Oxygen isotope analysis of zircon reference materials with SHRIMP SI

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Zircon reference materials including Temora II, Mud Tank, 91500, FC1, QGNG, CZ3, R33 have been analysed for $\delta^{18}O$ with the SHRIMP SI under a variety of analytical conditions. These include changing source slit width, electron impact energy, number of subsets. Data were reduced following a new protocol to obtain a robust estimate of external precision per spot. This procedure produces a robust determination of outliers. The final estimate of $\delta^{18}O$ allows the determination of a weighted mean for an entire analytical session. External reproducibility of spots is dependent on the number of subsets acquired (where 1 subset is ten acquisitions of 2 s integration time), and ranges from 0.2 to 0.3 ‰ (1σ) for four subsets, to 0.10 to 0.15 ‰ (1σ) for 6 subsets. The external precision per sample is dependent on the calibration to a normalising standard and is dependent on the number of analyses per sample. For high precision data sets (>30 analyses), external precision is better than 0.1 ‰ ($2\sigma_m$) while for the data sets less than 12 samples and for some of the four-scan data the external precision can be as high as 0.2 ‰ ($2\sigma_m$). Accuracy of the measurements within the cited uncertainties is demonstrated by agreement within uncertainty of laser fluorination analyses of these materials. Mud Tank and Temora II appear to be homogeneous within the cited uncertainties and well suited to being oxygen isotope reference materials.