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Interactive comment on “Carbon isotope discrimination of C₃ vegetation in Central Asian Grassland as related to long-term and short-term precipitation patterns” by M. Wittmer et al.

Anonymous Referee #2

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A review of the paper by Wittmer et al. (Carbon isotope discrimination of C₃ vegetation in Central Asian Grassland as related to long-term and short-term precipitation patterns) submitted to Biogeosciences. This study presents a study of the carbon isotope discrimination ($\delta^{13}\text{C}$; for Stipa and other C₃ species along an aridity transect in China and Mongolia. The conclusions from this study that rainfall anomalies can cause variation in $\delta^{13}\text{C}$; and that better correlations can be obtained from using growing season precipitation rather than mean annual precipitation were not particularly surprising. Much of these result seem intuitive even if they have need been shown before for this particular ecosystem. This research appeared to be well done and the conclusions are likely valid. There are issues with extrapolating weather

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data from specific sites to those without instrumentation using models especially in a region with highly variable and patchy rainfall patterns. However, other than a degree of discomfort with the extrapolations, there did not appear to be a better way to do the study. These results would be of interest for those using carbon isotope ratios to estimate the relative abundance of C3 and C4 plants within a community as well as those interpreting long-term records of organic matter in sediments. As always, the research points to the difficulty in making simplifying assumptions when environmental variability dominates ecosystem function.

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