Interactive comment on "Above- and below-ground net primary productivity across ten Amazonian forests on contrasting soils" *by* L. E. O. C. Aragão et al.

L. E. O. C. Aragão et al.

We would like to thank both reviewers for their relevant comments. We have considered and addressed all suggestions in the new version of the manuscript. Answers for each one of the referee comments are listed below:

Reviewer M. Ryan

Reponse to comment 1. The authors agree with the reviewer that methodological limitations may introduce biases that are not quantified in our error estimates. However, due to the lack of data and the spatial-temporal variability of decomposition and production, microbial and faunal diversity and abundance, and climate we believe that the magnitude of bias may vary considerably across Amazonia. It is therefore very diffi-

cult to estimate the size of the uncertainties associated to methodological issues with the current data availability. For instance, decomposition of litter in the traps may be higher in sites such as AGP-01 and AGP-02 than in other sites due to the lack of dry season. In addition the degree of litter retained by the canopy in the Amazonian sites is unknown. For clarifying the meaning of our error analysis and avoid the false sense of precision we have added a new statement in Page 12, lines 1-5: "It is important to note that uncertainty values represent uniquely the precision of measurements and that biases related to methodological issues were not accounted for in the error analysis due to the lack of available information. Probable sources of unaccounted errors are discussed throughout the text and their potential magnitude is quantified in Clark et al. (2001a)".

Reponse to comment 2.

We understand the Reviewer's concern with the term NPPfinelitter which is conceptually mislead. Therefore, we are now using the term NPPcanopy throughout the text.

Reponse to comment 3.

The confusion about the relationships between canopy NPP and total NPP; wood NPP and canopy NPP; and finally wood NPP and total NPP, is due to a difference in the dataset used to test these relations. Using our own dataset we find that canopy NPP is strongly related to total NPP, but is not significantly relate to wood NPP, which in turn supports the lack of correlation between wood NPP and total NPP. However, for the analysis between canopy and wood NPP, we also check the significance of this relationship using a larger dataset including previously published data (Malhi et al. 2004, Clark et al. 2001). Only when we run the analysis with all the data available we find that the relationship between canopy and wood NPP is significant. This is already explained in lines 29-31 pg 14. "Despite the linear trend, we did not find a significant relationship using only our dataset (NPPstem = 1.53 (ś 0.14) x NPPcanopy, n = 10, p = 0.2)".

Reponse to comment 4.

We completely agree with the referee. We are preparing a second manuscript which includes measurements of ecosystem respiration to test Litton et al. hypotheses using our dataset.

Reviewer J. Lloyd

Reponse to comment 1.

We agree with the Reviewer and have now re-run all analyses without fine root production from Manaus site.

Reponse to comment 2.

Unfortunately, co-author Quesada doesn't have the Caxiuana soils analysed yet for available P. We were therefore unable to update the P values for the Caxiuana plots. To investigate the influence of CAX plots on the trend we found, we carried out the correlation analyses removing the two CAX plots and found that NPPAG and Root turnover are still significantly correlated with P available according to Kendall and Spearman tests. The spatial autocorrelation issue is correctly identified by the Reviewer. While our dataset does not allow a more comprehensive geo-statistical analysis due to our small sample size, we followed the Reviewer's suggestion and have now merged the two Agua Pudre sites together for the regression analyses.

Response to Other Issues

P2455 - We have now corrected the Material and Methods for chemical analysis of leaf samples based on Lloyd et al paper.

Section 4.1. - We agree with the reviewer that robust nonparametric regression, based on median instead of mean values, is resistant to outliers and therefore may be more suitable for the cases where we identified the TAP-04 site as an outlier. In addition to the conventional regression approach previously used in the paper, we have anal-

ysed our data using the Kendall-Theil Robust Line method (U.S. Geological Survey KTRLine software version 1.0; Granato 2006), which allows the calculation of parameters for robust, nonparametric estimates of linear-regression coefficients between two continuous variables. The Kendall-Theil robust line is a robust nonparametric method resistant to the effects of outliers and non-normality in residuals. The slope of the line is calculated as the median of all possible pairwise slopes between points. The intercept is calculated so that the line will run through the median of input data. Again due to our small sample size, we were unable to identify benefits in applying the nonparametric approach. Slopes from both conventional and robust regressions were similar. We test the two regression methods including and excluding the Tapajos site and no apparent improvement was detected.

Reference Granato, G.E., 2006, Kendall-Theil Robust Line (KTRLine version 1.0). A visual basic program for calculating and graphing robust nonparametric estimates of linear-regression coefficients between two continuous variables: Techniques and Methods of the U.S. Geological Survey, book 4, chap. A7, 31 p.

Section 4.4 - We have now tested correlation between the components of NPP and other nutrients. However, no significant relation was identified.

Fine root turnover - 1. Indeed a non linear curve fits better the relationship between root turnover and soil available P, and was therefore used in the new version of the manuscript. 2 and 3. Hypotheses presented by Silver and Miya and Preiss et al. are now considered in the text. We have tested the relationship between root turnover and Al but it was not significant.

Table 2 - References in table 2 were corrected.

Table 3 - We were unable to identify any error in table 3.

Table 4 - We agree with the reviewer that more than one variable may define patterns in NPP. However we decided not to use multiple regression models due to the small

sample size which may lead to over parameterization. We believe the results are consistent with the proposed objectives and to test the effect of multiple variables upon NPP a larger sample size is definitely needed.

Fig. 4 - Seems to be fine.

Fig. 7 - We have tested the effect of leaf nutrients per area basis and the results are included in table 4.

Fig. 9 - The values for soil P are linear to avoid confusion.

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