

## Second proof reading comments

### Remarks from the language copy-editor

CE1 Please note the slight edits.

Could this be changed to “...lead to inaccuracy of up to thousands of years...”?

CE2 Please note the slight edits.

Could we have instead:

“In the place of the MSWD, a robust statistic called the spine width,  $s$ , may be used to assess whether or not data point scatter is commensurate with accurate use of this algorithm given assigned uncertainties. The  $s$  statistic is the median absolute deviation of weighted residuals, normalised to be equal to the standard deviation for a strictly Gaussian distribution (i.e. NMAD). This statistic tends towards 1 for well-behaved datasets and may be employed in a similar manner to the MSWD, although, in contrast...”?

CE3 Please check (here and throughout the paper). The hyphens have been removed as requested, but should the font be changed here to `\texttt{spine}`?

Thank you. It's probably best to just remove the word “spine” here. I don't think it's needed.

CE4 Should this be `\texttt{spine}`?

Yes, I think so.

### Remarks from the typesetter

TS1 Please note that any changes in values or content should be approved by the editor. Could you please provide a short explanation for this correction that can be forwarded by us to the editor? Thank you very much in advance for your help.

*Note for the typesetter and copy-editor:*

See note to the editor below. If approved by the editor, please make the following changes to the manuscript:

Page 10, line 101

Change to “... DTh/U value of  $0.2 \pm 0.06$  ( $2\sigma$ ), ...” and “...DPa/U value of  $3.4 \pm 0.8$  ( $2\sigma$ ) ...”

Page 11, line 10

Change to “...  $95.0 \pm 19$  ka (95% CI), with an MSWD of 3.55, indicating...”

Page 11, line 15

Change to "... 94.1 ± 9.8 ka (95% CI)..." and "... s value of 1.29..."

Page 11, line 27

Change to "... 92.0 ± 7.8 ka (95% CI)..."

Figure 5 caption, line 4

Change to "... DTh/U value of 0.2 ± 0.06 (2σ), ..." and "...DPa/U value of 3.4 +/- 0.8 (2σ) ..."

See comment below regarding correction to Figure 5.

*Note for the editor:*

If possible, I wish to make some corrections to the values quoted in the Sambe–Kisuki tephra <sup>207</sup>Pb-corrected age example.

- Firstly, there was a typo in the uncertainty given for  $D_{Th/U}$ . It should have read +/- 0.06 (2σ) rather than +/- 0.03. The correct value was used in the calculations and in constructing Figure 5.
- Secondly, there was an inconsistency between the  $D_{Pa/U}$  value quoted in the manuscript and the one used in calculations, although the impact on results is small. I think it would be best to use the value suggested by Shuhei Sakata who collected the data, which is  $D_{Pa/U} = 3.4 \pm 0.8$  (2s). This has a small impact on the weighted mean age, which becomes 94.1 +/- 9.8 ka (95% CI) compared to 94.4 +/- 10.9 ka in the original manuscript. For the weighted averages, the MSWD becomes 3.55 instead of 3.54 and the s (spine width) value is unchanged.
- There was also an error in the classical statistics weighted mean age uncertainty that is given for comparison. With the  $D_{Pa/U}$  values above. used, and the average age uncertainty corrected, this should be 95.0 +/- 19 ka (95% CI) compared to 96.6 +/- 39 ka in the original manuscript. If the "outlier" is removed, the classical statistics weighted mean becomes 92.0 +/- 7.8 ka (95% CI) compared to 92.1 +/- 6.3 ka in the original manuscript. The MSWD here remains 0.55.

I apologise for these errors and oversights, and hope it isn't too much of a problem to correct these values at this stage given that the data are provided for demonstration purposes only.

TS2 Please see previous remark regarding editor approval.  
OK.

TS3 Please confirm.

I don't think it's necessary to include the Zenodo URLs in the in-text citation. Please remove these, but keep the *GitHub* URLs that are provided in this paragraph.

TS4 Please confirm.

See TS3 above.

## Other comments

Page 9, line 25

Change

“...in cases where either uncertainties on input variables are very large, there is a high proportion of trials with non-convergent age solutions, and/or a large number of single-aliquot ages are computed simultaneously.”

to

“...in cases where either uncertainties on input variables are very large or there is a high proportion of trials with non-convergent age solutions.”

Page 9, line 55

I know I previously asked to add the “... (i.e. measured)...” for maximum clarity, but the sentence is now a bit awkward with the two “i.e.” Could the “... (i.e. measured)...” please be removed? Sorry about this.

Page 9, line 89

Change “...such as distribution coefficients or...” to “...such as distribution coefficient or...”. I.e., remove the “s”.

Page 10, line 35

Replace “isochron” with “regression line”.

Page 10, line 38

Change to “... $m$  by  $x$ - $y$  points ...”

Page 10, line 39

Change to “...representing the set of all simulated intercept points.”

Figure 5

The f05 file has been updated to reflect the changes discussed in the response to TS1. If these changes are accepted by the editor, please update the figure in the manuscript as well as the key figure with this new f05.pdf file.

Figure 5 caption, line 17

Change “... age computed using the robust spine algorithm which accounts for the age covariance structure, ...” to “... age computed using the robust spine algorithm accounting for the age covariance structure, ...”.

Page 14, Acknowledgements

Replace “...the associate editor Noah M. McLean...” with just “...the editor Noah M. McLean...”. If this is OK?

#### Supplementary data

The supplementary file “Sambe-Kisuki.csv” has been updated to reflect changes discussed in the response to TS1.