

Interactive comment on “GPS radio occultation with CHAMP: monitoring of climate change parameters” by T. Schmidt et al.

Anonymous Referee #1

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Anonymous Referee Report

Title: GPS radio occultation with CHAMP: monitoring of climate change parameters

Author(s) T. Schmidt, S. Heise, J. Wickert, G. Beyerle, and C. Reigber

A General Comments

1. Does the paper address relevant scientific questions within the scope of ACP?

The paper discusses the quality of CHAMP data and gives some examples. Since this data set is relatively new and so far not so visible in the community, the information is relevant and merits publication in ACP.

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2. Does the paper present novel concepts, ideas, tools, or data?

As stated above, the paper gives an overview of CHAMP data properties. It is not very explicit about which of the presented results are new.

3. Are substantial conclusions reached?

Yes, the paper leads to quantitative conclusions concerning the CHAMP stratospheric temperature errors. There is no very clear conclusion concerning the humidity data quality, but it has to be taken into account that this is a much more difficult question to answer, given that all other data sets for comparison are also questionable.

4. Are the scientific methods and assumptions valid and clearly outlined?

Yes, with exception of the specific problems discussed below in "Specific Comments".

5. Are the results sufficient to support the interpretations and conclusions?

Yes, with exception of the specific problems discussed below in "Specific Comments".

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

Yes.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

Yes, with exception of the specific problems discussed below in "Specific Comments".

8. Does the title clearly reflect the contents of the paper?

Yes.

9. Does the abstract provide a concise and complete summary?

Yes.

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10. Is the overall presentation well structured and clear?

Yes.

11. Is the language fluent and precise?

Yes.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

Yes.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

No.

14. Are the number and quality of references appropriate?

Yes.

15. Is the amount and quality of supplementary material appropriate?

Yes.

B Specific Comments

Section 3.1:

The section presents some statistics for tropopause altitude and temperature. It is unclear how these results compare to other published data, for example from radiosondes or HALOE, or other limb sounders. Other published tropopause statistics should be cited and differences or similarities to the CHAMP one discussed. This comment refers also to Figures 4 and 5.

Section 3.2:

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The section presents the tropical stratospheric QBO pattern derived from CHAMP data. As in the previous comment, previous work on this should be cited and differences or similarities of the CHAMP results discussed.

Page 7844, line 22:

"Figure 7 reveals significant improvement of background (ECMWF) specific humidity in comparison to radiosonde by the 1Dvar retrieval."

This statement seems too bold, given that only one profile is shown, and for this profile the retrieved humidity deviates only slightly from the a priori.

Page 7845, line 3:

"Radiosonde data were quality checked by comparison with ECMWF and have been ignored in case of more than 10 per cent refractivity deviation."

This procedure seems highly problematic, since ECMWF fields can not be taken as truth. The discarded radiosondes could be correct. More importantly, since the retrieval uses ECMWF as a priori, discarding all radiosondes that deviate from ECMWF might make the retrieval performance seem better than it really is. Please justify the procedure.

Same section, description of the humidity retrieval bias correction:

"Bias characteristics have been deduced from statistical comparison of one year of observation data with ECMWF analyses."

ECMWF fields are not an absolute reference for humidity data. It seems to me that bias-correcting the CHAMP humidity observations against ECMWF fields casts a doubt on their usefulness for climate applications. Please explain why you believe the data can still be used for climate studies.

(Incidentally, the same criticism would apply if radiosondes were used for the bias correction.)

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Acknowledgments:

Since COST 723 has paid the publication charges of the paper it should be acknowledged here.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 7837, 2004.

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