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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 delta15N 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 delta15N. They also report different factors affect delta15N on sunny and shady slopes.

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

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Discussion paper

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 15N 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 15N, there is unlikely to be evidence that the signature of available N is controlled by soil delta 15N. soil delta 15N 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 15N of available N vs. soil delta 15N) this statement is poorly supported.

Figure 1 needs to 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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