

Response to reviewer and editor comments

Journal: HESS

Title: " A new high-resolution groundwater isoscape for South-East Germany: insights from differences to precipitation "

Authors: Aixala Gaillard, Robert van Geldern, Johannes A. C. Barth, Christine Stumpp

Reviewer and community comments in *italic*; our answers in roman style.
Changes in the manuscript are highlighted by the MS Word tracking tool.

Referee comments 1:

The authors have made sufficient modifications to the previous round of revision. The groundwater isoscape proposed in the paper is very meaningful. However, the discussion of the reasons for isotope distribution is still relatively speculative, lacking some quantitative and targeted analysis. Here, before the paper can be accepted, I suggest the authors can make moderate revisions to further enhance the quality, clarity, and overall contribution of the paper.

Main comments:

1. In section 4.2, the author discussed the influence of altitude on isotope distribution and cited quantitative results from other studies. It is suggested that based on the altitude changes and isotope distribution in this study, the isotopic altitude effect in the study area can be quantitatively calculated. It is possible to consider adding a graph of isotopic changes with altitude and comparing it with other studies.

Altitude effects on isotope distribution are well known and described in precipitation. This has been done in Germany based on the GNIP dataset by Stumpp et al. (2014), which we cite. Therefore, we do not repeat the calculations in this study. For groundwater, the altitude effect amounts to -0.31‰ ($\delta^{18}\text{O}$) per 100 m elevation gain over the entire study area. A Figure with this correlation has been added to the supplementary materials and mentioned in section 4.2.

2. In section 4.3, the author discussed multiple influencing factors of isotope distribution, and it is better to add more quantitative analysis. For example, the author mentioned the evaporation effects. It is necessary to add the specific spatiotemporal variations of evaporation in mountainous and plain areas of the study area to help better understand the evaporation effect.

We rearranged section 4.3 according to the wishes of the reviewer, highlighting the climatic and topographic differences between the alpine region and the Main river regions in the first paragraph (lines 252-259) before discussing the factors specific to the Main River Region which is the focus of the section.

Some specific comments:

Graphical abstract, “-10.4 $\delta^{18}\text{O}$ ” should add the unit of “‰”.

Changed

L119: revise the orders for the following equations. The equation 1 is in the L82.

Changed

L352: revise the sentence: “We thank the We thank the...”.

Changed

L367: revise the format of references: “Bayerisches Landesamt für Umwelt,, Augsburg, ”.

Changed

Further check for other writing and formatting issues throughout the entire text.

We revised mainly unit and citation formats, numbering and δ -notations.

Referee comments 2:

The manuscript „A new high-resolution groundwater isoscape for South-East Germany: insights from differences to precipitation“ by Gaillard et al. presents for the first time a regionalized groundwater isotope map based on 596 measurements for south-east Germany. The work not only reflects on groundwater isotope patterns, but also compares to local precipitation patterns. This work, including the applied techniques and the attributed data set will definitively attract future attempts to sustainably judge and manage groundwater resources. I agree with the prior comments to the work and think that the authors have commented and improved almost all issues.

I recommend acceptance after only minor revision.

Minor comments:

Line 83: (Earlier comment by referee #1): Line 111: revise the orders for the following equations. Please check again, because you use „equation (1)“ in the introduction chapter (Line 83, revised version) and again „equation (1)“ (Line 119) in the Methods chapter. You need to re-number to equations 2-6 and check references to equations in the text.

Changed

Lines 34, 130, 172, 237, 474: Terzer-Wassmuth et al. (for 2021, but Terzer et al. 2013 is correct!)

Changed where necessary. When referring to the produced precipitation isoscapes that we used in this study, we only mention the latest update, after explicitly citing the underlying work of Terzer, 2013 on first occurrence.

Editor comments:

Two reviewers provide positive comments on the paper. Authors are required to address all comments on the revision, and have a thorough editing on the revision.

We addressed all revisions suggested by the reviewers.