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Interactive comment on "Evaluating the response of δ^{13}C in *Haloxylon ammodendron*, a dominant C_4 species in Asian desert ecosystem, to water and nitrogen addition as well as the availability of its δ^{13}C as the indicator of water use-efficiency" *by* Zixun Chen et al.

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Thank you for your comments! Leaf is most effective for the assessment of plant carbon isotope composition (δ13C). However, the leaves of H. ammodendron are degenerated due to extreme drought, we had to collect the assimilating branches of H. ammodendron, which was its prime assimilating organ. We know that there is a considerable difference in δ13C between buds, young and matured leaves, so we collected the ma-

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Discussion paper

tured assimilation branches at the top of the treetops in each individual, which were synthesized in the year of sampling, to minimize the effect of the age on δ13C. We will provide more information about the sampling in subsequent revised editions. In addition, we also recognized that differences in temporal scale may lead the δ13C to be irrelevant to water use efficiency (WUE). Yet we think our conclusion should be believable, because both water addition and N addition changed the WUE of H. ammodendron, but δ13C did not show variability across water and N treatments. We will discuss this uncertainty in subsequent revisions. Thanks for your suggestion on the φ value, The definite conclusion obtained from this study is that the φ value of H. ammodendron does not change with water and N addition, implying that environmental conditions may have no influence on φ value, which is still inconclusive. We will add this conclusion in subsequent revisions. The results gained from the present study are not necessarily analogous to all C4 plants due to the extreme climatic conditions in desert ecosystem. Yet we believed that this work has important application for enhancing our understanding of physiological responses of desert plants to future changes in precipitation and atmospheric N deposition. This is because H. ammodendron is a dominant species in desert regions, especially in Asia desert, which has a great effect on the stabilization of sand dunes, the survival and development of understory plants and the structure and function of desert ecosystems (Sheng et al., 2005; Su et al., 2007; Cui et al., 2017). Thus, the prediction of plant drought adaptation in H. ammodendron is crucial in desert ecosystem. We will supplement the significance of this study in subsequent revised editions. Thanks for your suggestion!

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