophysical data”, it seems that uncertain here only means that there is no unique interpretation. This case your study only illustrates that that there is a range of different yet plausible interpretations for one given seismic line (which was provided with no colour scale, which is supposed to be as standard information than a scale bar). It doesn’t really highlight any clear uncertainty (why these different interpretations, are they related to the background, to the colour scale, or else? As you state that vertical exaggeration does not have a real impact).

3. I am a bit dubious on the fact that this study proves/shows that the conceptual model is anchored. Given the short time students were left with for the interpretation (15-30 min), it seems that they would have not been able to supply a different conceptual model to the one they started with. Indeed, if the students were provided with additional data or context after a first interpretation, would they update their model or will they keep it unchanged? Is it possible to define ‘anchored’ conceptual models without taking that into account? If the authors are satisfied with this simplified definition of anchoring, they should discuss it or at least make it clearer in the manuscript.

4. I understand that this study is quite exciting but it would even be more if it were directly related to the background of the interpreter. In the appendix you provide the survey and questions handed to the students. A summary of the results of this survey should also be added to the paper/appendix to know if Normal vs Reverse fault is falling mostly for people that interpret often or with no knowledge about seismic interpretation. I think this survey is also part of the bias that forms the conceptual model.

5. One additional figure summarising clearly the work, such as the different interpretations, conceptual models and implications (such as which interpretation is the most probable) is necessary to fully comprehend the implications of this work.

Please also note the supplement to this comment:
https://www.solid-earth-discuss.net/se-2019-66/se-2019-66-RC1-supplement.pdf

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