**Hydrology and
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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.

Anonymous Referee #2

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This contribution by Handler et al. introduces the GNIR database available through IAEA. The paper is largely focused on using the database to describe spatial patterns of river isotope data (and characterizing them globally), to assess relationships with the GNIP precipitation isotope database, and then to demonstrate how different aspects of these characterizations and relationships can be used to infer hydrological processes and/or impacts. I think the paper is overall mostly well-written and well-organized with clear points made. It will make a good addition to the literature on isotope hydrology. Following some relatively minor considerations, I think the paper should be published (minor revisions).

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Interactive Discussion

Discussion Paper

Specific comments: 1. The paper heavily references the Feng et al. study on global precipitation isotope patterns. Given the broadly strong relationship between river and precipitation isotope values, it is not surprising that the paper might reference this previous study quite a lot. And overall, I very much liked the characterization of river isotope variability into several categories (but note that I am not familiar with Feng et al. paper). However, through the first half or so of the results and discussion, outside of a slightly longer duration of measurements included, it is not clear from where the novelty surrounding the hydrological characterizations lies (e.g., with this study or with Feng's). The paper could use some additions to clarify this since as written, most of the novelty of this portion of the paper appears to be credible more to the Feng et al. contribution. 2. One of the stated objectives of the paper is to "introduce" the new GNIR database. I found this introduction a little underdone because there is next to no information given about how the database might work (e.g., what types of queries can be conducted, will QA data be available, does it link directly to the GNIP database?, etc.). I would like to see more details about the database if its introduction is to be the first objective. 3. While the inclusion of work with the CC-RWIP model seems sound, some of the discussion comes off as repetitive to earlier portions of the paper. This is minor though and simply a suggestion for consideration. 4. One of the side findings of the paper is the seeming spatial mismatch in a number of places at least between GNIP and GNIR holdings. Further discussion here could be warranted. Around page 4055, a lot of discussion is put on the difficulties with the dataset. This is warranted, but it casts a bit of a shadow and I believe there is likely some room here to discuss what is still "right" with the database. 5. The study is limited to relatively larger watersheds. Some of these watersheds may have quite long residence times. There is an upper limit of <10 years where O-18 data is useful for much of the analysis investigated here. Has this been assessed at all (e.g., the residence or transit times within these watersheds)?

Technical comments: 1. The figures are generally well done except for the size of fonts used in labeling. I found the fonts in most of the figures (axes, but moreso for labeling

within figures) far too small to be legible. 2. I found the first paragraph of the introduction a little disorganized as written. It needs a sentence to better contextualize the disturbance explanations. 3. Page 4053, line 8: analyses were measured? Suggest rewording this sentence. 4. Page 4055, line 9: model instead of models? 5. Page 4055, line 15: sentence needs re-wording. 6. Page 4057, line 24: Do you mean "more" negative here?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 4047, 2015.