Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2017-647-RC1, 2017

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Groundwater origin, flow regime and geochemical evolution in arid endorheic watersheds: a case study from the Qaidam Basin, Northwest China" *by* Yong Xiao et al.

Anonymous Referee #1

Received and published: 20 December 2017

Review of Xiao, Y., and others paper, (in press paper) hess-2017-647 Submitted on 02 Nov 2017 Groundwater origin, flow regime and geochemical evolution in arid endorheic watersheds: a case study from the Qaidam Basin, Northwest China Yong Xiao, Jingli Shao, Shaun K. Frape, Yali Cui, Xueya Dang, Shengbin Wang, and Yonghong Ji

1. Interesting paper that should be published, but authors should respond to a few comments. a. Agree with the argument that there may be three different groundwater flow systems as evidenced by the numerical model and the increased age and lighter isotopic values downdip in the flow system. b. Authors should have run their chemical

analyses through a geochemical equilibrium program to determine degree of mineral saturation. They comment on the fact that there are significant rock water reactions, which is correct, but they should have provided some further documentation as to what minerals are important and whether the water are at saturation. This would give further credence to their geochemical argument. c. The authors did not mention anything about the redox system, which may be important . Are there any organics in the sediments. Is sulfate reduction occurring down the flow paths, especially when you get to the salt lakes and playas. d. The authors do not provide much documentation that the brines in Zone 5 have migrated into the downdip section of the flow system from some other location during an earlier time period. Presumable evaporates have been accumulated at this location since the Pleistocene, and the chemistry observed results from in situ rock/water interactions, and not the migration in from other location. e. Figure 6 and 7 may be too complicated. Data for different flow systems might be better represented as individual graphs. f. How does intense evaporation occur at the water table (i.e. a few meters below land surface)? It may well well be out of an evaporation zone. Are caliches developing? g. Paper should be considered as a reconnaissance level paper, opening the door for the authors to look at their conclusions in greater detail and greater analysis.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2017-647, 2017.