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Discussions

Interactive comment on "Nitrogen isotopic composition of plants and soil in an arid mountainous terrain: sunny slope versus shady slope" *by* Chongjuan Chen et al.

Anonymous Referee #1

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The authors compared the leaf and soil 15N isotopic labels on two sides of mountain where one slope is sunny and the other one is shady. They hypothesized that due to different environmental conditions, both slopes should differ in terms of these signatures. Moreover, they hypothesized that the local environmental conditions determine these variables instead of global generalization of environmental factors. The authors did extensive sampling of leaves and soils across a gradient of > 2000 m a.s.l. on both slopes and measured the δ15N of these samples. The introduction and materials and methods are well written. The description of results is also adequate, although it can be improved in the light of the suggestion given below. However, the discussion in it's current form is patchy and lacks the insight with which the results could have been

explained. Briefly, the reasoning behind different results and the varying environmental factors determining them on two slopes is not clear. In addition, the correlation of various environmental factors with the δ15N of leaf and soil is very ambiguous and unexplained. I would suggest to authors that the environmental factors and the response variables should be tested with principal component analysis(es) to get a clearer picture. The location of the two observatories on shady slope covers almost the whole range of the sampling gradient. However, on the sunny slope the two observatories merely cover half of the total gradient of the altitude sampled. How would the authors justify the use of climate data obtained from these observatories for the entire gradient of the altitude sampled and studied? Few general comments:

L 48: localized is a better word that 'local-dependent'. L 303: Various instead of varied. L 316-320: Should the plant not discriminate against the heavier isotope during N uptake, even if it's very low, thereby resulting in low leaf 15N signature, when higher N uptake is the routine? L 336-340: This explanation presented here just says that cold temperature caused high leaf δ15N on shady slope. But how?

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