

Interactive comment on “Geopotential field anomalies and regional tectonic features – two case studies: southern Africa and Germany” by Monika Korte and Mioara Mandea

Monika Korte and Mioara Mandea

monika@gfz-potsdam.de

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Reply to reviewer #3

We thank the reviewer for the very constructive suggestions and comments on our manuscript. We suggest to address them in the following way in a revision of the manuscript:

1) As a detailed geological/tectonic interpretation is beyond the scope of our study (and our expertise), as we already noted in the manuscript, we consider it inadequate to (re-)produce more detailed maps in this regard in our work. The interested reader should consult the original literature as cited. However, we propose to add some labels with

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legends in Figs. 8 and 9 to point out the general locations of the discussed structures. This will be indicated in the manuscript by the following modification/addition when introducing Figs. 8 and 9: "Small scale structures have all been omitted except for those specifically mentioned in the text."

2 (1) This is a very interesting remark. We had not realized that, but had noticed that the orientation of these anomalies seems to coincide with the Tornquist zone. However, we do not know how to interpret the fact that this structure is only visible in the north component of the magnetic anomalies, therefore we so not mention it in the manuscript.

2 (2) It would indeed be interesting to test if we can see the difference in crustal/lithospheric thickness south and north of the Tornquist zone by comparing ground and satellite magnetic anomaly data, but this structure lies too close to the border of our studied region. We do not have repeat station data from north of this zone. The maps in Fig.5 are cut off along the German boundaries as the regional model might be influenced by edge effects further out. Therefore, we cannot include any inferences about the region north-east of the Tornquist zone in the present study.

3) Lines 255-257, disagreement in F for northern Namibian region: Indeed, there seems to be an explanation due to data processing for this difference. We propose to add to the manuscript: "The reason in this case seems to be a combination of two effects: mainly the inadequate interpolation of data over areas with a poor coverage (see section 2.2.1) and probably the effects of some differences in the zero levels (core field) between the map and the model." Lines 278-285: Indeed the discussion of these observations is mainly in the conclusions section. We propose to add/modify the manuscript here as follows: "Less concordance between shallower and deeper structures appears to exist here than in the southern African region. However, it is also possible that the global model does not resolve these structures correctly, as these wavelengths are ambitious to be obtained from satellite data and are not contained in aeromagnetic survey data. An overall dichotomy in the X component of both the short and long wavelengths anomalies, with mostly positive values in the north and negative

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ones in the south, is hard to interpret." For the last aspect mentioned here, the agreement between gravity dXX and magnetic Y anomalies in Fig. 9, we propose to add in 3.3.2: "Horizontal dXX gravity gradient anomalies are weak over the whole region. Their and the long-wavelength Y magnetic anomalies strike directions are more similar than is the case for magnetic and gravity vertical components. Thus the dXX gravity anomalies are less concordant than the other two components with proposed tectonic structures." We do not have an explanation why this might be the case.

Minor corrections: We plan to make the suggested corrections and modifications with the following exception. Line 5: British spelling is used throughout the manuscript, so this has not been changed

More detailed replies to two of the minor points: Line 174: We propose to clarify the sentence about the gaps in aeromagnetic data coverage as follows: "Note that the resolution of this map is variable as gaps exist in aeromagnetic coverage for all of Lesotho and about 30 % of the Namibian territory (strips along much of its northern border, southern half of its western border and an area in its southeast), which have been interpolated."

Figure 4: Yes, the maps are the same with different scaling. In Figure 3 different colour scales are used to bring out the difference in the maximum intensities while showing the main structures. In Fig. 4 the maximum values of the southern African total intensities lie in the saturation of the lower range color scale used there, but the main structures come out well in comparison to the other panels, for which a color scale with broader range would be inappropriate. We propose to add the following explanations to the captions of Figures 3 and 4. Figure 3: "Different colour scales are used to accommodate the notable distinction in the maximum intensities of anomalies between the two regions." Figure 4: "... as described in text and shown in Fig 3a (left), ..."

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/se-2015-132/se-2015-132-AC3-supplement.pdf>

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