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Hydrology and Earth System Sciences
Discussions

Interactive comment on "The Global Network of Isotopes in Rivers (GNIR): integration of water isotopes in watershed observation and riverine research" *by* J. Halder et al.

G. Bowen (Referee)

gabe.bowen@utah.edu

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The paper by Halder and co-authors represents a nice first assessment of the GNIR water isotope data collection. If focuses primarily on evaluating a regional classification scheme, modeled heavily on that used by (Feng et al., 2009) for precipitation, that relates the seasonal pattern of river O isotope variation to atmospheric and catchment hydrological processes. A secondary analysis demonstrates that modeled monthly precipitation isotope values can be used to model river water values globally, as was previously demonstrated for US rivers, and finds systematic deviations in some cases that can be attributed to hydrological processes within the watersheds. The analysis

and paper are pretty straight forward and the results, if not particularly novel, will be of broad use to the community and a good 'entry point' for users of the newly released datasets. The citation of previous work, particularly in the area of isotope hydrology modeling, is uneven, and I think there are some important processes that may underlie some of the results but are not acknowledged here. My specific comments below address some of these issues.

p. 4050, l 3-4: also (Bowen et al., 2011), which presents some analyses for US rivers that are similar in character to yours and should also be referenced elsewhere in the manuscript (e.g., p. 4055, l 9-14).

p. 4052, l 1-4: will the database be released by the time of publication? Is it appropriate to 'introduce' a database that is not available to the readers? It looks like maybe this statement is now depreciated since I was able to find GNIR data in the WISER DB, if so it should be removed.

p. 4060, l14: also (Berman et al., 2009), and/or one of the many reviews and syntheses of isotope hydrograph separation.

p 4061, l 3-4: "235 evaluated"

p 4061, l 12: The term "variability" is confusing here, I think you actually mean variation

p 4062, l 15-20: A similar phenomenon was previously observed for the Kendall and Coplen USA data by (Bowen et al., 2011), who showed that it most likely reflects the higher runoff ratio (Q/P) for winter and/or high-elevation precipitation relative to summer and/or low-elevation precipitation. Some of this may be mediated by storage in the cryosphere but it need not necessarily be so.

p 4063, l 11: Here, too, I would be hesitant to attribute it solely to glacial storage. Seasonal changes in ET, for example, are also a plausible contributor and I don't think can be ruled out here.

p 4063, l 22-23: To some degree, but you and others (Fekete et al., 2006; Bowen et

al., 2011) have pointed out important differences, too!

p 4063: l 26-28: This is basically what (Jasechko et al., 2013) did, if incompletely, would be appropriate to cite that here.

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Berman, E., Gupta, M., Gabrielli, C., Garland, T., McDonnell, J.J., 2009. High-frequency field deployable isotope analyzer for hydrological applications. Water Resources Research, 45, W10201.

Bowen, G.J., Kennedy, C.D., Liu, Z., Stalker, J., 2011. Water Balance Model for Mean Annual Hydrogen and Oxygen Isotope Distributions in Surface Waters of the Contiguous USA. Journal of Geophysical Research, 116, G04011.

Fekete, B.M., Gibson, J.J., Aggarwal, P., Vorosmarty, C.J., 2006. Application of isotope tracers in continental scale hydrological modeling. Journal of Hydrology, 330: 444-456.

Feng, X., Faiia, A.M., Posmentier, E.S., 2009. Seasonality of isotopes in precipitation: A global perspective. Journal of Geophysical Research, 114, D08116.

Jasechko, S. et al., 2013. Terrestrial water fluxes dominated by transpiration. Nature.

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