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To *Geochronology* Associate Editor,

Dear Associate Editor,

Please find a final, revised version of manuscript gchron-2020-10 "Direct U-Pb dating of carbonates from micron scale fsLA-ICPMS images using robust regression", by Hoareau et al.

All the last, minor modifications requested by the 2 reviewers have been done in order to publish the manuscript:

#Reviewer 1:

Line 18: If the ICP-MS is not used in high resolution mode I suggest calling it sector filed ICP-MS instead of high resolution ICP-MS.

Done

Line 44: Replace "standard" by reference material. (throughout the manuscript). Only material certified by an institution should be called standard, all other materials we use for correction and validation should be called reference material (RM) and validation RM.

Done

Line 200-201: Why are the systematic uncertainties given as 1S, when all the results are given as "1.96σ level" ? That is a bit confusing.

Modified

Where is the long-term excess variance of 1% (S1) from? (Guillong et al 2020) suggest 2-2.5% (2S), please comment on how you got 1%.

An explanation is now given directly in the manuscript (l. 200-204).

#Reviewer 2

page 6/lines 170-2

Whether or not a drift correction is applied is still not really clear as the inserted sentence represents a contradiction ("correction for drift was also based on a standard bracketing approach" vs. "using the values obtained for the NIST612 preceding the unknown")

The sentence has been modified and made clearer (l. 170-171)

page 11/ sample JS4

The information given on sample JS4 from Drost et al. (2018) is inconsistent. Fig. 6A shows $n=980$, which is consistent with the data set given in Fig. 3A-D of Drost et al. (2018) (JS-4 run 1, criteria: Rb, Zr, Th<0.3 ppm, obtained ages TW $300.8\pm 3.7\text{Ma}$, $86\text{TW } 299.6\pm 4.0\text{Ma}$, isochron $298.9\pm 5.6\text{Ma}$). However, on page 4/line 97 you quote $300.5\pm 3.3\text{Ma}$ (which belongs to run2 in the original publication), on page 11/line 333 you quote run 2 in the header and in lines 335-6 you give the ages for run 1 with criteria: Rb<0.5ppm. Please check and clarify.

Corrected

page 12/line 343

"Like JS4,is characterized by low U and Pb...." should rather read "In contrast to JS4, is characterized by low U and Pb...."

We meant "Unlike": corrected

page 13/line 399

"... U/Pb and Pb/Pb ratios (~0.2 to ~106 for $^{238}\text{U}/^{206}\text{Pb}$),..." - $^{238}\text{U}/^{206}\text{Pb}$ is rather around 70 in Fig. 8B

The numbers are the right ones, but a few pixels are absent from the figure due to the scale chosen. This is now clearly stated in the caption (also for Figs. 6 and 9)

page 14/lines 403 and 406

ages reported here are not the same as in Fig. 8D and 8E, respectively

Corrected

page 14/line 415

reference to Fig. 8C is not correct - should be 8E instead?

Corrected

pages 14/15

numbering of sections is still inconsistent (section 3.2.3. is followed by 5.)

Corrected

7.1 Analytical conditions table

Quality control validation: "4 analyses of Duff Brown..." but then there are five ages given

Corrected

Table 1

here and in the figures and supplementary figures: the rounding is inconsistent

Corrected

Figure captions:

Fig. 5:

"D: TW concordia plot obtained from in situ LA-ICPMS analyses.." Do you want to replace "in situ" by "spot"?

Done

*Inconsistent numbering in the captions (instead of 1, 2, 3....9 it is 1, ...5, 6, 6, 7, 8).
Numbering in the text seems to be correct though.*

Corrected

Supplementary material (pdf)

you may want to consider replacing "Pb0 fixed" and "Pb0 not fixed" by "anchored to Pb0" and "unanchored"

Done

Duff Brown 1 in the supplementary material is called Duff Brown 2 in Table 1

Corrected (in the supplementary)

Supplementary Table S1 (xlsx)

*"This file presents the isotopic images, in number of counts, for the masses 238, 232, 208, 207, 206, for samples Duff Brown, BH14, PXG20-1, PXG32-2, ETC2, ARB and C6-265-D5 ."
- should it read "counts per second" instead of "number of counts"?*

Yes. Corrected.

Sincerely,

Guilhem Hoareau