**Earth System
Science Data
Discussions**

Interactive comment on "A description of the global land-surface precipitation data products of the Global Precipitation Climatology Centre with sample applications including centennial (trend) analysis from 1901–present" *by* A. Becker et al.

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For easy reference I will respond the RC of Grant Humphries (Referee#1) para by para while repeating the RC lines, and citing them with ""

My Reponse to general remarks

RC: "Thank you for the opportunity to review this paper. As I opened the document, I realized that I was in for a long-haul on this paper. I was, however, happy to see the detail the authors put into it. It is clear that they have a thorough understanding of their

product(s) and methods."

Thank you for taking the effort to thoroughly examine this long paper and in particular for the provision of specific recommendations to improve and shorten the manuscript. First of all we are grateful to Referee 1 that he – despite his 'major revision' rating - conciliates us a thorough understanding of our products and methods. We will refer to this trust later when we examine point by point the comments of referee 1.

RC: "I did, however, have a hard time reading through this for several reasons: 1) The English poor in many places, and I found myself reading and re-reading many sentences to try and get the message of certain lines."

A native speaker has checked the revised manuscript for English Language. Further comments are provided later in the point by point response to the change requests.

RC: "2) I found the high number of acronyms somewhat frustrating and difficult to follow."

We checked the manuscript for removable acronyms. For the remainder we added Appendix A with a list of abbreviations. (I took this place because according to the ESSD rules for Manuscript preparation (Ref) a list of abbreviations – normally put between abstract and introduction – is not mentioned, so I assume not foreseen at this place) (Ref: http://www.earth-system-science-data.net/submission/manuscript_preparation.html)

RC: "The number of sub-sections was very distracting. Many of those sub-sections were too short, and in some cases, redundant to information previously presented in the paper."

A general criticism is on the length of the paper and we have done our best to take this point to come up with a more concise manuscript, while taking the specific proposals of ref.#1 to the best possible extent, and omitting 10 sub-sections. Other sub-sections have rather been reworded to be more concise but not removed.

This manuscript is being submitted to provide for a new and thorough baseline docu-

mentation of the portfolio of the 10 DOI referenced GPCC data sets AND the methodologies utilized in line with the scope of ESSD. This is the reason that it is prone to be lengthy. The first documentation - made 20(!) years ago, had filled an entire Issue of Meteorol. Z. Volume 1 published in 1992. I hope this explains to a certain extent the length of the paper.

Point by point responses:

RC: "I believe that this paper should be accepted providing some major revisions take place. Please see below for a list of things I believe need to be improved upon prior to final acceptance: The paper requires heavy English editing, and I would recommend that the paper be first put through a rigorous edit by a native English speaker. I found many sentences were missing articles, or were worded in ways that did not make much sense. I have not gone through the entire article to point them all out, but have highlighted a few examples in the PDF document attached"

A native English speaker (British Canadian) has examined the requested rigorous English edit on the revised manuscript before submission. With the >50 papers I had authored or co-authored in English so far, I have never encountered such problems. But this is my first submission to ESSDD, and I understand that the cross-discipline review that is pursued here for data set description papers, which I strongly support, poses an additional demand on the language quality. I totally agree that DOI referenced data sets shall be used by scientist from a wide scope of disciplines, so their corresponding descriptive papers should be precise and made in proper language quality. So thanks a lot for the hint. I truly hope the revised manuscript offers a language quality that is sufficient to get the information unambiguously passed to the reader, which should be the ultimate requirement.

RC: "Section 4.3 You should not compare the methods if you are not presenting the results in this paper. I would suggest removing this whole section, and just focusing on the product you are presenting in THIS paper. (i.e. remove this section and related

figures)"

This is a valid point, indeed. However I was very reluctant to implement this entirely for three reasons:

* We are sometimes criticized for still using the 'outdated' SPHEREMAP method but not Kriging or any other more sophisticated interpolation method. We would like to address this critique by illustrating that on the monthly scale Kriging does not add any accuracy on our products, and that the station density and the application of the anomaly method are the most crucial parameters with regard to the interpolation error. Figures 10 and 11 demonstrate for the Monitoring Product and the Full Data Product the diminishing effect of the interpolation method with increasing data density and sampling, while pointing to those areas where notable deviations occur at all, which is more frequent and strong for the Monitoring Product. We believe that this is essential information for the users of these data sets.

* Ordinary Kriging might still be beneficial for the daily products that GPCC currently develops. For future publications on the daily products we would like to refer to this baseline ESSD paper, where these methodology questions already are clarified. Here the baseline character of this paper is indeed affecting its length.

* In June 2012 I have presented the SPHEREMAP vs KRIGING comparison study at the University of Reading to a number of colleagues pretty renown in the context of global water cycle assessment (among those Gabi Hegerl, David Easterling, Kevin Trenberth, and Mark New). It was taken very positively and Mark New, an author of the CRU CL 2.0 climate data set was especially interested in such a cross-comparison study of the different interpolation methods against the station density and was strongly looking forward to our manuscript submission because of the uncertainty assessment presented in Sect.5.

See also next point, where we take the proposal to focus on one metric, and spare the bottom half of Figure 13.

RC: "Section 5.2 - Line 7, pg 948. Why are you using both? They are essentially two different ways of measuring the same thing. Choose one or the other. (What about Root Mean Squared Deviation?)"

Good Idea! So we focus on MAE for two reasons: * The unit mm/month is more tangible (than mm2 / month2) for users in real application cases * Preferring MAE to MSE or RSME as the squared metrics are also dependent on the variance of the error and measurement, respectively. Therefore they are also more sensitive to individual outliers that are not the target of this investigation.

RC: "Section 5.2, line 16 pg 948. - Are you removing these stations randomly? How did you choose those 4000 stations in Germany to be removed?"

The station density across Germany is substantially higher than in any other region. Therefore, 4000 German stations were removed randomly before the 150 collectives were filled with 300 stations each. Of course this was done only for this particular uncertainty study presented in Sect.5.2

RC: "Section 5.2 line 19 pg 948 - What resolution were the bins?"

We noted the potential misunderstanding the might stem from the usage of 'bins'. We have replaced bins by 'collectives'. Their resolution/size is 300 stations, their number is 150.

RC: "Section 6.1 - I am not sure what the point of this section really is other than to reiterate what you have already told us in previous sections. This section can be removed."

Done, thanks for the specific advice.

RC: "Section 7. You have Way too many sub-headings in here. It gets too distracting. You can cut back on this by merging 7.1.1 into section 7.1 (state the product, and then a quick example of its use)."

Done, thanks for the specific advice

RC: "Figure 3 and Figure 4: Be consistent with your figures. The backgrounds should be colored the same, and you should label the axes in Figure 4. The idea being to ensure that I can look at the figure and immediately understand what the graph is saying. I would switch the Y-axes on figure 4 as well so that it is consistent with Figure 3 (i.e. number of stations on the left), and remove the line that shows the total number of stations (the black line) in figure 4 as it is redundant with figure 3's line that shows the exact same information."

Done, thanks for the specific advice

RC: "Figure 12: I cannot figure out the point of this figure. I get the gist of what you are showing, but I do not believe it is necessary."

Done, thanks for the specific advice. The Figure was meant to illustrate the problem of the land-surface percentage recognition. But I agree that this is a commonly known problem, so for the sake of a more concise paper I have omitted it, while moving the warning remark on un-educated use of standard software tools like cdo to the user advice Sect. 8.2 of the paper.

RC: "Figure 13: As above - why use both? they are similar. Use one or the other"

Done, while choosing MAE as explained above.

RC: "Figure 20: I do not think you need to include this figure. There are already enough and it makes it too much to read through. If you make a manual for your data product, that's where I would put this figure."

Agreed and done!

RC: "For some more specific comments on English, I have made highlighted comments in the attached PDF document."

All comments have been addressed. Thanks for the explicit pointers. Additionally, a

native speaker has also reviewed the manuscript.

RC: "Thank you again, and kudos to the authors for their hard work on this paper"

Let me in return compliment Referee#1 for his patient and thorough examination of this long paper and his provision of thoughtful and helpful comments to improve and shorten it.