

Solid Earth Discuss., editor comment EC1
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Comment on se-2021-145

Juliane Dannberg (Editor)

Editor comment on "Benchmark forward gravity schemes: the gravity field of a realistic lithosphere model WINTERC-G" by Barend Cornelis Root et al., Solid Earth Discuss., <https://doi.org/10.5194/se-2021-145-EC1>, 2022

Dear authors,

Both reviews are very positive, so I encourage you to write a reply and to submit a revised version of the manuscript incorporating any changes based on the reviewers' minor comments. (Most of these were suggestions, but at the very least I think it would be good to add the explanation for why different observables are used for the comparison involving WINTERC-G).

I also have some additional suggestions that I think would improve the manuscript:

- you already provide all the different codes, which is great. I think it would be very useful if you could also provide the input and output data of the shell tests as a data set (on zenodo, or as a supplement). The reason I am suggesting this: If someone wants to benchmark their own gravity code, they can use your test cases as an example and compare how well their own code performs against them. This would increase the impact of your paper.

- Figure 5: I would suggest to increase the size of the labels. They are quite hard to read. In addition, could you clarify at what depth this is for (a)?

- In section 4.2, you mention different versions of the computational approaches. So I think for reasons of reproducibility, it would be great if you could provide version numbers or commit hashes or something along those lines for all the codes you used in your code availability statement.

- Paragraph starting line 567: It's great that you provide computational times. But I was confused which of the times provided correspond to which method. It would be great if you could make that clearer.

Thank you!
Juliane Dannberg

While reading through the manuscript, I also found some typos you might want to fix:

Line 16: The Spherical harmonic basis functions produces **s** □ produce

Line 29: One of the latest global gravity field model □ models **s**

Line 33: such like □ such as

Line 39: consisting of 1-D stage □ consisting of **a** 1-D stage

Line 55: at location □ at location **P**

Line 76: ranging from simple shell tests to a **the** more complex upper mantle mode --> remove "the"

Line 115: had convergences **s** issues □ had convergence issues

Line 159: shows more smooth transitions, than the isosahedron grid □ remove comma

Line 200: We place spherical shell at a mean depth of 100 km with respect to the Earth's 6371 km reference sphere and modelling different thicknesses of 2, 5, and 10 km. □ We place a spherical shell at a mean depth of 100 km with respect to the Earth's 6371 km reference sphere and model different thicknesses of 2, 5, and 10 km.

Line 233: The mass shell in this scenario consists is described by □ remove consists

Line 254: Figure 6 visualises the differences of **various the** forward modeling results □ Figure 6 visualises the differences of the various forward modeling results

Line 268: this is not everywhere obvious □ this is not obvious everywhere

Line 293: the locations where the Moho boundary changes much □ do you mean: changes abruptly?

Line 312: which related to the limited radial resolution □ which is related to the limited radial resolution

Line 331: A series of layers are defined □ A series of layers is defined

Line 358: are mainly long-wavelength variations of around ± 2 m are similar □ are mainly long-wavelength variations of around ± 2 m that are similar

Line 379: reflects theeffect □ reflects the effect

Line 380: The difference are smaller □ The differences **s** are smaller