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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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We thank the reviewer for his careful assessment of the manuscript. We propose to make the modifications and corrections to the manuscript as listed below. In particular, we apologize for misspelling the reviewer's name in the bibliography, due to an issue with BibTex, that we didn't notice in time.

Re: main concerns - We had used local variometers to efficiently minimise the short term external variations existing in the measured magnetic field at the repeat station locations. Note that in this case these variometers are left running long enough to include truly quiet night time hours. The remaining reduction to annual means thus has to consider large scale signals like secular variation or longer term external field

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variations (originating in the magnetosphere and thus also mostly being of large spatial scale). All measurements were done in summer, i.e. close to the epochs to which they are reduced, and secular variation gradients in Germany are small. Therefore, differences to the results from using only Niemegk or the nearest observatory are in general negligible for this step. We had previously tested this for some cases and in the end for practical reasons chosen only Niemegk for our standard data processing. We propose to modify the text in lines 130 ff in the manuscript to briefly explain this as follows: "All measurements were first reduced to quiet night time values (most quiet two to four hour interval over the running period of the local variometer). The subsequent adjustment to annual means equivalents was done using the Niemegk observatory recordings forall stations, which is justified twofold: 1) all measurements were done over the summer time, close to the reduction epoch and 2) the secular variation gradients over Germany are small (see Korte and Fredow, 2004, for details on data processing)."

Figure 1: - Indeed there are a small number of cases where considering the magnetospheric field description from the model increases the scatter. We propose to include an explanation in the manuscript as follows in l. 124 ff: "Figure 1 shows how the scatter reduces for the individual stations by considering the magnetospheric field contribution. The reduction is strongest in the X component, while for the other components in some cases the effect is smallerand in a few cases the scatter even increases. This is most likely due to uncertainties in the repeat station results, but might also reflect an insufficient description of the external field by the model at certain times and locations." - Indeed the black dot in F for station 34 is covered by the red dot, see also a few other cases where it is nearly covered, e.g., F for station nr. 1 and OBS 2, Z for station nr. 1, Y for station ntr. 33. We will add an explanation "In a few cases the difference is so small that the black dot is hidden behind the red one." to the figure caption for clarification.

Re: minor corrections We thank the reviewer for spotting these and will happily make all the suggested corrections, except for the first one. That whole sentence reads "Repeat

stations are well-defined locations where magnetic absolute vector observations are carried out for one to a few days once a year to every couple of years." Deleting "a year to" changes the meaning slightly. "... carried out for one to a few days once every couple of years" would not clearly include the possibility that they are carried out once a year. Admittedly in most cases they are carried out at minimum repeat intervals of two to five years, but there are countries where they are done every year, and we would like to explicitly include this as our southern African data are such a case.

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