

Interactive comment on “Application of the Full Spectrum Inversion Algorithm for Airborne GPS Radio Occultation Measurements” by L. Adhikari et al.

Anonymous Referee #1

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Summary: This paper presents information on the airborne radio occultation technique (ARO). The novel aspect is using the Full Spectrum Inversion (FSI) retrieval method, which is developed and described. Simulations that are fairly realistic are used to evaluate the technique. Sensitivity to the ARO/FSI amplitude is a focus. Accuracy of bending angle and refractivity retrievals versus altitude are presented.

Review Summary: This is a well-written and informative paper that should be published after reasonably minor revisions, as detailed below in the comments. There are typos and errors in English that should be corrected.

Overall there are too many references to an unpublished work (Wang et al., 2015). This makes it difficult to evaluate several statements in the paper.

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Detailed Comments: p. 2 Line 18: impact parameter is conserved under the assumption of spherical symmetry, which should be stated here. Be clearer what is meant by “tangent point” (e.g. of the occulting raypath).

p. 6, L30: be explicit that this refractivity is an estimate from model.

p. 8, L8: could iteration be used after the initial CIRA estimate? This question is hanging out there and should be addressed in some way, either as “future work”, or a reason why iteration (updating the original CIRA model refractivity using the first retrieval) is not worth pursuing.

p. 8, L12: “accumulated” may be the wrong word here. What determines how α_{GPS} is defined versus α_{rec} ? The angles appear to be defined by an entry point into the atmosphere. No bending is accumulated above the atmosphere, so a re-phrasing is suggested.

p. 8, Eq 14 and 15: are capital PHIs defined?

p. 9, Eq 18: what approximation technique is this? Please identify. Use the approximately equals symbol, rather than equals.

p. 14, L3: How were these constants chosen? Something about that should be said.

p. 14, L18: Please confirm the numerical value of 0.75%.

p. 15, L23: Too many references to Wang et al., 2015, which is as yet not available.

P. 16, L1: The authors should elaborate on this “degraded observation”. What causes it? Will it occur frequently in practice? Should it be simulated here? Ignoring this may not be appropriate for a paper developing ARO techniques using FSI. This degradation has to be described and bounded in some way. Please elaborate.

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/amt-2015-378/amt-2015-378-RC1->

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