

Interactive comment on “Long-term nitrogen addition decreases carbon leaching in nitrogen-rich forest ecosystems” by X. Lu et al.

Anonymous Referee #2

Received and published: 15 April 2013

General comments:

This study provides solid evidence for an largely-ignored mechanism, reduction in soil DOC efflux, leading to soil organic carbon accretion in old-growth subtropical/tropical forests. I give a high applause to the authors for their contribution in proving this mechanism.

Specific comments:

However, I do not understand why the High-N treatment would lead to high soil water down-ward efflux as compared with the Low-and Medium-N plots. The authors did not present the zero-tension lysimeter water data. But the reduced DOC efflux in the High-N plot combined with the lowest DOC concentration in the High-N plot suggests an

C954

increased water efflux in the High-N plots as compared with the Low- and Medium-N plots. I would like to see an explanation in discussion by the authors.

I am not convinced that many tropical forests are N rich ecosystems. The citations listed by authors usually do not show higher N content in plant tissue or in soil total N. Instead, the cited studies generally refer to that the productivity of tropical forests is relatively more P limited than N limited as shown in temperate forests—By no means this is suggesting that tropical forests are N rich systems as a generalization. I guess that the authors can modify the statement as “many tropical forests are relatively N rich ecosystems as compared with P availability”. In fact, tropical moist forests with high precipitation can have high N leaching rate, and consequently have low N availability when N fixing plants are missing from the top canopy. Unless someone identify a common source of N input, I am not ready to accept the generalization that tropical forests are rich in N. In this study, the authors showed unchanged C/N ratio in soil WDOC, suggesting no signs of luxurious consumption of N in the N fertilized plots, consequently that forest is not over-dosed with N yet.

Technical corrections

Can Oe materials pass through the 2 mm sieve? Or what is your operational definition of Oe?

Do you have N data on atmospheric dry deposition?

Why increased DOC efflux in the High N plot as compared with the Low and Medium N plots?

Remove the regression line and equation in Fig. 5a because there is no significant correlation.

In the legend of Fig 2, delete “by” before “using”.

P/L

C955

1455/6 ... for the protection of ...
1455/9 ... per year ...
1455/18 According to ¹⁴C measurement of plant living tissues
1456/11 ... deionized water ...
1456/25 ... date of collection ...
1457/2 delete "and"
1458/20 ... test for differences ...
1460/8 ... study period increased, but not significant, in the N-treatment plots ...
1462/16 ... 2009). Gundersen ...
1462/18 ... ecosystems. Liu ...

Interactive comment on Biogeosciences Discuss., 10, 1451, 2013.