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Interactive comment on "The high sensitivity of SMOS L-Band vegetation optical depth to biomass" *by* Nemesio J. Rodríguez-Fernández et al.

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We would like to start thanking the reviewer for his thoughtful and constructive remarks. Please see our response to the specific comments in the attached file. In addition, we will upload a revised manuscript (using track change) and final answers referring to changes in the new version as soon as we are invited to do so by the Editors.

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Referee # 2

The study is aimed to introduce the sensitivity of the vegetation optical depth (VOD) at L band to the biomass. Different SMOS datasets, produced by different algorithms, are compared to some above ground biomass (AGB) datasets over Africa. The analysis is carried out to show the higher correlation of the L band VOD with respect to higher frequencies VOD and optical vegetation indices. The paper also presents the correlation of the SMOS VOD with other parameters like tree height and cumulated precipitations.

We thank the reviewer for his/her constructive comments.

General comments:

The study's goal is well defined in the paper introduction where the authors claim that the retrieval of the VOD at L band can provide an important tool for the monitoring of the vegetation properties at large scales. In the first section of the manuscript is highlighted that, besides optical measurements, passive microwave observations acquired by the SMOS radiometer can provide an important complementary information to infer the state of vegetation. Here, several references are correctly reported to introduce the study and it is emphasized how the L band observations are less attenuated through the vegetation canopy. Therefore, L band VOD is expected to sample the vegetation layer up to higher biomass values compared to higher frequency observations. This aspect represents the key point of the manuscript and it is supported by the figure 4 of the results section. Anyway, just few comments are deserved to this point while a deeper explanation of the high sensitivity of the L band should be provided in the last section of the results.

First, following comments by reviewer #1, we have improved the presentation and the explanation of former Fig. 4. Sect 4.4 will be moved to the discussion as the description of this figure, in particular using the curves of Fig S4 by Liu et al. 2015 is basically a discussion of new results on L-VOD/AGB with respect to published results by Liu et al. And we would like to avoid misunderstandings on this point. The new figure has two panels. In the left panel L-VOD and NDVI were normalized to 1 using their maximum values. This is needed to plot the two quantities in the same figure. In the right panel, L-VOD and K/X/C-VOD relationship to Saatchi AGB are shown without using any normalization, because they span basically the same range and following comment 2 by reviewer 1, we want to emphasize that the curves plotted here for the K/X/C-VOD are just those of Figure S4 from Liu et al., which were computed using Saatchi AGB and the same method that we used in the current study. Liu et al fitted their relationship using K/X/C-VOD data in the period 1998-2002 and Saatchi data acquired from 1995 to 2005 (page 6 of their supplementary information document). The fact that the dates of the different datasets vary will

Fig. 1.

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