

Table S1. LA-ICP-MS zircon U-Pb data for the Permian granites in the Chifeng area.

Sample	w_B/ppm			Th/U	Isotope ratio				T (Ma)			
	Pb	Th	U		$^{207}\text{Pb}/^{235}\text{U} \pm 1\sigma$		$^{206}\text{Pb}/^{238}\text{U} \pm 1\sigma$		$^{207}\text{Pb}/^{235}\text{U} \pm 1\sigma$		$^{206}\text{Pb}/^{238}\text{U} \pm 1\sigma$	
PM210-12-1-01	18	479	306	1.57	0.30120	0.01548	0.04258	0.00071	267	12	269	4
PM210-12-1-02	43	847	798	1.06	0.30296	0.00754	0.04262	0.00056	269	6	269	3
PM210-12-1-03	22	372	416	0.89	0.31363	0.00938	0.04399	0.00060	277	7	278	4
PM210-12-1-04	17	321	340	0.94	0.31135	0.00988	0.04404	0.00062	275	8	278	4
PM210-12-1-05	14	309	239	1.30	0.31456	0.01159	0.04321	0.00062	278	9	273	4
PM210-12-1-06	21	194	461	0.42	0.30855	0.00980	0.04323	0.00060	273	8	273	4
PM210-12-1-07	19	365	361	1.01	0.30706	0.00932	0.04290	0.00058	272	7	271	4
PM210-12-1-08	22	382	444	0.86	0.29926	0.00875	0.04198	0.00057	266	7	265	4
PM210-12-1-09	19	282	384	0.73	0.29478	0.00893	0.04230	0.00059	262	7	267	4
PM210-12-1-10	19	286	373	0.77	0.30602	0.00961	0.04306	0.00060	271	7	272	4
PM210-12-1-11	17	241	348	0.69	0.30275	0.01157	0.04236	0.00062	269	9	267	4
PM210-12-1-12	19	325	356	0.91	0.31134	0.01202	0.04358	0.00063	275	9	275	4
PM210-12-1-13	14	159	289	0.55	0.33868	0.01064	0.04183	0.00059	296	8	264	4
PM210-12-1-14	18	311	359	0.87	0.30850	0.01079	0.04329	0.00062	273	8	273	4
PM210-12-1-15	17	294	349	0.84	0.30095	0.01365	0.04176	0.00062	267	11	264	4
PM210-12-1-16	27	505	525	0.96	0.30742	0.00881	0.04298	0.00058	272	7	271	4
PM210-12-1-17	17	259	343	0.76	0.29843	0.00972	0.04209	0.00058	265	8	266	4
PM210-12-1-18	18	289	359	0.80	0.30452	0.00879	0.04270	0.00059	270	7	270	4
PM210-12-1-19	30	560	580	0.97	0.30524	0.00784	0.04273	0.00057	270	6	270	4
PM210-12-1-20	21	365	406	0.90	0.30491	0.00922	0.04271	0.00058	270	7	270	4
PM210-12-1-21	22	365	435	0.84	0.29347	0.00886	0.04275	0.00059	261	7	270	4
PM210-12-1-22	22	401	414	0.97	0.35615	0.01069	0.04241	0.00059	309	8	268	4
PM210-12-1-23	21	417	413	1.01	0.30165	0.00927	0.04251	0.00058	268	7	268	4
PM210-12-1-24	36	577	733	0.79	0.30270	0.00744	0.04261	0.00056	269	6	269	3
PM105-2-2-1	145	720	1235	0.56	0.29673	0.00963	0.04136	0.00037	264	8	261	2
PM105-2-2-2*	43	190	370	0.50	0.35780	0.01890	0.04256	0.00061	311	14	269	4
PM105-2-2-3	61	255	518	0.46	0.30865	0.01715	0.04247	0.00065	273	13	268	4
PM105-2-2-4	67	305	584	0.51	0.33610	0.01523	0.04320	0.00062	294	12	273	4
PM105-2-2-5	168	773	1312	0.56	0.32872	0.01151	0.04205	0.00046	289	9	266	3
PM105-2-2-6*	123	737	785	0.88	0.48000	0.02201	0.04305	0.00056	398	15	272	3
PM105-2-2-7*	104	432	760	0.54	0.38759	0.01611	0.04244	0.00050	333	12	268	3
PM105-2-2-8	111	460	962	0.47	0.31749	0.01283	0.04270	0.00052	280	10	270	3
PM105-2-2-9	52	206	447	0.45	0.32860	0.01658	0.04448	0.00066	288	13	281	4
PM105-2-2-10	94	432	885	0.47	0.30209	0.01287	0.04219	0.00046	268	10	266	3
PM105-2-2-11	75	328	692	0.46	0.29782	0.01290	0.04294	0.00054	265	10	271	3
PM105-2-2-12	60	256	545	0.45	0.31203	0.01775	0.04269	0.00055	276	14	269	3
PM105-2-2-13	83	338	765	0.43	0.29531	0.01326	0.04180	0.00056	263	10	264	3
PM105-2-2-14	109	479	838	0.55	0.31363	0.01319	0.04442	0.00055	277	10	280	3
PM105-2-2-15	83	339	776	0.43	0.29269	0.01256	0.04339	0.00048	261	10	274	3
PM105-2-2-16	50	208	455	0.44	0.31713	0.01681	0.04275	0.00067	280	13	270	4
PM105-2-2-17	58	239	528	0.44	0.31952	0.01517	0.04240	0.00056	282	12	268	3
PM105-2-2-18	49	210	471	0.43	0.30498	0.01446	0.04178	0.00056	270	11	264	3
D3038-1	218	1044	1442	0.72	0.27712	0.00925	0.03976	0.00034	248	7	251	2
D3038-2	214	1138	878	1.31	0.29200	0.01304	0.04070	0.00043	260	10	257	3
D3038-3	204	968	1270	0.76	0.29048	0.00960	0.04115	0.00040	259	8	260	2
D3038-4	246	1175	1845	0.63	0.27289	0.00841	0.03942	0.00033	245	7	249	2
D3038-5	275	1062	2047	0.52	0.32302	0.00949	0.04199	0.00046	284	7	265	3
D3038-6*	202	935	1192	0.78	0.35606	0.01276	0.04117	0.00039	309	10	260	2
D3038-7	221	1048	1227	0.83	0.28741	0.00940	0.04197	0.00043	257	7	265	3
D3038-8	213	1029	1380	0.73	0.28757	0.00889	0.04059	0.00035	257	7	256	2
D3038-9	178	833	1162	0.70	0.28793	0.00990	0.04081	0.00037	257	8	258	2
D3038-10	124	596	759	0.77	0.29174	0.01253	0.04232	0.00055	260	10	267	3

D3038-11	183	879	1277	0.67	0.29111	0.00975	0.04228	0.00038	259	8	267	2
D3038-12	189	857	1250	0.67	0.30543	0.00999	0.04270	0.00041	271	8	270	3
D3038-13	213	1046	1325	0.77	0.28770	0.00987	0.04172	0.00035	257	8	263	2
D3038-14	194	842	1110	0.74	0.31759	0.01065	0.04295	0.00039	280	8	271	2
D3038-15*	262	1240	1397	0.87	0.32884	0.01166	0.04035	0.00039	289	9	255	2
PM302-7-1-1*	143	560	1107	0.51	0.36743	0.01128	0.04452	0.00079	318	8	281	5
PM302-7-1-2*	78	210	306	0.69	0.30319	0.00681	0.03668	0.00063	269	5	232	4
PM302-7-1-3	63	245	397	0.62	0.29056	0.01314	0.04062	0.00073	259	10	257	5
PM302-7-1-4	112	308	714	0.43	0.28800	0.00822	0.04014	0.00090	257	6	254	6
PM302-7-1-5*	125	681	738	0.92	0.56001	0.01652	0.02889	0.00080	452	11	184	5
PM302-7-1-6	97	538	891	0.60	0.29314	0.00803	0.04008	0.00080	261	6	253	5
PM302-7-1-7	146	342	607	0.56	0.29222	0.00872	0.04251	0.00105	260	7	268	6
PM302-7-1-8*	87	469	714	0.66	0.29663	0.00978	0.03929	0.00093	264	8	248	6
PM302-7-1-9*	182	208	181	1.15	0.34545	0.00989	0.04161	0.00090	301	7	263	6
PM302-7-1-10	60	381	578	0.66	0.31256	0.00848	0.04335	0.00094	276	7	274	6
PM302-7-1-11*	89	283	562	0.50	0.34706	0.01299	0.04777	0.00100	303	10	301	6
PM302-7-1-14	92	526	761	0.69	0.28641	0.01539	0.04069	0.00101	256	12	257	6
PM302-7-1-15*	118	447	783	0.57	0.32985	0.00927	0.04464	0.00085	289	7	282	5
PM302-7-1-16*	152	398	562	0.71	0.46225	0.02595	0.04254	0.00091	386	18	269	6
PM302-7-1-17	201	329	589	0.56	0.29836	0.00896	0.04293	0.00078	265	7	271	5
PM302-7-1-18*	84	218	158	1.38	0.32349	0.01263	0.04054	0.00087	285	10	256	5
PM302-7-1-19	128	318	649	0.49	0.28353	0.00887	0.03900	0.00079	253	7	247	5
PM302-7-1-20*	137	230	430	0.54	0.39362	0.01650	0.04532	0.00099	337	12	286	6
PM302-7-1-21	124	468	730	0.64	0.30164	0.01239	0.04220	0.00097	268	10	266	6
PM302-7-1-22	142	416	789	0.53	0.29491	0.00815	0.04178	0.00072	262	6	264	4
PM302-7-1-23	163	259	551	0.47	0.30226	0.01088	0.04193	0.00119	268	8	265	7
PM302-7-1-24	92	271	490	0.55	0.28809	0.00954	0.04038	0.00129	257	8	255	8
PM302-7-1-25	74	521	823	0.63	0.28540	0.01095	0.04068	0.00128	255	9	257	8
D5695-01	5	45	95	0.48	0.29646	0.01537	0.04171	0.00078	264	12	263	5
D5695-02*	94	167	226	0.74	5.11548	0.16795	0.31990	0.00521	1839	28	1789	25
D5695-03	6	74	125	0.60	0.29109	0.01448	0.04103	0.00075	259	11	259	5
D5695-04	19	374	337	1.11	0.30132	0.01029	0.04136	0.00067	267	8	261	4
D5695-05*	124	95	329	0.29	5.18704	0.10556	0.32701	0.00498	1850	17	1824	24
D5695-06	8	83	157	0.53	0.29554	0.01493	0.04160	0.00074	263	12	263	5
D5695-07	8	106	162	0.65	0.29460	0.01153	0.04149	0.00071	262	9	262	4
D5695-08	13	212	263	0.81	0.29402	0.01197	0.04075	0.00069	262	9	257	4
D5695-09	17	248	345	0.72	0.29333	0.01053	0.04136	0.00070	261	8	261	4
D5695-10	18	314	343	0.92	0.27931	0.00807	0.04037	0.00066	250	6	255	4
D5695-11	27	629	465	1.35	0.29009	0.00776	0.04092	0.00065	259	6	259	4
D5695-12	11	149	218	0.68	0.29509	0.01233	0.04154	0.00071	263	10	262	4
D5695-13*	6	77	103	0.75	0.26525	0.01890	0.04178	0.00077	239	15	264	5
D5695-14	15	268	294	0.91	0.29038	0.01240	0.04101	0.00073	259	10	259	5
D5695-15	16	210	323	0.65	0.29369	0.00891	0.04136	0.00068	261	7	261	4
D5695-16	14	258	275	0.94	0.29097	0.00946	0.04097	0.00069	259	7	259	4
D5695-17	10	115	209	0.55	0.29103	0.01044	0.04097	0.00071	259	8	259	4
D5695-18	10	163	202	0.81	0.29562	0.01069	0.04171	0.00073	263	8	263	5
D5695-19	10	128	218	0.59	0.28881	0.01059	0.04079	0.00072	258	8	258	4
D5695-20	8	145	158	0.91	0.29332	0.01320	0.04134	0.00076	261	10	261	5
D5695-21	5	51	106	0.48	0.30420	0.01401	0.04172	0.00079	270	11	263	5
D5695-22	22	457	406	1.13	0.29273	0.00804	0.04123	0.00068	261	6	260	4
D5695-23	15	247	293	0.84	0.29101	0.00930	0.04109	0.00070	259	7	260	4
D5695-24	9	97	196	0.50	0.29350	0.01446	0.04133	0.00076	261	11	261	5
D5695-25	19	304	374	0.81	0.29439	0.00918	0.04154	0.00070	262	7	262	4
T310-01	536.76	1692.88	3923.57	0.43	0.30160	0.00673	0.04047	0.00051	268	5	256	3
T310-02	281.09	1252.29	1331.13	0.94	0.29487	0.00837	0.03955	0.00050	262	7	250	3
T310-03	416.87	1847.32	1939.62	0.95	0.28007	0.00672	0.03957	0.00049	251	5	250	3
T310-04	115.32	492.23	375.97	1.31	0.29540	0.01767	0.04120	0.00068	263	14	260	4

T310-05	408.73	1756.70	2111.76	0.83	0.28636	0.00677	0.03985	0.00042	256	5	252	3
T310-06	428.20	1822.41	2314.77	0.79	0.28534	0.01248	0.03952	0.00059	255	10	250	4
T310-07	323.22	1566.83	873.27	1.79	0.31435	0.00993	0.04004	0.00050	278	8	253	3
T310-08	297.57	1337.49	1285.46	1.04	0.28482	0.00749	0.03991	0.00048	254	6	252	3
T310-09	229.28	1005.60	852.70	1.18	0.30318	0.02609	0.04024	0.00087	269	20	254	5
T310-10	471.42	1958.81	1878.41	1.04	0.30301	0.00679	0.03994	0.00049	269	5	252	3
T310-11	257.83	1085.44	914.55	1.19	0.30877	0.01186	0.04029	0.00057	273	9	255	4
T310-12	285.22	1138.60	1496.03	0.76	0.28694	0.00678	0.04034	0.00056	256	5	255	3
T310-13	121.55	521.33	502.17	1.04	0.31047	0.01252	0.04101	0.00060	275	10	259	4
T310-14	81.67	325.90	249.62	1.31	0.29230	0.01372	0.04041	0.00058	260	11	255	4
T310-15	50.51	228.11	214.42	1.06	0.28330	0.02668	0.03942	0.00166	253	21	249	10
PM401-17-1-01	27.64	588.05	527.25	1.12	0.28126	0.01150	0.03981	0.00060	252	9	252	4
PM401-17-1-02	18.00	288.25	367.11	0.79	0.28591	0.01406	0.04035	0.00061	255	11	255	4
PM401-17-1-03*	35.92	628.21	546.82	1.15	0.60911	0.05187	0.04635	0.00133	483	33	292	8
PM401-17-1-04	10.78	238.88	198.34	1.20	0.29578	0.02128	0.04100	0.00091	263	17	259	6
PM401-17-1-05	22.17	445.98	440.88	1.01	0.29486	0.01734	0.03991	0.00070	262	14	252	4
PM401-17-1-06	8.36	351.50	124.18	2.83	0.29650	0.04611	0.03975	0.00184	264	36	251	11
PM401-17-1-07	19.30	324.16	379.72	0.85	0.25659	0.04024	0.04148	0.00122	232	33	262	8
PM401-17-1-08	41.13	967.02	857.05	1.13	0.28874	0.01432	0.04007	0.00070	258	11	253	4
PM401-17-1-09*	69.64	115.89	267.10	0.43	3.16082	0.12152	0.23906	0.00659	1448	30	1382	34
PM401-17-1-10*	17.08	267.36	290.77	0.92	0.42117	0.03195	0.04507	0.00087	357	23	284	5
PM401-17-1-11	40.91	690.36	869.49	0.79	0.28048	0.01286	0.03960	0.00080	251	10	250	5
PM401-17-1-12	20.64	452.68	386.05	1.17	0.27924	0.01681	0.04186	0.00078	250	13	264	5
PM401-17-1-13	8.66	344.00	121.57	2.83	0.28707	0.09547	0.04024	0.00254	256	75	254	16
PM401-17-1-14	25.74	553.53	510.92	1.08	0.30917	0.04021	0.04042	0.00196	274	31	255	12
PM401-17-1-15	55.41	640.08	1248.37	0.51	0.28769	0.01816	0.03971	0.00103	257	14	251	6
PM401-17-1-16	17.74	370.66	337.93	1.10	0.29893	0.01192	0.04090	0.00072	266	9	258	4
PM401-17-1-17	30.53	482.90	601.61	0.80	0.30815	0.01351	0.04191	0.00065	273	10	265	4
PM401-17-1-18	59.48	1276.75	1155.71	1.10	0.28042	0.00827	0.03964	0.00053	251	7	251	3
PM401-17-1-19	52.15	968.22	1014.04	0.95	0.31734	0.07809	0.04129	0.00082	280	60	261	5
PM401-17-1-20	6.54	142.11	121.20	1.17	0.32067	0.04890	0.04176	0.00295	282	38	264	18
PM305-21-1-01	39.65	787.04	862.99	0.91	0.28533	0.00806	0.03995	0.00054	255	6	253	3
PM305-21-1-02*	43.50	891.61	1059.24	0.84	0.24311	0.00652	0.03579	0.00048	221	5	227	3
PM305-21-1-03	60.28	1415.29	1193.15	1.19	0.28390	0.00716	0.04115	0.00055	254	6	260	3
PM305-21-1-04	108.96	3199.17	1972.83	1.62	0.28742	0.00717	0.04100	0.00055	257	6	259	3
PM305-21-1-05	36.89	716.16	794.71	0.90	0.28101	0.00762	0.04059	0.00055	251	6	256	3
PM305-21-1-06	107.72	3451.06	1883.18	1.83	0.28833	0.00749	0.04110	0.00055	257	6	260	3
PM305-21-1-07	37.06	834.76	775.81	1.08	0.28279	0.00783	0.04027	0.00055	253	6	255	3
PM305-21-1-08*	14.45	479.70	487.87	0.98	0.17455	0.00548	0.02565	0.00036	163	5	163	2
PM305-21-1-09	90.33	2357.00	1717.96	1.37	0.28515	0.00736	0.04120	0.00055	255	6	260	3
PM305-21-1-10	109.93	3669.51	1908.99	1.92	0.28683	0.00731	0.04057	0.00054	256	6	256	3
PM305-21-1-11	109.85	115.15	352.22	0.33	4.58226	0.12273	0.30546	0.00410	1746	22	1718	20
PM305-21-1-12	17.29	309.25	386.06	0.80	0.29523	0.00994	0.04012	0.00056	263	8	254	3
PM305-21-1-13	83.19	2491.27	1582.27	1.57	0.28095	0.00731	0.04008	0.00054	251	6	253	3
PM305-21-1-14	11.45	268.12	169.24	1.58	0.38291	0.01365	0.05207	0.00073	329	10	327	4
PM305-21-1-15	17.10	112.88	340.36	0.33	0.37062	0.01225	0.05139	0.00072	320	9	323	4
PM305-21-1-16	283.95	627.09	599.23	1.05	7.18168	0.18675	0.39052	0.00523	2134	23	2125	24
PM305-21-1-17	74.74	2170.05	1384.81	1.57	0.28795	0.00765	0.04126	0.00056	257	6	261	3
PM305-21-1-18	228.59	198.16	716.33	0.28	4.80778	0.12645	0.31784	0.00426	1786	22	1779	21
PM305-21-1-19	30.72	738.47	620.23	1.19	0.29821	0.00960	0.04123	0.00058	265	8	260	4
PM305-21-1-20	281.37	276.01	860.74	0.32	4.88528	0.12780	0.32237	0.00432	1800	22	1801	21
PM305-21-1-21	46.35	1013.23	985.23	1.03	0.29087	0.00846	0.04021	0.00055	259	7	254	3
PM305-21-1-22	74.98	2261.18	1439.28	1.57	0.28381	0.00793	0.04022	0.00055	254	6	254	3
PM305-21-1-23	46.34	1260.91	942.93	1.34	0.28683	0.00824	0.03971	0.00054	256	7	251	3

*Representing the abandoned points when calculating weighted average age because of discordance.

Table S2. Major (wt%) and trace (ppm) elements data of Permian granites in the Chifeng area.

Sample	PM105-2-1	PM105-2-2	PM105-2-3	PM105-2-4	PM105-2-5	PM105-4-1
Lithology	Monzogranite					
Pluton	Aohan Banner					
SiO ₂	72.00	72.34	72.10	73.37	72.45	72.02
TiO ₂	0.20	0.12	0.13	0.12	0.18	0.18
Al ₂ O ₃	14.57	14.17	14.41	14.43	14.53	14.62
TFe ₂ O ₃	2.73	2.68	2.87	2.56	2.38	2.87
FeO	0.81	0.70	0.76	0.67	0.40	0.76
MnO	0.02	0.02	0.02	0.02	0.02	0.03
MgO	0.09	0.06	0.02	0.04	0.16	0.15
CaO	0.34	0.34	0.34	0.31	0.36	0.32
Na ₂ O	4.38	4.46	4.67	3.94	4.22	4.13
K ₂ O	4.53	4.70	4.63	4.32	4.49	4.69
P ₂ O ₅	0.07	0.05	0.05	0.04	0.06	0.07
LOI	0.88	0.64	0.56	0.63	0.95	0.73
Total	100.6	100.2	100.5	100.4	100.1	100.5
Na ₂ O+K ₂ O	8.91	9.17	9.30	8.26	8.71	8.82
Na ₂ O/K ₂ O	0.97	0.95	1.01	0.91	0.94	0.88
A/NK	1.20	1.14	1.14	1.29	1.23	1.23
A/CNK	1.14	1.09	1.08	1.23	1.17	1.17
SI	0.69	0.45	0.13	0.38	1.35	1.18
AR	3.85	4.20	4.41	3.30	3.62	3.47
σ43	2.73	2.86	2.97	2.24	2.56	2.68
R1	2093	2054	1968	2398	2222	2144
R2	328	319	321	320	334	330
Mg [#]	0.07	0.05	0.01	0.04	0.21	0.11
La	33.01	34.66	34.50	34.20	30.46	11.16
Ce	65.06	70.53	69.45	69.18	61.78	30.19
Pr	7.00	7.07	6.93	6.91	6.65	2.49
Nd	25.43	24.49	24.38	24.07	24.00	9.53
Sm	5.08	4.60	4.55	4.48	4.88	2.12
Eu	0.67	0.61	1.03	0.57	0.62	0.39
Gd	4.18	3.62	3.64	3.62	4.06	2.01
Tb	0.75	0.63	0.62	0.61	0.73	0.43
Dy	4.53	3.75	3.71	3.69	4.30	2.91
Ho	0.89	0.75	0.73	0.74	0.83	0.60
Er	2.31	2.18	2.14	1.99	2.25	1.71
Tm	0.42	0.37	0.36	0.35	0.37	0.32
Yb	2.84	2.65	2.57	2.49	2.63	2.26
Lu	0.41	0.39	0.39	0.37	0.39	0.34
Y	25.20	21.83	20.92	21.06	23.61	17.31
ΣREE	152.5	156.2	154.9	153.2	143.9	66.45
LREE	136.2	141.9	140.8	139.4	128.3	55.88
HREE	16.33	14.34	14.16	13.86	15.56	10.56
LREE/HREE	8.35	9.90	9.95	10.06	8.25	5.29
La _N /Yb _N	8.34	9.39	9.62	9.84	8.30	3.54
δEu	0.43	0.44	0.75	0.42	0.42	0.57
δCe	1.00	1.04	1.04	1.04	1.02	1.35
Sc	2.87	2.39	3.13	2.52	3.85	3.56
V	22.02	15.04	18.04	16.52	20.21	19.27
Cr	23.69	37.52	29.17	29.64	44.66	28.67
Co	4.42	2.21	3.30	1.62	4.55	3.11
Ni	1.31	0.35	2.83	1.65	2.28	1.40

Be	4.07	4.05	4.12	4.09	3.92	4.55
Rb	216	212	210	212	215	238
Sr	69.73	66.09	66.71	65.21	66.24	67.09
Ba	313	342	344	333	311	313
Li	5.71	6.13	6.09	6.08	5.73	7.13
Zr	181	171	178	176	161	178
Nb	26.46	27.70	27.39	28.17	24.71	30.63
Hf	5.26	5.20	5.31	4.80	5.59	5.12
Ta	1.82	1.41	1.09	1.46	1.51	1.51
Th	11.02	14.81	20.02	17.50	14.80	17.17
U	2.01	1.18	1.19	1.23	1.88	1.30
Ga	19.08	18.53	18.81	19.77	18.92	20.35
Sr/Y	2.77	3.03	3.19	3.10	2.81	3.88
Zr+Nb+Ce+Y	298	291	296	294	272	256
Na ₂ O+K ₂ O/CaO	25.90	26.76	27.03	26.30	24.52	27.22
TFe ₂ O ₃ /MgO	31.72	47.92	168.82	59.60	15.25	19.50
YbN	16.71	15.57	15.14	14.66	15.48	13.29
Y+Nb	51.66	49.53	48.31	49.23	48.32	47.94
Yb+Ta	4.66	4.06	3.66	3.96	4.14	3.77
TFe ₂ O ₃ +MgO	2.81	2.74	2.89	2.61	2.54	3.01
Sample	D3038-1	D3038-2	D3038-3	D3047-1	D3048-1	D3049-1
Lithology	Monzogranite					
Pluton	Daluobogou					
SiO ₂	73.40	73.49	74.11	73.47	73.83	73.60
TiO ₂	0.18	0.17	0.18	0.18	0.18	0.16
Al ₂ O ₃	14.21	13.92	13.94	14.23	13.93	14.14
TFe ₂ O ₃	1.85	1.94	1.42	1.57	1.66	1.49
FeO	0.85	1.12	0.58	0.63	0.67	0.49
MnO	0.05	0.04	0.04	0.03	0.03	0.03
MgO	0.20	0.20	0.20	0.20	0.20	0.20
CaO	0.29	0.26	0.21	0.25	0.22	0.24
Na ₂ O	3.60	3.89	3.83	3.77	3.68	3.96
K ₂ O	5.79	5.62	5.47	5.76	5.64	5.80
P ₂ O ₅	0.03	0.03	0.03	0.03	0.03	0.03
LOI	0.27	0.17	0.43	0.38	0.39	0.26
Total	100.7	100.8	100.4	100.5	100.4	100.4
Na ₂ O+K ₂ O	9.39	9.51	9.30	9.53	9.32	9.76
Na ₂ O/K ₂ O	0.62	0.69	0.70	0.66	0.65	0.68
A/NK	1.17	1.12	1.14	1.14	1.15	1.11
A/CNK	1.12	1.07	1.11	1.10	1.11	1.07
SI	1.63	1.57	1.75	1.68	1.70	1.68
AR	2.97	3.43	3.36	3.18	3.17	3.45
σ43	2.91	2.97	2.78	2.98	2.82	3.11
R1	2174	2102	2242	2145	2226	2084
R2	319	309	306	316	307	312
Mg [#]	0.14	0.11	0.19	0.17	0.17	0.21
La	55.58	61.76	78.39	79.41	56.52	73.00
Ce	163	157	171	169	144	159
Pr	10.81	12.01	15.09	15.28	11.19	14.21
Nd	37.64	41.57	51.50	52.40	40.11	48.38
Sm	5.69	6.17	7.37	7.46	5.56	6.90
Eu	0.72	0.75	0.76	0.76	0.72	0.75
Gd	5.05	5.46	6.20	6.27	5.08	5.91
Tb	0.68	0.72	0.82	0.81	0.69	0.79
Dy	3.34	3.55	3.75	3.80	3.39	3.93
Ho	0.64	0.68	0.69	0.70	0.60	0.74
Er	1.60	1.71	1.78	1.80	1.72	1.89

Tm	0.29	0.29	0.30	0.30	0.28	0.32
Yb	2.04	2.07	2.10	2.12	1.99	2.21
Lu	0.30	0.31	0.31	0.32	0.32	0.33
Y	14.53	16.23	17.36	17.60	17.87	15.20
ΣREE	288.0	294.0	340.6	341.0	272.5	318.9
LREE	274.1	279.2	324.7	324.9	258.4	302.8
HREE	13.93	14.79	15.93	16.12	14.08	16.11
LREE/HREE	19.68	18.88	20.38	20.16	18.36	18.80
La _N /Yb _N	19.58	21.45	26.75	26.88	20.36	23.66
δEu	0.40	0.38	0.34	0.33	0.41	0.35
δCe	1.54	1.33	1.15	1.12	1.32	1.14
Sc	3.08	3.94	3.53	3.70	3.63	3.65
V	11.65	10.16	10.76	12.78	10.00	10.00
Cr	15.77	20.33	21.14	17.87	26.35	22.03
Co	2.76	2.75	1.03	2.12	1.06	2.53
Ni	2.00	2.00	2.00	2.00	2.00	2.00
Be	1.79	1.80	1.83	1.85	1.78	1.82
Rb	142	141	136	142	139	140
Sr	59.44	59.27	56.48	57.78	55.85	59.24
Ba	234	227	218	226	227	238
Li	5.11	5.31	6.85	6.74	6.51	5.40
Zr	210	211	207	214	205	197
Nb	18.64	18.23	17.33	18.39	18.33	18.10
Hf	3.88	1.13	1.06	1.22	1.08	1.09
Ta	0.97	0.70	0.61	0.80	0.92	0.90
Th	13.46	13.48	14.10	14.59	13.07	14.33
U	0.90	0.82	0.94	0.97	1.07	0.86
Sr/Y	4.09	3.65	3.25	3.28	3.13	3.90
Zr+Nb+Ce+Y	407	402	413	419	385	390
Na ₂ O+K ₂ O/CaO	32.27	36.16	44.07	37.66	42.37	41.00
TFe ₂ O ₃ /MgO	9.24	9.70	7.12	7.85	8.29	7.45
Yb _N	11.98	12.15	12.36	12.46	11.71	13.02
Y+Nb	33.17	34.46	34.69	35.99	36.19	33.30
Yb+Ta	3.01	2.77	2.71	2.92	2.91	3.11
TFe ₂ O ₃ +MgO	2.05	2.14	1.62	1.77	1.86	1.69
Sample	PM103-2-1	PM103-2-3	PM103-4-2	PM103-6-1	PM103-6-2	PM103-6-4
Lithology	Monzogranite					
Pluton	Erdaogou					
SiO ₂	76.91	76.32	77.20	76.36	77.16	76.29
TiO ₂	0.07	0.07	0.07	0.06	0.06	0.06
Al ₂ O ₃	12.93	12.87	12.77	12.99	12.75	12.81
TFe ₂ O ₃	0.85	1.26	0.83	1.23	0.97	1.57
FeO	0.36	0.81	0.49	0.63	0.58	0.97
MnO	0.01	0.08	0.01	0.02	0.01	0.03
MgO	0.00	0.05	0.07	0.08	0.08	0.11
CaO	0.16	0.18	0.14	0.14	0.09	0.11
Na ₂ O	4.25	4.56	4.32	4.63	4.32	4.25
K ₂ O	4.15	4.24	4.34	4.24	4.35	4.47
P ₂ O ₅	0.01	0.01	0.01	0.01	0.01	0.01
LOI	0.38	0.27	0.18	0.22	0.17	0.22
Total	100.0	100.7	100.4	100.5	100.5	100.9
Na ₂ O+K ₂ O	8.40	8.79	8.67	8.86	8.67	8.73
Na ₂ O/K ₂ O	1.02	1.08	1.00	1.09	0.99	0.95
A/NK	1.13	1.07	1.08	1.07	1.08	1.08
A/CNK	1.10	1.04	1.06	1.04	1.07	1.06
SI	0.01	0.45	0.72	0.73	0.74	0.93
AR	4.58	5.13	5.06	5.16	5.10	4.85

σ43	2.08	2.32	2.20	2.36	2.20	2.29
σ25	1.36	1.50	1.44	1.53	1.44	1.48
R1	2618	2409	2549	2394	2538	2441
R2	272	273	268	273	263	267
Mg [#]	0.00	0.04	0.09	0.08	0.08	0.07
La	25.00	20.68	22.13	23.73	21.30	23.99
Ce	58.34	46.86	49.77	51.61	45.64	53.58
Pr	5.48	4.58	4.66	5.29	4.94	5.62
Nd	17.58	14.38	14.46	16.86	16.07	18.73
Sm	3.57	2.69	2.58	3.26	3.06	4.32
Eu	0.14	0.23	0.21	0.15	0.15	0.18
Gd	3.02	2.29	2.45	2.79	2.66	3.94
Tb	0.60	0.43	0.48	0.53	0.53	0.85
Dy	4.32	2.93	3.40	3.61	3.73	5.82
Ho	0.99	0.66	0.77	0.79	0.85	1.29
Er	2.97	2.04	2.31	2.39	2.61	3.82
Tm	0.57	0.40	0.46	0.46	0.51	0.72
Yb	4.28	3.13	3.46	3.36	3.80	5.25
Lu	0.64	0.47	0.55	0.51	0.58	0.80
Y	33.60	19.53	25.10	24.22	28.40	41.31
ΣREE	127.5	101.7	107.6	115.3	106.4	128.9
LREE	110.1	89.42	93.81	100.9	91.16	106.4
HREE	17.40	12.34	13.86	14.44	15.27	22.50
LREE/HREE	6.33	7.25	6.77	6.99	5.97	4.73
La _N /Yb _N	4.19	4.75	4.59	5.06	4.02	3.28
δEu	0.13	0.28	0.25	0.15	0.16	0.13
δCe	1.17	1.13	1.14	1.08	1.05	1.09
Sc	2.62	2.86	2.19	2.83	2.70	3.37
V	9.19	8.88	7.10	10.25	8.56	9.59
Cr	45.89	47.65	36.24	39.53	44.08	36.37
Co	0.24	0.69	0.40	0.20	0.97	1.43
Ni	0.33	0.73	1.57	0.21	0.10	0.24
Be	3.57	4.72	3.83	7.16	4.97	5.00
Rb	280	275	275	337	330	351
Sr	14.65	16.64	23.98	14.90	14.08	16.41
Ba	15.44	7.72	22.12	0.05	10.31	20.31
Li	3.44	3.12	2.66	3.38	1.88	3.25
Zr	201	176	183	168	177	183
Nb	61.23	46.08	43.83	52.12	45.37	57.70
Hf	6.72	5.86	6.97	5.91	6.04	7.24
Ta	2.75	1.86	1.78	2.27	3.02	2.88
Th	18.30	20.15	19.75	23.35	21.98	23.67
U	2.89	2.80	1.77	1.90	2.69	2.86
Ga	24.15	24.06	23.29	24.81	24.42	24.62
Sr/Y	0.44	0.85	0.96	0.62	0.50	0.40
Zr+Nb+Ce+Y	354	288	302	296	297	336
10000Ga/Al	3.53	3.53	3.44	3.61	3.62	3.63
Sample	PM403-2-1	PM403-2-2	PM403-2-3	PM403-2-4	PM403-2-5	PM403-2-6
Lithology	Syenogranite					
Pluton	Qixieyingzi					
SiO ₂	76.25	76.56	76.22	76.69	76.61	77.58
TiO ₂	0.09	0.11	0.10	0.10	0.09	0.11
Al ₂ O ₃	12.62	12.56	12.63	12.38	12.54	12.05
TFe ₂ O ₃	1.06	1.14	0.81	1.21	1.05	1.28
FeO	0.54	0.49	0.54	0.58	0.54	0.49
MnO	0.04	0.04	0.01	0.02	0.01	0.02
MgO	0.48	0.45	0.56	0.34	0.26	0.24

CaO	0.24	0.24	0.25	0.20	0.17	0.16
Na ₂ O	3.81	3.74	3.13	3.72	3.27	3.25
K ₂ O	4.87	4.35	5.61	4.66	5.34	4.50
P ₂ O ₅	0.01	0.01	0.01	0.01	0.01	0.01
LOI	0.34	0.52	0.48	0.48	0.45	0.59
Total	100.3	100.1	100.3	100.3	100.3	100.2
Na ₂ O+K ₂ O	8.68	8.09	8.74	8.38	8.61	7.75
Na ₂ O/K ₂ O	0.78	0.86	0.56	0.80	0.61	0.72
A/NK	1.09	1.16	1.13	1.11	1.12	1.18
A/CNK	1.05	1.11	1.08	1.08	1.09	1.15
SI	4.43	4.46	5.26	3.26	2.45	2.46
AR	3.91	3.82	2.89	3.89	3.12	3.28
σ ₄₃	2.26	1.95	2.30	2.08	2.21	1.74
σ ₂₅	1.47	1.27	1.49	1.36	1.44	1.15
R1	2544	2718	2619	2652	2652	2921
R2	297	295	303	281	277	266
Mg [#]	0.37	0.38	0.41	0.28	0.24	0.24
La	15.68	24.58	17.43	26.06	28.76	25.49
Ce	33.81	52.18	36.51	55.34	54.36	55.35
Pr	3.37	5.33	3.89	5.46	5.96	5.47
Nd	11.10	17.38	12.60	17.50	18.87	17.93
Sm	1.65	2.59	1.93	2.48	2.58	2.53
Eu	0.26	0.33	0.25	0.33	0.31	0.30
Gd	1.25	1.90	1.31	1.84	1.78	1.74
Tb	0.17	0.24	0.16	0.21	0.19	0.20
Dy	0.90	1.28	0.73	0.95	0.85	0.94
Ho	0.17	0.27	0.14	0.18	0.21	0.24
Er	0.63	0.72	0.55	0.49	0.54	0.60
Tm	0.08	0.12	0.07	0.08	0.09	0.10
Yb	0.62	0.87	0.51	0.63	0.54	0.69
Lu	0.11	0.13	0.08	0.09	0.08	0.11
Y	5.32	8.22	4.19	5.42	16.66	15.20
ΣREE	69.80	107.9	76.14	111.6	115.1	111.6
LREE	65.87	102.3	72.60	107.1	110.8	107.0
HREE	3.93	5.54	3.55	4.47	4.29	4.62
LREE/HREE	16.77	18.47	20.48	23.96	25.86	23.18
La _N /Yb _N	18.05	20.30	24.32	29.48	37.99	26.46
δEu	0.54	0.44	0.45	0.46	0.42	0.41
δCe	1.09	1.07	1.04	1.08	0.96	1.10
Sc	1.29	1.07	1.06	1.09	0.99	1.11
V	9.59	10.46	10.26	12.29	10.36	12.64
Cr	45.49	48.86	41.01	56.42	47.94	48.49
Co	0.76	0.08	0.05	1.65	1.23	0.31
Ni	0.14	0.43	1.19	0.42	0.96	1.18
Be	1.25	1.11	1.13	1.25	1.18	1.15
Rb	167	154	195	166	185	158
Sr	122	119	138	140	129	117
Ba	167	142	182	162	161	140
Li	4.67	4.72	3.93	3.92	5.13	4.57
Zr	84.68	104.33	86.04	82.96	67.42	106.93
Nb	8.63	9.80	7.76	7.44	7.15	8.20
Hf	3.14	3.25	2.17	2.83	5.82	7.03
Ta	0.38	0.57	1.10	1.33	0.44	0.89
Th	11.86	14.66	14.09	24.17	19.08	23.35
U	0.96	2.05	0.45	0.73	0.61	0.79
Ga	15.27	14.72	14.20	13.49	15.33	15.56
Sr/Y	23.07	14.57	33.00	25.97	7.75	7.71

Zr+Nb+Ce+Y	132	174	134	151	145	185
10000Ga/Al	2.29	2.21	2.12	2.06	2.31	2.44
