Solid Earth Discussions

Solid Earth Discuss., referee comment RC2
https://doi.org/10.5194/se-2021-81-RC2, 2021
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Comment on se-2021-81

Anonymous Referee #2

Referee comment on "Joint modeling gravity, geoidal and geothermal of the Lithosphere in Sergipano Belt and tectonic implications, NE Brazil" by Onofre H. D. J. das Flores et al., Solid Earth Discuss., https://doi.org/10.5194/se-2021-81-RC2, 2021

Revision of manuscript se-2021-81

Joint modeling gravity, geoidal and geothermal of the Lithosphere in Sergipano Belt and tectonic implications, NE Brazil

Potentially, the manuscript may contain results that deserve publication by *Solid Earth*, because it presents a modeling of the crust / lithosphere of an important region of the Borborema Province, close to the limit with the São Francisco craton. However, from the methodological point of view, the manuscript is quite poor, as I describe below in detail.

As a result, the modifications that must be made to the manuscript go beyond what I consider a Major revision. Therefore, I recommend REJECTING the manuscript in its current form and suggesting that authors make a profound modification to the manuscript for a second submission. In particular, the manuscript needs a thorough revision of the English language because, in its current version, the quality of writing/grammar is so poor that it impairs understanding of the content.

In the following, the main shortcomings of the manuscript are listed in the order of appearance along the text, as I realized them during the reading. Some of these shortcomings are also appointed in the attached annotated version of the manuscript.

C1) The text needs a complete revision of the English language. In fact, the text is quite bad, both in writing and in grammar, to the point of impairing the understanding of the content. In the attached pdf file, at least in the beginning, I tried to correct some phrases, but I do not intend to be exhaustive in these corrections. Therefore, the authors should consider my suggestions just as examples of corrections. In addition, I marked with

interrogation (?) some points that I do not understand as, for example, what the authors mean by "heat production on the earth's surface" (lines 30-31). As far as I can understand, no heat is produced on the Earth's surface, but it is produced inside the Earth (or comes from the Sun what is important basically for the biosphere).

C2) In the Introduction, the references are sometimes introduced as long lists (as in lines 36-37; where more than 10 references are given) and, in contrast, long sentences do not contain any reference (as in lines 28-34). The authors must give the reference(s) in the exact point of the text in a precise association with a sentence or affirmation. Please see examples where references must be added in the annotated version of the manuscript in lines 28-34.

C3) Maybe due to their difficulties with the English language, the authors write sometimes rather awkward affirmations such as "…the SBP results on the collision between the Pernambuco-Alagoas Massif and São Francisco Cráton to the north…" in lines 70-71. First, the São Francisco craton is located to the south of the Borborema Province. Second, the collision occurred between the craton and the Borborema Province as a whole and not with just the Pernambuco-Alagoas Massif… So, the phrase is completely wrong.

C4) Sometimes, the authors do affirmations – without any justification – that might be wrong. For example, in line 135-136, they attributed the high values of Bouguer anomaly to basement rocks with high density. However, the region is associated with a marked transition between continental and oceanic crusts, which have a strong impact on Bouguer anomaly. In other words, relating gravity anomaly values to outcropping rocks can be done only in residual Bouguer anomalies, after the Moho influence is approximately removed.

C5) The description of the methodology is quite poor. In particular:

- the authors apply frequency filtering to datasets such as topography and geoid without any geological/tectonic justification for the chosen filtering parameters (see e.g. lines 151-160). In other words, any filtering process in geophysical data (particularly in potential field data) is part of an interpretation process and needs justification;
- the authors model crust and lithosphere interfaces based on isostatic assumptions without giving adequate references to the equations used (as in the case of equation 1) and also without justifying the chosen parameters and the validity of the assumptions associated with the methods used for the study area;
- obtaining all figures associated to the transects (Figs. 6 – 10) was quite obscure. Are these figures the results of trial and error modeling processes? If so, what constraints were used in the models? What are the justifications and/or origins of these constraints? Are these constraints valid for the study area? And finally,
- the authors tried to replace the methodology description with a figure (Fig. 4), describing the processing/modeling steps. However, this figure could at best serve as a support for an appropriate text, but not to replace the text.

C6) The chosen form for Fig. 5, as block diagrams, does not help to understand the modeling results. I suggest using conventional contour level maps. In addition, some figures have low resolution (as Figs. 7-8) and/or very small or even superimposed symbols/numbers (as Figs. 9-10).

C7) The description and discussion of the results seem to be adequate. However, given the serious shortcomings presented above with regard to methodology, accepting these results seems more a matter of faith than science.

REVIEW CRITERIA SUGGESTED BY SOLID EARTH

Excellent (1) Good (2) Fair (3) XX Poor (4)

Does the manuscript represent a substantial contribution to scientific progress within the scope of Solid Earth (substantial new concepts, ideas, methods, or data)?

No, see comments C4 and C5 above.

Are the scientific approach and applied methods valid? Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)?

No, see comments C4 and C5 above.

Are the scientific results and conclusions presented in a clear, concise, and well-structured way (number and quality of figures/tables, appropriate use of English language)?

No, see comments C1-C6 above.

In the full review and interactive discussion, the referees and other interested members of the scientific community are asked to take into account all of the following aspects:

Does the paper address relevant scientific questions within the scope of SE?

Yes.

Does the paper present novel concepts, ideas, tools, or data?

Maybe, but the present version is not acceptable for the presented reasons.

Are substantial conclusions reached?

Maybe, but the methodology is quite poor described.

Are the scientific methods and assumptions valid and clearly outlined?

The assumptions and justifications are not given. See comments C4-C5.

Are the results sufficient to support the interpretations and conclusions?

No. See comments C4-C7.

Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

No. The results cannot be reproduced because no details are given about the modeling processes. See comments C4-C5.

Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

Sometimes. The references are given in a very imprecise manner. See comments C2 and C5.

Does the title clearly reflect the contents of the paper?

Yes. But it should be changed to something like: "Joint lithospheric modeling in the Sergipe belt (NE of Brazil) based on gravimetric, geoid and geothermal data, and tectonic implications".

Does the abstract provide a concise and complete summary?

Partially.

Is the overall presentation well structured and clear?

No. See comments C1-C6.

Is the language fluent and precise?

No. See comments C1-C4.

Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

No. See comment C5.

Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

The size of the manuscript is adequate.

Are the number and quality of references appropriate?

See comment C2.

Is the amount and quality of supplementary material appropriate?

Not applicable.

Please also note the supplement to this comment:
https://se.copernicus.org/preprints/se-2021-81/se-2021-81-RC2-supplement.zip