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Interactive comment on “Regional and temporal patterns of litterfall in tropical South America” by J. Chave et al.

Anonymous Referee #2

Received and published: 21 September 2009

General Comments

Our understanding of ecosystem processes in tropical forests has lagged far behind our knowledge of temperate forests. Chave et al. present a literature review of a large number of published and unpublished litterfall datasets for South America, and analyze litterfall quantities with respect to rainfall, soil fertility, and litterfall N:P. They also applied a clever index of litterfall seasonality, and then relate litterfall seasonality to precipitation seasonality.

This review brings together an impressive amount of data, and it will serve as a benchmark for both modeling analyses and efforts to understand the geographic variation in carbon cycling across South America. In particular, some of the notable trends that

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were extracted from this dataset include the negative relationship between investment in reproductive organs versus photosynthetic tissue and N:P, suggesting that allocation patterns vary as a function of soil fertility, and the positive relationship between litterfall seasonality and precipitation seasonality. Interestingly, litterfall quantities did not depend on annual precipitation. In addition to these conclusions, the seasonality index that these authors use is a useful tool that can be applied to the analysis of other ecosystem parameters. This paper was both well written and concise, and will make a nice contribution to the literature.

Specific Comments

Title. In some sense the title does not capture the essence of the paper because the temporal patterns that are discussed are seasonal patterns, not long-term records of litterfall.

P. 7567, line 11. Do you mean litterfall N:P ratio? Please clarify.

P. 7569, line 16. What are "dry rainforests"? This must mean dry forests.

P. 7571, line 27-28. I do not completely agree with the assumption that N and P have similar resorption amounts, and thus litter N:P ratios can be estimated from foliar N:P. See the following reference.

Hättenschwiler, S., Aeschlimann, B., Coûteaux, M.-M., Roy, J. & Bonal, D. (2008) High variation in foliage and leaf litter chemistry among 45 tree species of a neotropical rainforest community. *New Phytol.*, 179.

P. 7572. The climatic dataset could use a little bit more description. For example, how does this global climate dataset compare to local measurements? At what scale were the climate data collected?

P. 7574. The Introduction discusses annual litterfall quantities and NPP in units of Mg CARBON per ha per year, and the Results section reports data in units of Mg

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DRY MASS per ha per year. It would make the Introductions and Results section more comparable to standardize units. It is not until the Discussion that the units are clarified.

P. 7586. In Table 1, there are a large number of sites with very high N:P ratios (e.g. Medio Rio Caqueta) but these sites do not seem to appear in Figure 6.

P. 7575, line 8. Is there any way to put this number, i.e. the mean litterfall seasonality index of 0.166 into biological terms. For example, can you add "indicating a mild/distinct/etc trend to litterfall across these sites"; Also, it would help to state the range of SL here.

P. 7575, how about replacing "designed to be eaten" with "have evolved to be eaten";

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