Table S1. LA-ICP-MS U-Pb isotopic data of zircon of the Qianlishan complex.

Spot	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$	1	$^{207}Pb/^{235}U$	1	$^{206}Pb/^{238}U$	1	ϱ	$^{207}Pb/^{235}U$ (Age /Ma)	$^{206}Pb/^{238}U$ (Age /Ma)
Porphyritic granite: 20 spots (without 2, 5, 8, 12, 13, 21, 22, and 23) weighted mean ages of 158.9 ± 1.1 Ma, MSWD = 0.45.												
SZY1-1	224	345	0.65	0.0486	0.0019	0.1688	0.0073	0.0251	0.0004	0.38	158.4 ± 6.4	160.1 ± 2.6
SZY1-2	485	2081	0.23	0.0593	0.0013	0.2133	0.0057	0.0262	0.0005	0.72	196.3 ± 4.8	166.5 ± 3.2
SZY1-3	275	499	0.55	0.0476	0.0015	0.1641	0.0063	0.025	0.0005	0.53	154.3 ± 5.5	159.4 ± 3.2
SZY1-4	387	1288	0.3	0.0516	0.0015	0.1722	0.0044	0.0244	0.0004	0.70	161.3 ± 3.8	155.1 ± 2.8
SZY1-5	97	196	0.49	0.0443	0.0027	0.1529	0.01	0.025	0.0004	0.27	144.5 ± 8.8	159.3 ± 2.8
SZY1-6	1265	2038	0.62	0.0512	0.0011	0.1798	0.0059	0.0254	0.0006	0.69	167.9 ± 5.0	161.6 ± 3.6
SZY1-7	504	1405	0.36	0.0485	0.001	0.1644	0.0041	0.0246	0.0003	0.54	154.5 ± 3.6	156.4 ± 2.1
SZY1-8	206	339	0.61	0.0638	0.003	0.2148	0.0117	0.0243	0.0006	0.42	197.6 ± 9.8	154.6 ± 3.5
SZY1-9	311	676	0.46	0.0486	0.0015	0.1673	0.0061	0.0248	0.0004	0.44	157.1 ± 5.3	158.2 ± 2.5
SZY1-10	727	2353	0.31	0.0499	0.0009	0.1738	0.0047	0.0252	0.0005	0.68	162.7 ± 4.1	160.6 ± 2.9
SZY1-11	697	1790	0.39	0.052	0.001	0.1838	0.0047	0.0256	0.0004	0.58	171.3 ± 4.1	162.7 ± 2.4
SZY1-12	563	684	0.82	0.0582	0.0025	0.1754	0.0088	0.0218	0.0005	0.41	164.1 ± 7.6	139.0 ± 2.9
SZY1-13	72	173	0.41	0.0606	0.0015	0.8813	0.026	0.1061	0.0023	0.72	641.7 ± 14.0	650.1 ± 13.2
SZY1-14	327	652	0.5	0.0487	0.0016	0.1656	0.0052	0.0249	0.0004	0.50	155.6 ± 4.5	158.7 ± 2.4
SZY1-15	417	1561	0.27	0.0505	0.0011	0.1726	0.0045	0.0247	0.0003	0.54	161.7 ± 3.9	157.5 ± 2.2
SZY1-16	187	366	0.51	0.0466	0.0019	0.1588	0.0068	0.0249	0.0004	0.39	149.6 ± 6.0	158.7 ± 2.6
SZY1-17	114	204	0.56	0.0465	0.0027	0.162	0.0103	0.0252	0.0005	0.30	152.5 ± 9.0	160.5 ± 3.0
SZY1-18	245	454	0.54	0.0496	0.0017	0.1687	0.006	0.0248	0.0004	0.43	158.3 ± 5.2	157.7 ± 2.4
SZY1-19	232	579	0.4	0.0496	0.0019	0.1705	0.007	0.0249	0.0005	0.45	159.6 ± 6.1	158.8 ± 2.9
SZY1-20	508	1213	0.42	0.0507	0.0015	0.1739	0.0051	0.025	0.0003	0.40	162.8 ± 4.4	159.0 ± 1.8
SZY1-21	97	234	0.41	0.0549	0.0041	0.1644	0.0121	0.0219	0.0005	0.30	154.6 ± 10.6	139.4 ± 3.0
SZY1-22	87	176	0.49	0.049	0.0023	0.3111	0.0146	0.0465	0.0009	0.41	275.0 ± 11.3	293.0 ± 5.6
SZY1-23	92	136	0.68	0.0654	0.0033	0.367	0.0176	0.0414	0.0009	0.43	371.4 ± 13.1	261.8 ± 5.3
SZY1-24	287	620	0.46	0.0498	0.0015	0.1713	0.0054	0.025	0.0004	0.47	160.5 ± 4.7	159.5 ± 2.4
SZY1-25	308	856	0.36	0.0503	0.0014	0.1757	0.0061	0.0252	0.0005	0.53	164.3 ± 5.3	160.5 ± 2.9

SZY1-26	136	204	0.67	0.0533	0.0028	0.1841	0.01	0.0251	0.0006	0.41	171.6 ± 8.6	159.8 ± 3.5
SZY1-27	535	978	0.55	0.0497	0.0011	0.1702	0.0045	0.0248	0.0004	0.54	159.6 ± 3.9	158.2 ± 2.3
SZY1-28	335	714	0.47	0.049	0.0015	0.1677	0.0056	0.0249	0.0004	0.44	157.4 ± 4.9	158.5 ± 2.3
Equigranular granite: 15 spots (without 9, 10, 11, 13, 15, and 20) weighted mean ages of 157.8 ± 1.4 Ma, MSWD = 0.77.												
SZY4-1	95	178	0.53	0.0464	0.0028	0.1541	0.0087	0.0246	0.0004	0.31	145.5 ± 7.7	156.4 ± 2.7
SZY4-2	115	233	0.49	0.0525	0.0026	0.1787	0.0092	0.0248	0.0005	0.36	166.9 ± 7.9	157.9 ± 2.9
SZY4-3	92	225	0.41	0.05	0.0029	0.172	0.0103	0.0255	0.0006	0.37	161.1 ± 8.9	162.3 ± 3.5
SZY4-4	97	213	0.46	0.0469	0.0028	0.1575	0.0098	0.0245	0.0004	0.29	148.5 ± 8.6	156.1 ± 2.8
SZY4-5	336	825	0.41	0.0482	0.0015	0.1692	0.0062	0.0256	0.0006	0.59	158.7 ± 5.4	163.2 ± 3.5
SZY4-6	176	400	0.44	0.0475	0.0025	0.1638	0.0099	0.025	0.0007	0.45	154.0 ± 8.7	159.3 ± 4.3
SZY4-7	242	525	0.46	0.0533	0.0021	0.185	0.0074	0.0253	0.0004	0.42	172.3 ± 6.3	161.1 ± 2.7
SZY4-8	153	287	0.53	0.0498	0.0031	0.1726	0.0105	0.0254	0.0004	0.28	161.7 ± 9.1	161.5 ± 2.8
SZY4-9	539	402	1.34	0.1346	0.0022	3.5462	0.0665	0.1912	0.0025	0.69	1537.6 ± 14.8	1127.7 ± 13.4
SZY4-10	1428	4193	0.34	0.0561	0.0018	0.1766	0.0056	0.0229	0.0004	0.55	165.1 ± 4.8	146.0 ± 2.5
SZY4-11	128	273	0.47	0.046	0.0051	0.1348	0.0156	0.0212	0.0005	0.20	128.4 ± 13.9	135.4 ± 3.1
SZY4-12	117	220	0.53	0.0494	0.0044	0.1662	0.0143	0.0247	0.0006	0.29	156.1 ± 12.5	157.5 ± 3.9
SZY4-13	2534	4133	0.61	0.0882	0.0033	0	0	0	0	0.00	0.0 ± 0.0	0.0 ± 0.0
SZY4-14	361	864	0.42	0.0514	0.0016	0.1736	0.0059	0.0244	0.0003	0.41	162.6 ± 5.1	155.6 ± 2.1
SZY4-15	114	313	0.36	0.0715	0.004	0.2604	0.0143	0.0267	0.0005	0.32	235.0 ± 11.5	169.9 ± 2.9
SZY4-16	270	509	0.53	0.0501	0.0024	0.1713	0.0084	0.0248	0.0004	0.30	160.5 ± 7.3	158.0 ± 2.3
SZY4-17	104	214	0.49	0.0462	0.0026	0.1565	0.0094	0.0246	0.0005	0.34	147.7 ± 8.2	157.0 ± 3.1
SZY4-18	272	577	0.47	0.0502	0.0025	0.168	0.0086	0.0244	0.0004	0.29	157.7 ± 7.5	155.4 ± 2.3
SZY4-19	600	1188	0.51	0.0488	0.0014	0.1666	0.0059	0.0246	0.0004	0.46	156.5 ± 5.1	156.7 ± 2.6
SZY4-20	356	859	0.41	0.0495	0.0012	0.2521	0.0074	0.037	0.0007	0.63	228.3 ± 6.0	234.3 ± 4.3
SZY4-21	266	584	0.46	0.0505	0.0021	0.1702	0.0071	0.0245	0.0003	0.32	159.6 ± 6.2	156.3 ± 2.1
Granite porphyry: 20 spots (without 3, 15, 16, and 17) weighted mean ages of 144.5 ± 1.0 Ma, MSWD = 0.24.												
SZY6-1	379	870	0.44	0.0505	0.0012	0.1588	0.0044	0.0228	0.0004	0.56	149.6 ± 3.9	145.3 ± 2.2
SZY6-2	127	238	0.54	0.0513	0.0022	0.1585	0.0066	0.0227	0.0004	0.39	149.4 ± 5.7	144.5 ± 2.3
SZY6-3	160	371	0.43	0.0567	0.0019	0.1924	0.0061	0.0249	0.0003	0.44	178.6 ± 5.2	158.3 ± 2.2
SZY6-4	169	400	0.42	0.0482	0.0019	0.1512	0.0058	0.0229	0.0004	0.41	143.0 ± 5.1	145.9 ± 2.3

SZY6-5	256	579	0.44	0.0497	0.0013	0.1564	0.0046	0.0228	0.0003	0.49	147.5 ± 4.0	145.0 ± 2.1
SZY6-6	328	548	0.6	0.0484	0.0015	0.1504	0.0052	0.0225	0.0003	0.41	142.2 ± 4.6	143.3 ± 2.0
SZY6-7	549	1126	0.49	0.0541	0.0012	0.1714	0.0042	0.023	0.0003	0.52	160.7 ± 3.7	146.4 ± 1.9
SZY6-8	986	1773	0.56	0.0498	0.001	0.154	0.0034	0.0224	0.0003	0.57	145.5 ± 3.0	143.1 ± 1.8
SZY6-9	302	721	0.42	0.0474	0.0013	0.1483	0.0047	0.0227	0.0003	0.45	140.4 ± 4.1	144.6 ± 2.0
SZY6-10	367	894	0.41	0.0499	0.0014	0.1561	0.0046	0.023	0.0006	0.90	147.3 ± 4.0	146.6 ± 3.8
SZY6-11	153	280	0.55	0.0506	0.004	0.157	0.0138	0.0226	0.0007	0.35	148.1 ± 12.1	143.9 ± 4.3
SZY6-12	245	564	0.43	0.0486	0.0018	0.1514	0.0055	0.0228	0.0004	0.48	143.1 ± 4.8	145.3 ± 2.5
SZY6-13	190	430	0.44	0.0539	0.0021	0.1659	0.0063	0.0226	0.0005	0.53	155.9 ± 5.5	144.2 ± 2.9
SZY6-14	355	857	0.41	0.0468	0.0012	0.1473	0.0045	0.0229	0.0004	0.63	139.5 ± 4.0	145.7 ± 2.8
SZY6-15	101	214	0.47	0.057	0.0016	0.5223	0.0164	0.0663	0.001	0.49	426.7 ± 11.0	414.1 ± 6.1
SZY6-16	143	222	0.65	0.0551	0.0017	0.4916	0.0154	0.065	0.0011	0.54	406.0 ± 10.5	406.1 ± 6.7
SZY6-17	197	438	0.45	0.0496	0.0029	0.1449	0.0073	0.0214	0.0004	0.41	137.4 ± 6.5	136.8 ± 2.8
SZY6-18	279	643	0.43	0.0523	0.0017	0.1624	0.0059	0.0225	0.0003	0.42	152.8 ± 5.1	143.7 ± 2.1
SZY6-19	250	556	0.45	0.0508	0.0018	0.159	0.0064	0.0227	0.0004	0.46	149.9 ± 5.6	144.7 ± 2.6
SZY6-20	121	265	0.46	0.0507	0.0026	0.1573	0.0088	0.0224	0.0005	0.37	148.3 ± 7.7	143.0 ± 2.9
SZY6-21	444	1341	0.33	0.0472	0.0013	0.1462	0.0045	0.0224	0.0003	0.45	138.5 ± 4.0	143.0 ± 1.9
SZY6-22	199	484	0.41	0.0494	0.0014	0.154	0.0049	0.0225	0.0003	0.44	145.5 ± 4.3	143.7 ± 2.0
SZY6-23	270	560	0.48	0.053	0.0017	0.1662	0.0057	0.0228	0.0004	0.47	156.1 ± 4.9	145.2 ± 2.3
SZY6-24	362	1018	0.36	0.0521	0.0012	0.164	0.0043	0.0228	0.0003	0.55	154.2 ± 3.8	145.3 ± 2.1
Mafic dykes: 9 spots (without 2, 3, 5, 6, 7, 11, 12, and 13) weighted mean ages of 157.6 ± 1.8 Ma, MSWD = 0.78.												
SZY9-1	186	320	0.58	0.0519	0.0022	0.1829	0.0084	0.0256	0.0005	0.42	170.6 ± 7.2	162.8 ± 3.1
SZY9-2	233	170	1.38	0.0713	0.0015	1.5915	0.0375	0.1625	0.0022	0.57	966.9 ± 14.7	970.7 ± 12.2
SZY9-3	204	272	0.75	0.0763	0.0035	0.2491	0.0115	0.0239	0.0003	0.37	225.8 ± 9.3	152.1 ± 2.1
SZY9-4	129	226	0.57	0.0614	0.0038	0.2076	0.0131	0.0248	0.0004	0.23	191.5 ± 11.0	157.8 ± 2.2
SZY9-5	122	299	0.41	0.05	0.0033	0.1642	0.0106	0.0242	0.0005	0.99	154.4 ± 9.2	153.9 ± 2.9
SZY9-6	209	426	0.49	0.0521	0.0027	0.1736	0.0104	0.0241	0.0005	0.45	162.5 ± 9.0	153.4 ± 3.3
SZY9-7	221	321	0.69	0.0501	0.0021	0.1849	0.0076	0.027	0.0004	0.29	172.2 ± 6.5	171.7 ± 2.7
SZY9-8	204	272	0.75	0.0498	0.0026	0.1668	0.0083	0.0246	0.0005	0.37	156.6 ± 7.2	156.7 ± 2.9
SZY9-9	221	428	0.52	0.0482	0.0022	0.1601	0.0076	0.0242	0.0004	0.33	150.8 ± 6.6	154.2 ± 2.4
SZY9-10	125	243	0.51	0.0489	0.0023	0.1671	0.0088	0.0248	0.0004	0.31	156.9 ± 7.7	157.7 ± 2.5

SZY9-11	905	665	1.36	0.2212	0.0837	4.2706	1.5137	0.0772	0.0207	0.56	1687.7 ± 300.0	1162.3 ± 451.9
SZY9-12	1696	1811	0.94	0.0518	0.0016	0.1624	0.0067	0.0225	0.0004	0.54	152.8 ± 5.8	143.3 ± 2.3
SZY9-13	158	202	0.78	0.0962	0.0086	2.2756	0.6051	0.1357	0.0348	0.55	1204.8 ± 189.7	820.3 ± 197.7
SZY9-14	282	287	0.98	0.0539	0.0028	0.1811	0.0094	0.0245	0.0004	0.30	169.0 ± 8.1	155.9 ± 2.4
SZY9-15	100	137	0.72	0.0528	0.0034	0.1759	0.0108	0.0248	0.0005	0.33	164.5 ± 9.3	157.7 ± 3.1
SZY9-16	131	242	0.54	0.05	0.0026	0.169	0.0082	0.0251	0.0005	0.42	158.6 ± 7.1	159.6 ± 3.2
SZY9-17	233	351	0.66	0.052	0.0021	0.1788	0.0074	0.0251	0.0005	0.47	167.0 ± 6.4	159.8 ± 3.1

Note: Common lead was corrected using ^{204}Pb.

Table S2. Hf isotopic data of zircons seperated from the Qianlishan complex.

Sample No.	Rock type	t (Ma)	$^{177}Lu/^{176}Hf$	$^{176}Hf/^{177}Hf$		$\varepsilon_{Hf}(t)$	T_{DM1} (Ma)	T_{DM2} (Ma)	$f_{Lu/Hf}$
SZY1-1	PG	159	0.000860	0.282481	0.000025	−7.5	1087	1647	−0.97
SZY1-3	PG	159	0.001085	0.282559	0.000024	−4.7	982	1472	−0.97
SZY1-4	PG	159	0.002224	0.282551	0.000030	−5.1	1025	1498	−0.93
SZY1-6	PG	159	0.003277	0.282593	0.000035	−3.7	993	1411	−0.90
SZY1-7	PG	159	0.001076	0.282503	0.000022	−6.7	1061	1598	−0.97
SZY1-9	PG	159	0.001096	0.282511	0.000022	−6.4	1051	1582	−0.97
SZY1-10	PG	159	0.002588	0.282713	0.000028	0.6	797	1136	−0.92
SZY1-11	PG	159	0.001204	0.282567	0.000023	−4.4	974	1455	−0.96
SZY1-14	PG	159	0.001689	0.282545	0.000026	−5.3	1019	1509	−0.95
SZY1-15	PG	159	0.002275	0.282521	0.000029	−6.2	1070	1565	−0.93
SZY1-16	PG	159	0.000886	0.282504	0.000023	−6.6	1054	1594	−0.97
SZY1-17	PG	159	0.000987	0.282457	0.000027	−8.3	1124	1701	−0.97
SZY1-18	PG	159	0.000731	0.282568	0.000024	−4.4	961	1450	−0.98
SZY1-19	PG	159	0.003445	0.282682	0.000033	−0.6	863	1211	−0.90
SZY1-20	PG	159	0.002985	0.282632	0.000026	−2.3	927	1322	−0.91
SZY1-24	PG	159	0.001603	0.282568	0.000031	−4.5	983	1455	−0.95
SZY1-25	PG	159	0.002367	0.282703	0.000035	0.2	807	1157	−0.93
SZY1-26	PG	159	0.001713	0.282549	0.000028	−5.2	1014	1500	−0.95
SZY1-27	PG	159	0.002149	0.282714	0.000034	0.7	786	1131	−0.94
SZY1-28	PG	159	0.001074	0.282526	0.000020	−5.9	1029	1546	−0.97
SZY4-1	EG	158	0.000633	0.282587	0.000025	−3.7	933	1409	−0.98
SZY4-2	EG	158	0.000733	0.282579	0.000020	−4.0	946	1427	−0.98
SZY4-3	EG	158	0.000611	0.282563	0.000019	−4.5	965	1460	−0.98
SZY4-4	EG	158	0.000755	0.282586	0.000018	−3.7	936	1410	−0.98
SZY4-5	EG	158	0.000594	0.282568	0.000020	−4.4	958	1450	−0.98
SZY4-7	EG	158	0.001526	0.282639	0.000029	−1.9	881	1297	−0.95
SZY4-8	EG	158	0.000700	0.282484	0.000021	−7.4	1078	1640	−0.98
SZY4-12	EG	158	0.000706	0.282603	0.000021	−3.1	912	1372	−0.98
SZY4-16	EG	158	0.000771	0.282578	0.000023	−4.0	949	1429	−0.98
SZY4-17	EG	158	0.000576	0.282562	0.000024	−4.6	966	1463	−0.98
SZY4-19	EG	158	0.001779	0.282677	0.000027	−0.6	831	1211	−0.95
SZY4-21	EG	158	0.001350	0.282686	0.000025	−0.3	809	1189	−0.96

SZY6-1	GP	145	0.000703	0.282573	0.000022	−4.2	953	1448	−0.98
SZY6-2	GP	145	0.000720	0.282538	0.000023	−5.5	1003	1527	−0.98
SZY6-4	GP	145	0.000801	0.282514	0.000024	−6.3	1039	1581	−0.98
SZY6-5	GP	145	0.000790	0.282547	0.000023	−5.1	992	1507	−0.98
SZY6-6	GP	145	0.001190	0.282772	0.000023	2.8	684	1003	−0.96
SZY6-7	GP	145	0.002195	0.282805	0.000028	3.9	654	933	−0.93
SZY6-8	GP	145	0.001358	0.282730	0.000020	1.3	747	1098	−0.96
SZY6-9	GP	145	0.000674	0.282617	0.000020	−2.7	892	1349	−0.98
SZY6-10	GP	145	0.000856	0.282580	0.000020	−4.0	947	1432	−0.97
SZY6-11	GP	145	0.000646	0.282597	0.000025	−3.3	918	1393	−0.98
SZY6-12	GP	145	0.000666	0.282580	0.000021	−3.9	942	1431	−0.98
SZY6-13	GP	145	0.000751	0.282541	0.000019	−5.3	999	1520	−0.98
SZY6-14.	GP	145	0.000887	0.282560	0.000019	−4.7	976	1478	−0.97
SZY6-18	GP	145	0.000921	0.282623	0.000032	−2.4	888	1336	−0.97
SZY6-19	GP	145	0.000754	0.282597	0.000024	−3.4	921	1394	−0.98
SZY6-20	GP	145	0.000555	0.282651	0.000022	−1.4	841	1271	−0.98
SZY6-21	GP	145	0.001010	0.282652	0.000026	−1.4	849	1271	−0.97
SZY6-22	GP	145	0.000704	0.282543	0.000023	−5.3	996	1516	−0.98
SZY6-23	GP	145	0.000891	0.282551	0.000023	−5.0	989	1498	−0.97
SZY6-24	GP	145	0.000940	0.282514	0.000020	−6.3	1043	1582	−0.97
SZY9-1	MD	158	0.001177	0.282615	0.000028	2.8	906	1348	−0.96
SZY9-4	MD	158	0.000927	0.282602	0.000024	−3.2	918	1375	−0.97
SZY9-8	MD	158	0.001965	0.282612	0.000039	2.9	929	1359	−0.94
SZY9-9	MD	158	0.000764	0.282572	0.000023	−4.2	956	1442	−0.98
SZY9-10	MD	158	0.000601	0.282568	0.000023	−4.4	958	1450	−0.98
SZY9-14	MD	158	0.002529	0.282597	0.000040	3.5	967	1397	−0.92
SZY9-16	MD	158	0.001063	0.282554	0.000022	3.9	990	1485	−0.97
SZY9-24	MD	158	0.002196	0.282818	0.000035	4.3	636	898	−0.93

Note: PG = porphyritic granite; EG = equigranular granite; GP = granite porphyry; MD = mafic dykes. $\varepsilon_{Hf}(0) = (((^{176}Hf/^{177}Hf)_S/(^{176}Hf/^{177}Hf)_{CHUR,0}-1) \times 10000$; $f_{Lu/Hf} = (^{176}Lu/^{177}Hf)_S/(^{176}Lu/^{177}Hf)_{CHUR}-1$; $\varepsilon_{Hf}(t) = (((^{176}Hf/^{177}Hf)_S-(^{176}Lu/^{177}Hf)_S \times (e^{lt}-1))/((^{176}Hf/^{177}Hf)_{CHUR,0}-(^{176}Lu/^{177}Hf)_{CHUR}*(e^{lt}-1))-1) \times 10000$; $T_{DM1}(Hf) = 1/l \times (1 + ((^{176}Hf/^{177}Hf)_S-(^{176}Hf/^{177}Hf)_{DM})/((^{176}Lu/^{177}Hf)_S-(^{176}Lu/^{177}Hf)_{DM}))$; $T_{DM2}(Hf) = T_{DM1}(Hf)-(T_{DM1}(Hf)-t)((f_{CC}-f_S)/(f_{CC}-f_{DM}))$ where, $(^{176}Lu/^{177}Hf)_S$ and $(^{176}Hf/^{177}Hf)_S$ are the measured values of samples; $(^{176}Lu/^{177}Hf)_{CHUR} = 0.0332$ and $(^{176}Hf/^{177}Hf)_{CHUR,0} = 0.282772$; $(^{176}Lu/^{177}Hf)_{DM} = 0.0384$ and $(^{176}Hf/^{177}Hf)_{DM} = 0.28325$; $f_{CC} = -0.548$ (average continental crust), $f_{DM} = 0.16$, t = crystallization time of zircon, $l = 1.865 \times 10^{-11}$ yr^{-1} are used in calculation [1].

Table S3. Major and trace elements of the Qianlishan complex.

Sample No.	SZY-1	SZY-2	SZY-3	SZY-4	SZY-5	SZY-6	SZY-7	SZY-8	SZY-9	SZY-10	SZY-11
Rock type	PG	PG	PG	EG	EG	GP	GP	GP	MD	MD	MD
major elements (wt.%)											
SiO_2	75.63	75.13	72.16	75.45	74.67	74.01	74.12	69.29	54.61	51.62	51.05
TiO_2	0.08	0.16	0.02	0.00	0.01	0.32	0.25	0.22	0.90	0.80	0.78
Al_2O_3	12.81	12.89	13.75	13.70	14.44	12.16	11.05	11.99	12.38	12.83	13.08
Fe_2O_3	0.55	0.69	0.20	0.01	1.60	2.29	1.43	3.27	7.07	7.80	7.96
MgO	0.09	0.11	0.32	0.01	0.02	0.36	0.53	1.50	8.28	9.07	9.13
MnO	0.01	0.02	0.04	0.00	0.08	0.03	0.08	0.16	0.28	0.17	0.18
CaO	1.05	0.72	1.12	0.49	0.72	1.26	2.81	3.84	8.19	9.64	9.30
K_2O	5.68	5.80	6.41	4.85	3.33	4.99	5.61	4.19	3.61	3.34	3.48
Na_2O	3.02	2.88	2.42	4.26	3.42	2.54	0.07	0.40	2.57	2.15	2.40
P_2O_5	0.02	0.05	0.02	0.02	0.03	0.09	0.07	0.12	0.49	0.52	0.52
LOI	0.84	1.03	2.70	0.61	1.30	1.56	3.45	4.80	1.32	1.81	1.81
Total	99.78	99.49	99.15	99.40	99.62	99.62	99.48	99.78	99.71	99.65	99.59
trace elements (ppm)											
Li	4.92	166	14.2	5.97	628	48.7	24.5	71.0	113	145	134
Be	24.4	7.19	17.9	11.7	18.2	6.59	4.54	10.3	6.45	8.89	10.2
Sc	2.51	0.82	3.82	0.35	0.99	4.61	4.27	6.85	21.9	31.70	35.5
Ti	410	47.2	70.6	25.4	25.3	1856	1407	1214	5343	5316	5260
V	1.74	0.36	0.59	0.26	0.29	20.2	11.8	26.5	158	154	166
Cr	1.97	1.47	1.18	1.62	8.10	7.55	2.25	87.8	573	527	791
Mn	119	182	355	19.8	611	547	709	1276	2424	1989	2012
Co	0.36	0.07	0.06	0.05	0.24	3.41	0.89	6.07	26.6	43.6	43.2
Ni	1.01	0.54	0.43	0.74	3.41	2.66	0.98	50.3	225	1148	210
Cu	9.10	1.53	2.33	1.42	77.2	3.64	1.46	2.63	4.32	36.6	15.9
Zn	11.2	11.2	7.15	6.90	127	44.0	17.8	82.4	132	90.2	149
Ga	14.8	19.9	22.5	20.9	25.5	25.1	23.3	20.1	18.3	15.8	16.3
As	1.80	1.84	2.65	1.85	167	4.39	5.50	4.62	11.8	8.98	10.5

Se	0.97	1.67	2.84	1.86	1.22	1.72	1.53	1.86	1.74	1.65	1.75
Rb	800	1065	1009	987	1095	381	707	713	451	316	394
Sr	22.3	6.99	123	11.8	12.2	85.0	40.0	93.4	383	270	306
Y	47.8	48.1	102	34.2	49.5	41.7	38.9	85.1	28.7	22.6	20.6
Zr	94.9	57.0	41.3	50.7	56.9	224	183	155	214	140	143
Nb	74.9	19.7	41.4	17.5	29.7	20.7	20.1	21.0	20.3	22.8	13.5
Mo	5.69	8.30	81.2	1.54	1.12	3.31	1.27	2.96	2.20	1.97	1.71
W	13.7	13.5	13.4	24.0	18.2	4.46	5.67	4.89	1.63	7.45	3.45
Sn	24.9	20.8	16.6	11.8	13.6	7.01	5.14	5.68	25.8	60.2	32.2
Cs	18.8	28.8	24.3	7.31	66.9	20.0	21.0	20.0	11.7	16.4	13.3
Ba	26.5	1.50	247	1.58	1.26	320	187	180	526	873	992
La	11.4	10.6	24.7	16.0	18.7	87.1	59.2	33.9	41.3	45.6	48.3
Ce	34.0	37.7	62.6	65.1	62.0	167	116	74.0	88.3	83.2	95.9
Pr	3.16	3.89	8.54	6.98	6.64	17.36	12.50	8.96	11.09	10.00	11.27
Nd	13.0	16.7	35.2	28.5	24.6	59.2	43.7	35.1	46.8	41.8	48.1
Sm	4.64	7.12	13.2	10.8	8.68	10.1	8.20	9.18	10.3	8.16	10.0
Eu	0.10	0.01	0.27	0.01	0.01	0.88	0.59	0.64	2.56	2.26	3.03
Gd	5.44	7.28	13.4	9.12	7.55	8.09	6.80	9.72	9.27	7.81	11.4
Tb	1.11	1.38	2.49	1.74	1.39	1.24	1.06	1.72	1.32	1.23	1.46
Dy	7.95	9.00	16.5	10.6	9.05	7.16	6.43	11.6	7.24	6.25	6.90
Ho	1.67	1.71	3.20	1.82	1.70	1.41	1.30	2.45	1.32	1.08	1.26
Er	5.29	5.02	9.86	5.24	5.26	4.07	3.89	7.58	3.56	3.25	3.10
Tm	0.95	0.88	1.80	0.95	0.98	0.61	0.61	1.27	0.50	0.42	0.45
Yb	6.74	6.12	13.1	6.83	7.14	3.88	3.99	8.53	3.16	3.88	2.61
Lu	1.05	0.90	2.01	1.01	1.07	0.58	0.60	1.30	0.47	0.33	0.41
Hf	4.73	4.31	2.70	4.99	7.12	6.56	5.67	5.59	5.41	4.03	3.94
Ta	19.4	6.84	28.4	18.3	28.9	2.50	2.70	7.50	1.08	0.88	0.69
Pb	49.4	33.2	56.4	63.4	48.6	39.7	7.67	24.2	15.8	14.1	31.1
Th	34.7	10.3	13.8	13.3	14.1	62.0	54.6	44.7	15.5	14.5	13.4
U	43.0	22.4	17.6	22.9	19.1	15.5	16.1	27.2	0.45	0.38	0.42
A/NK	1.47	1.49	1.56	1.50	2.14	1.61	1.95	2.61	2.00	2.34	2.22

A/CNK	1.31	1.37	1.38	1.43	1.93	1.38	1.30	1.42	0.86	0.85	0.86
$(La/Yb)_N$	1.25	1.21	1.36	1.67	1.87	16.10	10.64	2.85	9.37	8.43	13.28
Rb/Sr	35.84	152.47	8.24	84.05	90.16	4.49	17.84	7.63	1.18	1.17	1.29
Zr/Hf	20.07	13.23	15.30	10.15	8.00	34.16	32.16	27.78	39.61	34.71	36.31
Zr/Nb	1.27	2.89	1.00	2.90	1.92	10.81	9.07	7.38	10.54	6.14	10.60
Nb/Ta	3.87	2.88	1.46	0.96	1.03	8.29	7.46	2.80	18.81	25.88	19.57
Mg#	23.45	24.16	76.14	58.94	1.50	23.56	42.35	47.51	69.85	69.72	69.43

Note: PG = porphyritic granite; EG = equigranular granite; GP = granite porphyry; MD = mafic dykes. Mg# = $Mg^{2+}/(Mg^{2+} + Fe^{2+})$.

Table S4. Whole-rock Nd isotopic data of the Qianlishan complex.

Sample No.	Rock type	Ages (Ma)	Sm (ppm)	Nd (ppm)	$^{143}Nd/^{144}Nd$	$\varepsilon_{Nd}(t)$
SZY1	PG	159	4.64	13.07	0.512305	-7.65
SZY2	PG	159	7.12	16.74	0.512277	-7.34
SZY3	PG	159	13.16	35.19	0.512251	-8.04
SZY4	EG	158	10.80	28.53	0.512304	-7.10
SZY5	EG	158	8.68	24.58	0.512280	-7.26
SZY6	GP	145	10.10	59.22	0.512108	-8.58
SZY7	GP	145	8.20	43.65	0.512136	-8.08
SZY8	GP	145	9.18	35.08	0.512288	-8.09
SZY9	MD	158	10.26	46.81	0.512463	-2.08
SZY10	MD	158	8.16	41.80	0.512323	-1.94
SZY11	MD	158	10.01	48.11	0.512276	0.73

Note: PG = porphyritic granite; EG = equigranular granite; GP = granite porphyry; MD = mafic dykes. $^{147}Sm/^{144}Nd=0.1967$, $^{143}Nd/^{144}Nd=0.512638$, are used for the calculation. εNd(t) is calculated by assuming crystallization age (Ma).

Table S5. Synthesis of the ages of the Qianlishan complex.

No.	Granite type	Ages (Ma)	Dating method	Reference
1	main-phase porphyritic granites	158.9 ± 1.1	LA-ICP-MS U-Pb zircon	this paper
2	main-phase porphyritic granites	157 ± 2	LA-ICP-MS U-Pb zircon	[2]
3	main-phase porphyritic granites	154.5 ± 1.3	SIMS U-Pb zircon	[3]
4	main-phase porphyritic granites	160.3 ± 2.0	LA-ICP-MS U-Pb zircon	[4]
5	main-phase equigranular granites	152.5 ± 1.2	SIMS U-Pb zircon	[3]
6	main-phase equigranular granites	152 ± 2	SHRIMP U-Pb zircon	[5]
7	main-phase equigranular granites	157.8 ± 1.4	LA-ICP-MS U-Pb zircon	this paper
8	main-phase equigranular granites	156.0 ± 1.2	LA-ICP-MS U-Pb zircon	[4]
9	main-phase equigranular granites	158 ± 2	LA-ICP-MS U-Pb zircon	[2]
10	granite porphyry	131 ± 1	Rb-Sr isochron date	[6]
11	granite porphyry	144 ± 3	K-feldspar Ar-Ar plateau date	[7]
12	granite porphyry	154 ± 1	LA-ICP-MS U-Pb zircon	[2]
13	granite porphyry	144.5 ± 1.0	LA-ICP-MS U-Pb zircon	this paper
14	mafic dykes	157.6 ± 1.8	LA-ICP-MS U-Pb zircon	this paper

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