

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 #2

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The authors report results from a study comparing the nitrogen isotopic values of plants and soils of north and south-facing slopes of an Asian mountain range. [At least it seems that they are north and south facing slopes, since the authors only talk about shady and sunny] At each site, they measured the $\delta^{15}\text{N}$ of plants and soils as well as a series of other climatological and soil variables. These were used in a series of correlations and predictive models.

The authors report that "sunny" slopes have higher leaf and soil $\delta^{15}\text{N}$. They also report different factors affect $\delta^{15}\text{N}$ on sunny and shady slopes.

The paper would be clearer if the authors referred to north- and south-facing slopes,

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not sunny and shady. If this is wrong, the authors need to describe how a slope was determined to be either sunny or shady.

The authors interpolate mean annual temperature and mean annual precipitation for each site from measurements of MAT and MAP from 4 climate stations, two of which are sunny and two of which are shady. This is not valid. The authors sites are varying by a number of factors that cannot be "interpolated" from just 4 points. Stating that sunny sites are warmer than shady sites will need other data. One recommendation would be to simply remove the MAT and MAP regressions/correlations and examine other factors.

The authors interpret the difference of leaf and soil $\delta^{15}\text{N}$ as "as the isotopic composition of plant-available N". There is no empirical evidence for this. Given the results of Craine et al. 2015 that examines global patterns of soil $\delta^{15}\text{N}$, there is unlikely to be evidence that the signature of available N is controlled by soil $\delta^{15}\text{N}$. soil $\delta^{15}\text{N}$ at broad scales is likely simply an index of decomposition of the soil organic matter. Unless the authors have a reference to a graph that shows directly this relationship ($\delta^{15}\text{N}$ of available N vs. soil $\delta^{15}\text{N}$) this statement is poorly supported.

Figure 1 needs to be redrawn at a much larger scale, i.e. over less total area. The points all overlap and it is not helpful to see where the sampling is.

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