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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Retrieval of temperature profiles from CHAMP for climate monitoring: intercomparison with Envisat MIPAS and GOMOS and different atmospheric analyses" *by* A. Gobiet et al.

A. Gobiet et al.

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After analysis of the comment of Dr. Wickert (GFZ Potsdam), and pers. communications with him to understand why the most recent operational GFZ RO data should not be used though available in the public domain, we provide here answers to the comment as follows.

1) On why the operational GFZ retrievals (version 005) were used in the study: The version 005 retrieval data have been the most recent operational GFZ data product in July 2006, when the data needed for the two "validation seasons" (SON 2002, JJA 2003) were downloaded from the GFZ data center. For us as CHAMP RO Co-Investigators

this was a routine process (one dataset among a series of other sets acquired for the study). We confirmed February 27, 2007, that version 005 retrievals were still the latest operational product, i.e., there have been no updates since July 2006 and the data used in the study are thus the up-to-date operational status. There was and is no other or newer correlative GFZ product available for our validation purpose so it was fully credible to use this product. Furthermore, in a preliminary study (which did not include comparisons to atmospheric analyses, was based on a much smaller dataset, and published in a conf.proceedings book), the CCR and GFZ temperature retrievals have already been compared, showing basically the same differences as in the submitted paper. Since the GFZ retrieval played a major role in that study, Dr. Wickert co-authored it and agreed to any part of it [Gobiet et al. 2005]. We thus did not expect any problems in routine download of two seasons of operational data.

2) On why GFZ recommends not to use it: To understand the comment, we learned from GFZ that the "new-005" version mentioned in the comment refers to GFZ in-house trials for a small test time interval (not including our validation seasons) and that plans exist to update the operational product later in year 2007. Also we learned that given our study and previous ones (e.g., Von Engeln, 2006), GFZ will redraw the current operational temperature retrieval product from their data center server and provide no operational temperature product until their operational processing system is upgraded and re-processing available based on a newer version (including clearance of the mentioned numerical incorrectness of "new-005" trials, and more improvements). Based on these plans, GFZ recommends the current operational product to be no longer used.

3) We conclude from the above: Since our study is not focused on RO retrieval intercomparison but on the validation of RO temperature profiles using RO-independent datasets, the comparison with GFZ in the paper can receive less emphasis. If the reviewer's comments will be compliant, we intend not to completely remove the CCR-GFZ discussion (since it is important for demonstrating the effect of high altitude ini-

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tialization), but we will restrict this part to a discussion in the text of comparison results (incl. also RO other than GFZ, and further reference to earlier studies as Dr. Wickert suggested), and we will remove Figure 2 and the leftmost two columns of Figure 7 (i.e., the GFZ related figs). We think this is a reasonable approach accounting for GFZ's recommendation on their current temperature retrieval product.

On the scientific aspects of the comment - that the use of the current operational product led to "several incorrect assumptions and conclusions" and "conclusions related to temperature deviations are scientifically not justified" - we find these statements not really justified, for the reasons summarized below.

1) How much of the differences between the CCR and GFZ retrievals are caused by the "numerical incorrectness" in the GFZ retrieval of the current operational temperature data, and not by the high-altitude initialisation scheme, could not be verified as no sufficient description is available so far on recent improvement (GFZ informed they plan further improvements, before a larger-scale application of the new scheme). Independent of this, other studies [e.g., Gobiet and Kirchengast, 2004] clearly have demonstrated that different implementations of high altitude initialization create such differences in the temperature profiles as we showed and discussed. Furthermore, the depicted cold bias in the ECMWF analyses is consistent with explaining a significant part of the bias in the GFZ retrieval results. As a balanced solution, we plan to cite Dr. Wickert's expert judgement (substantiated in personal communication) that a part of the bias in version 005 operational data was due to a numerical incorrectness of the GFZ retrieval and that an improved operational temperature product is scheduled for release later in 2007 (J. Wickert, pers. communications, 2007).

2) As a remaining point to be commented on, Dr. Wickert stated that the CCR retrieval uses ECMWF as bending angle background data and that "this should be focussed more clearly." We note that the role of ECMWF analyses as background data in our retrieval is clearly discussed, in rather detail, in the paper in section 3.2 (description of CCR, including references) as well as in section 3.3.3, where the consequences

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on the comparison of CCR with ECMWF analyses are discussed. The aspect is thus explained in a fairly clear and transparent manner.

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