Data reporting Template (Information) for LA-ICP-MS U-Th-Pb data

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| **Laboratory & Sample Preparation** |  |
| Laboratory name | Dept of Earth Science, University of Everywhere |
| Sample type/mineral | Detrital zircons  |
| Sample preparation | Conventional mineral separation, 1 inch resin mount, 1m polish to finish |
| Imaging | CL, FEI Quanta600, 10nA, 17mm working distance |
| **Laser ablation system** |  |
| Make, Model & type | ESI/New Wave Research, UP193FX  |
| Ablation cell & volume | In-house built low volume cell, volume ca. 4 cm3 |
| Laser wavelength (nm) | 193 nm |
| Pulse width (ns) | 4 ns |
| Fluence (J.cm-2) | 2.5 J.cm-2 |
| Repetition rate (Hz) | 5 Hz |
| Ablation duration (secs) | 40 secs |
| Ablation pit depth / ablation rate | 16m pit depth, measured using an optical microscope, SEM and interferometry, equivalent to 0.08m/pulse |
| Spot diameter (m) nominal/actual | 25 m / 32 m |
| Sampling mode / pattern | Static spot ablation |
| Carrier gas | 100% He in the cell, Ar make-up gas combined using a Y-piece 50% along the sample transport line to the torch. |
| Cell carrier gas flow (l/min) | 0.8l/min |
| **ICP-MS Instrument** |  |
| Make, Model & type | Nu Instruments, Nu Plasma HR, MC-ICP-MS |
| Sample introduction | Ablation aerosol combined with co-aspiration of desolvated Tl-235U tracer  |
| RF power (W) | 1300W |
| Make-up gas flow (l/min) | Sourced from Nu Instruments DSN-100 desolvating nebulizer. Neb pressure 24psi (estimated at 0.7l/min) Ar. |
| Detection system | mixed Faraday-multiple ion counting array |
| Masses measured | 202-207, 235, 238 |
| Integration time per peak/dwell times (ms); quadrupole settling time between mass jumps | 200ms for each isotope |
| Total integration time per output datapoint (secs) | ~1.2secs*(N.B. this should represent the time resolution of the data)* |
| ‘Sensitivity’ as useful yield (%, element) | 0.4% U ((#ions detected/#atoms sampled)\*100; Schaltegger *et al.* 2015) |
| IC Dead time (ns) | 6, 9 & 7 ns IC0, IC1 & IC2 resp. |
| **Data Processing** |  |
| Gas blank | 30 second on-peak zero subtracted |
| Calibration strategy | 91500 used as primary reference material, Plesovice & GJ1 used as secondaries/validation |
| Reference Material info | 91500 (Wiedenbeck et al. 1995)Plesovice (Slama et al. 2008)GJ1 206Pb/238U 0.097877 ± 0.07%, 207Pb/206Pb 0.060171 ± 0.08% (in-house CA-TIMS, this study) |
| Data processing package used / Correction for LIEF | Nu Instruments Nu Plasma TRA software and in-house spreadsheet for data normalization, uncertainty propagation and age calculation. LIEF correction assumes reference material and samples behave identically. |
| Mass discrimination | Tl-U tracer solution used for initial mass bias correction with 207Pb/206Pb and 206Pb/238U additionally normalised to reference material |
| Common-Pb correction, composition and uncertainty | No common-Pb correction applied to the data. |
| Uncertainty level & propagation | Ages are quoted at 2*s* absolute, propagation is by quadratic addition. Reproducibility and age uncertainty of reference material and common-Pb composition uncertainty are propagated where appropriate. |
| Quality control / Validation | Plesovice – Wtd ave 206Pb/238U age = 338 ± 3 (2*s*, MSWD = 0.9, n=8)GJ-1 – Wtd ave 206Pb/238U age = 602 ± 5 (2*s*, MSWD = 1.1, n=7)Systematic uncertainty for propagation is 2% (2*s*). |
| **Other information** | Depth profiling and single-pulse ablation studies used a low-volume ablation cell, sample line of 3 m from ablation cell to torch and a 20 sec wait time between ablations. Cell washout time was ca. 0.8 secs to 1% of peak signal. |