

Earth Syst. Sci. Data Discuss., referee comment RC1  
<https://doi.org/10.5194/essd-2021-139-RC1>, 2021  
© Author(s) 2021. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## **Comment on essd-2021-139**

Anonymous Referee #1

---

Referee comment on "Mineral, thermal and deep groundwater of Hesse, Germany" by  
Rafael Schäffer et al., Earth Syst. Sci. Data Discuss.,  
<https://doi.org/10.5194/essd-2021-139-RC1>, 2021

---

Referee comment on preprint essd-2021-139

### **"Mineral, thermal and deep groundwater of Hesse, Germany"**

General comments:

The authors assembled a large database on groundwater chemistry in the German federal state of Hesse with a focus on high mineralization, high temperature and deeply sourced groundwater, i.e. the subsurface waters with a geothermal and/or balneological application potential. The data was collected, processed and extended from literature including partly old publications with a very limited public availability. The database and the associated article document large efforts invested in its compilation and maintenance. The work is technically and formally sound (with minor exception, see specific and technical comments). To the reviewer's knowledge, a suchlike database did not exist until now. Considering data sources and compilation efforts, this database is unique and hardly reproducible. I also see a high degree of usefulness here, not only for technical geothermal/balneological questions, but also for regional hydrogeological and hydrochemical approaches in general. Researchers and practitioners with an interest in e.g., a specific trace element, gas, or isotope system will find this database a valuable resource for an overview of existing data. The database is readily available for download in different formats. It is structured and formatted in a meaningful way, data sources are comprehensibly documented. Given the presented specific spatial information for the groundwater samples, export to – and use in – geographical information systems for regionalization exercises etc. are possible. Another big advantage is the (credibly promised) future extension of the database whereby the participation of both state and federal geosciences authorities is a real asset. It would be great to have such a database

also for other federal states, or even the entire country.

In the article, the authors offer a comprehensive overview of the geology and hydrogeology of the federal state as a framework to enable the reader a proper evaluation and use of the data. They also give a meaningful example of potential database usage by statistically processing the dataset distinguished by hydrogeological regions of the federal state.

Specific comments:

P1, L26: "almost exclusively from publications" – where is rest of the data from? Consider reformulation.

P1, L27/28: "reduce uncertainties" – unclear in this context, please reformulate.

P2, L3: suggest to rather start like "The physical and chemical properties of groundwater determine its suitability..."

P2, L8: suggest to write "... we developed the database ... of the federal state of Hesse, Germany."

P2, L20: can you give a reference for the mentioned software?

P2, L25: recommend to generally omit "see" from references to figures, tables etc.

P2, L30: recommend to use the term "Southern German Scarplands" rather than "Cuesta Landscape". It is the more widely used term, at least in my experience.

In the Introduction, the authors offer a very good and detailed regional geological and hydrogeological overview as a framework to the dataset, based on a thorough literature review (most of which is literature written in German of course which, however, makes this overview even more valuable for the international readership).

P6, L29: you talk about 100 m below ground level, I suppose. Please clarify.

The description of data compilation, sources and database structure in the Methods chapter is comprehensible.

P8, L1: not sure if "impoundment" is the right word here. May "sealing" or "packing" be more to the point? Please check.

Eq. 1: recommend to explain equation variables directly below the equation.

In the Results chapter, the authors offer a good description of data distribution and statistics in the different hydrogeological units defined in the federal state, and also mention some noteworthy regional peculiarities. It is a useful overview and example of the application capabilities and limitations of the presented database.

Data availability: the provided link worked without a problem, I was able to download the database and work with it.

P13, L8: "temporally" – do you mean in terms of covered stratigraphy? If so, better use that word.

Fig. 4: any explanation for the 50 °C outlier mentioned earlier?

Database itself: well-arranged, meaningfully formatted. Of course, not all information is available for all the samples due to differences in the (historical) records. But it will be very useful for many regional and supra-regional applications. The offered lithological and geological information (including regional geological/stratigraphical names) is valuable, as is the information on chemical groundwater type and quality of analysis.

In column K, I suggest to concretize "Altitude" – I guess it is the elevation of the drilling/sampling site?

Technical corrections:

P1, L22: "In the future,"

P1, L28: "to estimate"

Fig. 1: I am missing the city of Kaiserslautern in the map... add, or omit from the caption. Also, add a green cross to the legend, or explain it in the caption.

P7, L6: "is available in Hesse"

P8, L11: omit "they"

P8, L26: "...balances ... are marked ..."

P12, L31: "Schäffer et al."

Figs. 3-5: add axis labels!

Table 3: please check the used font, it is obviously different from the rest of the article.

I hope my comments and suggestions can help the authors to further improve this article.

Kind regards