

Point-by-point response for major revision

A global zircon U–Th–Pb geochronological database

Yujing Wu et al.

Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2023-20>

RC: Referee Comment, AR: Author Response

Dear Editor,

Thank you very much for your precious time and effort spent on our manuscript and dataset. The referees' comments and suggestions were greatly helpful.

We revised the manuscript as the referees suggested. The supplement seemed good and was not changed this time. About the Zircon database, we added an *Access* column which contains access type or license information in the “References” file in the Zenodo repository. I am very grateful for your professional help on the license issue. Currently, the Zircon database is under “restricted access”. Once the paper is accepted and/or ready to be published, we will change it to “open access” under the license of Creative Commons Attribution 4.0 International (CC BY 4.0).

Please find below a point-by-point reply to all referee comments and the corresponding revisions.

Many thanks and kind regards,
Yujing Wu (on behalf of the author team)

Author Response to Referee #1

A global zircon U–Th–Pb geochronological database

Yujing Wu et al.

Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2023-20>

RC: Referee Comment, AR: Author Response

Dear referee,

Thank you very much for your positive response, and for your precious time and effort spent reviewing the manuscript and the dataset. Your suggestions are of great help.

Please find a point-by-point reply below.

Kind regards,

Yujing Wu (on behalf of the author team)

Comments and responses:

RC: General Comments:

The revised manuscript is much improved and nearly ready for publication. Appropriately, it now discusses areas of research that require further investigation. Of course, this new database will be helpful in resolving these uncertainties. I was critical of earlier versions of the database (including understandings gained from discussions with the authors prior to this submission), but now believe the database is structured in such a way that the research community can use it optimally. I will be among those who use and study this database. There are still a few minor revisions, mostly grammatical, that will improve the manuscript, which are listed below. After making these minor revisions, I recommend publication. Overall, this is excellent work.

AR: General Responses:

Thank you very much for your support. We did corresponding revisions as you suggested. Please find a point-by-point reply below.

RC: Specific Comments:

RC: **Line 61:** Poor grammar and a confusing statement. Suggest revising the phrase "This database may provide a more comprehensive and objective chronology data source both the temporally and spatially" to state "This database provides a comprehensive source of geochronological data, both temporally and spatially, ..."

AR: Implemented. Please see lines 70-71 in the revised manuscript with track-changes.

RC: **Lines 155-156:** I have questions about the method Keller and Schoene (2012) use for minimizing sampling bias, and suspect that it might sometimes give inappropriate results. There is no need for the authors to make any revisions

because my investigations into this matter remain incomplete. In fact, this new database might help resolve this problem.

AR: Thank you for your open perspective on this point and your support of this zircon database. We are looking forward to new approaches to minimizing sampling bias. Glad to hear that our database may help.

RC: **Line 196:** The phrase "absolute zircon densities" might be misleading and confused with "absolute sampling densities". To eliminate this likely confusion, the authors should rephrase this to state "absolute age counts per 50 or 100-Myr bin" ... but only if this is the author's intent.

AR: Sorry for the confusion. The following explanation was added after this confusing sentence.

The "zircon density" here refers to age counts per grid which is bounded by longitudes of 4° length and latitudes of 2° width during the peak periods (50 or 100 Myr).

Please see lines 223-224 in the revised manuscript with track-changes.

RC: **Lines 223-224:** Suggest re-phrasing "much zircon production" to state "amplified zircon production".

AR: Implemented. Please see line 258 in the revised manuscript with track-changes.

RC: **Line 224:** Suggest replacing "zircon production series" to state "zircon production time series".

AR: Implemented. Please see line 259 in the revised manuscript with track-changes.

RC: **Lines 250-254:** Suggest removing the sentence: "Although some important magmatic and metamorphic activities for crustal evolution (such as orogenic belts and subduction zones) were concentrated in certain regions and periods, the distributions of zircon ages were remarkably similar regardless of depth or height (Parman, 2015)." Parman's method of analyzing U-Pb age distributions, as a function of depositional-age intervals, is completely unrelated to the grid-area method of Puetz et al. (2017). For this reason, it is confusing why this sentence was even placed here.

AR: Sorry for the improper citation. We deleted this citation and the first half of the sentence. We kept "the distributions of zircon ages were remarkably similar regardless of depth or height" to explain to a broader audience why the grid-area method works well. Please see line 289 in the revised manuscript with track-changes.

RC: **Line 271-272:** No revisions necessary. I agree with this statement: "New approaches can be explored to address biased sampling issues, and this zircon database provides great experimental materials." ... Very good, I agree these questions are unresolved and require further investigation.

AR: Thanks a lot for your support.

Author Response to Referee #2

A global zircon U–Th–Pb geochronological database

Yujing Wu et al.

Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2023-20>

RC: Referee Comment, AR: Author Response

Dear referee,

Thank you sincerely for your positive response, and for dedicating your valuable time and effort to reviewing both the manuscript and the dataset. Your suggestions and concerns are of great help.

Please find our point-by-point reply below.

Kind regards,

Yujing Wu (on behalf of the author team)

Comments and responses:

RC: General Comments:

The revised manuscript by Wu et al. is much improved compared to the original submission and the authors have taken care to respond to all comments raised by both reviewers. I recommend the publication of this revised manuscript pending a few minor corrections as detailed below.

AR: General Responses:

We greatly appreciate your supportive comments and feedback. We have revised the manuscript and updated the zircon database as you suggested. Please see the point-by-point response below.

RC: Detailed Comments:

RC: The article is due to be published with a CC BY 4.0 Attribution license; it is unclear what license will be linked to the Zenodo dataset. Has it been checked that all licenses of the data sources in the compilation have been honoured and that CC BY 4.0 is appropriate?

AR: Great question! Currently, our Zenodo dataset is a “restricted access” dataset. Once the paper is accepted and/or ready to be published, we will change it to “open access” under the license of Creative Commons Attribution 4.0 International (CC BY 4.0).

Thanks a lot for your comments. We checked all access types or licenses of the data sources. 11,284 out of 11,571 references are “free-to-download” and the other 291 references are “open access” (licenses including CC BY, CC BY-NC, CC BY-NC-ND, CC BY-NC-SA, and other open-access types for specific journals). We

added an *Access* column which contains access type or license information in the “References” file. Please check the updated Zenodo repository (version 2.1) for more details.

The Editor Elger helped me ask a professional colleague who said that extracting data from articles is not violating any copyright and I am not bound to the license of the article. There is no issue with publishing our database with an open license. Although we didn’t cite the original sources one by one, we used the “References.xlsx” to give credit to the original work.

Thank you so much for this question. I learned a lot about open access through it.

RC: I accept that you do not wish to compare the content of your data compilation with existing global compilations at such as those of EarthChem (<https://earthchem.org/>), GEOROC (<https://georoc.eu/>; e.g. <https://doi.org/10.25625/SGFTFN/AKMJG2>), Martin et al. (2022, <https://doi.org/10.1038/s41597-022-01730-7> and <https://doi.org/10.25625/FWQ7DT>). However, I do expect these previous efforts to be mentioned and referenced in your manuscript. Please include these references, e.g. in Sections 1 or 2 (Introduction/Database).

AR: Sorry for our carelessness. We added some sentences about these references in the Introduction. Please see lines 62-66 in the revised manuscript with track-changes.

RC: As you rightly point out, a huge benefit of this dataset lies in the large number of Chinese data that have been compiled. This fact is stated at the beginning of the manuscript but also deserves to be emphasised again in the later discussion. Conversely, global coverage for the rest of the world is comparatively sparse. While you discuss sampling bias and present methods for statistical resampling, I think it would be helpful to honestly present this regional disparity throughout the manuscript. In numbers, what proportion of the 2 million geochronological records lie outside of China? A quick check of zircon data available through the EarthChem Portal shows that the sample distribution in other, existing global compilations (~500,000 records across GEOROC, EarthChem, GANSEKI, NAVDAT and MetPetDB; see screenshot below) could perhaps be a valuable resource to complement the data presented here, prior to any statistical analysis.

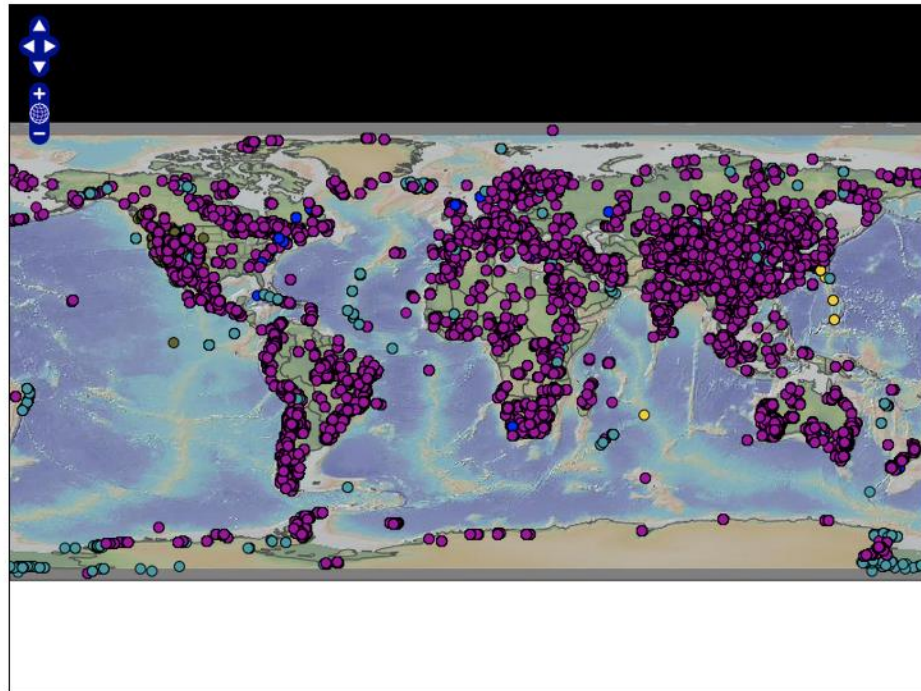
Earthchem Portal

EarthChem Home EarthChem Search About EarthChem + Data + Account + Saved Queries Help

Earthchem Dynamic Map

The map below contains samples from the current search query. You can drag the map dynamically, as well as use the zoom bar to zoom in and out. Use shift-click to create a dynamic zoom range for more detailed zooming. To get sample details, click on the individual samples.

Legend: ● NAVDAT ● GEOROC ● USGS ● SedDB
● MetPetDB ● EarthChem ● GANSEKI@DARWIN



AR: Great points.

1) We mentioned the large numbers of Chinese and European data in the Discussion (Section 5.2). Please see line 282 in the revised manuscript with track-changes.

2) We added a quantitative explanation of the regional disparity in the sections of Database and Discussion. Since our Zenodo database is not a curated database and doesn't provide a GUI (Graphical User Interface) tool to show regional disparity quantitatively, we did simple statistics using the GPS data. For zircon records with GPS information (~1.6 million records), data sampled from China and outside China account for ~42% and 58%, respectively. Please see lines 122-124 and 282-284 in the revised manuscript with track-changes.

RC: Typos & grammatical errors:

RC: L10: word missing after "geochronological", e.g. "geochronological records"

AR: We changed "geochronological" to "geochronology". Please see line 10 in the revised manuscript with track-changes.

RC: L12: Please remove unnecessary and subjective statement "and is by far the largest geochronological database to our knowledge"

AR: Removed. Please see line 12 in the revised manuscript with track-changes.

RC: L12: “complied” should be “compiled”

AR: Implemented. Please see line 12 in the revised manuscript with track-changes.

RC: L23: reference “(Becker, 2007)” seems out of place

AR: Moved to the end of the sentence. Please see line 25 in the revised manuscript with track-changes.

RC: L38: “all of” rather than “all of the”

AR: Implemented. Please see line 38 in the revised manuscript with track-changes.

RC: L56: add reference to Martin et al.; EarthChem and GEOROC compilations

AR: We added the citations and some sentences on these studies. Please see lines 62-66 in the revised manuscript with track-changes.

RC: L58: please rephrase “dating data points”

AR: Rephrased as “dating records”. Please see line 68 in the revised manuscript with track-changes.

RC: L59: I would use “techniques” rather than “instruments” here

AR: Changed to “techniques”. Please see line 69 in the revised manuscript with track-changes.

RC: L61: remove “the” before “temporally and spatially”

AR: Removed. Please see line 71 in the revised manuscript with track-changes.

RC: L150-152: the use of “etc” is jarring. Rewrite as “includes, for example, [A, B, C, ...]” Figure 6: what does the colour scale represent? Please add label

AR: 1) We revised the text using “for example”. Please see lines 170-172 in the revised manuscript with track-changes.

2) We updated the caption of Figure 6 to explain the color scale. Please see lines 248-250 in the revised manuscript with track-changes.

RC: L277: rephrase “largest known database” into a more quantitative and less subjective statement

AR: We deleted “the largest known” and added an “a”. Since the next sentence describes the amount of the records (~ 2 million), we didn’t add other quantitative phrases. Please see lines 322-323 in the revised manuscript with track-changes.