Biogeosciences

Discussions

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Interactive
comment

Interactive comment on "Estimating aboveground carbon density and its uncertainty in Borneo's structurally complex tropical forests using airborne laser scanning" *by* Tommaso Jucker et al.

Anonymous Referee #1

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Dear authors,

Thank you very much for your interesting and meaningful paper regarding large area forest biomass mapping using ALS based on an ecological general model. I feel that the paper is worth to be published. However some explanations should be added to make the meaning or value of results clearer to the readers. Please read my comments below.

Yours sincerely,

General comment: I agree to authors idea about necessity of a general model for ACD mapping. Since the regression approach for ACD prediction is basically a case study in

specific forests, proposing a general model is very important to avoid effort of modeling in each case. Tropical forests have complex species, structure with wide validation and it is difficult to estimate biomass accurate. Therefore this is an important paper which showed a semi-empirical general ACD estimation model using ALS.

I also remind that although the proposed models are based on Asner and Mascaro (2014), the adaptation using ALS parameters is based on regression analysis. Therefore the authors should refer necessity of developing any thorough general models in the future. For example Fig. 2c, d and Fig. 5a suggest that there is a clear relationship between modeled and field ACD among plots less than ca. 70 Mg C ha-1, however, the relationship diverse greatly among plots exceeding it. Fig 5a shows TCH has a clear near-linear relationship with canopy cover among plots less than ca. 25m of TCH, however, it diverse greatly after ca. 25m. These suggest that unknown factors which are caused by canopy changes during tree growth influence on the ACD estimation in Fig 2d. To reduce the prediction errors in Fig. 2d, you have some approaches which are maybe statistical (regression) analysis, semi-empirical or physical modeling. You should suggest the approach to improve accuracy of your general models in the future to readers.

Individual comment: I feel that the paper is documented very well. I suggest adding a few explanations below to improve your paper.

1. P13 25 I suppose that you had better change the following part. adding a canopy cover term to Asner and Mascaro's (2014) general model → adding a canopy cover term to estimate BA in Asner and Mascaro's (2014) general model

2. p27 Fig 4 Three plots in Kuamut forest reserve appeared at the bottom of figure. The authors had better describe about the cause of spread from other plots. The reviewer suppose that they are young secondary forests with pioneer species with small WD. If you have any information about species composition of the three plots and describe them, it will be helpful information to the readers.

3. Fig 2 c, d vs. Fig 7 The authors compare their ACD estimation using ALS and two ACD estimation using satellite optical imagery. The nature or principle of the two systems is different and it cause better performance of ALS based approach than optical image analysis. You should describe about it and make clear the reason of advantage using ALS data.

4. Many reference paper is not shown in the reference list. Please finish the reference list.

END

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