

***Interactive comment on* “New analytical and data evaluation protocols to improve the reliability of U-Pb LA-ICP-MS carbonate dating” by Marcel Guillong et al.**

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Thank you for the comments and suggestions that helped to improve the manuscript. Please find below some answers, comments and findings.

Please also see the answers to RC 1, including the figures.

Our method does not use the drift or downhole correction of Iolite. We just use the software to do the baseline subtraction and calculate raw ratios that we subsequently use in an Excel spreadsheet to do the matrix and drift corrections. This is now precised in the text.

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“Which bring me on to a question about lines 189-194 – have you tried this? Yes, this is our standard approach to carbonate dating: We load a bunch of interesting samples, program a short sequence with 2-4 points per interesting phase with shortened gas blank / ablation times and run this “test” sequence (20-30 minutes). We monitor live the U and Pb intensities and decide based on the 2-4 point if the tested sample may work, needs larger crater or is hopeless. Criteria for samples worth a shot are $^{238}\text{U} > \sim 10000$ cps; or $> \sim 1000$ cps if there is not much initial Pb, in which case we increase the crater diameter / repetition rate from 110 micron and 5Hz to 163 micron and 7.4 Hz. If $^{238}\text{U} < \sim 1000$ cps and/or the initial Pb is higher than ^{238}U , there is little hope, and we skip this sample in the subsequent session.

It is quite common that carbonate samples have a very high MSWD when analysed by ID-TIMS. For instance, the calibration data for WC-1 have a MSWD of 1069 (Roberts et al., 2017). We do explicitly not give the detailed ID-TIMS data for ASH-15 in this manuscript as these data will be published elsewhere (P. Nuriel et al., in preparation)

Thank you for suggesting using the VizualAge_UcomPbine DRS in Lolite, we will give it a try soon.

We adjusted the manuscript with your suggestions. VRM is defined on Line 10 in the abstract.

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