Review of the paper:

Nonlinear Wavefield Characteristics of Seismic Translation and Rotation under the nonlinearity in Small-Strain Deformation: Insights from Moment Tensor Simulations

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The authors present an updated version of their previous submitted work. Despite the topic is of interest to the community I have rejected the paper in several previous occasions.

The authors have carefully done several modifications to their work and I acknowledge that. compared to the initial version of this work, the authors have considerably increased the quality of research and presentation of their work.

The presented work has a very clean and clear methodological structure now. It is easily readable and the message is clear. I however have some major comments. This time is not major in the sense of methodological structure (like previous revisions) and/or agree or disagree with what is written there, but some important points that need to be addressed.

My major comments are only few:

(1) If the authors mention the simulation of a realistic event. Then I have to see data comparison. After the theoretical work done, which is credible, it makes no sense to talk about an important event and not compare to data. This will allow the reader to validate the methodology and importance of the work from the data point of view. This is important if the author insist on modeling a realistic event. One can simply download the data from IRIS for this event and after a little waveform processing, do the data comparison. If the authors are not familiar with this kind of data processing, please visit the Obspy tutorials.
The main idea of data comparison is not to state whether your numerical modeling reproduces the data. The authors are not doing a tomography. The comparison instead will help to have an idea how accurate the 1D non-linear structural model reproduces the data and to check whether a better data comparison can be achieved by the non-linear model. It does not have to state that the non-linear model reproduces better the data compared to the linear one (of course this will be the ideal scenario). The main idea is to analyze whether seismograms can be reproduced by a non-linear model (or not). It is just reporting the whether this can be achieved (or not) with the current assumptions and to discuss the reasons.

(2) The authors need to be aware that the term non-linearity is used in the literature to describe many different physical effects. For example, the term non-linearity can be used to describe visco-elastic plastic effects (Bonilla et al. 2005, Bonilla et al. 2011, Frankel et al. 2011, Régnier et al. 2018). However, in this study, non-linearities are geometrical, to describe pre-stressed medium (see Tromp & Trampert 2018 and

references therein). These are two completely different things. So, I would like to read a discussion in the paper clarifying these differences to the reader.

In addition, since the geometrical non-linearity is used to describe pre-stressed media (see Tromp & Trampert 2018), how is this related to the medium when the realistic earthquake is modeled? Is it realistic to do this? Why so? This is very important to discuss.

(3) The benchmark tests should be more explicitly explained inside the paper. Even if it is written as a supplementary information or as an appendix. There must be a discussion of the benchmark done to the code.

(4) Finally, the presentation of the time histories (seismograms) is not the most appropriate one (in my opinion). I still lack of a clear comparison of the transverse component. Simply because the transverse component should not have any energy before the S wave and I cannot see that in the plots. It seems tricky to me how the authors are rotating the seismograms. While this is a minor comment, it is important to clearly show and present in the text.

I would like to respectfully acknowledge the large amount of work that the authors have done at this point. I do believe that after the previous mentioned modification are done, this can easily be a very cited and valuable work.

With best regards,

A reviewer

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