

Solid Earth Discuss., community comment CC1
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Comment on se-2021-14

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Community comment on "101 geodynamic modelling: how to design, interpret, and communicate numerical studies of the solid Earth" by Iris van Zelst et al., Solid Earth Discuss., <https://doi.org/10.5194/se-2021-14-CC1>, 2021

Just a comment that will help distinguish this document from what would be generic information that could be applied to any scientific discipline. What geophysics, astrophysics and similar disciplines have in common is the inability to set up a controlled experiment in the lab, which is an important factor in many other disciplines. Nowhere in the document is the lack of experimental control mentioned, which has an impact on how model validation is done. So can't test out a model hypothesis by setting up an experiment in the lab (e.g. no scaling of gravity possible, therefore any tidal forcing models are impossible to do in a lab). What this means is that the concept of cross-validation becomes much more important, in contrast to the typical hypothesis testing and prediction that are the usual yardsticks for evaluating the utility of a model. In addition, can't wait for predictions on geological time-scales that will unfold over the course of years to millenia, but do have historical data that is amenable to cross-validation analysis.

See [https://en.wikipedia.org/wiki/Cross-validation_\(statistics\)](https://en.wikipedia.org/wiki/Cross-validation_(statistics))

BTW, I come from a solid-state physics background where controlled experiments rule over everything else, and so this gaping hole in the discipline related to geophysics is glaringly obvious. This should be taken as advice from the trenches, no more than that.