

Interactive comment on “Global whole-rock geochemical database compilation” by Matthew Gard et al.

Matthew Gard et al.

matthew.g.gard@gmail.com

Received and published: 7 July 2019

Reviewer 1: Kent Condie

We thank Kent Condie for the encouraging comments and suggested revisions.

>"Excellent contribution to the earth science community, should be widely used. A couple of suggestions to improve the paper: 1) p4, line 10. Indicate isotopic dating method (U/Pb zircon, Sm/Nd garnet, Rb/Sr whole rock, $^{40}\text{Ar}/^{39}\text{Ar}$ mica etc) 2) Add uncertainties to isotopic ages 3) Do you include detrital zircon ages? If so they should be reported separately from igneous zircon ages."

The 'method' field in the original submission contains the isotopic methods where available, as well as other various methods for geochemical analyses concatenated into a

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single entry. Additionally, some information is present in the comments field. This is not ideal, and we agree that separating this information is important. Instead we will separate geochemical method and age dating method into their own fields. Entries are inherited from a vast variety of sources however, and this information was not always supplied or retained, but we will endeavour to expand these fields in each iteration. If a method is supplied, the range of age dates (age_sd, or age_max and age_min range) can be taken to the uncertainty in isotopic age. We do not include detrital zircon ages.

>"Data availability Investigators should be able to download specific parts of the geochemical database, by sorting before download (such as mafic igneous rocks, detrital sediments, tonalities > 2.5 Ga etc.)"

While we understand the Reviewer's desire to have pre-sorted datasets, we philosophically disagree on this point. It is partly this pre-sorting that has led us to design the database in the manner we have. Another reason opted for a single database is we found it annoying to have to download pre-existing databases through web forms in parts because of download limitations. Our dataset is large, but not overly so and smaller than many global datasets. First, pre-sorting requires that several files will be needed to be maintained during subsequent updates. Where does one end with pre-sorting? There are a number of geologically interesting datasets that one might consider e.g. TTGs, komatiites, kimberlites, plume-related magmatism, etc. However, as our understanding of Earth processes grows, our definitions of some of these interesting rocks has evolved. Not to mention the debate surrounding some of these definitions at present. We prefer the database to remain agnostic in this regard. One last point here is that we have developed a set of codes (in Matlab) to parse, filter, plot and run basic computations on the database that is available through github (repository address is included in the text). Not all the codes are available yet because they have not been fully documented, but a complete set of codes is forthcoming. In the future, we may also provide similar codes in Python and/or R.

Reviewer 2: Anonymous reviewer Thank you to the anonymous reviewer for the positive

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and constructive comments.

>"Gard and coauthors present a curated database of (primarily) whole-rock elemental and isotopic analyses. This work fills a useful niche between domain-specific manual compilations and large but less-curated online repositories such as EarthChem. I particularly applaud the authors for ensuring that it is relatively easy to download the full dataset and bibliography in open formats – in this case, csv and bib. There is one minor issue here though that I would request the authors consider addressing: right now, it would not be easy for a user without significant database experience to figure out, e.g., which age corresponds with which sample metadata, or elemental composition, or so on, for any of the ten individual tables provided. The simplest way to address this would be to provide a flat csv of the entire dataset. While this would weigh in at perhaps 1 GB, it would be sparse and highly amenable to compression (e.g. gzip, for a standard and open option). A similar dataset I have worked with compresses to a relatively manageable 160 MB when treated in such a manner."

A compressed version of the database in a single, flat file format will be added to the file list as suggested. We agree this may promote easier use of the data for individuals unfamiliar with database structures.

>"Finally (though I suspect this may have already been done) since it is not immediately clear from the text, I would echo the request from Prof. Condie's review, to indicate the isotopic dating method and (critically!) uncertainty for samples with newly-attributed ages."

As addressed in the response to Kent Condie, we will strip the isotopic dating method from the method field where currently retained and endeavour to expand this where information is lacking. Uncertainty has been incorporated through the use of the age_sd, age_max and age_min fields.

Reviewer 3: Juan Carlos Afonso

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We thank Juan Carlos Afonso for the positive comments and recommended revisions.

>"This compilation and associated database make up a fantastic contribution to the geo- science community. It should be useful for a wide range of researchers. The manuscript is well-written and easy to follow. The csv files are clear and easy to download and manipulate. Besides the comments from the other reviewers, the only shortcoming I found at the moment is the lack of interrogation and/or manipulation tools. The authors clearly state that they are creating such tools in matlab, which is terrific, but I would have loved to have at least some basic interrogation codes with this publication! Maybe something the authors can work on for a final version?"

We endeavour to have at least a preliminary suite of Matlab scripts available prior to the final publication. Regardless a full suite of scripts will be available later this year, which will be accompanied with documentation and a manuscript of its own.

>"Another comment is about the computed properties (Vp, RHP, density). The authors refer to other works in the text for the methods, which is fine, and then include some equations in Table 3. Can the authors say anything about the uncertainties associated with these estimates? or even better, provide any sort of validation of the predictions against real measurements? I guess that at least some of the samples that made it into the database/s have been characterized well enough to include measured density and perhaps ultrasonic measurements of Vp (?). Such a validation would be great for us readers/users. Perhaps this has been done in the cited works, and if so, all good. I'd then just mention it in the manuscript and give a brief summary to help the reader. Overall, a really nice contribution. Well done and thanks for your efforts!"

The computed properties sections are a little sparse on details of uncertainty and discussion of validity in the current iteration of the manuscript. These details are available in the cited works but should probably be mentioned within this manuscript too. We will include a brief summary of this information as suggested.

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