

Interactive comment on “Ionospheric Plasma Density Measurements by Swarm Langmuir Probes: Limitations and possible Corrections” by Piero Diego et al.

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We want to thank the Referee for the general comment and the suggestions. The aim of our work is to find the reasons why Swarm and CSES plasma densities show a high discrepancy in the absolute values while they track each other in the shape of the time series along the orbit (reaching a very good agreement when at almost same LT). In particular, we are interested in the variability of such discrepancy that appear to be related to the Debye length variation along the orbit and during plasma depletion occurrences. Our thesis is that both instruments produce reliable data but could need additional calibrations as well. Even if systematic differences could be

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ascribed to various effect (i.e. data inversion algorithms, altitude difference, . . .) we aim that some anomalous increases in the Swarm/CSES Ne ratio should be investigated. Anyway, we cannot state that the entire data set of Swarm is not valid and has to be corrected. Results obtained by Lomidze et al. show consistent agreement between the measurements and the models used, but we think that in-situ observations should be treated separately since these are obtained with similar procedures, and these are quite different from those used for the calibration made by Lomidze et al. Thanks to suggestions from Swarm team, we have deepened some aspects of our analysis finding that the sheath effect is very small in case of fast moving object (only about 50% more than that of probe cross section) and also the electric field induced by S/C presence is usually confined inside the probe sheath (thus it is already described by OML theory). On the other hand, the case in which the sheath radius is comparable with the probe stub (and the possible melting between probe sheath and S/C sheath) need to be furtherly investigated. We think the paper cannot be upgraded starting from its current version but it needs a complete revision, thus we decided to withdraw it. Best regards.

Piero Diego

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