

Solid Earth Discuss., author comment AC2
<https://doi.org/10.5194/se-2021-90-AC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Reply on RC2

Roman V. Sidorov et al.

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-AC2>, 2021

Dear Reviewer,

Thank you for your appreciation of the results of our study and for your valuable comments, which helped to improve the manuscript. We have made all necessary corrections. In particular, we have extended the discussion about possible effect of density anomalies in the crystalline crust and put all the results in a public repository.

p.3, L. 79 ...and then deformed during a collision between the East Siberian and East Arctic continental lithospheric plates

-> ...and then deformed during the collision between the East Siberian and East Arctic continental lithospheric plates

Corrected.

- **89 - North of the territory is bounded by the Arctic Ocean Shelf of the Laptev Sea, East Siberian Sea, and Chukchi Sea. -> check grammar. You mean: The northern part of the territory....?**

Yes, we meant this. We have clarified this issue.

- **6, L. 184- please check reference calls according to SE instructions.**

These links are correct.

L. 186: M is the depth to the Moho-> M is a single value, whereas Moho depth varies over the window in which the spectral analysis is calculated; define if it is a reference value an average depth, and criterion to define the value.

Yes, in Eqs 1 M is a constant value. Therefore, it is not possible to apply the spectral method for the variable M. Instead, we use the Green's function technique, which provides a possibility to take into account variations of the Moho depth within the study area. In Eqs. 4 M depends on the location. We changed Eqs. 4 to clarify this.

- **199-200: The isostatic correction is estimated in a sliding window as a**

convolution of the adjusted topography with the Green's functions for corresponding M and EET -> please explain in the methodological part how the Moho depth M and elastic thickness EET are set, as needed in the equation 4 and 5.

In Eqs. 4, M and Te are variable and depend on the location. This is clarified.

- **7, L. 223: For computation of the Bouguer anomalies-> Which maximal radius was used for the effect of topography/bathymetry? Which method to discretize the topography was used? Was the global topography correction used? If not, justify.**

The gravity effect of the topography/bathymetry has been calculated within the radius 333.6 km (3 degrees) based on the initial topography/bathymetry grids. The increase of this radius would produce only long-wavelength anomalies, which are not considered as described in the manuscript. This is clarified.

- **8, L. 253: The residual isostatic anomalies are displayed in Fig. 5b-> add for clarity that these are isostatic anomalies corrected for the effect of a starting model of sediments**

The statement has been added.

- **P. 9, L. 258: Based on computed decompensative gravity anomalies: we have corrected the initial model of the sedimentary cover-> You explain the final anomalies through a correction to sediments thickness and density- but the anomalies could also be due to local densification of the crust, as magmatic intrusions or magmatic deposits, or metamorphic processes. Please explain in the text that the possible densification is not considered, and what uncertainties on the crustal structure may arise.**

This aspect has been already mentioned in the results section. Following the reviewer's comment, we have extended the discussion of this effect.

Another question which arises, is whether in the inversion process you control where sediments are present, and how you deal in areas where no sediments are documented.

We cannot be sure that the existing maps correctly show the position of sedimentary basins since this territory is not studied in many places. Therefore, we assume that our results should also indicate some new sedimentary deposits, which were not documented previously.

Data Availability: please make all the data available at the time of revision of the manuscript and specifically indicate the link, according to journal regulations.

The obtained results, including the new sedimentary thickness and density models, can be downloaded from the World Data Center for Solid Earth Physics. The corresponding statement with the link has been added in the 'Data Availability' section.

Figure 9a: color scale lacks numbers.

The figure has been revised.