

Interactive comment on “Nitrogen input ¹⁵N-signatures are reflected in plant ¹⁵N natural abundances of sub-tropical forests in China” by Geshere Abdisa Gurmesa et al.

Anonymous Referee #2

Received and published: 21 December 2016

Dear authors

The study investigated effects of natural ¹⁵N abundance of sources in forest ecosystems on δ¹⁵N value in two different types of forest ecosystems receiving relatively high nitrogen deposition in China. The study is valuable because there are very few long-term nitrogen addition experiments in the area. The theme of the study is suitable for Biogeosciences. However there are some problems and manuscript should be revised.

Major comments

There are two processes explaining nitrogen isotope ratio; ¹⁵N of sources and fractionation processes. Authors discuss the relative contribution of these factors. Authors

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concluded that source 15N is more important than fractionation in the study. However, it is very difficult to separate these two processes. Authors stressed the importance of source 15N too much. Description of the manuscript should be revised substantially.

To evaluate the effects of nitrogen addition, nitrogen concentration and $\delta^{15}\text{N}$ values are compared between the control and nitrogen added plots. There only three replication in each treatment and statistical power is very low. Because of this weakness care should be taken when the authors discuss the non-significant results. For example, nitrogen concentration of tree leaves at the pine forest was greater in the N added plot at 10 percent level in table 3. When considering the small number of replication, it is difficult to conclude that there is no significant effect of nitrogen addition. In figure 2, $\delta^{15}\text{N}$ in soil seems different between the control and nitrogen added plots, p-value should be shown for each soil layer and total soil as shown for plant compartments. Authors should describe the limitation of the study about statistical analysis and careful interpretations are required.

Specific comments L 31, leafs ->leaves

L 29-30, $\delta^{15}\text{N}$ value of added nitrogen should be described in the sentence.

L37, “plant N% was unchanged. . .,” nitrogen concentration was marginally increased in pine leaves and significantly in understory vegetation in the pine forest.

L39, “the signal from the input may override. . .,” ‘override’ is not a proper word in the situation. Fractionation is also an important process for explaining the difference between plant and soil and between soil depths.

L137, duration of nitrogen addition should be clearly shown.

L192-193, information of surface runoff is not sufficient. What is the size of the barrier? How did you collect the water samples?

L229-230, p-value of statistical analysis should be shown in table 2.

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L235, 'see page' should be 'soil solution.' 15N value of total inorganic N (NH₄ plus NO₃) should be helpful.

L238, section title should be revised. It would be "effects of forest types."

L239-240, the information about earlier study should be described in discussion.

L240-241, clearly indicate that this comparison is about the control plots.

L245-247, p-value should be shown. Information about fig 2 should be included in table 4 as shown for table 3.

L263, p-value of statistical analysis should be described.

L295-299, information of the graphs should be included in table 4 and statistical analysis for N addition should be shown.

L312-316 Figure 3, Information of the graphs should be presented in tables as shown in table 3 and 4. The effects of nitrogen addition should be indicated. Nitrogen concentration and d15N of whole ecosystem (plant plus soil) would be helpful.

L329-332, Mean value of d15N of soil solution is much lower than throughfall or precipitation. Is there any reason for this difference?

L345-347, when you compare the d15N value between BF and PF, pine forest had lower d15N. The positive correlation between N availability and leaf 15N still exists within the area. Therefore, it is difficult to conclude the results reject the hypothesis.

L362-375, description is only about BF. Is there any comment on PF?

L382, the contribution of fractionation process and source 15N value is not clearly known in this study.

L392-397, it is difficult to understand. N addition possibly decreases the fractionation during n mineralization and may increase plant 15N. It is difficult to conclude that 15N source is main sole factor.

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L398-403, the results are based on non-significant results. It is very difficult to conclude the decrease is due to ^{15}N of added N. Because N input by throughfall has lower value than added N, ^{15}N of total N input should be lower in the control plots. I thought the description is not correct.

L405-442, the section should be moved to just before the previous section 4.2.

L415-416, it is difficult to conclude that source ^{15}N is more important in PF. It is too speculative.

L436-439, description about N addition should not be described in this section.

L445-455, it is difficult to conclude that ^{15}N of source is more important than fractionation process. The contribution of fractionation is still also important factor. Conclusion should be revised substantially.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-439, 2016.

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