**Appendix: U-Pb data**

Analytical notes for samples analyzed on the Element2 HR ICPMS [ANB, SNR, MAN, SAL, MDP, GSB, PAR, T755, T693-(100-235), DR584-(106-289), DR585-(103-309), DR591-(105-274), MLB-(99-315)].

1. Analyses with >10% uncertainty (1-sigma) in 206Pb/238U age are not included.
2. Analyses with >10% uncertainty (1-sigma) in 206Pb/207Pb age are not included, unless 206Pb/238U age is <400 Ma.
3. Best age is determined from 206Pb/238U age for analyses with 206Pb/238U age <900 Ma and from 206Pb/207Pb age for analyses with 206Pb/238Uage >900 Ma.
4. Concordance is based on 206Pb/238U age / 206Pb/207Pb age.  Value is not reported for 206Pb/238U ages <400 Ma because of large uncertainty in 206Pb/207Pb age.
5. Analyses with 206Pb/238U age >400 Ma and with >20% discordance (<80% concordance) are not included.
6. Analyses with 206Pb/238U age >400 Ma and with >5% reverse discordance (<105% concordance) are not included.
7. All uncertainties are reported at the 1-sigma level, and include only measurement errors.
8. Systematic errors are as follows (at 2-sigma level): [ANB: 1.0% (206Pb/238U) & 0.9% (206Pb/207Pb)], [SNR: 1.0% (206Pb/238U) & 1.0% (206Pb/207Pb)], [MAN: 1.6% (206Pb/238U) & 1.2% (206Pb/207Pb)], [SAL: 1.1% (206Pb/238U) & 1.2% (206Pb/207Pb)], [MDP: 1.0% (206Pb/238U) & 1.0% (206Pb/207Pb)], [GSB: 1.0% (206Pb/238U) & 0.9% (206Pb/207Pb)], [PAR: 1.0% (206Pb/238U) & 0.8% (206Pb/207Pb)], [T755: 1.2% (206Pb/238U) & 1.0% (206Pb/207Pb)] [T693: 0.9% (206Pb/238U) & N/A (206Pb/207Pb)], [DR584: 0.9% (206Pb/238U) & 0.8% (206Pb/207Pb)], [DR 585: 1.0% (206Pb/238U) & 0.9% (206Pb/207Pb)], [DR591: 0.8% (206Pb/238U) & 0.9% (206Pb/207Pb)], [MLB: 1.0% (206Pb/238U) & 0.9% (206Pb/207Pb)].
9. Analyses conducted by LA-ICPMS, as described by Gehrels et al. (2008) and Gehrels and Pecha (2014).
10. U concentration and U/Th are calibrated relative to FC-1 zircon standard and are accurate to ~20%.
11. Common Pb correction is from measured 204Pb with common Pb composition interpreted from Stacey and Kramers (1975).
12. Common Pb composition assigned uncertainties of 1.5 for 206Pb/204Pb, 0.3 for 207Pb/204Pb, and 2.0 for 208Pb/204Pb.
13. U/Pb and 206Pb/207Pb fractionation is calibrated relative to fragments of large Sri Lanka zircons and individual crystals of FC-1, and R33.
14. U decay constants and composition as follows: 238U = 9.8485 x 10-10, 235U = 1.55125 x 10-10, 238U/235U = 137.82.
15. U-Th disequilibrium correction is applied to 206/238 ages assuming a value of 2.3 for the magma.

Analytical notes for samples analyzed on the Nu HR ICPMS [T1135, T978, T958, CAR, T693-(1-99), DR584-(1-105), DR585-(1-102), DR591-(1-104), MLB-(1-98)]

1. 1. Analyses with >10% uncertainty (1-sigma) in 206Pb/238U age are not included.
2. Analyses with >10% uncertainty (1-sigma) in 206Pb/207Pb age are not included, unless 206Pb/238U age is <500 Ma.
3. Best age is determined from 206Pb/238U age for analyses with 206Pb/238U age <1000 Ma and from 206Pb/207Pb age for analyses with 206Pb/238Uage > 1000 Ma.
4. Concordance is based on 206Pb/238U age / 206Pb/207Pb age.  Value is not reported for 206Pb/238U ages <500 Ma because of large uncertainty in 206Pb/207Pb age.
5. Analyses with 206Pb/238U age > 500 Ma and with >20% discordance (<80% concordance) are not included.
6. Analyses with 206Pb/238U age > 500 Ma and with >5% reverse discordance (<105% concordance) are not included.
7. All uncertainties are reported at the 1-sigma level, and include only measurement errors.
8. Systematic errors are as follows (at 2-sigma level): [T1135: 1.0% (206Pb/238U) & 0.8% (206Pb/207Pb)], [T978: 0.9 (206Pb/238U) & 0.8% (206Pb/207Pb)], [T958: 0.8% (206Pb/238U) & 0.8% (206Pb/207Pb)], [CAR: 0.9% (206Pb/238U) & 0.9% (206Pb/207Pb)], [T693: 0.9% (206Pb/238U) & 0.8% (206Pb/207Pb)], [DR584: 1.0% (206Pb/238U) & 0.8% (206Pb/207Pb)], [DR585: 0.9% (206Pb/238U) & 0.8% (206Pb/207Pb)], [DR591: 1.0% (206Pb/238U) & 0.8% (206Pb/207Pb)], [MLB: 0.9% (206Pb/238U) & 0.8% (206Pb/207Pb)].
9. Analyses conducted by LA-MC-ICPMS, as described by Gehrels et al. (2008).
10. U concentration and U/Th are calibrated relative to Sri Lanka zircon standard and are accurate to ~20%.
11. Common Pb correction is from measured 204Pb with common Pb composition interpreted from Stacey and Kramers (1975).
12. Common Pb composition assigned uncertainties of 1.5 for 206Pb/204Pb, 0.3 for 207Pb/204Pb, and 2.0 for 208Pb/204Pb.
13. U/Pb and 206Pb/207Pb fractionation is calibrated relative to fragments of a large Sri Lanka zircon of 563.5 ± 3.2 Ma (2-sigma).
14. U decay constants and composition as follows: 235U = 9.8485 x 10-10, 238U = 1.55125 x 10-10, 238U/235U = 137.88.

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