

Dear Editors and Reviewer,

We would like to extend our sincere thanks to the Associate Editor for the careful handling of our manuscript throughout the review process. We are further grateful to the third reviewer, whose detailed and insightful comments were instrumental in refining and strengthening the geochronology section. Each comment has been carefully considered. Our point-by-point responses and explanations are provided below.

Following the comments of the Associate Editor and the third reviewer regarding the English language, we have thoroughly revised the manuscript to improve its overall flow and to eliminate long, potentially misleading phrases. In doing so, we have followed the correction example provided by the reviewer as a guide throughout the revision process.

We sincerely hope that these improvements meet your expectations for publication.

Yours sincerely,

Ben-Tami Abdelhay on behalf of all co-authors.

Ben-Tami and co-authors have clearly made significant improvement to their manuscript based on the recommendations raised in the previous round of reviews. For me the geochemistry parts are now very strong and well argued and the figures are of a publication standard. For the geochronology there still should be some clarity on the methodology and how ages are determined that should be included and some extra work needed on the figures, below I have made a series of suggestions for improved clarity. However, the biggest issue with the work is the language, there are a lot of unnecessary connecting words and phrases that can make the text hard to read. I would encourage the authors to do a further language check, I include a revised version of the introduction to highlight the point.

Scientific comments on the manuscript:

Lines 88-91: Calculation of maximum depositional ages is an imprecise science, I would say these estimates are likely within error of your geological constraint in the Sirwa inlier. So rather than saying the SG is significantly older in the Sirwa inlier you might rephrase as “Within the Sirwa inlier depositional age of the SG is constrained by the Mzil granite dated at 614 [add errors] Ma”.

Author response:

We have corrected this accordingly. The sentence has been rephrased, and the age error has been added. Please refer to lines 85–86 in the revised version.

Lines 95 – 97: Again I would consider rephrasing it that ‘Abati et al. (2010) report ca. 600 Ma detrital ages in the Bou Salda Group indicating co-eval volcanogenic input’ rather than framing it around maximum depositional ages.

Author response:

We have corrected this accordingly. The sentence has been rephrased. Please refer to line 91 in the revised version.

Figure 4: The dashed line around the figure is distracting, given the figure layout maybe no border is even needed, but if you do include one it should be a thin solid line.

Author response:

We have modified this accordingly. The dashed line has been removed, and only the two lines between samples (solid, thin lines) have been retained.

Caption fig. 4: Do you really report $^{206}\text{Pb}/^{238}\text{U}$ ages even for Paleoproterozoic grains? Most studies switch to $^{207}\text{Pb}/^{206}\text{Pb}$ ages for ‘older’ ages. State what are the reported errors, 2s?

Author response:

Yes, we report $^{206}\text{Pb}/^{238}\text{U}$ ages, including for Paleoproterozoic grains, as given in Supplementary Table 2. We retained $^{206}\text{Pb}/^{238}\text{U}$ ages rather than switching to $^{207}\text{Pb}/^{206}\text{Pb}$ ages for the older grains. $^{206}\text{Pb}/^{238}\text{U}$ ages provide sufficient precision for the purposes of this study. The reported errors are 2s (lines 194–195).

Line 205: Can you state somewhere in the main text how you determine concordance, there are many different methods and windows applied by different studies.

Author response:

We applied a distance-to-concordia filter, retaining only analyses with 95–105% concordance, prior to generating concordia diagrams. This has been clarified now in Supplementary Data 1; lines: 60–61.

Lines 208 – 209: Is there actually any sense in ‘calculating’ a maximum depositional age in such a sample?

Author response:

We understand the reviewer's concern. Indeed, our sample shows a homogeneous, uniform Paleoproterozoic peak at ca. 2.1 Ga, providing a coherent and well-defined population from which a maximum depositional age can be meaningfully calculated. However, we note that the calculation of the maximum depositional age was specifically requested during the first round of review, and was therefore kept as a respect to that earlier comment.

Line 217: Would be good if you stated somewhere how this subset of 21 data points was chosen to calculate the weighted mean age, is it simply the ‘exclude outliers’ function?

Author response:

We acknowledge this ambiguity. We confirm that the weighted mean ages were calculated using the ‘exclude outliers’ function. We have added this to the text; please refer to Subsection 3.1, “U-Pb zircon geochronology”, line 142 in the revised version.

Line 224: What do you mean by “A total of high-quality concordant zircon analyses”?

Author response:

By "high-quality concordant zircon analyses," we meant zircon analyses that fall only within 95–105% concordance. We agree that this phrase requires rephrasing, and have revised it accordingly in the text. Please refer to lines 219–220 in the revised version.

Lines 225-226: Surely you didn't need software to identify that a Paleoproterozoic grain was a statistical outlier!

Author response:

We agree that the anomalous age of this grain is apparent without statistical analysis. We have removed the part saying ‘after being identified by IsoplotR as a statistical outlier’.

Figure 5: What is the meaning of red or green fill in the weighted mean in (a), and what is the scale 96 – 104 on the right side mean. In B and C what is the significance of filled and unfilled ellipses. Maybe it would be better to plot the weighted means as separate panels, otherwise they are very small.

Author response:

Figure 5 has been reproduced following the reviewer's recommendations. Here is a point by point answer to the reviewer's comments:

- The coloring in Fig. 5A-1 reflects the statistical position of each individual $^{206}\text{Pb}/^{238}\text{U}$ age analysis (1, 2, 3), with the grey shaded band indicating the accepted weighted mean age (2025 Ma) and its uncertainty. The green bar highlights the analysis corresponding to the median age within this weighted mean, while the red bars represent the remaining analyses.
- The scale 96–104 on the right side of Fig. 5A represents concordance (%), consistent with the concordance filter (95–105%) described in Supplementary Data 1; lines 60–61.
- The unfilled ellipses in Fig. 5B, and C, represent excluded statistical outliers, while filled ellipses represent the concordant analyses retained for the weighted mean age calculation.
- We agree that the weighted mean plots are difficult to read at their current size. Therefore, we have represented them as separate, larger panels for improved clarity.

Lines 532-534: It might be relevant to note that some of the samples studied by Abati are rich in Neoproterozoic zircons whereas others are poor and dominated by Paleoproterozoic zircons, like your sample. This seems to be a feature of the Anti-Atlas Ediacaran.

Author response:

Indeed, our Paleoproterozoic peak is consistent with the signature observed in the analyzed detrital zircon populations from the Saghro and Bou Salda group sediments of the Sirwa massif. Abati et al. (2010) argued in favor of an exposed cratonic basement (Paleoproterozoic ?) based on the relatively lower proportion of ca. 610 Ma zircons relative to Paleoproterozoic zircons in the upper levels of the stratigraphic sequence. Moreover, it has been established that neither the base nor the top of the Saghro Group is exposed anywhere in the Sirwa inlier (Thomas et al., 2002). This therefore suggests that

the source of the 610 Ma zircons was probably eroded, favoring enrichment in Paleoproterozoic ages, assuming that the ZGMR reflects the lower stratigraphic levels of the Saghro Group in the Sirwa inlier, hence its 2.1 uniform peak.

We are open to incorporating this into the manuscript text if the reviewer deems it necessary for strengthening the discussion.