

Reviewer Comments: Anonymous

The ms titled “Carbon and nitrogen dynamics in native *Leymus chinensis* grasslands along a 1000km longitudinal transect in northeast China” by Ma et al., presents an interesting dataset of belowground and aboveground measurements of plant and soil parameters that may be of use to the general scientific community interested in how those vary with changes in mean annual precipitation. In terms of scientific significance, the ms can be ranked as good; the scientific quality and presentation qualities are fair. The ms does need more work before it can be accepted for publication.

Major comments:

1. Soil C and N mineralization are shown in results and discussed, yet in the methods there is no mention of how the data was gathered.
2. The data is presented on per area basis, have the authors considered the data on a per mass basis and if so, how do the trends compare then?
3. The study focuses on variability in below and above ground parameters along a precipitation gradient, based on mean annual precipitation amounts, however, across the same sites there is also a 5.5 degree C difference in mean annual temperature. The two climate variables are highly correlated, which was at times mentioned in the manuscript, yet it was not clear how any temperature effects were accounted for before any conclusions about precipitation regimes were reached. I see you have at least 3 sites with the same MAP and different MAT (Table 1), perhaps you can use those for a more detailed, closer examination of any effects of MAT on your measured parameters and use results from that analysis to infer MAT-MAP confounding effects.
4. Table 2, mentioned on page 12168, is missing.
5. Have there been similar studies in other grasslands (even if not completely measuring all of the parameters you have measured), which can be used to put your results into a broader context? It seems most of your references are from studies conducted along the same North East China Transect (NECT).
6. You keep highlighting the relationship between total plant biomass and MAP – this relationship is clearly driven by above ground biomass only, given that belowground biomass you have shown to be constant across the gradient. So is that not redundant information? Similarly reporting the S:R ratio or C:N ratios, when you already show the components of each?
7. Table 1 shows you sampled 18 sites, yet on the graphs the lines of points are at best 11-12. From MAP data it does look like some may overlap, perhaps you could plot the data more clearly. Why not average the samples for each site and plot the mean and standard deviation (given at all sites the sampling was equal). This would reduce the scatter and focus your patters; any overlapping data points

can be given a different symbol and actually be seen; the standard deviation can also be shown as “error bars” if you want to highlight the spatial variability within each site (which in itself could be further investigated and compared among the sites – are they comparable when accounting for this spatial variability?).

9, I am not convinced that your data fits a quadratic relationship (Fig. 3, c) – why/how did you arrive at that conclusion? Linearity is also questionable in the given scatter of points of the other figures in Fig 2 and 3 – perhaps fit means.

Minor comments:

1. It is more acceptable to write species names in italics (ex. *Leymus chinensis*)
2. Check your reference list – there are references on that list, which are not in the text (ex. McCulley et al 2005; Olsson et al 1999; Sayer 2006)
3. Grammatical clarity can be improved. (ex. it is not clear what is mean by the following?: “ ... heavy fractions of C and N followed by steady phases with MAP...” (line 25, p.12165) or “Related research ...have demonstrated that the responses of soil C and N content to increased precipitation represent increases... and no changes... at local and regional scales in the temperate grasslands.” (lines23-27, page 12169) or lines 1-4 on page 12170, etc)
4. title suggestion: “Carbon and nitrogen dynamics of a native grassland along a 1000km longitudinal precipitation gradient in northeast China” ? or discuss C and N dynamics in light of MAT too.
5. why was data not shown for fungal/bacterial biomass (line 6, page 12166 – that that was already described in more details in one of your previous papers on the sites and dataset, then please cite the paper)
6. How is “soil microbial biomass” is an environmental factor? – line 11, page 12167.
7. “The relative reduction in soil N availability in mesic sites...” – relative to what? (lines 19-20, page 12169)