Dear Anonymous Referee #1,

We are very grateful for your kindly suggestions and comments for improving our manuscript, and following are our responses. The revisions of the manuscript are shown in blue colour.

Comment 1: Lines 27-29. Page 1. The authors concluded from their culture experiments that "*snails discriminate plant species as food*". This statement is, in my opinion, too strong and not supported by the presented data. Published data suggest that in the field, individuals from the same species consume C3 and CAM plants in relation to their relative abundance in the landscape (see a recent study in Yanes et al., 2013: Quaternary Research). I think that a different experiment design, with snails having access to a variety of food resources, should be conducted if the authors want determine whether or not snails indeed select plant species. Bottom-line, I'm not convinced by the presented results that snails select plant species. Note that the authors used food resources (lettuce and corn) that are not present in the natural landscape. Also, the authors have studied one single species. Will all land snail species behave equally?

Response: We accepted the referee's suggestions, that the food preference may be related to species. And we revised the manner of our expression in the abstract. For more details, please see the details in response to comment 4.

Revisions: Lines 27-29. Page 1.

'Moreover, according to the literature and our observations, the species we cultured in this study show preference to choose different plant species as food. Therefore, we suggest that the potential food preference should be considered adequately for some species in paleo-environment studies.'

Comment 2: Lines 8-14. Page 4. I recommend adding a sentence that justify why the authors selected this species. As a reader, I wonder why the authors chose this species over others. Is there a local fossil record of this species? Is this species the dominant in the region? Why this species and not others? Other culture experiments (Stott, 2002, Metref et al., 2003) have used always *Cornu aspersum* because is widely distributed and abundant, and has been intensively studied in terms of its physiology and ecology.

Response: Thanks a lot for this useful suggestion. We have added this information in the revised manuscript.

Revisions: Lines 8-14. Page 4.

Land snail *Acusta despecta*, with a Japanese name 'Usukawa-maimai', is widely distributed around Japan, except Hokkaido (Azuma, 1995), and in Korea (Lee and Kwon, 1996). This species is regarded as very useful for reconstructing the paleo-environment of the Japanese archipelago from the late Pleistocene Epoch because their fossils have been found in Okinawa (3,370 B.P., Takamiya and Meighan, 1992) and many other islands in southern Japan (e.g., 2,000–3,000 B.P., Fujie, 2000a; 38,000–35,000 B.P., Fujie, 2000b). As a common species in Japan, their physiology and ecology have been well explained in the literature (e.g., Sumikawa, 1962; Kohno, 1976; Okuma, 1982; Takahashi et al., 1992). Generally speaking, they mainly consume fresh plants (Suzuki and Yamashita, 1967; Takeuchi and Tamura, 1995) and live at temperatures of 15–30 ℃ with the optimum temperatures of 25–30 ℃ (Kohno, 1976). Typically, the Acusta despecta lifespan is around 1 year. Individuals become adults in 6 months from birth (Sumikawa, 1962; Okuma, 1982; Takahashi et al., 1992).

Comment 3: Lines 22-30. Page 13. Even though some studies may have suggested that some snail species tend to select plants, other studies suggest the opposite (see Yanes et al., 2013:Quaternary Research). It might depend on the target species.

Response: We agree. We added the new discussions as the suggestions from referee.
Revisions: Lines 22-30. Page 13.
'However, some other studies, such as those of Yanes et al. (2013b), indicate an opposite conclusion. Their results show that individuals from the same land snail species consume different plants in relation to their relative abundance in nature. To summarize, we infer that the food selectivity of land snails might depend on species, which would increase the difficulty of their application in the paleo-environment reconstruction, especially for the accurate study of C_3/C_4 vegetation distribution.'

Comment 4: Lines 7-10. Page 14. I kind of disagree with this statement. The great majority of land snail species are generalized herbivorous and tend to consume plants in relation to their abundance in the landscape. I am not convinced by the presented data that the target species selected food (see also comments above).

Response: We would like to show the following literature to answer the referee's question.

For the species we cultured: Suzuki and Yamashita (1967) reported that among the 50 families 267 species of plant they tested, *Acusta despecta* most prefer 28 families 149 species; can eat 16 families 43 species; a little eat 8 families 21 species; and cannot eat 17 families 54 species at all. The preference is not related to phytotaxonomy, but probably related to some physical structure or water content. Similar observation of food preference was reported by Takeuchi and Tamura (1995), for example, *Acusta despecta* cannot eat *Oxalis corniculata* (C_3 plant), *Commelina communis* (C_3 plant), *Yoshinagella japonica* (Fungi) at all.

And for other species: To *Helix Aspersa* (Muller), Iglesias and Castillejo (1998) reported that, 'Comparison between the availability of the different plant species and their contribution to the snails' diet showed that the snails did not eat at random; *Urtica dioica* was eaten much more than expected from its occurrence and grasses were strongly under-represented in the snails' diet.' Another example, Hatziioannou et al. (1994) observed five land snail species, their preferable plants are different, and not depend on the proportion to the occurrence of the plants/abundance.

Therefore, in this study we want to point out that the food preference may exist, at least for some species. And it probably depends on the food quality (water content or physical structure) from different plant species, as well as the land snail species. So, we consider that further studies of food quality are needed. And we suggest that the pre-investigation of food preference on living snails is important before applying shell carbon isotopic values in the plaeo-environment reconstruction of a certain species.

Comment 5: Lines 12-26. Page 15. You can actually calculate potential differences in metabolic rates among individuals using the model by Balakrishnan and Yapp (2004). (See also Yanes et al., 2013:Quaternary Research).

Response: We have tried this kind of calculations as referee suggested. And concluded that: for snails grew up at 20 ℃, ϕ (which could reflect metabolic rate, see Balakrishnan and Yapp, 2004) is around 0.33; and for those grew up at 30 ℃, ϕ is around 0.37. The reason why ϕ values do not differ too much at different temperatures probably because that this model is not suitable for the situation of a large amount of limestone ingestion (for the details, please check the previous response to comment R1-S6). In this case, we prefer not involving this kind of calculation in our manuscript. And if the readers want to learn this issue and discuss more, they can calculate out the ϕ values based on the data shown in Table 1 easily.

Comment 6: Lines 3-5. Page 16. Are the authors suggesting that the carbon isotope values of land snails are better indicators of temperature than vegetation? If so, I disagree with this statement. Even though they speculate that atmospheric CO2 can be an important controlling factor of the carbon isotope composition of the shell, they have not monitored this variable.

Response: We think the referee may misunderstand our purpose here. In this section (Sect 4.3), we do not discuss the temperature; besides, Sect 4.4 showed that temperature could not directly affect the carbon isotope values so much. Instead, here we just want to show that the suddenly change of environment conditions (temperature could be an example) can affect the metabolic rate of land snails (e.g., ratio of consumed diet vs. limestone), which will be recorded in the land snail shell carbon isotope values. For avoiding the readers misunderstanding our discussions, we revised the expression as following:

Revisions: Lines 3-5. Page 16.

'Consequently, the carbon isotopic composition controlled by metabolic rate in land snail fossils can be regarded as an auxiliary tool to ascertain changes of paleo-environment conditions, such as suddenly changed environment conditions during the Younger Dryas event.'

Comment 7: Perhaps some parts of the main text may need some grammar refinement by a native English speaker.

Response: Thanks for the suggestion. We asked the English correction for improving the written English.

Following are the references we added based on the referee's suggestions.

Fujie, A.: Holocene fossil assemblages of minute land molluscs from sand dunes on Kikaijima Island in the Amami Archipelago, Japan (in Japanese), The Japanese Journal of Malacology, 59, 317-324, 2000a.

Fujie. A.: The late Pleistocene fossil assemblages of minute land molluscs from an ancient sand dune on Kikaijima Island in the Amami Archipelago (in Japanese), The Japanese Journal of Malacology, 59, 165-175, 2000b.

Takamiya, H., Meighan, C. W.: Faunal remains obtained from the Atta-baru Shell Midden (in Japanese), Bulletin of the Department of Sociology, Okinawa International University, 19, 195-207, 1992.

Yanes, Y., Asta, M. P., Ibáñez, M., Alonso, M. R., and Romanek, C. S.: Paleoenvironmental implications of carbon stable isotope composition of land snail tissues, Quaternary Res., 80, 596-605, 2013b.

Thanks again for your great help and encouragement.

Sincerely yours,
Naizhong Zhang