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Atmospheric Measurement Techniques Discussions

Interactive comment on "An introduction to FY3 GNOS instrument and its performace tested on ground" *by* W. Bai et al.

Anonymous Referee #4

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This paper provides a nice overview of the GNSS Occultation Sounder (GNOS) that was designed to track both GPS and Beidou occultation signals. The paper describes the specifications of the instrument as well as some testing results The GNOS has now been launched on the Chinese FY3-C weather satellite, so the paper is a timely contribution. The paper is generally well written, although there are several places that require more details and clarifications.

(1) P4, L19-22: On the occultation antenna, could you provide some description of the antenna design? If 10 dBi is the average gain over the field of view, what is the peak gain?

(2) P4, L28-29: "An Ultra Stable Oscillator (USO) is used as a reference oscillator with

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very stable frequency (Allan variance of 10ˆ{-12}). . .." Did you mean "Allan deviation" here? In addition, I think it'd be good to mention the integration time here, even though it's given in Table 1.

(3) P5, L9-11: I'm confused about the GNSS terminology used here. What is meant by L2 C/A? Do you mean L2C? Can GNOS track L2C? Also are the codes for B1 and B2 same as the C/A code in GPS L1?

(4) P5, L12-14: Open-loop (OL) tracking is carried out for L1 only. Is there any reason that GNOS does not track B1 and/or B2 signals in OL as well?

(5) P5, L14-17: Can you describe the onboard Doppler model used by GNOS during OL tracking? Do you track the code in OL as well?

(6) P6, L20: ". . .simulator output SNR was 48 dB. . .." Did you mean dB-Hz?

(7) P6, L21-24: What is the integration time for the code and phase noise? 1 second? Why is the precision worse for Beidou?

(8) P7, L16: "We succeed in retrieving the refractivity profiles. . ." Please describe the inversion method used to retrieve refractivity.

(9) P7, L22-29: It would be helpful to show a plot for the statistical comparisons.

(10) P8, L4-5: ". . . we just carried out GNOS Beidou occultation functional test." What does "functional test" mean? Please explain.

(11) P8, L5-8/Fig. 9: Why is the Beidou case biased relative to the GPS closed loop case? A refractivity > 350 seems too large for a non-tropical site. It might be due to inversion errors. Please check.

Minor comments:

(12) P2, L26: Beyerle et al. 2005 should be referenced for GRACE occultation.

(13) P2, L30: "even" -> "evenly"

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(14) P3, L9: “possess” -> “possesses”

(15) P3, L11-12: “Scott Gleason et al.” -> “Gleason and Gebre-Egziabher” (You might want to cite the specific chapter on RO.)

(16) P3, L19: “Yanmeng et al.” -> “Bi et al.”

(17) P4, L12: “bean” -> “beam”

(18) P4, L20: remove “that”

(19) P5, L1, L5: “Multi-frequency” -> “multi-frequency” (lower case)

(20) P5, L25-26: “The average GRAS data rate is . . ..” Did you mean “GNOS” here?

(21) P5, L29: what are equatorial crossing times of FY3?

(22) P5, L32: spell out GEO, IGSO, and MEO

(23) P6, L1: “. . . 24 hours, with considering. . .” -> “24 hours. Considering. . .”

(24) P6, L17: “Oliver et al.” -> “Montenbruck et al.”

(25) P6, L28: “there dimensions” -> “three dimensions”

(26) P7, L8-9: “we can overlook the horizontal isn’t hidden the landform in the southward view.” Please rephrase.

(27) P8, L8: “compare” -> “compared”

(28) P8, L27-28: “Especially, GNOS first succeed in implementing Beidou mountain-based occultation explorer.” Maybe rephrase as “In addition, we present results from the first Beidou mountain-based occultations from GNOS.”

(29) Figure 3 caption: “Beidou” should be “GPS”

(30) Figure 7: Please indicate in caption which way is South.

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