

Table S1. Results of U-Pb dating by of zircons from the Duhongshan granites.

Spot no.	Th/U	Isotopic ratios				Ages (Ma)			
		²⁰⁷ Pb/ ²³⁵ U		²⁰⁶ Pb/ ²³⁸ U		²⁰⁷ Pb/ ²³⁵ U		²⁰⁶ Pb/ ²³⁸ U	
		Ratios	±1σ	Ratios	±1σ	Age	±1σ	Age	±1σ
DHS11-1	1.79	0.40223	0.02298	0.06139	0.00073	343	17	384	4
DHS11-2	1.25	0.41272	0.01321	0.05923	0.00073	351	9	371	4
DHS11-3	0.93	0.43438	0.02565	0.06021	0.00073	366	18	377	4
DHS11-4	0.60	0.49813	0.00648	0.06043	0.00073	410	4	378	4
DHS11-5	0.65	0.48646	0.00913	0.06010	0.00073	402	6	376	4
DHS11-6	0.53	0.41450	0.02939	0.05993	0.00073	352	21	375	4
DHS11-7	0.63	0.49735	0.01044	0.05967	0.00073	410	7	374	4
DHS11-8	0.68	0.48577	0.00696	0.05972	0.00073	402	5	374	4
DHS11-9	1.37	0.47382	0.03384	0.06143	0.00074	394	23	384	4
DHS11-10	0.64	0.40765	0.00843	0.05985	0.00073	347	6	375	4
DHS11-11	0.52	0.50217	0.00714	0.06056	0.00074	413	5	379	4
DHS11-12	0.76	0.41872	0.00977	0.05942	0.00074	355	7	372	5
DHS11-13	1.32	0.49804	0.00996	0.05996	0.00073	410	7	375	4
DHS11-14	0.59	0.48488	0.00674	0.05947	0.00074	401	5	372	5
DHS11-15	0.65	0.39473	0.00690	0.06123	0.00074	338	5	383	4
DSH15-1	0.65	0.48588	0.00923	0.05971	0.00073	402	6	374	4
DSH15-2	0.65	0.39305	0.00636	0.05936	0.00073	337	5	372	4
DSH15-3	0.79	0.40684	0.01040	0.05928	0.00073	347	8	371	4
DSH15-4	0.63	0.41392	0.00874	0.05966	0.00074	352	6	374	5
DSH15-5	0.43	0.41154	0.00647	0.05933	0.00073	350	5	372	4
DSH15-6	0.31	0.49089	0.01654	0.05895	0.00073	406	11	369	4
DSH15-7	0.57	0.44161	0.01472	0.05956	0.00078	371	10	373	5
DSH15-8	0.49	0.43435	0.00674	0.05943	0.00074	366	5	372	5
DSH15-9	0.49	0.38318	0.00601	0.05949	0.00074	329	4	373	5
DSH15-10	0.43	0.38279	0.00628	0.06034	0.00075	329	5	378	5
DSH15-11	0.55	0.39604	0.00741	0.06040	0.00087	339	5	378	5
DSH15-12	0.61	0.43065	0.00820	0.06159	0.00077	364	6	385	5
DSH15-13	0.63	0.45624	0.00829	0.06076	0.00076	382	6	380	5
DSH15-14	0.42	0.44082	0.00637	0.06145	0.00077	371	4	384	5

Table S2. Zircon trace elements (ppm) analysis result of the Duhongshan granites.

Spot no.	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
DHS11-1	49.98	202.82	27.12	165.61	202.94	1.33	564.48	187.49	1730.70	473.19	1769.67	345.53	2929.47	483.27
DHS11-2	8.25	57.74	5.29	29.79	35.67	0.45	137.48	58.69	701.24	238.06	1049.77	214.65	1935.95	356.89
DHS11-3	105.25	298.73	34.29	158.31	102.87	0.66	274.55	116.55	1306.37	420.59	1713.19	379.85	3514.75	594.64
DHS11-4	5.65	47.62	2.22	14.30	22.82	0.13	130.30	59.88	780.92	295.85	1327.16	269.83	2390.90	449.06
DHS11-5	10.28	120.69	9.60	48.24	46.63	0.30	177.34	72.30	875.27	320.22	1402.48	294.97	2695.71	498.05
DHS11-6	6.14	78.63	3.76	23.64	34.94	0.24	179.50	79.89	1039.63	385.96	1709.82	353.22	3216.03	608.80
DHS11-7	3.05	49.13	2.26	17.28	43.04	0.04	150.22	62.44	761.97	277.39	1226.28	260.17	2326.12	430.16
DHS11-8	4.96	73.65	7.37	43.20	29.50	0.16	118.68	49.49	607.05	215.98	965.60	205.49	1879.95	357.46
DHS11-9	22.71	123.91	16.90	95.81	108.59	0.80	306.49	117.53	1307.49	396.43	1645.67	334.80	3070.71	537.30
DHS11-10	1.90	41.95	1.98	11.79	25.26	0.13	118.03	51.81	632.57	228.48	1017.98	212.78	1956.26	376.71
DHS11-11	3.25	61.48	2.83	19.12	31.89	0.17	169.39	72.91	919.35	345.32	1548.89	321.05	2959.79	563.65
DHS11-12	6.54	75.51	5.82	35.50	37.40	0.29	141.88	55.72	671.72	244.78	1055.19	215.11	1927.98	367.74
DHS11-13	8.33	49.10	4.35	21.21	14.64	0.27	53.78	23.61	283.63	109.71	492.23	109.34	1003.51	208.43
DHS11-14	3.41	46.51	2.48	15.89	21.39	0.03	102.03	43.68	552.73	224.55	981.05	207.65	1915.48	379.25
DHS11-15	1.29	40.43	2.02	11.15	26.68	0.07	136.57	57.23	697.15	259.99	1144.48	242.76	2333.77	436.11
DSH15-1	5.55	68.93	4.20	34.16	59.60	0.16	285.01	110.91	1302.72	459.61	1938.21	390.71	3506.95	608.17
DSH15-2	1.29	38.05	0.22	4.96	18.33	0.01	100.37	48.40	600.46	241.11	1111.95	238.00	2010.36	393.78
DSH15-3	6.25	53.34	4.70	24.59	35.17	0.13	140.82	57.11	675.88	240.90	1059.95	221.33	2124.55	375.23
DSH15-4	4.50	62.53	6.47	35.37	41.85	0.22	156.56	67.17	765.17	283.69	1236.07	263.62	2444.13	439.32
DSH15-5	3.10	27.13	2.45	18.14	45.41	0.14	289.38	133.26	1421.47	465.65	1910.85	408.49	3412.28	619.66
DSH15-6	28.06	76.43	12.07	72.63	94.53	0.09	312.63	94.44	995.11	316.94	1376.30	294.66	2920.13	558.79
DSH15-7	0.00	15.01	0.01	0.80	1.73	0.29	14.98	5.81	74.99	31.84	153.51	33.77	343.66	74.18
DSH15-8	2.63	42.32	2.41	8.09	19.12	0.01	91.40	44.78	637.15	254.65	1231.55	287.38	2833.37	539.85
DSH15-9	11.44	62.02	6.22	33.06	32.69	0.09	146.08	61.54	787.42	308.28	1400.78	288.30	2755.94	517.90
DSH15-10	1.38	35.35	0.89	4.45	14.62	0.04	98.30	46.36	597.12	235.36	1067.28	230.71	2189.73	416.83
DSH15-11	1.35	29.66	1.15	10.89	22.01	0.10	139.25	61.72	799.19	320.77	1436.32	294.36	2688.42	509.91
DSH15-12	0.09	17.67	0.09	0.87	3.77	0.31	20.74	8.15	104.57	45.25	214.76	45.91	447.33	93.32
DSH15-13	2.62	35.94	2.02	12.51	20.56	0.04	103.63	49.86	666.96	253.12	1158.91	255.97	2418.09	442.48
DSH15-14	0.04	37.57	0.34	3.17	15.84	0.01	127.82	58.47	841.42	324.94	1507.83	317.74	2989.92	537.59

Table S3. Whole-rock major (wt.%) and trace element (ppm) analyses of the Duhongshan granites.

Sample	DHS-1	DHS-2	DHS-3	DHS-4	DHS-5	DHS-6	DHS-7	DHS-8	DHS-9	DHS-10	DHS-13	DHS-14	DHS-15	DHS-16
Si ₂ O	68.29	70.86	71.65	69.01	69.34	71.27	76.31	71.09	72.17	72.53	73.31	70.38	73.65	73.01
Al ₂ O ₃	14.25	14.45	14.17	14.66	14.91	14.46	13.07	13.74	14.27	14.24	13.65	13.25	13.63	13.77
CaO	1.08	1.10	0.91	1.32	1.50	1.09	1.27	0.57	0.66	0.64	0.63	0.77	0.66	0.62
^t Fe ₂ O ₃	1.72	1.18	1.49	1.37	1.52	1.22	1.59	1.26	1.44	1.36	0.72	1.48	1.00	1.28
K ₂ O	6.98	7.13	6.64	6.82	6.55	7.20	4.43	7.39	7.49	7.65	7.05	7.24	7.03	7.35
MgO	0.33	0.04	0.05	0.05	0.06	0.04	0.05	0.04	0.04	0.04	0.04	0.23	0.04	0.04
Na ₂ O	5.47	5.09	4.59	5.25	6.12	5.35	2.77	4.89	5.20	4.92	5.36	4.83	4.52	4.78
P ₂ O ₅	0.30	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.21	0.01	0.01
TiO ₂	0.35	0.05	0.06	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.24	0.04	0.04
MnO	0.04	0.03	0.04	0.04	0.04	0.03	0.03	0.02	0.02	0.01	0.02	0.02	0.01	0.02
LOL	1.09	0.80	0.40	0.90	0.80	0.60	0.80	0.60	0.60	0.40	0.60	0.40	0.60	0.60
total	99.90	100.73	100.01	99.48	100.94	101.32	100.39	99.64	101.96	101.86	101.44	99.04	101.19	101.51
Mg [#]	25.71	6.15	5.18	6.14	7.06	5.43	5.59	5.08	4.88	4.62	9.18	21.78	5.97	5.23
A/NK	0.86	0.90	0.96	0.91	0.87	0.87	1.40	0.86	0.86	0.87	0.83	0.84	0.91	0.87
A/CNK	0.77	0.80	0.86	0.79	0.75	0.78	1.12	0.80	0.80	0.81	0.78	0.77	0.84	0.81
10000Ga/ Al	4.36	4.13	4.95	4.61	4.56	4.26	4.84	4.01	4.43	4.21	4.42	4.30	4.28	3.75
Ba	13.09	12.95	12.5	12.69	14.6	13.14	13.66	12.45	9.82	8.7	12.19	11.18	11.06	11.99
Rb	390	377	389	376	374	376	358	370	397	373	356	394	363	341
Cs	12.24	9.83	10.66	10.78	10.97	11.15	11.08	8.15	10.35	9.18	8.45	9.78	8.8	7.49
Th	71.47	71.14	90.08	103.67	99.88	65.27	86.58	66.14	84.28	71.54	85.96	62.1	72.18	70.02
U	4.26	3.93	5.12	6.22	5.54	4.15	5.63	3.83	7.65	6.27	4.17	5.18	4.25	3.93
Nb	38.8	32.52	39.29	43.65	44.09	31.43	38.4	31.46	34.48	28.71	29.41	28.01	27	25.61
Ta	4.98	4.84	5.27	5.85	5.86	4.37	5.42	3.93	4.52	4.05	4.16	3.85	3.72	3.48
Pb	38.35	36.43	39.79	50.74	41.03	36.97	40.83	37.58	42.09	39.36	34.47	38.55	37.55	32.93
Sr	5.76	8.03	6.35	9.39	10.87	7.12	7.65	5.44	5.81	5.17	5.23	4.67	4.81	5.03
Zr	165	250	186	220	223	208	237	139	213	208	128	162	177	159
Hf	9.99	13.56	10.11	13.84	14.07	12.33	14.48	8.16	12.33	11.89	7.13	9.16	9.89	9.14
P	2187	40	65	76	103	58	53	36	56	47	39	901	53	39
Ti	3283	288	369	302	384	270	350	276	318	282	308	1440	269	256
Cr	4.12	2.89	4.99	5.7	1.77	1.33	3.22	3.41	2.03	1.46	1.48	2.67	1.77	2.06
Ni	1.95	1.76	2.01	2.64	0.73	0.5	1.77	1.3	0.69	0.81	0.44	0.94	0.62	0.8
Co	0.24	0.16	0.17	0.18	0.18	0.14	0.17	0.16	0.15	0.13	0.14	0.17	0.13	0.18
V	0.29	0.32	0.24	0.34	0.21	0.22	0.25	0.31	0.48	0.37	0.32	0.42	0.32	0.32
Sc	7.97	7.63	8.33	8.27	8.69	7	7.99	6.3	7.82	6.95	6.05	6.29	6.26	5.9
Ga	32.85	31.6	37.15	35.76	36.01	32.64	33.51	29.13	33.48	31.72	31.92	30.15	30.88	27.37
La	32.23	30.13	41.9	40.3	35.42	33.71	34.62	26.14	33.68	40	42.21	25.98	29.94	25.39
Ce	83.26	77.78	109.69	102.99	91.37	87.34	90.89	67.78	88.14	106.66	110.16	66.77	78.75	66.46
Pr	10.86	10.18	14.6	13.64	12.25	11.36	11.96	8.79	11.53	13.52	14.03	8.85	10.21	8.55
Nd	43.38	40.79	57.93	55.17	50.25	45.68	48.99	35.47	47.54	53.6	53.78	35.95	41.68	34.2
Sm	13.55	13.53	18.06	17.75	17.2	14.65	16.63	11.55	15.43	16.14	15.59	11.89	13.9	10.92
Eu	0.04	0.04	0.04	0.04	0.05	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Gd	16.2	16.64	21.4	20.79	22.2	17.88	21.29	14.68	19.48	18.65	16.92	14.88	17.21	13.37
Tb	2.98	3.14	3.9	3.77	4.16	3.22	4.02	2.78	3.71	3.41	3.03	2.85	3.23	2.53
Dy	19.61	20.3	25.2	24.45	28.07	20.66	26.7	18.74	25.08	22.52	19.56	19.04	21.72	16.82
Ho	4.09	4.25	5.23	5.05	5.85	4.22	5.64	3.9	5.3	4.69	3.95	3.97	4.55	3.49
Er	12.39	13.23	15.57	15.09	17.84	12.78	17.37	11.79	16.4	14.28	11.94	12.23	13.97	10.7
Tm	1.9	2.06	2.37	2.3	2.77	1.9	2.67	1.84	2.59	2.26	1.79	1.88	2.18	1.64
Yb	13.21	14.59	16.43	16.03	19.45	13.28	19.08	12.87	18.16	15.94	12.47	13.21	15.68	11.8

Lu	1.86	2.04	2.27	2.27	2.7	1.86	2.67	1.79	2.54	2.24	1.73	1.87	2.18	1.64
Y	124	136	161	153	182	131	177	116	156	137	116	117	134	102

Table S4. Whole-rock Nd isotopic data for the Duhongshan granites.

Sample no.	Sm/Nd	¹⁴⁷ Sm/ ¹⁴⁴ Nd	¹⁴³ Nd/ ¹⁴⁴ Nd	±2σ	(¹⁴³ Nd/ ¹⁴⁴ Nd) _i	ε _{Nd} (<i>t</i>)	T _{DM2} (Ma)
DHS-2	0.312436	0.188775	0.512732	0.000008	0.512267	2.21	1231
DHS-4	0.331767	0.200455	0.512743	0.000007	0.512249	1.86	1274
DHS-7	0.321748	0.194402	0.512740	0.000006	0.512262	2.11	1244
DHS-12	0.320790	0.193823	0.512743	0.000006	0.512266	2.18	1235
DHS-13	0.339417	0.205077	0.512753	0.000007	0.512248	1.84	1277