Appendix A
Geochronology plots and tables

For:
Compiled bedrock geologic map of the North Carolina portion of the Laurinburg 30' x 60' Quadrangle (Laurinburg 100K), North Carolina

Geochronology data reduction and interpretation by Adam C. Curry

Sample

Zircons were analyzed from NCGS sample : Lau100K-550109 to determine maximum depositional ages (MDAs).

Table 1 with analyses are attached.

Methodology

Analyses of zircon for U-Pb geochronology were conducted using laser ablation inductively-coupled plasma mass spectrometry (LA-ICP-MS) at the Arizona LaserChron Center according to methods described in several publications (G. E. Gehrels et al., 2008; G. Gehrels & Pecha, 2014; Horstwood et al., 2016; Pullen et al., 2018; Sundell et al., 2021). Zircon U-Pb isotope data were reduced using IsoplotR to calculate a weighted mean age, assess degree of concordance, and estimate maximum depositional age (MDA; Vermeesch, 2018, 2021a, 2021b). We used the Concordia distance filter (d_c) of Vermeesch (2021a) to filter data for degree of concordance, discarding values outside of the range $-2 < d_c < 4.6$, in addition to visual assessment of concordance, discarding any analyses not touching Concordia. Zircon U-Pb analyses were also excluded in cases where Pb loss was apparent (too young ages) or U/Th ratios were anomalous. Igneous crystallization ages reported here are zircon $^{238}U/^{206}Pb$ weighted mean ages, with errors reported at a 95% confidence interval. Outliers were not included in the weighted mean ages, using Chauvenet's Criterion in IsoplotR. Estimations of MDAs for detrital zircon ages are based on the Maximum Likelihood Aga (MLA) developed by Galbraith and Laslett (1993) for fission track thermochronology and extended to zircon U-Pb detrital zircon geochronology by Vermeesch (2021b).

References

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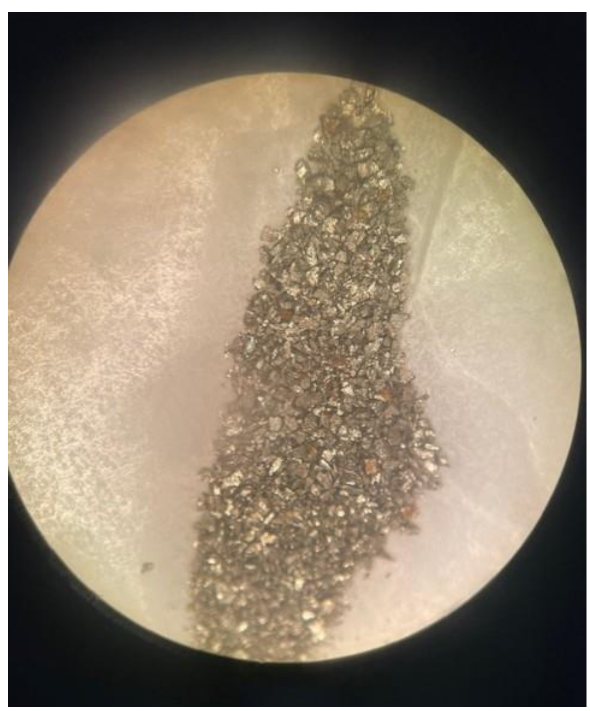
The detrital zircon results for NCGS sample Laur100K-550109 are problematic. Arizona LaserChron Center reported that after heavy liquids and Frantz magnetic separations that there were no visible zircon grains (Photograph 3 and 4). The sample contained only abundant sulfides (pyrite?). The sample was acid washed to determine if zircons were present within the sulfides. Seven (7) zircons were recovered with 10 spot analyses provided. Of the 10 analyses, 5 were between ca. 402 to 498 Ma, 1 analysis was ca. 510 Ma, and 4 analyses were older than 1 Ga. These results are not easily explained and may indicate the sample is highly altered.

Photograph 1: Outcrop sampling of Laur100K-550109

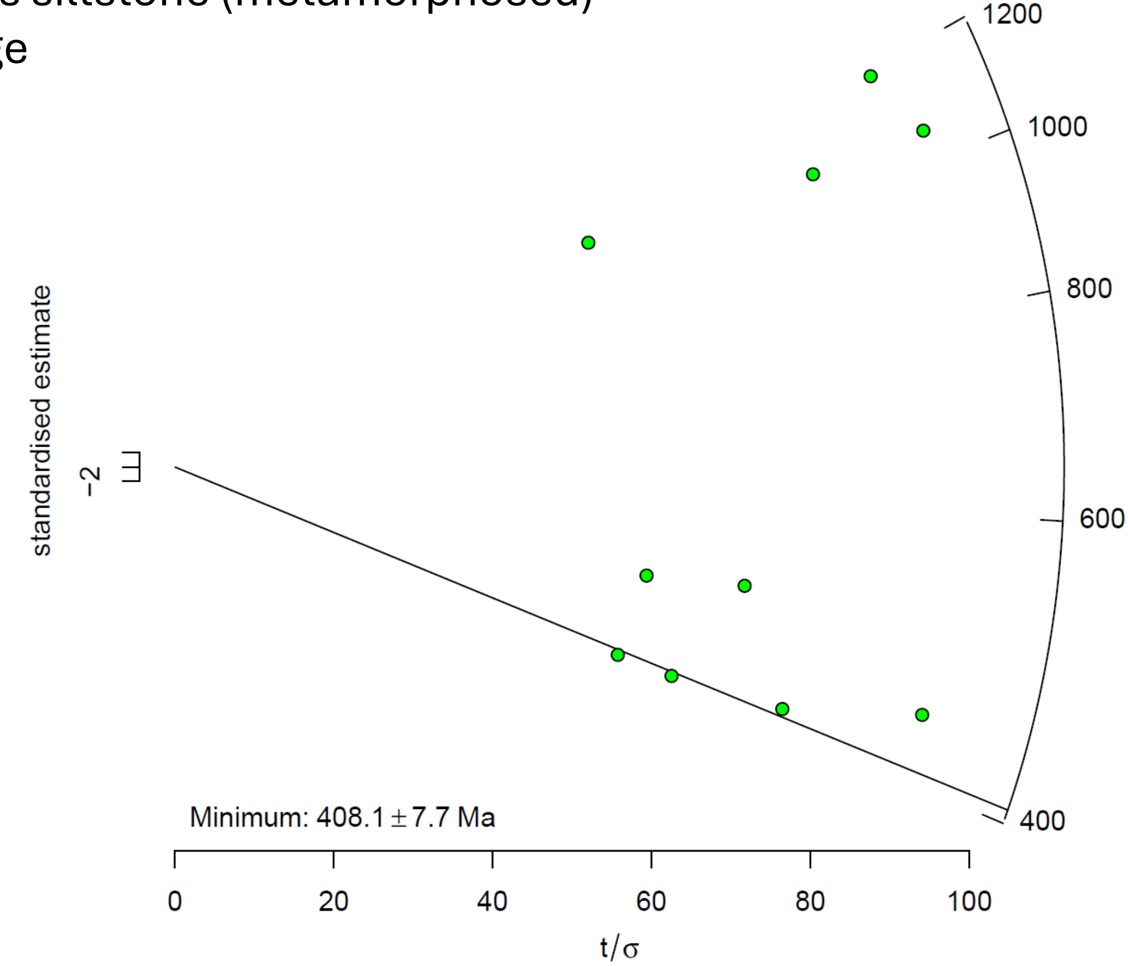
Photograph 2: Close-up of rock chips for Laur100K-550109

Photograph 3: Sulfides after heavy liquids and Frantz magnetic separations for Laur100K-550109. Photograph provided by Arizona LaserChron Center



Photograph 4: Close-up of sulfides after heavy liquids and Frantz magnetic separations for Laur100K-550109. Photograph provided by Arizona LaserChron Center

NCGS Station Laur100K-550109
Tuffaceous siltstone (metamorphosed)
Detrital age



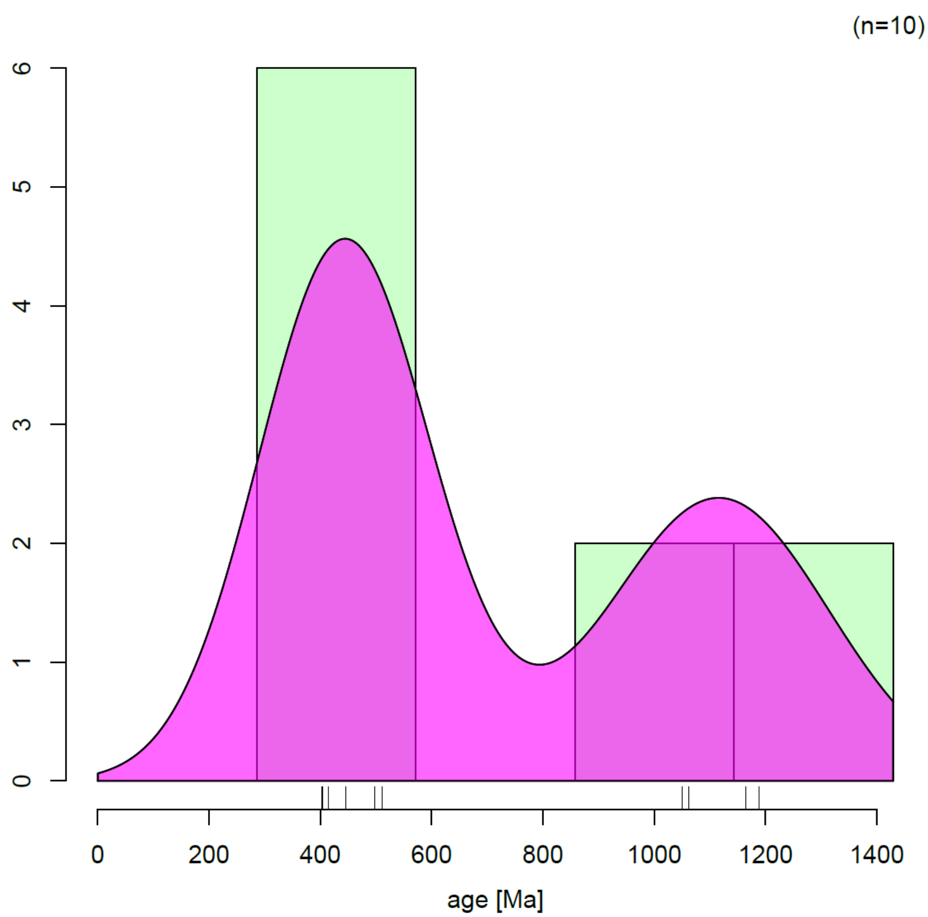


Table 1. LA-ICP-MS U-Pb zircon data for Laur100k_550109

	Composition		Isotopic Ratios									Ages (Ma)					
ID	U (ppm)	Th/U	^{206}Pb/^{204}Pb[a]	^{206}Pb/^{207}Pb	Error (%)	^{207}Pb/^{235}U	Error (%)	^{206}Pb/^{238}U	Error (%)	error correlation	concordia distance (d_c)[a]	^{206}Pb/^{238}U	Error (Ma)	^{207}Pb/^{235}U	Error (Ma)	^{206}Pb/^{207}Pb	Error (Ma)
Sample Laur100k 550109																	
NEW Grain 1 C	204	1.18	177797	17.9099	3.8	0.49609	5.3	0.064468	3.7	0.691	1.4	402.7	14.3	409.1	17.8	444.8	85.1
NEW Grain 2	236	0.27	241185	17.6929	3.6	0.55767	4.2	0.071593	2.2	0.518	0.92	445.7	9.4	450	15.4	471.8	80
NEW Grain 4 SPOT 1	161	1.19	328423	12.7293	2.7	2.19242	3.7	0.202499	2.5	0.68	-0.81	1188.7	27.6	1178.6	26.1	1160.1	54.4
NEW Grain 4 SPOT 2	114	1.19	358922	12.6874	3	2.15007	5.2	0.197933	4.2	0.812	0.069	1164.2	45	1165.1	36.1	1166.7	60.1
NEW Grain 5 SPOT 1	333	0.31	317279	13.48	2.2	1.83034	3.5	0.179025	2.7	0.765	-0.43	1061.6	26.1	1056.4	22.9	1045.6	45.2
NEW Grain 5 SPOT 2	310	0.33	225814	13.4043	2.6	1.82035	3.5	0.177048	2.3	0.654	0.19	1050.8	22.2	1052.8	22.9	1056.9	53.3
NEW Grain 6 R1	519	0.61	917108	17.1906	2.5	0.66047	3.9	0.082383	2.9	0.757	0.8	510.3	14.4	514.9	15.7	535.2	55.3
NEW Grain 6 R2	294	0.61	71777	17.6244	4.4	0.62848	5.6	0.08037	3.5	0.618	-0.6	498.3	16.8	495.1	22.1	480.4	98.2
NEW Grain 7 C	299	0.81	90632	18.115	2.7	0.49237	4.3	0.064718	3.3	0.777	0.49	404.3	13.1	406.5	14.4	419.4	60.4
NEW Grain 7 R	228	0.49	258709	18.5224	3.2	0.49383	4.2	0.066369	2.7	0.645	-1.5	414.2	10.9	407.5	14.1	369.5	72.2

Notes:

[a]Concordia distance (d_c) was calculated using IsoplotR (Vermeesch, 2018), and we discarded analyses outside of the range $-2 < d_c < 4.6$ (Vermeesch, 2021).