

Supplementary Table S1: Operating conditions for the LA-ICP-MS equipment

Laboratory & Sample Preparation	
Laboratory name	GeOHeLiS Analytical Platform, OSUR, Univ Rennes, France
Sample type/mineral	Zircon
Sample preparation	Epoxy Mount
Laser ablation system	
Make, Model & type	ESI NWR193UC, Excimer
Ablation cell	ESI NWR TwoVol2
Laser wavelength	193 nm
Pulse width	< 5 ns
Fluence	6.6J/cm ²
Repetition rate	4Hz
Spot size	25 µm
Sampling mode / pattern	Single spot
Carrier gas	100% He, Ar make-up gas and N2 (3 ml/mn) combined using in-house smoothing device
Background collection	20 seconds
Ablation duration	40 seconds
Wash-out delay	15 seconds
Cell carrier gas flow (He)	0.76 l/min
ICP-MS Instrument	
Make, Model & type	Agilent 7700x, Q-ICP-MS
Sample introduction	Via conventional tubing
RF power	1350W
Sampler, skimmer cones	Ni
Extraction lenses	X type
Make-up gas flow (Ar)	0.67 l/min
Detection system	Single collector secondary electron multiplier
Data acquisition protocol	Time-resolved analysis
Scanning mode	Peak hopping, one point per peak
Detector mode	Pulse counting, dead time correction applied, and analog mode when signal intensity > ~ 10 ⁶ cps
Masses measured	²⁰⁴ (Hg + Pb), ²⁰⁶ Pb, ²⁰⁷ Pb, ²⁰⁸ Pb, ²³² Th, ²³⁸ U
Integration time per peak	10-30 ms (²⁰⁷ Pb)
Sensitivity / Efficiency	21000 cps/ppm Pb (50µm, 10Hz)
Data Processing	
Gas blank	20 seconds on-peak
Calibration strategy	GJ1 zircon standard used as primary reference material, Plešovice used as secondary reference material (quality control)
Common-Pb correction, composition and uncertainty	No common-Pb correction.
Reference Material info	GJ1 [36], Plešovice [37]
Data processing package	Iolite 4 [82]
Uncertainty level and propagation	Ages are quoted at 2 sigma absolute, propagation is by quadratic addition according to Horstwood et al. [83]. Reproducibility and age uncertainty of reference material are propagated.
Quality control / Validation	Plešovice: Concordia Age: 337.0 ± 1.3 Ma (MSWD=1.6, n=16)