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Atmospheric Chemistry and Physics Discussions

Interactive comment on "

First results from the GPS atmosphere sounding experiment TOR aboard the TerraSAR-X satellite" *by* G. Beyerle et al.

Anonymous Referee #1

Received and published: 30 November 2010

General Remarks:

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Generally a well written article, with only a few minor things that should be clarified or amended.

There is a large interest in obtaining radio occultation data in near real time for assimilation into numerical weather prediction models. Please add whether this is planned for TerraSAR-X (Tandem-X). The focus is also shifted more to bending angles, thus a

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validation of these would greatly benefit the manuscript.

Specific Remarks:

Page 28824, Line 2: GRAS seems to be missing here. ROSA could also be mentioned.

Page 28826, Line 9: You focus on the data recorded prior to this SW patch - is there any effect of this update on the data quality?

Page 28826, Line 25: Recent work by Sergey shows that there is still signal at lower LSAs. Is this detectable on TerraSAR-X as well? How does the receiver decide where an occultation ends?

Page 28831, Line 11 / Table 1: What is the main reason for loosing so many occultations? It seems similar to COSMIC statistics, but not to GRAS ones.

Page 28831, Line 16 / Figure 4: One could also deduce from this figure that CHAMP is capable of tracking occultations even with SNRs around 200, while TerraSAR-X does not see any with this low SNRs. Now this could be cause by TerraSAR-X generally seeing higher SNRs of an occultation, but what about at very high azimuth angles, where theoretically these occultations could be tracked but none are found (for both instruments actually)? Is TerraSAR-X driven by the antenna performance (thus azimuth angles higher than 55 Degrees are never observed) while CHAMP is driven by tracking performance?

Page 28832, Line 11: Is there always an increase when using the reference link? Isn't this the same data that is also used for POD, so it is anyway tracked, or is the POD tracking at lower frequency?

Page 28833, Line 9, Figure 5: I was naively assuming that the 30s clock solution would introduce deviations the further one is away from the 30s sampling point. This does not seem to be the case, rather a general degradation higher up is observed. Is there

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any further explanation for this? Is the 30s solution just so bad that it cannot be used at all?

Page 28836, Line 23: I probably don't understand enough of these NCO refractivities, but I would assume that there will generally be a bias between the N^NCO and the true N when the underlying model / climatology stirring the NCO has a bias with respect to the true atmospheric state. And this will show up more when extreme conditions are found (low SNRs), which will not be near a climatological mean.

Page 28837, Validation: Would be nice to see also bending angles, up to some 50 or 60km.

Page 28838, Line 3: These 29 occultations were removed in a quality control procedure? They must have an ECMWF refractivity profile as long as they have a latitude, longitude, time entry.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 28821, 2010.