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Atmospheric Measurement Techniques Discussions

Interactive comment on "Electron density profiles probed by radio occultation of FORMOSAT-7/COSMIC-2 at 520 and 800 km altitude" *by* J. Y. Liu et al.

Anonymous Referee #1

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The present paper discusses the differences in GPS RO electron density profiles based on satellite altitudes of 500 and 800 km altitudes. The results are potentially relevant for combining GPS RO electron density profiles from missions at different altitudes. Overall the results are interesting, and I believe that it is suitable for publication. There are, however, several aspects of the paper that could be improved. Specifically there are several areas where the paper would benefit from additional depth. Detailed comments are provided below.

Major Comments: 1 - In the abstract the authors state "The electron density derived from 500 and 800 km satellite altitude of the F3/C observation and the OSSSE confirm

that the standard Abel inversion can correctly derive the electron density profile". Given the known error of the Abel inversion due to the assumption of spherical symmetry, the authors should revise this statement. To say that the Abel inversion can "correctly" derive the electron density profile is misleading given the known errors.

2 - I believe that the paper does not provide sufficient background information for the reader to fully understand the purpose of this study. For example, why would the results be expected to be different when derived from satellite altitudes of 500 km vs. 800 km? Given that other RO missions profiled the ionosphere from lower altitudes, one would assume that there is not a large difference in the electron density based on the satellite altitude. Additional background information as to why this study is necessary would be beneficial.

3 - In March and April 2007, one satellite (LEO 4) is in between 500 and 800 km. The authors should clarify whether this satellite is assigned to the 500 or 800 km group.

4 - In the final paragraph of section 3, the error between the Abel OSSE and IRI truth is discussed. Many previous studies have examined the error in the Abel inversion. The authors should place their results in the context of these prior studies.

5 - The authors only present the differences between the electron density profiles based on satellite altitudes of 500 and 800 km. There is no explanation as to why these differences appear. An additional discussion of the source of the differences would be beneficial.

6 - The present results are for near solar minimum conditions. Do the results hold true for solar maximum when 500 km is much closer to the F-region peak altitude? Discussion of any potential impact of the solar cycle variability on the results would be a useful addition to the paper.

Minor Comments: 1 - Page 1616 line 13 - GPS should be defined.

2 - Page 1618, line 8 - "difficult to identical" should be "difficult to identify"

3 - Page 1618, line 20 - “can be fund in” should be “can be found in”

4 - Figure 1 caption - “from launched to middle” should be “from launch to middle”

5 - Figure 3 caption - “showed” should be “shown”

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 1615, 2015.