**Atmospheric
Measurement
Techniques
Discussions**

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

Anonymous Referee #2

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The paper is suitable for publication after addressing the comments listed below:

P1534: the abstract mentions that there is a positive impact on surface pressure with the assimilation of GPS RO observations. However, this is not shown in the text. I can only see a very marginal impact with the use of TerraSAR-X (Fig 7). The comment on surface pressure should be removed from the abstract or additional plots/discussion need to be provided.

P1535: The introduction should contain a paragraph indicating that GPS RO data is being assimilated operationally at the major weather centers. References to the work being done within the operational community would also be appropriate.

P1536: Is there a reference for Gorbonuv's forward operator?

P1537: Equation 2 should contain a reference to the original author (Rueger) instead of the report/article where it was taken from. Many studies, in Europe and other places, make use of Rueger's equation.

P1537: Why do you use climatology information above the model top to compute the bending angles? Most centers usually extend the atmosphere by extrapolating the model top levels. One of the nicest features of the bending angle forward operator is that its assimilation can be done without requiring climatology information. Have you checked other approaches and if so, how do the results compare?

P1538: The errors you chose seem to be a combination of forward model errors and observational errors. The forward model component depends on the characteristics of the specific model being used. Have you tuned these errors to adjust them to the characteristics of your forecast model?

P1538: Was there a problem in the CDAAC processing of the profiles? Do you have a reference or explanation for this? I am not aware of any changes addressing the coordinates of the assigned point on Earth for a profile.

P1544: Is there a particular reason for stopping the assimilation of bending angles at 30km? Is it close to your model top?

P1542: I am a bit confused with the paragraph describing the blacklisting of observations south of 65 degrees. Are these profiles being used in the operational configuration?

P1543: How often are the bias correction coefficients being updated in your static bias correction approach?

P1543: Fig. 2 shows a slight degradation around 150-200 mb in the tropics and southern hemisphere extra-tropics with the use of GPS RO data. Does this pattern repeat for other periods? Have you investigated possible explanations?

P1544: Since the relative humidity depends on the temperature, improvements on this

variable might reflect an improvement on temperature rather than moisture. Have you looked at the verification of pure moisture variables, such as specific humidity?

P1544: What is the statistically significance of figures 4 and 5? Some information on the level of confidence of the results should be provided with these figures.

P1545: Is it possible to add the statistics for COSMIC along with the statistics for TerraSAR-X. The text indicates that the quality of TerraSAR-X is similar to COSMIC; but this is difficult to verify it, if statistics for COSMIC is not provided.

P1454: Does the marginal impact found on surface pressure with the use of TerraSAR-X extend to other variables? I would like to know if the almost neutral impact is found for other fields as well.

P1454: Please, add Taiwan along with UCAR to acknowledge the use of the data from the COSMIC/FORMOSAT-3 mission.