**Table S2**

**(a) Operating conditions for the LA-ICP-SF-MS equipment for U-Th-Pb isotope analysis**

|  |  |
| --- | --- |
| **Laboratory & Sample Preparation** |  |
| Laboratory name | Institute for Geosciences, Goethe University Frankfurt, Germany |
| Sample type/mineral | detrital zircons  |
| Sample preparation | Conventional mineral separation, 1 inch resin mount polished |
| Imaging | TESCAN VEGA2 SBH with Oxford SwiftED EDX-system, 15 kV, <10nA  |
| **Laser ablation system** |  |
| Make, Model & type | ComPexPro 102F, Coherent (Excimer) |
| Ablation cell | Two-volume ablation cell (Laurin Technic, Australia) |
| Laser wavelength  | 193 nm |
| Pulse width  | < 5 ns |
| Fluence  | 2.8 J/cm-2  |
| Repetition rate  | 5.5 Hz  |
| Spot size  | 26 µm  |
| Sampling mode / pattern | single spot |
| Carrier gas | 0.33 l/min He, 0.89 l/min Ar, N2 (6 ml)  |
| Background collection  | 20 seconds |
| Ablation duration | 16 seconds |
| Pre-ablation | 3 pulses |
| Wash-out delay | 10 seconds |
| Cell carrier gas flow (He) | 0.33 l/min  |
| **ICP-MS Instrument** |  |
| Make, Model & type | Thermo-Scientific ELEMENT XR (sector field) |
| Sample introduction | via conventional tubing  |
| RF power  | 1325 W |
| Sampler, skimmer cones | Ni |
| Extraction lenses | X type |
| Make-up gas flow (Ar) | 0.89 l/min |
| Detection system | single collector secondary electron multiplier |
| Data acquisition protocol | Time-resolved analysis |
| Scanning mode | Peak hopping, four point per peak |
| Detector mode | Pulse counting mode  |
| Masses measured |  202Hg,204(Hg + Pb), 206Pb, 207Pb, 208Pb, 232Th, 238U |
| Integration time per peak  | 10 milliseconds  |
| Sensitivity / Efficiency  | ca. 9900 cps/ppm Pb (26 µm, 5.5Hz) |
| **Data Processing** |  |
| Gas blank | 16 seconds on-peak  |
| Calibration strategy | GJ1 zircon standard used as primary reference material, Plešovice, and BB used as secondary reference material (quality control) |
| Reference Material info | GJ1 (Jackson et al., 2004 : 604 ± 1 Ma; 206Pb/238U age)Plešovice (Slama et al., 2008: 337.13 ± 0.37 Ma ; Concordia age)BB (Santos et al., 2017: 562 ± 9 Ma; 206Pb/238U age) |
| Data processing package used  | in-house EXCEL spreadsheet (Gerdes & Zeh, 2006, 2009) |
| Quality control / Validation | Plešovice (session1): concordia age = 337.9 ± 1.1 Ma (n=26; MSWD=0.97; probability=0.52) Plešovice (session2): concordia age = 337.8 ± 2.3 Ma (n=10; MSWD=0.77; probability=0.75)BB (session 1-grain GUF): concordia age = 563.5 ± 2.5 Ma (n=10; MSWD=0.89; probability=0.60), BB (session2-grain KIT): concordia age = 561.1 ± 1.2 (n=38; MSWD=1.08; probability=0.32) |

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