



Data report

Report to	Stephen Pearson
Operator	Dr Renjie Zhou
RIF Director	Professor Jianxin Zhao
Report date	15 June 2023

What's in this document?

- Summary of samples and project timeline
- Methods
- QA/QC
- Plots of results

Summary of samples and project timeline

- **Materials/Samples:** two meta-sedimentary rocks
 - CWDD001-322.30-323.30 (Lab code: CWDD001_1)
 - CWDD001-358.50-359.40 (Lab code: CWDD001_2)
- **Analysis:** Detrital zircon U-Pb geochronology by laser ablation ICP-MS with at least 100 grains dated from each sample
- **Project timeline**
 - Initial discussion: Feb/Mar 2023
 - Rock samples received at UQ: 22 March 2023
 - Zircon mineral separates returned to UQ: 26 May 2023
 - Zircon grains prepared into polished mounts: 07 June 2023
 - Laser ablation ICP-MS analysis: 09-11 June 2023
 - Data reporting: 15 June 2023

- **Laboratory, materials, instrument**

Lab name	Radiogenic Isotope Facility (RIF), The University of Queensland (UQ)
Materials	Detrital zircons
Sample preparation	<ul style="list-style-type: none">• Conventional mineral separation conducted by Geotrack International Pty Ltd• One-inch resin round mounts, ~0.3 μm polish to finish
Laser ablation system	ASI RESOLution 193nm excimer laser ablation system
ICP-MS system	Thermo Scientific™ iCAP™ RQ Single Quadrupole (SQ) Inductively Coupled Plasma Mass Spectrometry (ICP-MS) system

- **Laser ablation operating conditions**

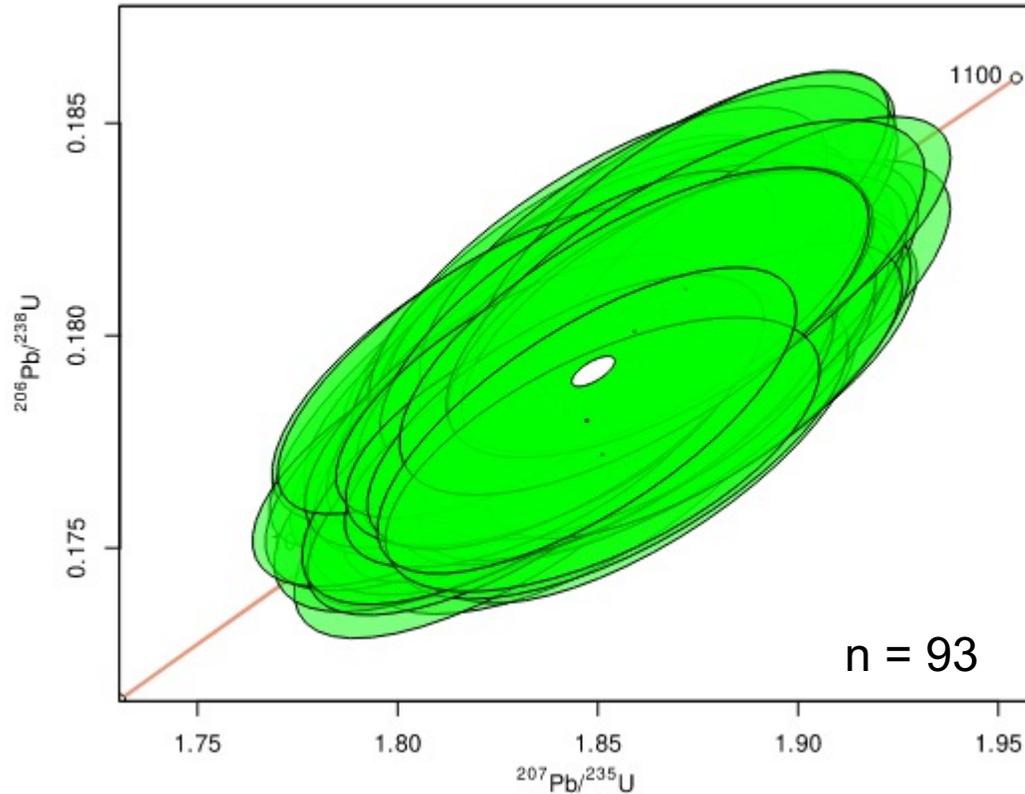
Spot size	38 μm round spot
Repetition rate	8 Hz
On-sample fluence	2.9 J/cm ²
Carrier gas	320 ml/min He gas mixed with 5 ml/min high-purity N ₂

- **ICP-MS operating conditions**

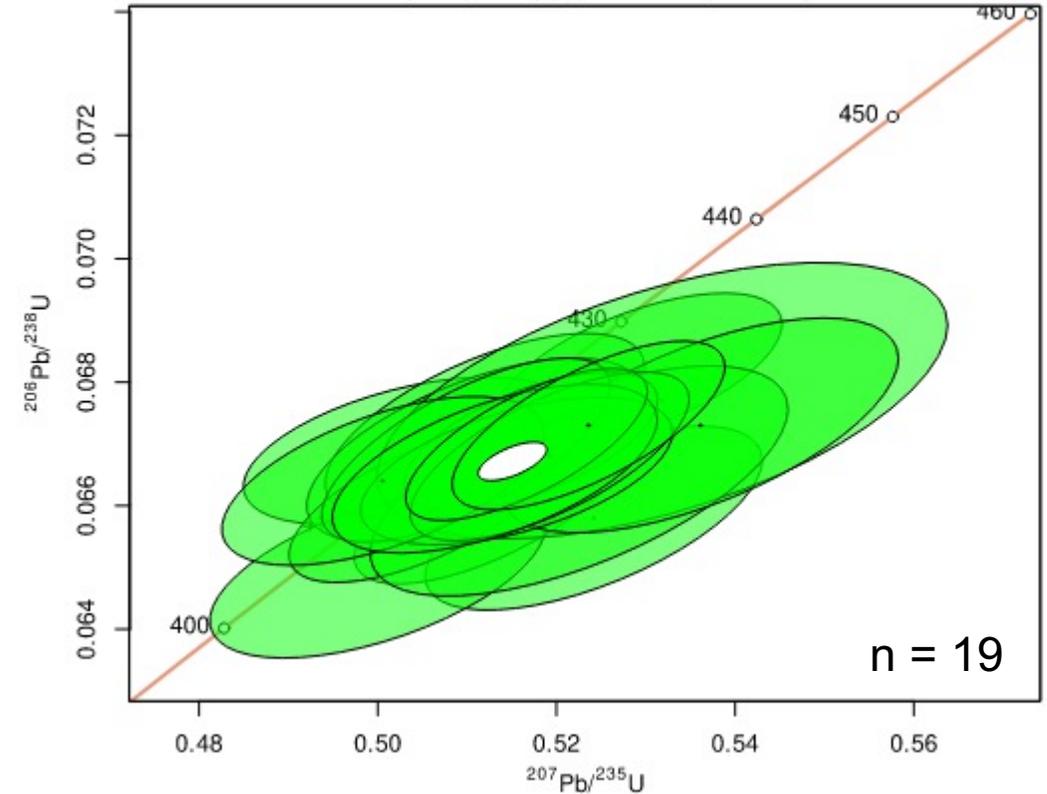
RF Power	1550 W
Nebuliser gas	Ar gas flow at 0.96 l/min
Sampling depth	4.7 mm
Mass fractionation	Monitored with NIST612 glass: $^{232}\text{Th}/^{238}\text{U} = \sim 1.0$, $^{206}\text{Pb}/^{236}\text{U} = \sim 0.23$

- **Primary reference material: 91500 zircon (1065 Ma)**
 - Zircon reference material 91500 is one of the best characterised geochemical reference materials for microanalysis. It is a single crystal, natural zircon reference material accepted as such by both the secondary ion mass spectrometry (SIMS) and the laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) communities.
 - Citation: Wiedenbeck, M.A.P.C., Alle, P., Corfu, F.Y., Griffin, W.L., Meier, M., Oberli, F.V., Quadt, A.V., Roddick, J.C. and Spiegel, W., 1995. Three natural zircon standards for U-Th-Pb, Lu-Hf, trace element and REE analyses. *Geostandards newsletter*, 19(1), pp.1-23.
- **Secondary reference material: TEMORA2 zircon (417 Ma)**
 - TEMORA2 zircons are natural zircon grains from the Middledale Gabbroic Diorite within the Palaeozoic Lachlan Orogen of Eastern Australia. It is a major international reference material mainly distributed by Geoscience Australia.
 - Citation: Black, L.P., Kamo, S.L., Allen, C.M., Davis, D.W., Aleinikoff, J.N., Valley, J.W., Mundil, R., Campbell, I.H., Korsch, R.J., Williams, I.S. and Foudoulis, C., 2004. Improved $^{206}\text{Pb}/^{238}\text{U}$ microprobe geochronology by the monitoring of a trace-element-related matrix effect; SHRIMP, ID-TIMS, ELA-ICP-MS and oxygen isotope documentation for a series of zircon standards. *Chemical Geology*, 205(1-2), pp.115-140.

- Results from primary and secondary reference materials are consistent with their literature values with both excellent precision and accuracy.



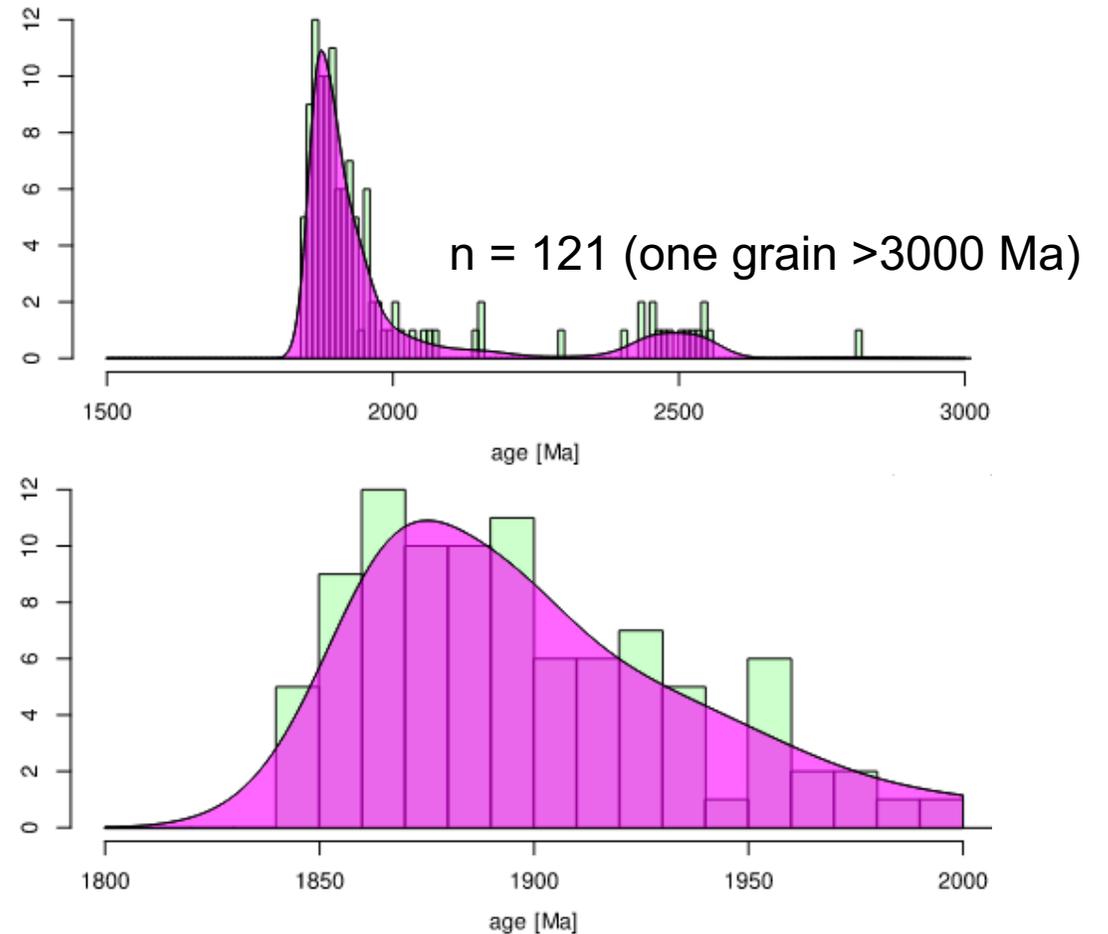
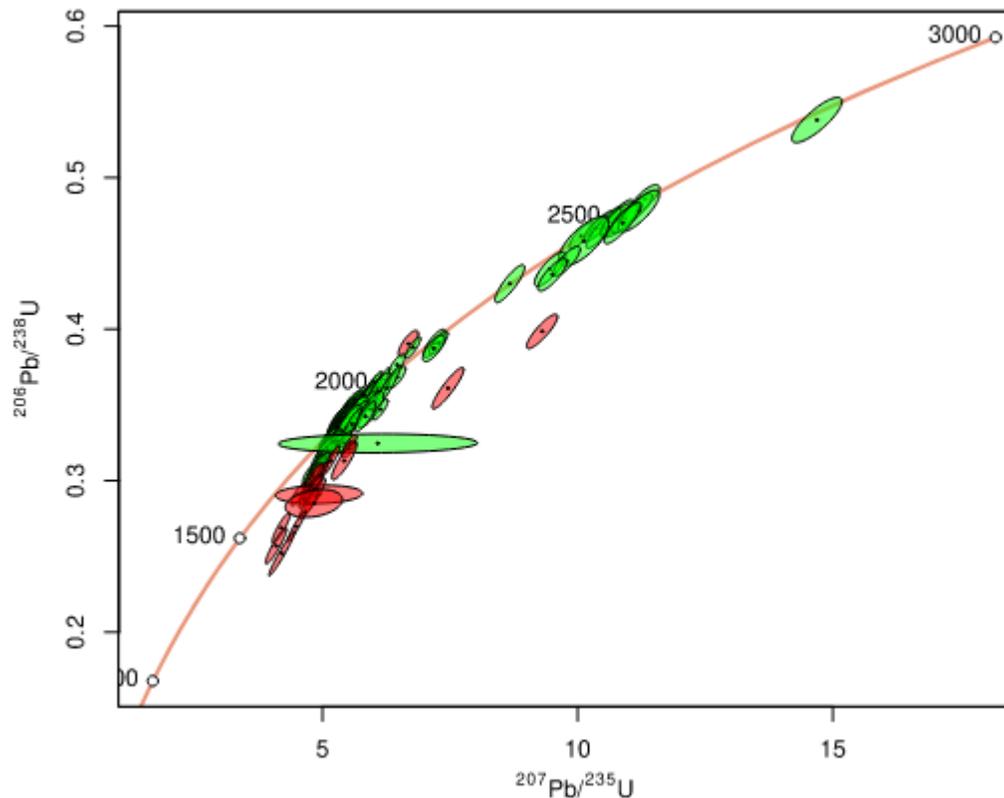
Primary reference material 91500 zircon
Concordant age: **1062.7 ± 1.5 Ma** (2σ level error bar)



Secondary reference material TEMORA2 zircon
Concordant age: **417.0 ± 1.5 Ma** (2σ level error bar)

Plots of results

- CWDD001-322.30-323.30 (Lab code: CWDD001_1)
- 144 spots were measured.
- 122 spots have discordance between -5% to 10%. They are plotted as **green spots** in the concordia diagram. Their $^{207}\text{Pb}/^{206}\text{Pb}$ ages are plotted in age histograms.
- 22 spots yielded “discordant” ages. They are plotted as **red spots** in the concordia diagram.



Plots of results

- CWDD001-358.50-359.40 (Lab code: CWDD001_2)
- 145 spots were measured.
- 125 spots have discordance between -5% to 10%. They are plotted as **green spots** in the concordia diagram. Their $^{207}\text{Pb}/^{206}\text{Pb}$ ages are plotted in age histograms.
- 20 spots yielded “discordant” ages. They are plotted as **red spots** in the concordia diagram.

