

Solid Earth Discuss., author comment AC1  
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## Reply on RC1

Roman V. Sidorov et al.

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Author comment on "Sedimentary basins of the eastern Asia Arctic zone: new details on their structure revealed by decompensative gravity anomalies" by Roman V. Sidorov et al., Solid Earth Discuss., <https://doi.org/10.5194/se-2021-90-AC1>, 2021

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Thank you for your appreciation of our research and for your valuable comments, which helped to improve the manuscript. We have made all necessary corrections.

### A- GENERAL COMMENTS

***However, one of the biggest limitations of the paper is that the research area is very large, the scale of the map showing the results is too small, so the obtained results compared with previous results, as well as the comments of the authors are difficult to follow. I recommend the authors consider zooming in on the necessary figures and providing affirmative independent evidence for your new results.***

Following this comment; we have prepared a set of maps in addition to the main maps for the whole region. The new maps zoom-in several regions including one or two sedimentary basins, in particularly, the Zyryanka, Anadyr and Chauna basins. This improves visibility of small-scale details of the thickness and density of the basins.

***- The authors use the methods mentioned in Haeger and Kaban, 2019; Kaban et al., 2021a, b, Kaban et al., 2016 for their calculations. However, the presentation of the method in this manuscript lacks creativity and could be unclear for the readers (the papers themselves by Haeger and Kaban, 2019; Kaban et al., 2021a, b, Kaban et al., 2016 are also very succinct).***

Following the reviewer's suggestion, we have extended the description of the method to make it clear to the readers without reading additional papers.

***The presentation of the method for correcting the initial model in the "5-New models of the sedimentary thickness and density" section should be moved to section "3-Methods" and presented more clearly verifiable.***

Opposite to computation of the decompensative anomalies, which are described in section 3, the description of the procedure for correction of the initial model is directly related to the obtained results. We believe that this is important for their correct understanding and clarity. Therefore, we prefer to keep this part in section 5.

#### B- SPECIFIC COMMENTS

**- Line 219: Is it possible to change " Intermountane depression" for "Intermontane depression"**

Done (this was line 119, not 219)

**- Line 184: "the isostatic correction is estimated following (Kaban et al., 2016, 2017) as" You should be considered change "following (Kaban et al., 2016, 2017) as" by "the following (Kaban et al., 2016, 2017):".**

Changed to "using the following equation (Kaban et al., 2016, 2017)" .

**- Line 185: What is  $G_{is}$  ( $kx$ ,  $ky$ )?**

$G_{is}$  is the Green's function. Added to the explanations.

**- Line 197: What do you use a Green's function for? Is it possible to change "We use a Green's function method (Wienecke et al., 2007; Braitenberg et al., 2002; Dill et al., 2015)" for "We use a Green's function method for calculation of Eq. (1) (Wienecke et al., 2007; Braitenberg et al., 2002; Dill et al., 2015)"**

Done

**- Line 202 (in formula (4)): What is  $G_{is}(x,y,M,Te)$  ?**

This is the Green's function depending on the Moho depth  $M$  and effective elastic thickness  $Te$ . We have changed the corresponding explanations before Eq. (4), so that the Green's function is explicitly defined as  $G_{is}(x,y,M,Te)$

**- Line 266: "the range 1.9-2.72 g/cm<sup>3</sup>" could be possible " the range 1.9 – 1.75 g/cm<sup>3</sup>"?**

1.9-2.72 g/cm<sup>3</sup> is the correct density range.

The corresponding article:

Kaban, M.K.; Mooney, W.D.: Density structure of the lithosphere in the Southwestern United States and its tectonic significance, J. Geophys. Res., 106, 721–740,

<https://doi.org/10.1029/2000JB900235>, 2001,

- has been added into the reference list.

***Line 282: "5. Discussion" should be changed by "6. Discussion"***

***- Line 283: "5.1 Sedimentary cover: model 1" should be replaced by "6.1 Sedimentary cover: model 1"; and***

***- Line 377: "5.2 Sedimentary cover: model 2" should be changed by "6.2 Sedimentary cover: model 2"***

The section and subsection numbers have been fixed.

***- Maps in Figures. 8a, b, and 9 have a very small scale, so it is very difficult to follow the descriptions in the text, especially the detailed descriptions in some basins. For example, the Zyryanka basin is divided into 3 parts consisting of Zyryanka depression structures, Myatis zone, and Zyryanka-Silyapsk zone, or very detailed descriptions of its structural units (according to Koporulin (1979)), however, Figures 8a, b, 9 can't show these descriptions, so I recommend that the authors zoom in the maps in Fig 8 and 9 or some basins for readable.***

Following the reviewer's comment, we zoom in several regions in additional figures as mentioned above.

***- The location of the Avyon segment (or Avyon basin) in the Chauna basin is not shown in the figures.***

The Avyon segment location is now shown in the figure for the Chauna basin.

***- "In the continental part, the maximal thickness is shifted to the southeast less than in the first model, but in both cases its position differs from that one in the initial model".***

***Do you mean "The maximal thickness in the second model is shifted to the southeast less than in the first model, but in both cases its position differs from that one in the initial model"?***

We have revised the sentence following the reviewer's comment.

***- The color ruler in Figure 9a lacks a density value.***

Thank you, we have improved the figures and added all necessary notations, including the color scales.

**- Line 429 (5. Conclusion): "For the offshore part of the Chauna basin (referred as the Ayon basin), the sedimentary thickness has appeared to be 2-2.5 km in the new model, which is lower than in the initial model (4 km). The new result agrees with the marine seismic surveys, which confirms robustness of the method".**

**In the text, you didn't mention the seismic data before. How can say your result agrees with the seismic survey? A short statement should be made on the comparison between your calculation and seismic data in the text.**

A description of the seismic data for the Chauna basin and for the Ayon segment has been added in the Section 2.2. Furthermore, the comparison has been added in Section 6.1 (lines 333-334 in the revised manuscript)

**List of references missing articles:**

**Hildenbrand et al., 1996; (line 66)**

**Zinchenko et al., 1987 (line 125)**

**Drachev et al., 2011 (line 130)**

**- List of redundant references:**

**Smelror, M.: Crustal structure and tectonic model of the Arctic region, Earth Sci. Rev., 2016. Vol. 154. P. 29-71.**

Hildebrand et al., 1996 – added in the References

Zinchenko et al., 1987 – removed (irrelevant paper)

Drachev et al., 2011 – added in the References

The reference

Smelror, M.: Crustal structure and tectonic model of the Arctic region, Earth Sci. Rev., 2016. Vol. 154. P. 29-71. –

is not redundant. This is an article by Petrov et al., 2016. We refer to it in Section 6.1 (line 363).