We thank the two reviewers for their thoughtful and constructive comments. Detailed responses are provided individually to each of the two reviews in the *Author Comment* files. This document contains an overview focussing on the resulting changes to the manuscript file. **Note:** to avoid confusion we have avoided quoting specific line numbers below as these change between the files with and without track changes activated.

Reviewer #1

This reviewer has reservations about providing the ^{204}Pb-based Pb-isotope ratio data to 3 decimal places. In response we have modified our reporting of ^{204}Pb-based isotope ratios to two decimal places as suggested, commensurate with our typical internal precision for SF-ICPMS measurements.

In addition we have made all the other minor changes to the text as suggested in his annotated Word document, specifically:

1. Removing reference to 'top coarse' in the abstract (this concept is explained later in the text)
2. Additional text added at the end of the first paragraph, section 1.
3. Additional text added for clarification at the start of Section 3.2.2.
4. Additional explanatory text in Section 3.4
5. Minor commas and other punctuation issues fixed.

We have however retained the bold text in Section 3.3 as this identified specific commands in QGis. We have changed the font here, however, to match the rest of the document

Reviewer #2

This reviewer was concerned about the potential for biases in our dataset due to 1) the presence of iron oxides or phosphates in our samples which might be impervious to our ammonium acetate leach. 2) the presence of metamict microminerals in some felsic rocks which might be more susceptible to leaching with aqua regia and 3) the possibility that natural thallium, present in our samples, might affect our mass bias corrections which rely on an admixed thallium solution prior to analysis.

We have argued in our *Author Comment* that processes 1 and 2 are not likely to occur at a scale which will affect our catchment scale analyses. Further we note that natural variations in thallium isotopic composition (concern 3) are relatively minor and would not affect our mass bias calculations to a degree which would be visible within the uncertainties of our analytical method. For these reasons we have made no changes to the text in response to these specific comments.

The reviewer suggests deleting Figures 2 and 3 as they simply describe our errors and are thus not very useful. We concur that Figure 2 is unhelpful to the non-specialist and have therefore removed it and any associated text from the manuscript. Figure 3 (now Figure 2 in

the new version) does not actually relate to errors but provides a useful statistical overview of the dataset and therefore we prefer to retain it.

A basic description of the variation in isotopic composition with major crustal boundaries is provided in Section 3.2.2. However we consider the reviewer's request for additional descriptions of Australia's tectonic divisions and lithology together with an analysis of the isotopic characteristics of each of these to be beyond the scope of the ESSD journal format, as documented in our *Author Comment*. Companion papers focussing on the *interpretation* of the dataset will of course include such an analysis.

The Reviewer also suggests that Fig 4 (our new Fig 3) is unnecessary as it simply documents the data shown in Table 4. We have argued in our *Author Comment*, however, that it does contribute to the discussion since it clearly shows correlations which are not evident from the Table of data alone. For this reason we have retained this figure.

We have also made the vast majority of the minor corrections suggested by this reviewer, specifically:

1. 'detail' changed to 'details' and 'deviation' changed to 'deviations' as requested
2. commas added or deleted throughout as specified
3. 'the' added throughout as specified
4. Huston et al. (2021) added to the list of references.
5. Jochum et al. (2007) deleted from the list of references. The correct reference is Jochum (2005) and this is in the reference list.
6. More information is provided about the origin of all the rock standards including 'BR'.

Further modifications

1. Additional references have been added to the reference list corresponding to text additions suggested by reviewer #1
2. A typo '<1%' at the end of section 2 has been replaced with '>1%'
3. A line of text has been removed at the end of Section 2.3 as it erroneously referred to reproducibility, not accuracy.
4. Additional remarks added to the Acknowledgements