

Interactive comment on “Towards ground-truthing of spaceborne estimates of above-ground biomass and leaf area index in tropical rain forests” by P. Köhler and A. Huth

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The referee pointed to individual parts of the MS where some clarification might be needed. We are able to satisfactory reply to all specific comments. We furthermore will implement the content of this discussion in the revised version of the MS accordingly.

The comments of the referee and our replies are in detail:

- Reviewer comment: *"On page 3229 line 21-22 the paper states that allometric*
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relations between canopy height and standing biomass are so far missing. This is not true to my knowledge. Previous allometric research in the UK and by the FAO has related canopy height to biomass, although knowledge of the tree species is necessary. I suggest rephrasing this sentence and citing further previous work where a connection between canopy height and forest above-ground biomass was found, perhaps including: FAO (1997): Estimating biomass and biomass change of tropical forests: a primer, FAO Forestry Paper 134"

Our response: The relevant sentence in our manuscript ("allometric relations between canopy height and standing biomass are so far missing") was referring to tropical forests. Concerning available data in the tropics, the mentioned FAO report contains species-specific relationship between biomass and tree height of individual trees, but not on the whole forest canopy level. However, we revised the sentence to avoid confusion.

- *"An important question is how valid the model is for different forest ecosystems, and the authors should either discuss the constraints of their generalisation more clearly in the discussion section, or provide more evidence that the model is sufficiently general to work at global scale. How can the reader be assured that the good model results are more than a mere over-fitting to one particular test site?"*

The model used here was developed for tropical rain forest. It was applied in various different forest types in South-East Asia and South- and Middle America (see section 2.1 for details). The model has never been applied on a global scale nor is it planned to do so. Our study here was indeed focused on individual data and model application performance for a specific site. Our objective was to show how typical data for a typical site in South-East Asia can be understood

and might be discussed from remote sensing. We never intend to extrapolate these findings to the global scale. We believe that the results are in its order of magnitude system intrinsic, e.g. not dependent on the specific model. We clarified this position at the end of the introduction in the revised MS.

- *"On page 3228 line 24-25 the paper mentions remote sensing techniques but is unspecific. Which remote sensing techniques are meant here? The entire paper needs to be strengthened by being precise in the terminology on the different remote sensing techniques that have been developed. I suggest that the authors differentiate between two groups of methods of the highest relevance to their paper: (i) Remote sensing methods for forest canopy height mapping, e.g. LIDAR and SAR interferometry; and (ii) Remote sensing retrieval of Leaf Area Index from optical/near-infrared sensors. Accordingly, the discussion of the forest model results needs to differentiate and state that the results suggest that remote sensing of canopy height has got the potential to map global forest biomass at an acceptable level of accuracy, but that remote sensing techniques based on the retrieval of leaf area index are not providing a biophysical parameter that is closely enough linked to biomass to provide accurate enough results."*

Following this comment we tried to clarify the relevant remote sensing technique whenever mentioned, which are LIDAR and SAR interferometry. In addition, there seems to be a misunderstanding here. Our approach analyses in the modelling results the relationships between canopy height h and either above-ground biomass AGB or leaf area index LAI , thus it is always connected to the canopy height which might be derived by the remote sensing techniques mentioned above. We do not relate a LAI (which might according to the comment be retrieved via optical/near-infrared sensors directly via remote sensing) with AGB . Therefore, the differentiation of the discussion as suggested is not neces-

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sary, but we clearly describe whenever mentioned, that we mean LIDAR and SAR interferometry when talking about remote sensing techniques. To avoid a misunderstanding we briefly expand the discussion on the subject, that LAI might be directly detected/calculated with the aim of other remote sensing techniques.

- *"page 3232, line 2-3: change to "the same configuration as in these three applications.""*

Done.

- *"page 3235 line 10: change "tress" to trees "*

Done.

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