**Atmospheric
Measurement
Techniques
Discussions**

Interactive comment on "Assimilation of GPS radio occultation data at DWD" *by* H. Anlauf et al.

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P1535, L20: GFZ RO. The authors probably mean GPS RO. Besides, I suggest that they use consistently either GPS RO or GPSRO.

The referee is correct, it should have read GPS RO. As suggested, we will change the spelling to GPSRO consistently throughout the manuscript.

P1536, L26: By choosing one single horizontal location for the tangent point, the authors are NOT modeling its drift. The procedure described is some form of optimal choice for this single location, but is neglecting the drift.

The referee's comment is correct. We will change the wording slightly to make it clear that the choice of an effective occultation point only partially takes into account the drift of the tangential points relative to the nominal occultation point.

P1537, L1: The expression shown in eq. (2) is from Rueger (2002), who should be cited. The report and article cited explore whether this expression is appropriate, and find no evident objection. The actual recommendation in those sources is that, first, a modern determination from experimental data is to be encouraged, and second, that if this expression is used, it should be together with the inclusion of a compressibility factor in the equation of state.

We will add a citation of Rüeger's paper and clarify that the quoted GRAS SAF Report 05 recommends this formula. The referee should note that we cited Healy's published paper instead of GRAS SAF Report 09. We did not discuss non-ideal gas effects as we do not take them into account in the forward model. We will change the text to better reflect this.

P1538, L26: The issue is unclearly presented. It seems that the authors perform a check, which sometimes failed around the dateline. Was it really a CDAAC problem? If evaluated properly, a longitude of -179 and of 179 degrees are close. It seems to me that it was not a CDAAC problem. Secondly, please note that the dateline is not exactly the meridian -180.

The presentation of the issue with COSMIC data was indeed quite vague, so we will slightly extend the description of the problem.

The mentioned problem with some COSMIC occultation data can be verified by inspecting the original BUFR data distributed via GTS. For example, selecting the COSMIC occultations between 80°S-80°N, 179°E-179°W, just for 2010-03-01, 00:00-23:59 UTC, the DWD operational database returns 9 occultations exhibiting the problem. The first is from COSMIC FM-4 (satellite id 743), nominal occultation time 00:09 UTC, nominal occultation point 28.57°N,179.86°E. The BUFR data contain two rays with missing values for the longitude, which are discarded, plus one ray with reported longitude 3.57°E, plus two more rays with questionable longitudes. Similar comments apply to the other eight occultations.

It appears that this problem does not occur for COSMIC near real-time data disseminated after 9 July 2010.

The reference to the dateline is of course incorrect. It should have read 180° meridian.

P1543, L21: Are the final bias correction coefficients again static, or are they sistematically reevaluated "from time to time"?

The referee's question is valid. The description of the treatment of bias correction in DWD's 3D-Var system was misleading and will be corrected and slightly extended. The bias correction coefficients for the operational assimilation system are already systematically reevaluated from time to time, with an update typically every two or three months. The additional use of GPSRO in the impact experiment required a calculation of these coefficients independent of the operational system. This was initially done even more frequently although it did not appear necessary.

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