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Hydrology and Earth System Sciences
Discussions

# *Interactive comment on* "Quantification of seasonal variabilities in groundwater discharge in an extensive irrigation watershed using H, O, and Sr isotopes" *by* Takeo Yoshida et al.

**Anonymous Referee #2**

Received and published: 7 January 2019

General Comments âĂĺThe manuscript attempts to quantify seasonal variabilities in groundwater discharge in an extensive irrigation watershed using H, O, and Sr isotopes. conducted point- and watershed-scale observations of surface water, soil water, groundwater, and ponded water in rice paddies and examined changes in these isotopic compositions. They conclude that the ratios of groundwater to the stream was in the range 7–86% during the irrigation period and 38– 66% during the non-irrigation period. The use of Sr isotopes showed better results that those of stable water isotopes.

ÂăâĂĺThe manuscript contains some useful material, however in its current form the manuscript is not publishable. It seems particularly apparent given the amount of time



the manuscript spends describing the measurement results itself. While no quantitatively evidence to support their assumptions, e.g. the water isotope diagram can not provide direct evidence. And despite the length there are several statements in the technical description which need to be clarified as they indicate some further analysis is required to confirm the results.

Major comments:

1. I don't find the new insight from this paper. Since Sr isotopes is less fractionation, it is well known that the use of Sr isotopes has the higher potential to aid in quantification of temporal variations in groundwater discharge.

2. The manuscript is not straightforward, and the results are difficult to understand. For me, it is better to show the sampling locations in more detailed way. I can not find where is the location of Br1- 23. And where is the upstream and downstream mentioned in the manuscript. Also, please give the detail information about sampling date. This is extremely important for stable water isotope study. If surface water, soil water, groundwater, and ponded water in rice paddies are sampling in different days, the authors should make sure they are not change significantly in temporal scale.

3. Ponded water isotope in rice paddies indeed showed large spatial variability. The inflow side and outflow side will show large differences. I don't know whether the authors consider this or not. To get an average value, I think it need special treatment.

4. The most important thing is neglecting the effect of precipitation. Please plot out the precipitation during the sampling period. Precipitation will definitely change all the results.

5. The two endmembers partitioning method is good but neglecting the recharge process. This may be important for irrigation period. Large portions of irrigation water may recharge regional aquifer. Any idea or evidence?

6. To give some quantitative conclusions from the isotope experiment, I suggest the

authors should at least discuss the result with water balance components (precipitation, ET, irrigation, flow rates in rivers, groundwater table fluctuations, etc.) at the specific studied area. For instance, the authors can estimate the irrigation water based on the local irrigation schedule and the cultivated area. Currently, the authors only present the peak flow rates for the whole diversion weirs (71 mˆ3/s), it is hard for us to link this to your experimental results.

Minor comments: Line 24 p5: The – the

Line 25 p6: water table was 1.67 m — this is confusing. Do you mean groundwater depth?

Line 21 p9: Usually observation error is not portable, given the data features at different basins are quite different. Moreover, the reference you cite is from 1963, now we have more accurate and convenient method to measure the flow rate.

Lines 6, 8 in p11: leave a space after ‰

Line 7 p12: duplicated ,

Line 21 p13: The – the

Line 26 p13: please use endmember or end member consistently in the paper.

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