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Data Repository

Supplementary Table S1. Zircon U–Pb dating results for the Permian-Triassic granitoids from Hainan, South China

Supplementary Table S2. Zircon in-situ Hf-O isotopic analytical results for the Permian-Triassic granitoids from Hainan Island

Supplement Table S3. Major oxides (wt%), trace element (ppm) and Sr-Nd isotopic analytical results for the Permian-Triassic granitoids from Hainan Island in this study

Supplement Table S4. Major oxides (wt%), trace element (ppm) and Sr-Nd isotopic analytical results for the previous Permian-Triassic granitoids from Hainan Island

Appendix Analytical Methods

Supplementary Table S1. Zircon U-Pb dating results for the Permian-Triassic granitoids from Hainan, South China

Spot	Th/U	Isotopic ratios						Apparent ages (Ma)					
		$^{207}\text{Pb}/^{206}\text{Pb}$		$^{207}\text{Pb}/^{235}\text{U}$		$^{206}\text{Pb}/^{238}\text{U}$		$^{207}\text{Pb}/^{206}\text{Pb}$		$^{207}\text{Pb}/^{235}\text{U}$		$^{206}\text{Pb}/^{238}\text{U}$	
		ratio	1 σ	ratio	1 σ	ratio	1 σ	age	1 σ	age	1 σ	age	1 σ
11SY-21													
11SY-21-1	0.53	0.05191	0.00130	0.28863	0.00742	0.04031	0.00103	283	53	257	6	255	6
11SY-21-2	0.44	0.05195	0.00130	0.28936	0.00752	0.04039	0.00105	283	53	258	6	255	6
11SY-21-3	0.64	0.05259	0.00132	0.29047	0.00748	0.04005	0.00103	322	57	259	6	253	6
11SY-21-4	0.44	0.05525	0.00139	0.30051	0.00807	0.03933	0.00102	420	56	267	6	249	6
11SY-21-5	0.77	0.05151	0.00129	0.28620	0.00728	0.04030	0.00102	265	57	256	6	255	6
11SY-21-6	0.62	0.05899	0.00150	0.36968	0.00934	0.04552	0.00117	569	56	319	7	287	7
11SY-21-7	0.35	0.05174	0.00130	0.28903	0.00742	0.04052	0.00104	272	57	258	6	256	6
11SY-21-8	0.64	0.05123	0.00129	0.28801	0.00755	0.04075	0.00106	250	59	257	6	257	7
11SY-21-9	0.46	0.05173	0.00130	0.28650	0.00738	0.04016	0.00103	272	57	256	6	254	6
11SY-21-10	1.08	0.05152	0.00129	0.28878	0.00745	0.04064	0.00104	265	57	258	6	257	6
11SY-21-11	0.86	0.05173	0.00131	0.27583	0.00706	0.03866	0.00098	272	59	247	6	245	6
11SY-21-12	1.06	0.05164	0.00130	0.28815	0.00757	0.04045	0.00105	333	59	257	6	256	6
11SY-21-13	0.55	0.05124	0.00128	0.28591	0.00765	0.04051	0.00109	250	57	255	6	256	7
11SY-21-14	0.84	0.05102	0.00128	0.28417	0.00729	0.04038	0.00103	243	57	254	6	255	6
11SY-21-15	0.44	0.05122	0.00129	0.28040	0.00718	0.03970	0.00101	250	59	251	6	251	6
11SY-21-16	0.57	0.05133	0.00129	0.28495	0.00745	0.04025	0.00105	257	62	255	6	254	7
11SY-21-17	0.64	0.05129	0.00129	0.28545	0.00731	0.04034	0.00103	254	57	255	6	255	6
11SY-21-18	0.53	0.05146	0.00130	0.28713	0.00738	0.04046	0.00103	261	53	256	6	256	6
11SY-21-19	0.35	0.05161	0.00130	0.28636	0.00741	0.04023	0.00104	333	57	256	6	254	6
11SY-21-20	0.68	0.05168	0.00130	0.28720	0.00734	0.04030	0.00103	272	57	256	6	255	6
11SY-21-21	0.59	0.05143	0.00129	0.28388	0.00729	0.04002	0.00102	261	53	254	6	253	6
11SY-21-22	0.31	0.05151	0.00129	0.28517	0.00729	0.04014	0.00102	265	57	255	6	254	6
11SY-21-23	0.46	0.05186	0.00131	0.28674	0.00737	0.04011	0.00102	280	62	256	6	254	6
11SY-21-24	0.68	0.05453	0.00139	0.29882	0.00764	0.03990	0.00104	394	53	265	6	252	6
11SY-22													
11SY-22-01	0.51	0.05118	0.00129	0.27962	0.00719	0.03962	0.00101	256	57	250	6	250	6
11SY-22-02	0.55	0.05149	0.00129	0.28632	0.00736	0.04033	0.00103	261	55	256	6	255	6
11SY-22-03	0.51	0.05149	0.00129	0.28085	0.00719	0.03954	0.00101	261	55	251	6	250	6
11SY-22-04	0.48	0.05169	0.00131	0.28133	0.00731	0.03947	0.00102	272	57	252	6	250	6
11SY-22-05	0.48	0.05173	0.00130	0.28447	0.00740	0.03987	0.00103	272	59	254	6	252	6
11SY-22-06	1.06	0.05142	0.00129	0.28113	0.00726	0.03964	0.00102	261	53	252	6	251	6
11SY-22-07	0.46	0.05580	0.00146	0.30726	0.00839	0.03984	0.00103	456	59	272	7	252	6
11SY-22-08	0.57	0.05176	0.00130	0.28570	0.00758	0.04002	0.00106	276	57	255	6	253	7
11SY-22-09	0.68	0.05165	0.00130	0.28359	0.00725	0.03981	0.00102	333	57	254	6	252	6
11SY-22-10	0.68	0.05163	0.00130	0.28240	0.00726	0.03966	0.00101	333	57	253	6	251	6
11SY-22-11	0.59	0.05137	0.00130	0.28135	0.00728	0.03971	0.00102	257	62	252	6	251	6
11SY-22-12	0.42	0.05149	0.00130	0.28648	0.00775	0.04036	0.00109	261	55	256	6	255	7
11SY-22-13	0.51	0.05153	0.00130	0.28387	0.00731	0.03994	0.00102	265	57	254	6	252	6
11SY-22-14	0.51	0.05166	0.00130	0.28615	0.00736	0.04017	0.00103	333	57	256	6	254	6
11SY-22-15	0.88	0.05202	0.00131	0.28894	0.00748	0.04033	0.00105	287	57	258	6	255	6

11SY-22-16	0.44	0.05158	0.00130	0.28392	0.00738	0.03990	0.00103	333	57	254	6	252	6
11SY-22-17	0.53	0.05160	0.00130	0.28729	0.00745	0.04038	0.00104	333	57	256	6	255	6
11SY-22-18	0.53	0.05241	0.00132	0.29067	0.00769	0.04020	0.00105	302	56	259	6	254	7
11SY-22-19	0.64	0.05205	0.00131	0.28898	0.00818	0.04019	0.00111	287	57	258	6	254	7
11SY-22-20	0.73	0.05159	0.00129	0.28517	0.00742	0.04007	0.00104	333	57	255	6	253	6
11SY-22-21	0.46	0.05193	0.00130	0.28776	0.00743	0.04018	0.00103	283	53	257	6	254	6
11SY-22-22	0.59	0.05160	0.00130	0.28313	0.00729	0.03978	0.00102	333	57	253	6	251	6
11SY-22-23	0.44	0.05138	0.00129	0.28815	0.00747	0.04066	0.00105	257	62	257	6	257	7
11SY-22-24	0.70	0.05178	0.00131	0.28496	0.00733	0.03992	0.00102	276	57	255	6	252	6

11SY-27

11SY-27-1	0.57	0.05144	0.00141	0.28051	0.00862	0.03954	0.00120	261	61	251	7	250	7
11SY-27-2	1.52	0.05210	0.00144	0.28018	0.00854	0.03897	0.00113	300	58	251	7	246	7
11SY-27-3	0.59	0.05124	0.00139	0.28757	0.00947	0.04070	0.00133	250	68	257	7	257	8
11SY-27-4	0.46	0.05114	0.00140	0.27473	0.00802	0.03896	0.00112	256	63	246	6	246	7
11SY-27-5	0.46	0.05143	0.00140	0.28330	0.00855	0.03996	0.00120	261	63	253	7	253	7
11SY-27-6	0.57	0.05153	0.00140	0.28384	0.00888	0.03996	0.00124	265	56	254	7	253	8
11SY-27-7	0.55	0.05144	0.00140	0.27050	0.00800	0.03814	0.00112	261	61	243	6	241	7
11SY-27-8	0.46	0.05143	0.00140	0.28492	0.00873	0.04018	0.00123	261	61	255	7	254	8
11SY-27-9	0.59	0.05134	0.00140	0.27822	0.00826	0.03931	0.00117	257	63	249	7	249	7
11SY-27-10	0.42	0.05173	0.00141	0.27764	0.00818	0.03894	0.00115	272	68	249	7	246	7
11SY-27-11	0.48	0.05134	0.00140	0.28830	0.00866	0.04073	0.00122	257	63	257	7	257	8
11SY-27-12	0.55	0.05133	0.00140	0.28840	0.00884	0.04075	0.00125	257	63	257	7	257	8
11SY-27-13	0.57	0.05210	0.00143	0.29031	0.00850	0.04048	0.00121	300	58	259	7	256	8
11SY-27-14	0.55	0.05119	0.00139	0.28429	0.00866	0.04028	0.00123	250	61	254	7	255	8
11SY-27-15	0.42	0.05131	0.00140	0.29051	0.00946	0.04106	0.00133	254	63	259	7	259	8
11SY-27-16	0.44	0.05127	0.00139	0.27639	0.00819	0.03910	0.00115	254	66	248	7	247	7
11SY-27-17	0.59	0.05136	0.00140	0.28176	0.00841	0.03980	0.00119	257	61	252	7	252	7
11SY-27-18	0.42	0.05130	0.00140	0.28593	0.00861	0.04044	0.00122	254	66	255	7	256	8
11SY-27-19	0.53	0.05140	0.00140	0.28087	0.00849	0.03963	0.00119	257	63	251	7	251	7
11SY-27-20	0.64	0.05152	0.00140	0.28179	0.00837	0.03968	0.00118	265	56	252	7	251	7
11SY-27-21	0.59	0.05130	0.00139	0.27815	0.00839	0.03933	0.00119	254	66	249	7	249	7
11SY-27-22	0.40	0.05119	0.00139	0.27583	0.00835	0.03908	0.00117	250	61	247	7	247	7
11SY-27-23	0.64	0.05114	0.00139	0.27760	0.00843	0.03939	0.00120	256	63	249	7	249	7
11SY-27-24	0.42	0.05118	0.00139	0.27700	0.00816	0.03926	0.00115	256	63	248	6	248	7
11SY-27-25	0.57	0.05132	0.00139	0.27456	0.00809	0.03880	0.00114	254	63	246	6	245	7

11SY-28

11SY-28-01	0.67	0.05325	0.00055	0.29843	0.00566	0.04053	0.00046	339	22	265	4	256	3
11SY-28-02	0.53	0.05151	0.00018	0.28628	0.00326	0.04029	0.00044	265	7	256	3	255	3
11SY-28-03	0.76	0.05163	0.00020	0.28799	0.00353	0.04044	0.00047	333	9	257	3	256	3
11SY-28-04	0.71	0.05152	0.00020	0.28817	0.00400	0.04055	0.00054	265	9	257	3	256	3
11SY-28-05	0.55	0.05231	0.00047	0.29248	0.00502	0.04057	0.00064	298	20	261	4	256	4
11SY-28-06	0.67	0.05112	0.00014	0.28537	0.00316	0.04047	0.00045	256	7	255	2	256	3
11SY-28-07	0.42	0.05124	0.00019	0.28627	0.00425	0.04050	0.00059	250	9	256	3	256	4
11SY-28-08	0.53	0.05126	0.00022	0.28581	0.00375	0.04042	0.00050	254	9	255	3	255	3
11SY-28-09	0.68	0.05153	0.00029	0.28771	0.00492	0.04049	0.00067	265	13	257	4	256	4
11SY-28-10	0.78	0.05164	0.00022	0.28800	0.00437	0.04045	0.00062	333	9	257	3	256	4

11SY-28-11	0.84	0.05157	0.00021	0.28592	0.00297	0.04019	0.00039	265	9	255	2	254	2
11SY-28-12	0.46	0.05154	0.00020	0.28812	0.00365	0.04053	0.00050	265	7	257	3	256	3
11SY-28-13	0.45	0.05151	0.00020	0.28731	0.00349	0.04044	0.00048	265	9	256	3	256	3
11SY-28-14	0.59	0.05145	0.00025	0.28638	0.00415	0.04035	0.00056	261	11	256	3	255	3
11SY-28-15	0.41	0.05146	0.00022	0.28672	0.00339	0.04040	0.00046	261	42	256	3	255	3
11SY-28-16	0.86	0.05170	0.00021	0.28966	0.00424	0.04062	0.00058	272	9	258	3	257	4
11SY-28-17	0.61	0.05152	0.00018	0.28904	0.00399	0.04068	0.00056	265	7	258	3	257	3
11SY-28-18	0.64	0.05318	0.00060	0.29789	0.00664	0.04046	0.00053	345	26	265	5	256	3
11SY-28-19	0.50	0.05128	0.00020	0.28424	0.00290	0.04018	0.00038	254	3	254	2	254	2
11SY-28-20	0.48	0.05142	0.00022	0.28666	0.00340	0.04043	0.00047	261	42	256	3	256	3
11SY-28-21	0.78	0.05129	0.00017	0.28726	0.00464	0.04061	0.00064	254	3	256	4	257	4
11SY-28-22	0.43	0.05125	0.00020	0.28613	0.00404	0.04048	0.00055	254	9	256	3	256	3
11SY-28-23	0.74	0.05118	0.00025	0.28486	0.00495	0.04037	0.00069	256	11	255	4	255	4
11SY-28-24	0.68	0.05139	0.00020	0.28740	0.00447	0.04054	0.00060	257	42	257	4	256	4

11SY-25

11SY-25-01	0.68	0.05239	0.00143	0.28240	0.00882	0.03906	0.00119	302	63	253	7	247	7
11SY-25-02	0.56	0.05512	0.00150	0.28934	0.00819	0.03807	0.00107	417	61	258	6	241	7
11SY-25-03	0.57	0.05575	0.00153	0.29818	0.00977	0.03873	0.00121	443	56	265	8	245	8
11SY-25-04	0.46	0.05572	0.00153	0.29807	0.00857	0.03879	0.00110	443	56	265	7	245	7
11SY-25-05	0.67	0.05114	0.00139	0.27374	0.00775	0.03883	0.00110	256	63	246	6	246	7
11SY-25-06	0.54	0.05300	0.00144	0.28548	0.00852	0.03910	0.00118	328	63	255	7	247	7
11SY-25-07	0.59	0.05061	0.00138	0.27916	0.00809	0.04002	0.00116	233	58	250	6	253	7
11SY-25-08	0.73	0.05321	0.00146	0.36749	0.01061	0.05010	0.00143	345	61	318	8	315	9
11SY-25-09	0.62	0.05170	0.00147	0.36786	0.01266	0.05178	0.00182	272	69	318	9	325	11
11SY-25-10	0.62	0.16128	0.00439	10.35537	0.30745	0.46531	0.01348	2469	41	2467	27	2463	59
11SY-25-11	0.75	0.05461	0.00151	0.30196	0.00911	0.04019	0.00125	394	63	268	7	254	8
11SY-25-12	0.57	0.05125	0.00139	0.28280	0.00907	0.04004	0.00129	254	68	253	7	253	8
11SY-25-13	0.55	0.05125	0.00150	0.27341	0.00881	0.03878	0.00123	254	67	245	7	245	8
11SY-25-14	0.64	0.05147	0.00141	0.28070	0.00835	0.03956	0.00117	261	63	251	7	250	7
11SY-25-15	0.42	0.05370	0.00147	0.28371	0.00802	0.03835	0.00110	367	63	254	6	243	7
11SY-25-16	0.68	0.05108	0.00138	0.27560	0.00799	0.03914	0.00113	256	58	247	6	247	7
11SY-25-17	0.68	0.05137	0.00139	0.27365	0.00795	0.03865	0.00112	257	63	246	6	244	7

11SY-26

11SY26-01	0.64	0.05167	0.00141	0.27600	0.00836	0.03875	0.00117	333	63	247	7	245	7
11SY26-02	0.45	0.05154	0.00140	0.27546	0.00853	0.03877	0.00120	265	58	247	7	245	7
11SY26-03	0.44	0.05152	0.00140	0.27678	0.00826	0.03897	0.00116	265	56	248	7	246	7
11SY26-04	0.40	0.05137	0.00140	0.27777	0.00825	0.03922	0.00115	257	63	249	7	248	7
11SY26-05	0.51	0.05144	0.00140	0.27421	0.00829	0.03867	0.00117	261	61	246	7	245	7
11SY26-06	0.53	0.05163	0.00140	0.26875	0.00788	0.03777	0.00110	333	63	242	6	239	7
11SY26-07	0.46	0.05172	0.00141	0.28177	0.00865	0.03949	0.00118	272	68	252	7	250	7
11SY26-08	0.66	0.05122	0.00139	0.27553	0.00818	0.03903	0.00116	250	68	247	7	247	7
11SY26-09	0.79	0.05127	0.00139	0.27407	0.00815	0.03878	0.00115	254	66	246	6	245	7
11SY26-10	0.53	0.05160	0.00140	0.27892	0.00840	0.03919	0.00117	333	58	250	7	248	7
11SY26-11	0.44	0.05133	0.00140	0.27761	0.00847	0.03922	0.00118	254	63	249	7	248	7
11SY26-12	0.95	0.05143	0.00140	0.27606	0.00838	0.03895	0.00118	261	63	248	7	246	7
11SY26-13	0.55	0.05131	0.00139	0.27674	0.00840	0.03912	0.00118	254	63	248	7	247	7

11SY26-14	0.42	0.05136	0.00140	0.28614	0.00892	0.04043	0.00126	257	61	256	7	255	8
11SY26-15	0.42	0.05133	0.00140	0.27279	0.00810	0.03856	0.00114	254	63	245	6	244	7
11SY26-16	0.42	0.05134	0.00142	0.27410	0.00834	0.03874	0.00116	257	63	246	7	245	7
11SY26-17	0.51	0.05142	0.00140	0.28354	0.00934	0.03999	0.00131	261	63	253	7	253	8
11SY26-18	0.42	0.05140	0.00140	0.27347	0.00782	0.03858	0.00109	257	63	245	6	244	7
11SY26-19	0.55	0.05169	0.00142	0.28433	0.00891	0.03985	0.00120	272	68	254	7	252	7
11SY26-20	1.17	0.05122	0.00140	0.27521	0.00824	0.03899	0.00116	250	68	247	7	247	7
11SY26-21	0.62	0.05148	0.00141	0.27788	0.00844	0.03915	0.00118	261	63	249	7	248	7
11SY26-22	0.73	0.05138	0.00139	0.27589	0.00825	0.03896	0.00117	257	63	247	7	246	7
11SY26-23	0.75	0.05119	0.00140	0.27404	0.00838	0.03883	0.00118	250	63	246	7	246	7
11SY26-24	0.46	0.05129	0.00139	0.27647	0.00837	0.03909	0.00118	254	66	248	7	247	7
11SY26-25	0.88	0.05121	0.00139	0.27123	0.00788	0.03841	0.00111	250	68	244	6	243	7

13CZ-3A

13CZ-3A-01	0.95	0.27666	0.00737	0.03911	0.00104	0.27666	0.00737	257	62	248	6	247	6
13CZ-3A-02	0.57	0.28403	0.00741	0.03980	0.00104	0.28403	0.00741	280	62	254	6	252	6
13CZ-3A-03	0.53	0.27465	0.00718	0.03900	0.00101	0.27465	0.00718	256	57	246	6	247	6
13CZ-3A-04	0.46	0.27033	0.00706	0.03851	0.00099	0.27033	0.00706	235	59	243	6	244	6
13CZ-3A-05	0.55	0.27320	0.00703	0.03869	0.00099	0.27320	0.00703	250	59	245	6	245	6
13CZ-3A-06	0.77	0.27157	0.00722	0.03875	0.00102	0.27157	0.00722	232	64	244	6	245	6
13CZ-3A-07	0.42	0.27598	0.00732	0.03902	0.00103	0.27598	0.00732	257	62	247	6	247	6
13CZ-3A-08	0.59	0.27309	0.00725	0.03860	0.00101	0.27309	0.00725	254	57	245	6	244	6
13CZ-3A-09	0.48	0.29488	0.00765	0.03917	0.00101	0.29488	0.00765	398	57	262	6	248	6
13CZ-3A-10	0.59	0.27323	0.00712	0.03863	0.00100	0.27323	0.00712	254	64	245	6	244	6
13CZ-3A-11	0.42	0.28728	0.00798	0.03876	0.00103	0.28728	0.00798	350	53	256	6	245	6
13CZ-3A-12	0.46	0.27362	0.00724	0.03873	0.00102	0.27362	0.00724	250	59	246	6	245	6
13CZ-3A-13	0.57	0.27347	0.00736	0.03877	0.00102	0.27347	0.00736	256	57	245	6	245	6
13CZ-3A-14	0.77	0.27389	0.00735	0.03881	0.00103	0.27389	0.00735	256	59	246	6	245	6
13CZ-3A-15	0.42	0.28119	0.00755	0.03878	0.00103	0.28119	0.00755	322	57	252	6	245	6
13CZ-3A-16	0.46	0.27051	0.00714	0.03866	0.00101	0.27051	0.00714	232	57	243	6	245	6
13CZ-3A-17	0.46	0.27086	0.00721	0.03876	0.00102	0.27086	0.00721	233	59	243	6	245	6
13CZ-3A-18	0.70	0.27215	0.00718	0.03875	0.00102	0.27215	0.00718	239	53	244	6	245	6
13CZ-3A-19	0.66	0.27149	0.00723	0.03886	0.00103	0.27149	0.00723	228	59	244	6	246	6

17HN-32

17HN-32-01	0.80	0.05175	0.00162	0.27961	0.00970	0.03921	0.00105	275	70	250	8	248	7
17HN-32-02	0.67	0.05459	0.00185	0.28970	0.01070	0.03852	0.00104	395	74	258	8	244	6
17HN-32-04	1.01	0.05179	0.00173	0.26885	0.00982	0.03767	0.00101	276	75	242	8	238	6
17HN-32-05	0.59	0.05067	0.00126	0.26859	0.00791	0.03847	0.00102	226	57	242	6	243	6
17HN-32-07	0.93	0.05167	0.00135	0.27614	0.00843	0.03879	0.00103	271	59	248	7	245	6
17HN-32-10	0.41	0.05182	0.00195	0.27923	0.01128	0.03911	0.00107	278	84	250	9	247	7
17HN-32-12	0.67	0.05051	0.00130	0.26452	0.00803	0.03802	0.00101	218	59	238	6	241	6
17HN-32-15	0.60	0.05429	0.00218	0.28834	0.01232	0.03855	0.00107	383	87	257	10	244	7
17HN-32-19	0.64	0.05611	0.00266	0.29795	0.01467	0.03855	0.00110	456	102	265	11	244	7
17HN-32-20	0.67	0.05343	0.00155	0.28352	0.00939	0.03853	0.00104	347	64	253	7	244	6
17HN-32-21	0.69	0.05412	0.00169	0.40279	0.01413	0.05403	0.00147	376	69	344	10	339	9
17HN-32-24	0.66	0.05210	0.00241	0.27422	0.01328	0.03821	0.00108	290	103	246	11	242	7

17HN-33

17HN-33-01	1.06	0.05123	0.00198	0.26623	0.01097	0.03773	0.00102	251	87	240	9	239	6
17HN-33-02	0.79	0.05387	0.00216	0.28621	0.01215	0.03857	0.00105	366	88	256	10	244	7
17HN-33-03	0.47	0.05324	0.00208	0.27421	0.01139	0.03739	0.00102	339	86	246	9	237	6
17HN-33-04	0.78	0.05618	0.00264	0.28891	0.01406	0.03733	0.00105	459	102	258	11	236	7
17HN-33-05	0.77	0.05225	0.00225	0.26740	0.01208	0.03715	0.00103	297	95	241	10	235	6
17HN-33-06	0.39	0.05183	0.00216	0.26617	0.01170	0.03728	0.00102	278	93	240	9	236	6
17HN-33-07	0.58	0.05375	0.00279	0.27942	0.01488	0.03774	0.00107	361	112	250	12	239	7
17HN-33-08	0.39	0.05418	0.00207	0.27802	0.01135	0.03725	0.00102	378	83	249	9	236	6
17HN-33-09	0.78	0.05320	0.00238	0.28547	0.01336	0.03895	0.00108	337	98	255	11	246	7
17HN-33-10	0.86	0.04993	0.00256	0.25628	0.01351	0.03726	0.00105	192	115	232	11	236	7
17HN-33-11	0.39	0.05313	0.00249	0.27885	0.01357	0.03810	0.00107	334	103	250	11	241	7
17HN-33-12	0.64	0.05426	0.00229	0.28410	0.01263	0.03800	0.00105	382	92	254	10	240	7
17HN-33-13	0.47	0.05266	0.00212	0.28392	0.01213	0.03914	0.00108	314	89	254	10	248	7
17HN-33-14	0.62	0.05400	0.00223	0.28375	0.01232	0.03814	0.00104	371	90	254	10	241	6
17HN-33-15	0.50	0.05333	0.00204	0.27409	0.01123	0.03731	0.00102	343	84	246	9	236	6
17HN-33-16	0.57	0.05278	0.00241	0.27383	0.01298	0.03766	0.00104	320	100	246	10	238	6
17HN-33-17	0.36	0.05237	0.00288	0.28150	0.01582	0.03902	0.00112	302	121	252	13	247	7
17HN-33-18	0.40	0.05211	0.00197	0.27389	0.01105	0.03816	0.00103	290	84	246	9	241	6
17HN-33-19	0.57	0.05402	0.00239	0.27996	0.01293	0.03762	0.00104	372	96	251	10	238	6

11HN-67

11HN-67-01	0.61	0.05082	0.00154	0.26679	0.00821	0.03807	0.00116	232	70	240	7	241	7
11HN-67-02	0.63	0.05088	0.00154	0.26884	0.00837	0.03832	0.00119	235	69	242	7	242	7
11HN-67-03	0.43	0.05101	0.00154	0.26870	0.00823	0.03819	0.00116	243	69	242	7	242	7
11HN-67-04	0.61	0.05125	0.00154	0.26919	0.00829	0.03809	0.00117	254	66	242	7	241	7
11HN-67-05	0.61	0.05121	0.00154	0.26870	0.00822	0.03806	0.00116	250	64	242	7	241	7
11HN-67-06	0.49	0.05165	0.00156	0.27087	0.00837	0.03802	0.00116	333	70	243	7	241	7
11HN-67-07	0.58	0.05125	0.00154	0.26869	0.00816	0.03803	0.00115	254	66	242	7	241	7
11HN-67-08	0.63	0.05391	0.00163	0.28646	0.00879	0.03854	0.00118	369	69	256	7	244	7
11HN-67-09	0.40	0.05134	0.00155	0.26983	0.00830	0.03813	0.00117	257	70	243	7	241	7
11HN-67-10	0.41	0.05145	0.00155	0.27471	0.00843	0.03873	0.00119	261	69	246	7	245	7
11HN-67-11	0.40	0.05116	0.00154	0.26928	0.00823	0.03818	0.00116	256	70	242	7	242	7
11HN-67-12	0.49	0.05194	0.00156	0.27783	0.00856	0.03878	0.00119	283	69	249	7	245	7
11HN-67-13	0.45	0.05174	0.00156	0.27341	0.00840	0.03833	0.00117	272	66	245	7	242	7
11HN-67-14	0.63	0.05144	0.00155	0.27144	0.00835	0.03828	0.00117	261	69	244	7	242	7
11HN-67-15	0.58	0.05138	0.00155	0.27160	0.00831	0.03835	0.00117	257	69	244	7	243	7
11HN-67-16	0.67	0.05133	0.00155	0.26962	0.00819	0.03810	0.00115	254	70	242	7	241	7
11HN-67-17	0.56	0.05160	0.00155	0.27363	0.00838	0.03847	0.00117	333	73	246	7	243	7
11HN-67-18	0.79	0.05096	0.00154	0.26898	0.00825	0.03829	0.00117	239	69	242	7	242	7
11HN-67-19	0.56	0.05134	0.00155	0.27025	0.00837	0.03820	0.00118	257	69	243	7	242	7
11HN-67-20	0.47	0.05217	0.00157	0.27712	0.00850	0.03851	0.00117	300	70	248	7	244	7
11HN-67-21	0.42	0.05128	0.00155	0.26947	0.00827	0.03812	0.00116	254	66	242	7	241	7
11HN-67-22	0.41	0.05244	0.00158	0.27597	0.00848	0.03814	0.00116	306	69	247	7	241	7

11HN-51

11HN-51-01	0.55	0.05088	0.00159	0.26095	0.00877	0.03724	0.00124	235	72	235	7	236	8
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11HN-51-02	0.56	0.05164	0.00178	0.26775	0.00925	0.03774	0.00126	333	80	241	7	239	8
11HN-51-03	0.70	0.05098	0.00166	0.26506	0.00929	0.03774	0.00125	239	81	239	7	239	8
11HN-51-04	0.56	0.05078	0.00160	0.26314	0.00877	0.03758	0.00120	232	68	237	7	238	7
11HN-51-05	0.65	0.05091	0.00160	0.26257	0.00898	0.03741	0.00123	235	74	237	7	237	8
11HN-51-06	0.65	0.05178	0.00160	0.26771	0.00964	0.03749	0.00132	276	68	241	8	237	8
11HN-51-07	0.62	0.05133	0.00164	0.25542	0.00854	0.03611	0.00117	257	69	231	7	229	7
11HN-51-08	0.66	0.05567	0.00181	0.28677	0.00982	0.03736	0.00119	439	72	256	8	236	7
11HN-51-09	0.54	0.05146	0.00156	0.26588	0.00871	0.03746	0.00120	261	70	239	7	237	7
11HN-51-10	0.58	0.05299	0.00172	0.28088	0.00930	0.03845	0.00119	328	106	251	7	243	7
11HN-51-11	0.59	0.05106	0.00161	0.26415	0.00893	0.03754	0.00123	243	77	238	7	238	8
11HN-51-12	0.57	0.05097	0.00158	0.26377	0.00877	0.03754	0.00122	239	72	238	7	238	8
11HN-51-13	0.65	0.05086	0.00160	0.26259	0.00869	0.03747	0.00121	235	69	237	7	237	8
11HN-51-14	0.51	0.05074	0.00156	0.26090	0.00852	0.03730	0.00120	228	66	235	7	236	7
11HN-51-15	0.54	0.05689	0.00177	0.29411	0.01061	0.03748	0.00131	487	69	262	8	237	8
11HN-51-16	0.29	0.05728	0.00183	0.29794	0.01032	0.03770	0.00119	502	70	265	8	239	7
11HN-51-17	0.40	0.05659	0.00186	0.29407	0.01173	0.03743	0.00124	476	40	262	9	237	8
11HN-51-18	0.60	0.05176	0.00162	0.26785	0.00880	0.03754	0.00120	276	68	241	7	238	7
11HN-51-19	0.62	0.05300	0.00160	0.27417	0.00918	0.03752	0.00125	328	69	246	7	237	8
11HN-51-20	0.64	0.05163	0.00160	0.26750	0.00898	0.03754	0.00120	333	72	241	7	238	7
11HN-51-21	0.68	0.05254	0.00170	0.25635	0.00847	0.03543	0.00115	309	77	232	7	224	7

11HN-22

11HN-22-01	0.44	0.06321	0.00232	0.75350	0.02789	0.08648	0.00308	717	78	570	16	535	18
11HN-22-02	0.37	0.05313	0.00188	0.25156	0.00922	0.03424	0.00122	345	80	228	7	217	8
11HN-22-03	0.74	0.16987	0.00595	9.98518	0.35185	0.42631	0.01501	2567	58	2433	33	2289	68
11HN-22-04	0.67	0.06547	0.00229	1.14093	0.04049	0.12639	0.00448	791	69	773	19	767	26
11HN-22-05	0.54	0.05150	0.00181	0.26635	0.00939	0.03751	0.00132	265	77	240	8	237	8
11HN-22-06	0.58	0.05491	0.00193	0.26433	0.00933	0.03494	0.00123	409	80	238	7	221	8
11HN-22-07	0.45	0.05726	0.00203	0.29347	0.01035	0.03721	0.00131	502	78	261	8	235	8
11HN-22-08	0.65	0.07266	0.00255	1.47424	0.05365	0.14709	0.00534	1006	71	920	22	885	30
11HN-22-09	0.56	0.10802	0.00378	4.04252	0.14221	0.27134	0.00953	1766	63	1643	29	1548	48
11HN-22-10	0.46	0.05159	0.00182	0.26194	0.00928	0.03682	0.00130	333	81	236	7	233	8
11HN-22-11	0.61	0.05079	0.00178	0.25143	0.00895	0.03590	0.00128	232	80	228	7	227	8
11HN-22-12	0.58	0.05062	0.00178	0.23996	0.00848	0.03437	0.00121	233	81	218	7	218	8
11HN-22-13	0.42	0.05094	0.00179	0.24286	0.00867	0.03456	0.00123	239	81	221	7	219	8
11HN-22-14	0.44	0.05546	0.00195	0.27048	0.00963	0.03535	0.00125	432	78	243	8	224	8
11HN-22-15	0.42	0.05238	0.00184	0.24640	0.00870	0.03412	0.00120	302	84	224	7	216	7

Supplementary Table S2. Zircon in-situ Hf-O isotopic analytical results for the Permian-Triassic granitoids from Hainan Island

Analytical spot	Apparent age (Ma)	$^{176}\text{Hf}/^{177}\text{Hf}$	2σ	$^{176}\text{Yb}/^{177}\text{Hf}$	$^{176}\text{Lu}/^{177}\text{Hf}$	$\varepsilon_{\text{Hf}}(\text{t})$	2σ	$T_{\text{DM2}}(\text{Ga})$	2σ	$\delta^{18}\text{O}$	2σ
11SY-27											
11SY-27-1	250	0.282573	0.000012	0.025947	0.000576	-1.6	0.4	1.13	0.01		
11SY-27-2	246	0.282529	0.000012	0.009981	0.000319	-3.2	0.4	1.21	0.01		
11SY-27-3	257	0.282552	0.000013	0.032748	0.000747	-2.3	0.5	1.17	0.01		
11SY-27-4	246	0.282511	0.000018	0.067414	0.001721	-4.1	0.6	1.25	0.01		
11SY-27-5	253	0.282505	0.000014	0.024184	0.000561	-4.0	0.5	1.25	0.01		
11SY-27-6	253	0.282588	0.000014	0.038743	0.000860	-1.1	0.5	1.11	0.01		
11SY-27-7	241	0.282572	0.000016	0.045993	0.001002	-1.9	0.6	1.14	0.01		
11SY-27-8	254	0.282608	0.000017	0.089508	0.001836	-0.5	0.6	1.08	0.01		
11SY-27-9	249	0.282582	0.000017	0.097714	0.002043	-1.6	0.6	1.13	0.01		
11SY-27-10	246	0.282525	0.000015	0.037837	0.000841	-3.5	0.5	1.22	0.01		
11SY-27-11	257	0.282564	0.000013	0.060799	0.001306	-1.9	0.5	1.15	0.01		
11SY-27-12	257	0.282588	0.000014	0.073833	0.001542	-1.1	0.5	1.12	0.01		
11SY-27-13	256	0.282573	0.000015	0.039711	0.000903	-1.6	0.5	1.14	0.01		
11SY-27-14	255	0.282571	0.000017	0.117783	0.002441	-1.9	0.6	1.15	0.01		
11SY-27-15	259	0.282539	0.000016	0.050032	0.001061	-2.7	0.6	1.2	0.01		
11SY-27-16	247	0.282606	0.000015	0.069354	0.001420	-0.7	0.5	1.08	0.01		
11SY-27-17	252	0.282529	0.000013	0.038771	0.000855	-3.2	0.5	1.21	0.01		
11SY-27-18	256	0.282566	0.000017	0.055308	0.001217	-1.9	0.6	1.15	0.01		
11SY-27-19	251	0.282561	0.000012	0.010089	0.000273	-2.0	0.4	1.15	0.01		
11SY-27-20	251	0.282541	0.000014	0.014962	0.000401	-2.7	0.5	1.19	0.01		
11SY-27-21	249	0.282524	0.000013	0.016940	0.000422	-3.4	0.5	1.22	0.01		
11SY-27-22	247	0.282510	0.000014	0.015009	0.000394	-3.9	0.5	1.24	0.01		
11SY-27-23	249	0.282508	0.000014	0.030764	0.000738	-4.0	0.5	1.25	0.01		
11SY-27-24	248	0.282528	0.000015	0.029997	0.000668	-3.3	0.5	1.22	0.01		
11SY-27-25	245	0.282528	0.000014	0.017063	0.00041	-3.3	0.5	1.21	0.01		
11SY-28											
11SY-28-01	256	0.282568	0.000011	0.06426	0.001381	-1.8	0.4	1.15	0.01	9.93	0.29
11SY-28-02	255	0.28250	0.000012	0.01313	0.00037	-4.1	0.4	1.26	0.01	9.77	0.22
11SY-28-03	256	0.282515	0.000016	0.007078	0.000256	-3.5	0.6	1.23	0.01	9.74	0.24
11SY-28-04	256	0.282549	0.000019	0.031541	0.000749	-2.4	0.7	1.18	0.01	9.43	0.3

11SY-28-05	256	0.282503	0.000016	0.015386	0.00043	-4.0	0.5	1.25	0.01	9.59	0.25
11SY-28-06	256	0.282496	0.000014	0.014931	0.000405	-4.2	0.5	1.27	0.01	10.07	0.26
11SY-28-07	256	0.282561	0.000019	0.023914	0.000596	-2.0	0.6	1.16	0.01	9.35	0.25
11SY-28-08	255	0.282627	0.000023	0.077415	0.001682	0.2	0.8	1.05	0.02	9.90	0.29
11SY-28-09	256	0.282544	0.000018	0.054991	0.001211	-2.6	0.6	1.19	0.01	10.18	0.29
11SY-28-10	256	0.282505	0.000018	0.039121	0.000851	-4.0	0.6	1.26	0.01	9.99	0.23
11SY-28-11	254	0.282529	0.000015	0.02389	0.000567	-3.1	0.5	1.21	0.01	10.37	0.26
11SY-28-12	256	0.282571	0.000013	0.040643	0.000954	-1.6	0.5	1.14	0.01	10.36	0.30
11SY-28-13	256	0.282526	0.000012	0.042283	0.000947	-3.2	0.4	1.22	0.01	10.2	0.30
11SY-28-14	255	0.282556	0.000013	0.034335	0.000768	-2.2	0.4	1.17	0.01	10.17	0.19
11SY-28-15	255	0.282604	0.000013	0.075531	0.001613	-0.6	0.5	1.09	0.01	10.19	0.31
11SY-28-16	278	0.282527	0.000014	0.02935	0.000665	-2.7	0.5	1.21	0.01	9.88	0.33
11SY-28-17	257	0.282514	0.000011	0.031941	0.00074	-3.6	0.4	1.24	0.01	10.26	0.28
11SY-28-18	257	0.282565	0.000015	0.04697	0.001019	-1.9	0.5	1.15	0.01	10.46	0.30
11SY-28-19	256	0.282519	0.000106	0.073668	0.001562	-3.6	3.7	1.24	0.17	9.99	0.25
11SY-28-20	254	0.282533	0.000011	0.029352	0.000654	-3.0	0.4	1.21	0.01	10.05	0.26
11SY-28-21	256	0.28253	0.000011	0.024183	0.000578	-3.1	0.4	1.21	0.01		
11SY-28-22	257	0.282496	0.000013	0.018838	0.000474	-4.2	0.5	1.27	0.01		
11SY-28-23	256	0.282588	0.000016	0.058781	0.001216	-1.1	0.6	1.11	0.01		
11SY-28-24	255	0.282529	0.000013	0.024699	0.000558	-3.1	0.5	1.21	0.01		

11SY-25

11SY-25-1	247	0.282579	0.000014	0.045395	0.001019	-1.6	0.5	1.13	0.01	10.61	0.25
11SY-25-2	241	0.28254	0.000014	0.028615	0.000660	-3.0	0.5	1.20	0.01	10.87	0.28
11SY-25-3	245	0.282465	0.000013	0.032991	0.000678	-5.6	0.4	1.33	0.02	10.79	0.21
11SY-25-4	245	0.282574	0.000020	0.073165	0.001892	-1.9	0.7	1.14	0.02	10.95	0.23
11SY-25-5	246	0.282642	0.000014	0.048909	0.001098	0.6	0.5	1.02	0.01	10.66	0.30
11SY-25-6	247	0.282492	0.000012	0.027485	0.000533	-4.6	0.4	1.28	0.02	10.65	0.26
11SY-25-7	253	0.282445	0.000014	0.005169	0.000114	-6.0	0.5	1.35	0.01	10.95	0.39
11SY-25-8	254	0.282475	0.000019	0.050994	0.001292	-5.2	0.7	1.31	0.02	11.41	0.17
11SY-25-9	253	0.282613	0.000012	0.042804	0.000916	-0.2	0.4	1.07	0.01	10.88	0.21
11SY-25-10	245	0.282569	0.000015	0.010887	0.000229	-1.8	0.5	1.14	0.02	10.79	0.21
11SY-25-11	250	0.282497	0.000014	0.053849	0.001248	-4.4	0.5	1.27	0.02		
11SY-25-12	243	0.282637	0.000014	0.043349	0.00093	0.4	0.5	1.03	0.01		

11SY-25-13	315	0.282347	0.000016	0.118041	0.002789	-8.7	0.5	1.54	0.01
11SY-25-14	325	0.282611	0.000015	0.010055	0.000224	1.4	0.5	1.05	0.01
11SY-25-15	2463	0.281417	0.000026	0.032832	0.000757	6.1	0.9	2.58	0.02
11SY-25-16	247	0.282662	0.000014	0.001207	0.053057	1.6	0.5	0.98	0.01
11SY-25-17	244	0.282651	0.000012	0.048108	0.001040	0.9	0.4	1.00	0.01
11SY-26									
11SY-26-01	243	0.282484	0.000012	0.028705	0.000689	-4.9	0.4	1.29	0.01
11SY-26-02	241	0.282519	0.000012	0.035830	0.000831	-3.7	0.4	1.23	0.01
11SY-26-03	243	0.282501	0.000011	0.015606	0.000391	-4.3	0.4	1.26	0.01
11SY-26-04	241	0.282516	0.000013	0.039050	0.000892	-3.7	0.5	1.24	0.01
11SY-26-05	239	0.282536	0.000012	0.039169	0.000906	-3.1	0.4	1.21	0.01
11SY-26-06	240	0.282462	0.000030	0.078083	0.002076	-6.1	1.1	1.34	0.01
11SY-26-07	246	0.282483	0.000014	0.033205	0.000820	-4.9	0.5	1.30	0.01
11SY-26-08	238	0.282481	0.000014	0.036772	0.000892	-5.0	0.5	1.30	0.01
11SY-26-09	237	0.282500	0.000011	0.027778	0.000679	-4.3	0.4	1.26	0.01
11SY-26-10	245	0.282507	0.000012	0.047061	0.001162	-4.1	0.4	1.26	0.01
11SY-26-11	243	0.282498	0.000012	0.033608	0.000826	-4.4	0.4	1.27	0.01
11SY-26-12	241	0.282516	0.000013	0.036922	0.000862	-3.8	0.4	1.24	0.01
11SY-26-13	241	0.282513	0.000015	0.029607	0.000714	-3.9	0.5	1.24	0.01
11SY-26-14	254	0.282473	0.000012	0.034236	0.000828	-5.1	0.4	1.31	0.01
11SY-26-15	234	0.282572	0.000017	0.104200	0.002299	-2.1	0.6	1.15	0.01
11SY-26-16	234	0.282511	0.000011	0.006252	0.000121	-3.9	0.4	1.24	0.01
11SY-26-17	254	0.282459	0.000012	0.063296	0.001485	-5.8	0.4	1.34	0.01
11SY-26-18	232	0.282465	0.000018	0.040322	0.001159	-5.7	0.6	1.33	0.01
11SY-26-19	251	0.282455	0.000015	0.017116	0.000341	-5.7	0.5	1.34	0.01
11SY-26-20	240	0.282456	0.000015	0.013640	0.000375	-5.8	0.5	1.34	0.01
11SY-26-21	240	0.282446	0.000015	0.051373	0.001210	-6.3	0.5	1.36	0.01
11SY-26-22	241	0.282497	0.000013	0.031193	0.000768	-4.4	0.5	1.27	0.01
11SY-26-23	233	0.282525	0.000015	0.031704	0.000695	-3.5	0.5	1.22	0.01
11SY-26-24	240	0.282526	0.000014	0.045954	0.001084	-3.5	0.5	1.22	0.01
11SY-26-25	235	0.282567	0.000020	0.153417	0.003434	-2.5	0.7	1.17	0.01
17HN-32									
17HN-32-01	248	0.282507	0.000013	0.021448	0.000509	-4.0	0.5	1.25	0.01

17HN-32-02	244	0.282445	0.000015	0.016744	0.000390	-6.3	0.5	1.36	0.01	11.75	0.21
17HN-32-04	238	0.282467	0.000016	0.023686	0.000557	-5.6	0.6	1.32	0.01	11.30	0.28
17HN-32-05	243	0.282433	0.000015	0.030239	0.000702	-6.8	0.5	1.38	0.01	11.56	0.24
17HN-32-07	245	0.282504	0.000015	0.078822	0.001829	-4.4	0.5	1.27	0.01	11.28	0.26
17HN-32-10	247	0.282453	0.000014	0.032159	0.000743	-6.0	0.5	1.35	0.01	11.45	0.27
17HN-32-12	241	0.282451	0.000015	0.025150	0.000573	-6.2	0.5	1.35	0.01	10.89	0.22
17HN-32-15	244	0.282452	0.000013	0.015663	0.000369	-6.0	0.4	1.35	0.01	10.96	0.18
17HN-32-17	244	0.282454	0.000017	0.026708	0.000611	-6.0	0.6	1.35	0.01	11.45	0.22
17HN-32-19	244	0.282458	0.000015	0.017976	0.000431	-5.8	0.5	1.34	0.01	11.53	0.27
17HN-32-20	244	0.282444	0.000013	0.038031	0.000879	-6.4	0.5	1.37	0.01	10.88	0.15

17HN-33

17HN-33-01	239	0.282423	0.000013	0.039433	0.000971	-7.4	0.5	1.41	0.02
17HN-33-02	244	0.282424	0.000014	0.024822	0.000588	-7.1	0.5	1.40	0.02
17HN-33-03	237	0.282514	0.000012	0.046587	0.001104	-4.0	0.4	1.24	0.02
17HN-33-04	236	0.282410	0.000014	0.027882	0.000648	-7.5	0.5	1.42	0.02
17HN-33-05	235	0.282458	0.000014	0.028985	0.000692	-5.9	0.5	1.34	0.02
17HN-33-06	236	0.282431	0.000016	0.020378	0.000494	-7.3	0.6	1.39	0.02
17HN-33-07	239	0.282433	0.000016	0.025435	0.000581	-7.1	0.6	1.39	0.02
17HN-33-08	236	0.282452	0.000014	0.023930	0.000564	-6.4	0.5	1.35	0.02
17HN-33-09	246	0.282441	0.000016	0.014891	0.000356	-6.7	0.6	1.37	0.02
17HN-33-10	236	0.282500	0.000015	0.021010	0.000494	-4.8	0.5	1.27	0.02
17HN-33-11	241	0.282461	0.000016	0.019753	0.000455	-5.5	0.5	1.33	0.02
17HN-33-12	240	0.282452	0.000014	0.019435	0.000453	-5.9	0.5	1.35	0.02
17HN-33-13	248	0.282328	0.000014	0.027618	0.000657	-10.4	0.5	1.56	0.02

11HN-67

11HN-67-01	241	0.282452	0.000016	0.023305	0.000557	-6.1	0.5	1.35	0.01
11HN-67-02	242	0.282473	0.000016	0.026936	0.000623	-5.4	0.6	1.31	0.01
11HN-67-03	242	0.282492	0.000014	0.049338	0.001125	-4.8	0.5	1.28	0.01
11HN-67-04	241	0.282422	0.000012	0.024037	0.000551	-7.2	0.4	1.40	0.01
11HN-67-05	241	0.282450	0.000013	0.022895	0.000531	-6.2	0.5	1.35	0.01
11HN-67-06	241	0.282461	0.000016	0.034426	0.000784	-5.8	0.6	1.33	0.01
11HN-67-07	241	0.282495	0.000016	0.035271	0.000814	-4.7	0.6	1.28	0.01
11HN-67-08	244	0.282505	0.000015	0.049862	0.001115	-4.3	0.5	1.26	0.01

11HN-67-09	241	0.282460	0.000013	0.050696	0.001124	-5.9	0.5	1.34	0.01
11HN-67-10	245	0.282514	0.000014	0.027381	0.000672	-3.9	0.5	1.24	0.01
11HN-67-11	242	0.282487	0.000016	0.033834	0.000768	-4.9	0.6	1.29	0.01
11HN-67-12	245	0.282460	0.000013	0.032984	0.000763	-5.8	0.5	1.34	0.01
11HN-67-13	242	0.282461	0.000014	0.025838	0.000605	-5.8	0.5	1.33	0.01
11HN-67-14	242	0.282496	0.000015	0.029471	0.000692	-4.6	0.5	1.27	0.01
11HN-67-15	243	0.282500	0.000014	0.042646	0.001032	-4.5	0.5	1.27	0.01
11HN-67-16	241	0.282494	0.000015	0.034969	0.000827	-4.7	0.5	1.28	0.01
11HN-67-17	243	0.282458	0.000014	0.038016	0.000861	-5.9	0.5	1.34	0.01
11HN-67-18	242	0.282482	0.000015	0.038777	0.000881	-5.1	0.5	1.30	0.01
11HN-67-19	242	0.282448	0.000014	0.034963	0.000805	-6.3	0.5	1.36	0.01
11HN-67-20	244	0.282463	0.000016	0.036825	0.000874	-5.7	0.6	1.33	0.01
11HN-67-21	241	0.282445	0.000014	0.023727	0.000548	-6.4	0.5	1.36	0.01
11HN-67-22	241	0.282479	0.000012	0.044124	0.000983	-5.2	0.4	1.30	0.01
11HN-22									
11HN-22-01	535	0.282404	0.000015	0.282404	0.000015	-1.7	0.5	1.37	0.01
11HN-22-02	223	0.282381	0.000015	0.282381	0.000015	-9.2	0.5	1.48	0.01
11HN-22-03	2289	0.281421	0.000016	0.281421	0.000016	2.3	0.6	2.62	0.02
11HN-22-04	767	0.28195	0.000013	0.28195	0.000013	-12.5	0.5	2.10	0.01
11HN-22-05	223	0.28242	0.000012	0.28242	0.000012	-7.5	0.4	1.41	0.01
11HN-22-06	223	0.28236	0.000015	0.28236	0.000015	-9.8	0.5	1.51	0.01
11HN-22-07	223	0.282388	0.000019	0.282388	0.000019	-8.8	0.7	1.47	0.01
11HN-22-08	885	0.282036	0.000017	0.282036	0.000017	-6.6	0.6	1.90	0.01
11HN-22-09	1548	0.281915	0.000017	0.281915	0.000017	3.0	0.6	1.98	0.02
11HN-22-10	223	0.282425	0.000012	0.282425	0.000012	-7.3	0.4	1.40	0.01
11HN-22-11	223	0.282398	0.000012	0.282398	0.000012	-8.4	0.4	1.45	0.01
11HN-22-12	223	0.282311	0.000017	0.282311	0.000017	-11.7	0.6	1.60	0.01
11HN-22-13	223	0.282334	0.000013	0.282334	0.000013	-10.8	0.5	1.56	0.01
11HN-22-15	223	0.282351	0.000015	0.282351	0.000015	-10.4	0.5	1.54	0.01

Supplement Table S3: Major oxides (wt%), trace element (ppm) and Sr-Nd isotopic analytical results for the Permian-Triassic granitoids from Hainan Island in this study

Sample	11SY-21	11SY-22A	11SY-27	11SY-28	11SY-25	11SY-26	13CZ-3A	13CZ-3B	17HN-32	17HN-33	11HN-51	11HN-67
	Group 1						Group 2				Group 3	
Age	255	253	252	256	247	247	247	246	244	239	237	242
SiO ₂	69.43	69.83	67.61	65.04	68.77	64.65	75.75	73.57	74.66	71.66	71.89	70.90
TiO ₂	0.45	0.51	0.63	1.34	0.54	0.83	0.20	0.24	0.22	0.30	0.30	0.36
Al ₂ O ₃	14.91	13.78	14.51	15.39	15.28	15.33	13.78	13.69	13.74	13.63	13.68	13.65
FeOt	3.43	3.54	4.12	5.03	2.77	4.82	1.80	2.00	1.90	3.13	3.16	3.30
MgO	0.93	1.33	1.96	1.72	0.92	1.45	0.14	0.58	0.36	0.34	0.35	0.27
MnO	0.07	0.06	0.08	0.08	0.05	0.06	0.01	0.05	0.03	0.05	0.07	0.05
CaO	2.96	1.70	3.51	4.31	2.74	3.40	1.49	1.72	1.61	1.37	1.37	0.92
K ₂ O	4.49	5.04	3.49	2.91	3.55	3.55	3.57	4.13	3.85	5.41	5.42	5.91
Na ₂ O	2.77	2.76	2.47	3.10	3.80	3.21	2.42	2.97	2.70	3.08	3.05	2.93
P ₂ O ₅	0.09	0.12	0.10	0.37	0.13	0.17	0.02	0.06	0.04	0.06	0.06	0.05
LOI	0.50	0.44	0.43	0.67	1.55	2.49	0.60	0.75	0.67	0.78	1.25	1.23
Total	100.03	99.60	98.92	99.95	100.10	99.96	99.77	99.76	99.77	99.80	100.65	99.65
Sc	11.4	13.2	12.6	14.8	7.82	10.0	4.64	8.13	7.27	7.40	7.40	7.27
V	20.4	45.6	74.8	63.3	29.1	45.5	5.48	28.8	1.10	10.1	10.2	5.25
Cr	11.6	18.7	35.4	6.68	8.67	19.1	7.08	11.6	30.9	8.03	21.8	1.10
Co	4.19	8.77	9.04	9.32	3.56	6.41	1.96	3.01	7.83	9.63	9.63	30.9
Ni	14.2	16.4	23.0	3.35	5.09	7.73	2.71	6.11	1.75	4.36	5.11	1.75
Ga	18.3	21.5	14.6	22.5	19.3	18.9	14.2	19.0	19.0	20.5	18.2	19.0
Rb	222	174	222	240	141	153	193	242	238	199	239	238
Sr	202	364	482	302	331	348	232	204	142	163	168	142
Y	46.8	18.9	27.2	46.2	13.3	22.1	6.35	16.2	34.7	30.8	35.7	34.7
Zr	187	252	168	142	161	266	139	110	358	308	366	358
Nb	16.3	17.2	7.79	20.6	10.1	13.5	4.69	10.8	18.9	18.3	20.3	18.9
Ba	276	275	204	248	533	561	397	265	924	698	885	924
La	47.2	25.8	23.9	29.6	42.2	48.4	9.30	16.1	112	94.8	114	112
Ce	94.1	52.6	44.9	66.9	75.7	90.4	18.1	31.1	217	183	220	217
Pr	10.9	5.83	5.41	8.67	8.23	9.73	1.89	2.99	24.7	20.0	24.6	24.7
Nd	40.0	21.1	20.8	33.7	27.9	33.3	7.16	10.8	86.2	72.0	86.9	86.2
Sm	8.93	4.36	4.23	8.14	4.91	6.20	1.43	2.31	12.7	11.5	13.3	12.7

Eu	0.82	1.25	0.94	1.36	0.98	1.27	0.76	0.62	1.74	1.18	1.60	1.74
Gd	8.23	3.87	4.10	7.54	4.00	5.13	1.14	1.72	9.07	8.28	9.49	9.07
Tb	1.45	0.63	0.69	1.44	0.55	0.76	0.18	0.34	1.30	1.20	1.36	1.30
Dy	8.11	3.18	3.93	7.94	2.41	3.69	1.07	2.38	7.10	6.08	7.20	7.10
Ho	1.75	0.70	0.87	1.69	0.44	0.76	0.20	0.52	1.32	1.17	1.36	1.32
Er	4.51	1.87	2.39	4.36	1.13	2.00	0.66	1.57	3.46	3.00	3.53	3.46
Tm	0.65	0.27	0.39	0.62	0.16	0.26	0.11	0.29	0.49	0.43	0.50	0.49
Yb	4.13	1.75	2.50	3.81	0.98	1.80	0.79	2.13	3.07	2.82	3.22	3.07
Lu	0.62	0.24	0.37	0.53	0.13	0.27	0.12	0.27	0.46	0.43	0.49	0.46
Hf	5.91	6.03	4.04	4.02	4.07	6.33	4.65	2.84	9.52	8.98	10.1	9.52
Ta	2.33	1.89	0.59	2.51	1.14	1.04	0.56	1.48	1.59	1.22	1.53	1.59
Pb	34.4	17.9	9.75	15.9	25.9	15.6	44.6	38.5	35.3	33.9	36.0	35.3
Th	31.4	7.16	8.01	14.5	22.4	19.2	34.7	8.80	42.4	24.8	34.7	42.4
U	26.5	7.15	1.91	10.0	5.11	4.25	11.9	7.35	5.35	4.48	4.92	5.35
$^{87}\text{Rb}/^{86}\text{Sr}$	3.174	1.336	1.336	2.301	1.230	1.28	2.409					
$^{147}\text{Sm}/^{144}\text{Nd}$	0.135	0.125	0.123	0.146	0.106	0.112	0.121					
$^{87}\text{Sr}/^{86}\text{Sr}$	0.71984	0.71302	0.70882	0.71653	0.71192	0.71429	0.71779					
2σ	9	7	8	7	7	8	12					
$^{143}\text{Nd}/^{144}\text{Nd}$	0.51230	0.51225	0.51235	0.51224	0.51225	0.5122	0.51232					
2σ	3	4	3	4	3	4	8					
$(^{87}\text{Sr}/^{86}\text{Sr})_i$	0.70834	0.70804	0.70406	0.70815	0.70757	0.70984	0.70939					
$\epsilon_{\text{Nd}}(t)$	-4.59	-5.45	-3.25	-6.11	-4.71	-5.89	-3.81					
Tzr	774	819	757	727	765	795	792	754	773	842	859	867

Supplement Table S4: Major oxides (wt%), trace element (ppm) and Sr-Nd isotopic analytical results for the previous Permian-Triassic granitoids from Hainan Island

Sample	08HNK	0909HN	0909HN	09HN 28-1	09HN 28-3	0909HN	0909HN	0909HN	0909HN	0909HN	08HNK
	25-3	84-1	84-2			63-3	23-1	23-2	22-1	22-2	25-1
Permian granites (272-253Ma)											
Age	257	264	264	263	263	256	272	272	272	272	262
SiO ₂	73.10	65.60	65.40	71.30	69.60	67.40	71.70	70.90	66.70	66.10	68.80
TiO ₂	0.26	0.68	0.69	0.40	0.43	0.82	0.40	0.35	0.53	0.60	0.50
Al ₂ O ₃	13.70	16.00	16.20	14.60	15.00	15.20	13.70	14.50	15.90	15.90	15.10
FeOt	1.92	4.34	4.32	1.83	2.56	3.75	2.74	2.39	3.64	3.99	3.07
MgO	0.36	1.25	1.26	0.50	0.79	1.40	0.79	0.65	0.85	0.98	0.85
MnO	0.04	0.06	0.06	0.02	0.03	0.05	0.04	0.03	0.06	0.05	0.07
CaO	1.57	3.79	3.71	1.31	2.10	3.87	1.98	2.03	2.86	2.80	2.18
K ₂ O	4.58	3.41	3.59	5.69	4.56	3.85	4.06	4.26	4.13	3.95	3.76
Na ₂ O	3.32	3.47	3.36	3.22	3.36	2.71	2.98	3.27	3.57	3.61	4.13
P ₂ O ₅	0.06	0.15	0.15	0.09	0.18	0.19	0.08	0.07	0.12	0.13	0.15
LOI	0.54	0.75	0.77	0.56	0.85	0.88	1.07	0.98	1.22	1.44	0.97
Total	99.45	99.50	99.51	99.52	99.46	100.00	99.50	99.50	99.50	99.50	99.50
Sc	6.13	6.86	6.91	2.06	2.58	5.62	7.23	5.32	5.79	5.25	6.07
V	19.0	52.4	51.4	25.1	36.2	52.0	21.8	18.5	29.4	30.2	33.3
Cr	2.58	7.12	8.15	2.76	3.11	12.9	8.85	6.45	3.08	2.50	5.01
Co	45.9	45.0	48.0	35.0	34.5	48.2	50.2	52.2	33.1	34.8	28.8
Ni	1.82	1.61	2.49	2.50	2.57	3.93	3.13	2.14	0.82	0.55	2.29
Ga	18.0	21.3	21.0	20.1	21.9	19.3	19.3	20.5	21.78	21.9	20.3
Rb	202	186	194	232	190	162	189	184	126.2	119	174
Sr	123	368	370	394	524	508	206	253	433	502	241
Y	29.6	24.8	23.4	11.3	13.1	26.4	32.0	33.4	23.2	21.9	37.1
Zr	167	251	259	311.9	268	203	227	233	238	249	295
Nb	12.2	11.8	11.3	8.06	6.99	13.2	11.4	11.3	10.7	10.3	20.6
Ba	325	638	697	1257	1145	667	424	407	991	912	723
La	45.8	49.9	45.2	108	92.9	38.6	42.6	36.0	48	72.5	59.9

Ce	95.7	98.5	88.9	203	164	83.4	92.4	79.0	102	139	123
Pr	11.8	11.4	10.1	21.0	17.4	10.7	11.6	9.90	12.2	15.6	14.1
Nd	42.9	39.9	36.6	68.0	54.9	40.8	43.4	38.1	44.3	53.8	50.1
Sm	8.24	6.94	6.46	8.31	6.97	7.80	8.63	8.23	7.96	8.35	9.24
Eu	0.64	1.36	1.39	1.17	1.24	1.51	0.91	0.84	1.52	1.52	1.02
Gd	6.55	5.53	5.34	5.74	3.31	6.27	7.30	7.21	6.36	6.07	8.11
Tb	1.05	0.86	0.80	0.54	0.44	0.96	1.21	1.2	0.94	0.89	1.39
Dy	5.72	4.64	4.34	2.19	2.23	5.09	6.63	6.59	5.02	4.57	7.69
Ho	1.11	0.91	0.83	0.37	0.42	0.97	1.30	1.30	0.96	0.85	1.43
Er	2.98	2.38	2.27	0.95	1.17	2.54	3.26	3.49	2.50	2.25	3.80
Tm	0.44	0.37	0.33	0.12	0.18	0.36	0.45	0.49	0.36	0.32	0.50
Yb	2.77	2.36	2.29	0.73	1.08	2.35	2.84	3.24	2.21	2.08	3.01
Lu	0.45	0.37	0.34	0.10	0.14	0.34	0.44	0.51	0.32	0.31	0.44
Hf	5.52	6.95	6.98	7.71	6.49	5.49	6.55	7.34	6.89	6.98	7.91
Ta	1.18	2.00	1.91	0.58	0.63	1.46	1.5	1.39	1.19	0.91	1.75
Pb	26.7	24.3	23.7	44.5	34.7	23.1	32.6	34.9	30.2	28.4	18.8
Th	28.6	19.9	17.5	53.5	35.4	14.8	22.6	32.4	13.1	18.4	19.9
U	10.1	5.85	6.25	5.77	3.23		5.71	9.85	2.58	2.22	3.95
$^{87}\text{Rb}/^{86}\text{Sr}$		1.5		1.7				2.1		0.7	2.1
$^{147}\text{Sm}/^{144}\text{Nd}$	0.1051		0.0739				0.1307		0.0939	0.1115	
$^{87}\text{Sr}/^{86}\text{Sr}$	0.71572		0.716509				0.722609		0.713817	0.722555	
2σ	12		12				12		11	13	
$^{143}\text{Nd}/^{144}\text{Nd}$	0.512192		0.512124				0.512328		0.512146	0.512181	
2σ	8		10				9		8	8	
$(^{87}\text{Sr}/^{86}\text{Sr})_i$	0.71022		0.71012				0.71448		0.71116	0.71473	
$\varepsilon_{\text{Nd}}(t)$	-5.6		-5.9				-3.8		-6	-6.1	
Tzr	786	785	791	848	821	765	809	811	797	803	825
Reference	Wen, 2013										

(To be continue)

Sample	2011 TC-4	09HN 14-1	09HN 14-2	0909HN	0909HN	0909HN	09HN 43-1	09HN 43-2	0909HN	0909HN	08HNK
				25-1	25-2	25-3			63-1	63-2	25-2
Permian granites (272-253Ma)											
Age	258	254	254	257	257	257	257	256	254	254	262
SiO ₂	66.30	66.60	66.70	65.70	66.20	67.10	73.10	73.90	66.20	67.20	72.50
TiO ₂	0.80	0.77	0.79	0.68	0.67	0.58	0.32	0.17	0.96	0.86	0.27
Al ₂ O ₃	15.50	14.80	15.10	15.70	15.50	15.40	13.50	13.40	15.00	15.00	13.30
FeOt	4.95	4.47	4.59	4.54	4.41	3.84	1.51	1.11	4.19	3.93	2.10
MgO	1.05	0.98	0.96	1.25	1.22	1.07	0.34	0.26	1.56	1.48	0.43
MnO	0.08	0.07	0.08	0.06	0.06	0.05	0.02	0.02	0.05	0.05	0.04
CaO	2.95	2.24	3.18	3.59	3.28	3.24	0.91	0.93	3.97	3.78	1.35
K ₂ O	4.74	5.00	4.65	3.50	3.90	3.91	6.00	5.74	3.89	4.05	4.41
Na ₂ O	2.79	3.06	2.79	3.41	3.23	3.24	2.62	2.43	2.67	2.61	4.47
P ₂ O ₅	0.28	0.27	0.27	0.14	0.14	0.12	0.07	0.04	0.21	0.20	0.07
LOI	0.38	1.25	0.90	0.95	0.85	0.88	0.07	1.45	1.31	0.86	0.66
Total	99.40	99.50	100.00	99.50	99.50	99.50	0.07	99.50	100.00	100.00	99.60
Sc	7.50	3.59	3.85	7.14	7.27	5.70	2.73	6.13	6.63	6.68	7.62
V	44.8	35.9	33.7	39.5	37.7	34.4	13.3	12.0	55.8	53.4	19.4
Cr	105	1.77	3.30	7.55	7.04	6.83	2.12	6.29	12.7	11.7	3.01
Co	6.59	25.8	24.4	55.8	51.7	51.7	28.0	60.7	47.7	52.5	33.2
Ni	12.1	1.60	1.73	2.60	2.77	2.60	1.98	3.77	3.81	3.88	1.69
Ga	41.0	22.4	21.1	22.5	22.0	21.2	18.9	20.5	19.3	19.5	17.1
Rb	191	192	223	183	193	181	282	404	166	164	205
Sr	615	601	547	331	322	334	149	150	475	498	121
Y	22.3	30.1	28.5	34.7	34.7	29.2	22.5	35.7	36.2	28.6	31.8
Zr	338	393	382	265	265	225	184	137	215	204	174
Nb	31.4	37.4	36.6	15.2	15.1	13.3	15.4	13.7	16.4	14.1	13.4
Ba	1596	1414	1452	516	615	657	552	613	655	700	309
La	87.2	87.0	94.2	48.1	51.5	39.3	61.5	41.3	34.3	31.8	32.8
Ce	160	163	169	99.5	105	79.9	123	83.6	82.2	72.5	72.0

Pr	17.6	18.1	19.3	12.2	12.6	9.80	14.7	10.0	11.5	9.80	8.90
Nd	59.6	63.4	66.0	44.5	46.1	36.2	51.5	34.8	47.1	38.4	32.6
Sm	9.26	10.5	10.5	8.96	9.17	7.30	8.69	6.81	9.92	8.03	7.05
Eu	1.88	1.92	1.92	1.28	1.22	1.19	0.91	0.67	1.55	1.44	0.65
Gd	7.60	7.69	7.39	8.12	8.24	6.38	6.67	6.50	8.27	6.43	6.26
Tb	1.00	1.17	1.13	1.31	1.31	1.03	0.97	1.00	1.36	1.03	1.08
Dy	4.90	6.07	5.78	6.81	6.78	5.58	4.96	5.33	7.11	5.44	5.91
Ho	0.84	1.12	1.07	1.30	1.31	1.08	0.90	1.09	1.37	1.03	1.15
Er	2.25	2.89	2.71	3.37	3.41	2.78	2.34	3.10	3.46	2.63	3.20
Tm	0.32	0.40	0.38	0.49	0.50	0.40	0.32	0.47	0.51	0.41	0.46
Yb	1.98	2.78	2.57	3.20	3.17	2.59	1.96	3.13	3.07	2.46	3.17
Lu	0.28	0.42	0.37	0.45	0.46	0.38	0.29	0.46	0.46	0.36	0.48
Hf	8.06	9.76	9.22	7.58	7.52	6.38	6.23	3.89	6.05	5.58	5.72
Ta	2.47	3.17	2.73	1.49	1.43	1.25	1.70	1.70	1.89	1.59	1.29
Pb	24.8	34.7	31.4	21.9	25.1	23.6	130	135	22.0	23.6	27.0
Th	20.5	26.7	27.1	20.4	20.4	15.3	43.6	25.2	13.3	13.4	31.7
U	3.66	6.25	4.38	4.65	5.63	3.93	10.4	10.5			11.9
$^{87}\text{Rb}/^{86}\text{Sr}$		0.9				1.600		7.800			1.0
$^{147}\text{Sm}/^{144}\text{Nd}$		0.1003				0.122		0.1182			0.1265
$^{87}\text{Sr}/^{86}\text{Sr}$		0.71574				0.71924		0.73231			0.71368
2σ		11				13		11			11
$^{143}\text{Nd}/^{144}\text{Nd}$		0.51201				0.51219		0.51219			0.51216
2σ		8				8		8			7
($^{87}\text{Sr}/^{86}\text{Sr}$)i		0.7124				0.7135		0.70394			0.71023
$\varepsilon_{\text{Nd}}(t)$		-9.2				-6.3		-6.1			-7.1
Tzr	827	850	830	792	798	784	807	785	764	765	779
Reference	Wen, 2013										

(To be continue)

Sample	SL15-1	SL15-2	0909HN 91-1	0909HN 91-2	2011 TC-1	0909HN 74	0909HN 24	WZS	0909HN 73
Permian granites (272-253Ma)									
Age	254	252	258	258	258	245	249	243	245
SiO ₂	72.05	70.20	66.80	65.90	68.70	65.47	65.30	74.90	67.30
TiO ₂	0.38	0.41	0.93	1.02	0.59	0.85	0.71	0.19	0.76
Al ₂ O ₃	13.04	14.22	14.80	14.80	15.20	15.20	15.40	12.90	15.00
FeOt	2.96	3.10	3.81	4.11	3.95	4.95	5.00	2.10	4.30
MgO	0.70	0.73	1.53	1.68	0.81	1.40	1.01	0.15	1.51
MnO	0.05	0.06	0.04	0.04	0.06	0.07	0.08	0.03	0.06
CaO	1.89	2.62	3.30	3.51	2.68	2.96	1.96	0.95	4.14
K ₂ O	4.59	3.97	5.07	4.92	4.75	3.25	4.53	5.49	3.12
Na ₂ O	3.06	2.82	2.51	2.61	2.71	3.14	3.41	2.63	2.71
P ₂ O ₅	0.13	0.14	0.33	0.37	0.21	0.21	0.14	0.02	0.16
LOI	0.44	0.67	0.94	0.99	0.25	1.34	1.98	0.63	0.99
Total	99.29	98.94	100.00	100.00	99.50	98.84	99.52	100.00	100.05
Sc	5.90	6.80	6.13	6.12	6.41	6.50	9.11	7.02	6.09
V	19.0	23.0	66.1	69.6	36.7	57	46.1	7.40	33.9
Cr	6.00	8.00	18.8	21.9	103	10	6.70	0.90	9.20
Co	4.10	3.80	48.9	48.0	5.15	8.9	40.6	76.7	62.5
Ni	2.10	2.20	9.33	11.9	12.6	3.3	2.30	0.70	2.80
Ga	18.9	20.2	19.2	19.4	37.6	23.1	22.2	21.2	19.5
Rb	147	195	186.	190	195	184.0	173	342	128
Sr	381	196	687	684	595	357	276	39.4	471
Y	23.3	21.1	19.8	20.7	15.6	28.2	42.2	89.3	27.0
Zr	161	169	266	273	359	319	297	216	221
Nb	13.1	14.5	15.5	17.3	25.8	17.6	23.9	21.7	12.9
Ba	362	269	1494	1418	1471	434	528	198	423
La	32.3	30.7	54.9	56.4	60.8	47.6	85.5	98.5	43.5
Ce	62.4	61.7	111	115	112	97.6	167	214	90.2

Sample	(To be continue)										
	BD10	D121-1	H306	S043-1	09HN53	S029	D1447-1	S08-2	D35-1	S013-2	SY15
Middle-Late Triassic granites (242-225Ma)											
Age	241	241	241	241	238	241	241	241	241	241	240
SiO ₂	66.44	72.60	74.64	69.82	68.30	71.78	68.52	72.98	73.33	69.70	78.88
TiO ₂	0.35	0.20	0.17	0.32	0.66	0.27	0.29	0.22	0.22	0.29	0.10
Al ₂ O ₃	14.98	13.48	12.80	14.50	15.10	13.22	15.55	13.03	12.74	14.49	10.90
FeOt	4.90	2.79	2.74	3.39	4.30	3.55	3.48	2.98	3.16	3.51	0.96
MgO	0.12	0.19	0.19	0.25	1.05	0.19	0.48	0.10	0.06	0.40	0.13
MnO	0.09	0.04	0.04	0.06	0.05	0.07	0.06	0.04	0.06	0.06	0.04
CaO	2.20	1.14	0.94	1.62	3.12	1.04	2.55	0.96	0.81	1.60	0.40
K ₂ O	6.50	5.42	5.10	6.00	3.80	6.06	5.14	5.80	6.20	5.30	4.50
Na ₂ O	3.61	3.40	3.10	3.19	2.69	3.16	3.28	3.36	2.90	3.57	2.65
P ₂ O ₅	0.04	0.04	0.04	0.06	0.16	0.04	0.08	0.02	0.01	0.06	0.01
LOI	1.00	0.42	0.63	0.40	0.73	0.68	0.56	0.71	0.39	0.70	0.65
Total	100.20	99.70	100.40	99.60	99.96	100.10	100.00	100.20	99.90	99.70	99.22
Sc	3.60	9.30	10.4	15.5	8.35	5.40	9.10		6.90	7.60	1.80
V	5.30	8.40	4.60	11.0	26.8	8.40	7.70	3.00	9.30	16.0	4.00
Cr	4.90	8.60	14.7	14.0	4.90	15.3	10.2		18.5	10.1	2.00
Co	2.40	2.20	2.2	3.60	33.1	1.00	2.10	2.80	1.70	2.70	1.00
Ni	2.00	3.10	7.2	5.50	2.60	8.50	6.10	4.00	12.0	4.20	1.10
Ga	18.7	21.6	20.7	28.5	21.9	18.1	24.0	17.0	18.8	22.8	13.6
Rb	125	174	136	162	182	133	129	218	198	227	246
Sr	95.5	151	214	393	465	26.0	194	40.0	108	120	59.0
Y	32.3	38.9	11.7	36.2	22.8	37.7	30.3	35.2	23.5	26.3	33.6
Zr	162	312	537	572.1	210	409	301	570	193	295	73.0
Nb	8.2	17.2	11.7	23.5	14.8	20.9	16.1	22.8	15.9	27.7	13.5
Ba	427	492	732	3316	672.1	41.3	1461	340	425	323	120
La	77.8	54.4	41.4	166.2	57.3	101	67.8	178	223	104	30.3
Ce	121	104	78.0	312	113	201	122	330	491	211	66.9

Pr	17.4	11.3	8.50	33.6	13.51	21.7	13.5	27.3	49.2	25.9	8.44
Nd	62.5	43.1	30.3	117	48.3	75.1	47.9	131	169	82.5	29.7
Sm	10.1	8.30	4.70	18.0	8.27	11.3	7.50	19.4	21.3	11.6	7.58
Eu	1.83	0.97	0.86	1.48	1.35	1.40	1.31	0.33	0.78	1.25	0.64
Gd	8.80	7.00	3.6	12.7	6.05	7.50	6.90	12.7	12.6	9.40	5.51
Tb	1.22	1.12	0.46	1.61	0.89	1.21	0.99	1.64	1.41	1.14	1.03
Dy	5.51	7.02	2.36	7.67	4.64	6.27	5.25	8.25	5.92	4.78	6.13
Ho	1.21	1.40	0.44	1.49	0.84	1.23	1.06	1.51	1.01	0.99	1.26
Er	2.91	3.92	1.33	3.41	2.07	3.41	2.95	3.58	2.46	2.45	3.75
Tm	0.45	0.52	0.21	0.48	0.29	0.50	0.47	0.40	0.29	0.36	0.66
Yb	2.68	3.99	1.27	2.88	1.77	3.27	3.03	2.91	2.07	1.93	4.64
Lu	0.46	0.59	0.22	0.45	0.28	0.51	0.42	0.39	0.31	0.34	0.70
Hf	5.00	9.40	13.4	14.0	5.84	13.1	7.40	14.0	6.60	9.8	3.00
Ta	0.53	0.83	0.67	1.14	1.39	0.64	0.47	1.80	1.24	1.39	2.30
Pb	19.9	24.9	20.7	30.3	22.5	86.1	19.3	35.0	28.5	38.5	
Th	9.60	33.3	7.10	10.7	21.8	27.1	21.0	22.0	15.4	32.4	20.1
U	1.60	8.00	3.60	1.70	5.97	2.80	2.50		5.60	4.5	5.77
$^{87}\text{Rb}/^{86}\text{Sr}$			3.729	3.209	1.1		1.89	14.25			10.070
$^{147}\text{Sm}/^{144}\text{Nd}$			0.0961	0.0894	0.1036		0.097	0.091			0.155
$^{87}\text{Sr}/^{86}\text{Sr}$			0.72262	0.72095	0.71438		0.71731	0.75981			0.74195
2σ					11						16
$^{143}\text{Nd}/^{144}\text{Nd}$			0.512106	0.512162	0.51213		0.51219	0.512203			0.51222
2σ					8						8
$(^{87}\text{Sr}/^{86}\text{Sr})\text{i}$					0.71055						0.70758
$\varepsilon_{\text{Nd}}(t)$			-7.29	-5.97	-7.2		-5.68	-5.25			-6.80
Tzr	755	845	909	897	786	869	821	905	804	831	739
Reference	Zhou et al., 2010	Wen, 2013	Zhou et al., 2010	Yan et al., 2017							

(To be continue)

Sample	LD15	S039	S040-2	S027	HG-438	0909HN 66	D467-1	3	4	7	8
Middle-Late Triassic granites (242-225Ma)											
Age	242	241	241	241	241	235	241	230	230	230	230
SiO ₂	68.82	76.08	75.30	69.71	75.14	70.60	70.18	72.50	72.71	71.91	74.13
TiO ₂	0.45	0.11	0.16	0.33	0.18	0.29	0.34	0.24	0.29	0.28	0.30
Al ₂ O ₃	14.28	11.78	11.82	13.65	12.76	15.00	13.76	13.40	13.87	14.82	12.63
FeOt	3.19	2.32	2.79	4.22	2.90	2.70	4.19	1.98	2.25	1.51	1.82
MgO	0.90	0.03	0.04	0.28	0.17	0.23	0.19	0.86	0.71	0.51	0.39
MnO	0.03	0.03	0.04	0.08	0.04	0.04	0.07	0.05	0.05	0.03	0.03
CaO	1.93	0.48	0.52	1.43	0.82	1.27	1.35	1.91	2.15	1.26	0.92
K ₂ O	4.04	5.46	5.40	6.12	4.80	6.10	5.65	4.55	4.26	4.76	5.90
Na ₂ O	3.55	2.90	2.97	3.02	3.22	2.74	3.24	2.91	2.43	3.31	2.58
P ₂ O ₅	0.11	0.01	0.01	0.08	0.05	0.03	0.05	0.09	0.08	0.10	0.05
LOI	2.24	0.73	0.56	0.40	0.61	0.51	0.61	1.28	1.03	1.28	1.02
Total	99.54	99.90	99.60	99.30	100.70	99.50	99.60	99.77	99.83	99.77	99.77
Sc	4.90	2.60	2.40	9.30	5.60	7.38	□				
V	24.0	0.60	0.60	4.60	1.50	7.50	13.2	32.6	18.4	21.3	15.1
Cr	10.0	7.60	8.10	3.80	1.60	0.10	9.50				
Co	3.60	0.90	0.90	2.20	1.50	59.9	3.20	6.00	4.90	5.00	3.60
Ni	1.90	3.40	2.30	1.80	2.00	0.20	3.80	8.00	8.30	6.80	5.90
Ga	20.5	19.3	20.9	17.3	18.0	20.0	22.7				
Rb	160	226	234	208	281	163	194	262	156	253	306
Sr	205	23.3	21.9	191	126	117	286	138	206	209	145
Y	22.4	47.2	48.6	43.3	13.0	35.6	36.8	20.5	24.3	14.2	14.3
Zr	201	203	293.5	393	334	182	247	107	126	134	240
Nb	12.6	30.3	28.2	19.1	17.8	15.6	12.0	15.1	10.6	13.3	22.0
Ba	519	50.3	62.5	936	653	489	939	269	403	488	492
La	54.9	107	177	129	38.0	159	100	38.5	27.2	50.4	71.1
Ce	104	210	335	256	53.0	317	197	63.1	57.1	78.1	142
Pr	11.5	22.2	34.4	28.0	7.50	37.5	21.1	8.19	6.24	9.83	11.1

Nd	39.8	77.9	122	95.9	25.0	127	75.3	27.3	23.3	33.6	55.9
Sm	7.61	13.3	20.4	14.7	5.30	18.4	11.7	5.41	4.82	6.23	8.52
Eu	0.99	0.41	0.55	1.99	0.22	1.47	1.59	0.70	0.86	0.97	1.29
Gd	5.56	9.90	15.4	9.90	2.70	12.4	8.50	4.44	4.33	4.74	4.89
Tb	0.84	1.61	2.16	1.57	0.87	1.62	1.27	0.73	0.71	0.71	0.56
Dy	4.46	9.02	10.9	8.08	3.00	7.79	6.69	3.45	4.22	2.88	3.11
Ho	0.83	1.70	1.95	1.51	0.54	1.46	1.34	0.69	0.83	0.54	0.57
Er	2.21	4.46	4.86	4.09	1.30	3.66	3.54	1.72	2.20	1.18	1.34
Tm	0.26	0.65	0.70	0.57	0.23	0.51	0.50	0.33	0.37	0.20	0.20
Yb	1.91	4.71	4.26	3.55	1.30	3.35	3.42	2.18	2.26	1.00	1.07
Lu	0.24	0.64	0.6	0.56	0.32	0.50	0.50	0.365	0.35	0.15	0.15
Hf	6.10	8.20	10.5	10.8	9.50	5.25	6.50	4.50	6.50	9.60	8.40
Ta	0.90	1.71	1.04	1.33	1.50	1.03	0.73	2.70	1.14	0.50	1.20
Pb		33.0	30.4	33.6	40.8	24.5	24.5	49.5	18.4	43.3	48.8
Th	18.10	24.2	27.5	39.6	49.3	31.8	21.2				
U	4.04	5.90	5.30	5.20	7.40	2.78	5.70				
$^{87}\text{Rb}/^{86}\text{Sr}$	2.260	26.590	1.599	3.084		4.000	4.046				
$^{147}\text{Sm}/^{144}\text{Nd}$	0.116	0.102	0.085	0.095		0.0872	0.096				
$^{87}\text{Sr}/^{86}\text{Sr}$	0.71649	0.80004	0.71811	0.72073		0.728882	0.72777				
2σ	16					14					
$^{143}\text{Nd}/^{144}\text{Nd}$	0.51216	0.512073	0.512052	0.512119		0.512122	0.51212				
2σ	3					10					
$(^{87}\text{Sr}/^{86}\text{Sr})_i$	0.70871					0.71536					
$\varepsilon_{\text{Nd}}(t)$	-6.81	-8.10	-8.00	-7.01		-6.8	-7.01				
Tzr	796	818	851	857	864	804	818	742	761	780	827
Reference	Yan et al., 2017	Zhou et al., 2010	Zhou et al., 2010	Zhou et al., 2010	Zhou et al., 2010	Wen, 2013	Zhou et al., 2010	Li et al., 2005	Li et al., 2005	Li et al., 2005	Li et al., 2005

(To be continue)

Sample	WN16-1	WN16-3	LS15	0909HN85-1	09HN 45-1	09HN 45-2
Middle-Late Triassic granites (242-225Ma)						
Age	234	234	228	234	234	234
SiO ₂	75.15	76.35	72.36	65.10	71.40	70.40
TiO ₂	0.15	0.06	0.28	0.70	0.35	0.37
Al ₂ O ₃	12.94	12.75	13.64	15.30	13.60	13.70
FeOt	1.73	1.58	2.45	6.30	3.10	3.50
MgO	0.07	0.03	0.34	0.43	0.24	0.29
MnO	0.06	0.11	0.03	0.10	0.04	0.05
CaO	0.80	0.64	1.34	1.98	0.84	0.99
K ₂ O	6.09	6.05	5.48	6.27	5.97	5.85
Na ₂ O	2.60	2.75	3.26	2.99	3.03	2.82
P ₂ O ₅	0.03	0.01	0.06	0.12	0.04	0.05
LOI	0.26	0.33	0.33	0.82	1.10	1.36
Total	99.88	100.66	99.57	100.00	99.80	99.50
Sc			6.80	14.4	6.98	7.55
V	6.09	5.91	9.00	7.90	3.50	7.00
Cr	325	175	3.00	0.30	2.10	0.10
Co	2.04	5.79	0.90	41.2	27.5	34.4
Ni			0.90		2.50	1.00
Ga	16.0	11.0	15.9	19.6	18.7	19.3
Rb	252	292	130	181	235	241
Sr	110	110	158	313	133	150
Y	23.3	23.9	17.0	31.0	31.8	37.6
Zr	99.0	55.6	274	494	345	372
Nb	18.8	16.2	8.00	25.2	17.7	20.1
Ba	279	171	326	1795	895	953
La	21.9	13.7	83.3	76.9	102	123
Ce	60.0	28.4	166	161	192	243
Pr	6.11	3.36	18.7	18.9	21.8	27.6

Nd	23.5	12.0	64.1	70.4	77.2	95.2
Sm	4.76	3.49	10.1	11.6	11.4	14.1
Eu	0.64	0.53	0.75	2.93	1.68	1.79
Gd	4.55	3.97	5.87	8.67	8.77	9.38
Tb	0.69	0.68	0.75	1.23	1.26	1.43
Dy	3.87	3.90	3.61	6.61	6.65	7.55
Ho	0.71	0.84	0.71	1.26	1.25	1.40
Er	2.13	2.44	1.73	3.27	3.33	3.60
Tm	0.37	0.38	0.26	0.48	0.48	0.51
Yb	2.24	2.60	1.80	3.08	2.97	3.17
Lu	0.35	0.36	0.28	0.48	0.43	0.50
Hf	3.40	2.60	6.80	11.43	9.72	9.32
Ta	1.04	1.52	0.40	1.56	1.54	1.65
Pb	29.2	41.8		33.7	34.9	35.7
Th	29.4	22.9	14.1	17.9	37.4	47.4
U	6.17	6.52	2.95	2.82	4.71	6.00
$^{87}\text{Rb}/^{86}\text{Sr}$	1.549		2.380	1.700		
$^{147}\text{Sm}/^{144}\text{Nd}$	0.1075		0.09587	0.0994		
$^{87}\text{Sr}/^{86}\text{Sr}$	0.71565		0.71504	0.717338		
2σ			14	14		
$^{143}\text{Nd}/^{144}\text{Nd}$	0.5122		0.51226	0.512147		
2σ			9	9		
$(^{87}\text{Sr}/^{86}\text{Sr})_i$	0.71041		0.70731	0.71178		
$\varepsilon_{\text{Nd}}(t)$	-5.90		-4.49	-6.7		
Tzr	753	710	829	873	864	871
Reference	Tang et al., 2013	Tang et al., 2013	Yan et al., 2017	Wen, 2013	Wen, 2013	Wen, 2013

(continued)

REFERENCES CITED

- Li, S. X., Yun, Y., Fan, Y., et al., 2005, Zircon U-Pb Age and Its Geological Significance for Qiongzong Pluton in Qiongzong Area, Hainan Island[in Chinese with English abstract]: *Geotectonica et Metallogenica*, v. 29, p. 227–233, <https://doi.org/10.16539/j.ddgzyckx.2005.02.010>.
- Tang, L.M., Chen, H.L., Dong, C.W., Yang, S.F., Shen, Z.Y., and Cheng, X.G., 2013, Middle Triassic post-orogenic extension on Hainan Island: Chronology and geochemistry constraints of bimodal intrusive rocks [in Chinese with English abstract]: *Science China. Earth Sciences*, v. 56, p. 783–793, <https://doi.org/10.1007/s11430-012-4562-5>.
- Wen, S.N., 2013. Geochronologic and Geochemical Studies of Permo-Triassic Magmatism in Hainan Island, South China. University of Chinese Academy of Sciences, [in Chinese].
- Yan, Q.S., Metcalfe, I., and Shi, X.F., 2017, U-Pb isotope geochronology and geochemistry of granites from Hainan island (northern South China sea margin): constraints on late Paleozoic-Mesozoic tectonic evolution: *Gondwana Research*, v. 49, <https://doi.org/10.1016/j.gr.2017.06.007>.
- Zhou, Z.M., Xie, C.F., and Qian, X.U., 2010, Geological and geochemical characteristics of middle Triassic syenite—granite suite in Hainan Island and its geotectonic implications [in Chinese with English abstract]: *Geological Review*, v. 57, no. 4, p. 515–531, <https://doi.org/10.1007/s11589-011-0776-4>.

APPENDIX ANALYTICAL METHODS

Representative samples were selected for zircon U-Pb-Hf-O and whole-rock elemental and Sr-Nd isotopic analyses.

Zircon grains were obtained from the crushed rock by standard density and magnetic separation techniques at the Bureau of Geology and Mineral Resources of Hebei Province. Individual crystals were hand-picked under a Nikon binocular microscope and mounted in epoxy in a diameter circular grain mount. The cathodoluminescence (CL) image showing the internal structures of the zircons was carried out at Sun Yat-sen University by a Carl ZEISS SIGMA Field Emission Scanning Electron Microscope. The Agilent 7500a Q-ICPMS and a Neptune MC-ICPMS coupled with a 193 nm laser ablation system were used for in-situ zircon U-Th-Pb measurements and Lu-Hf isotopic analyses at Guangdong Provincial Key Lab of Geodynamics and Geohazards, Sun Yat-sen University and Guangzhou Institute of Geochemistry (GIG), Chinese Academy of Sciences (CAS), respectively. Zircon 91500 external standard was used for the U-Pb dating and zircon in-situ Lu-Hf isotopes (Sláma et al., 2008). In-situ Lu-Hf isotopic data were normalized to $^{176}\text{Lu}/^{177}\text{Hf} = 0.7325$ and $^{176}\text{Yb}/^{172}\text{Yb} = 0.5887$ using exponential correction for mass bias. The ^{176}Lu decay constant of $1.865 \pm 0.015 \times 10^{-11}/\text{year}$, the present-day chondritic values of $^{176}\text{Hf}/^{177}\text{Hf}$ (0.282772) and $^{176}\text{Lu}/^{177}\text{Hf}$ (0.0332) were applied to the calculation of the $\varepsilon_{\text{Hf}}(t)$ values. The detailed analytical procedures follow Xia et al. (2011) and Wu et al. (2006).

Zircon oxygen isotopic measurement was made at Institute of Geology and Geophysics, Chinese Academy of Sciences (CAS). The normal incidence electron flood gun was used to compensate for sample charging and the Cs⁺ ion beam was accelerated to 10 kV with an intensity of ~2 nA. The internal precision of a single analysis generally was better than 0.2‰ (1 σ) for the $^{18}\text{O}/^{16}\text{O}$ ratio (Kita et al., 2009). The detailed procedures referred to Li et al. (2013).

Whole-rock samples for elemental and Sr-Nd isotopic analyses were crushed to 200-mesh using an agate mill. Major oxides analyses were done by a wavelength X-ray fluorescence

spectrometry (XRF) using a Rigaku RIX 2000 spectrometer at Sun Yat-sen University. Trace elemental analyses were performed by Perkin–Elmer Sciex ELAN 6000 ICP-MS at GIGCAS. The analytical precision is better than 5% for elements <10 ppm, less than 8% for those >10 ppm, and about 10% for transition metals. Sr and Nd isotopic analyses were performed on the Neptune Plus multi-collection mass spectrometry at GIGCAS. Detailed sample preparation and analytical procedures followed Qi et al. (2000). The measured $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of the (NIST) SRM 987 standard and $^{143}\text{Nd}/^{144}\text{Nd}$ ratios of the La Jolla standard are 0.710265 ± 12 (2σ) and 0.511862 ± 10 (2σ), respectively. The within-run errors of precision were better than 0.000015 for $^{146}\text{Nd}/^{144}\text{Nd}$ in the 95% confidence level. The $^{87}\text{Rb}/^{86}\text{Sr}$ and $^{146}\text{Nd}/^{144}\text{Nd}$ ratios are calculated by Rb, Sr, Sm and Nd contents measured by ICP-MS.

REFERENCES CITED

- Kita, N.T., Ushikubo T, Fu B and Valley JW, 2009, High precision SIMS oxygen isotope analysis and the effect of sample topography. *Chemical Geology*, v. 264(1–4), p. 43–57, <https://doi.org/10.1016/j.chemgeo.2009.02.012>.
- Li, X.H., Tang, G., Gong, B., Yang, Y., Hou, K., Hu, Z., Li, Q., Liu, Y., and Li, W., 2013, Qinghu zircon:a working reference for microbeam analysis of U-Pb age and Hf and O isotopes: *Chinese Science Bulletin*, v. 58, p. 4647–4654, <https://doi.org/10.1007/s11434-013-5932-x>.
- Wu, F.Y., Yang, Y.H., Xie, L.W., Yang, J.H., and Xu, P., 2006, Hf isotopic compositions of the standard zircons and baddeleyites used in U-Pb geochronology: *Chemical Geology*, v. 234 (1–2), p. 105–126, <https://doi.org/10.1016/j.chemgeo.2006.05.003>.
- Xia, X.P., Sun, M., Geng, H.Y., Sun, Y.L., Wang, Y.J., and Zhao, G.C., 2011, Quasi-simultaneous determination of U-Pb and Hf isotope compositions of zircon by excimer laser-ablation multiple-collector ICPMS: *Journal of Analytical Atomic Spectrometry*, v. 26, p. 1868–1871, <https://doi.org/10.1039/c1ja10116a>.
- Sláma, J., Košler, J., Condon, D.J., Crowley, J.L., Gerdes, A., Hanchar, J.M., Horstwood, M.S.A., Morris, G.A., Nasdala, L., Norberg, N., Schaltegger, U., Schoene, B., Tubrett, M.N. and Whitehouse, M.J., 2008, Plešovice zircon – a new natural reference material for U-Pb and Hf isotopic microanalysis. *Chemical Geology*, v. 249 (1–2), p. 1–35, <https://doi.org/10.1016/j.chemgeo.2007.11.005>.
- Qi, L., Hu, J. and Grégoire, D.C., 2000, Determination of trace elements in granites by inductively coupled plasma mass spectrometry. *Talanta*, v. 51, p. 507-513, [https://doi.org/10.1016/S0039-9140\(99\)00318-5](https://doi.org/10.1016/S0039-9140(99)00318-5).