Supplementary Table 1
Petrography of the samples from seven plutons in the northeastern North China Craton

Pluton	Lithology	Texture	Plagioclase (volume content)	Alkali-feldspar	Quartz	Biotite	Muscovite	Accessory mineral
Lishugou	Biotite monzogranite (16XJ4-1,3,5,6)	Medium- to fine-grained	~32%	~31%	~30%	~5%		Ap, Ttn, Zrn
Yaolin	Muscovite monzogranite (16XJ1-1,3)	Medium- to fine-grained	~35%	~30%	~30%		~3%	Ap, Opa, Zrn
Shengping	Alkali feldspar granite (16XJ8-1,4,5)	Medium- to fine-grained		~60%	~38%			Opa, Zrn
Ji`an	Alkali feldspar granite (16XJ14-1,3)	Medium- to fine-grained Miarolitic cavities	~5%	~65%	~25%	~3%		Opa, Zrn
	Granophyre (16XJ15-1,2,4)	Porphyritic	~10%	~60%	~25%	~3%		Ap, Opa, Zrn
Shihu	Syenogranite (16XJ6-1,2,4)	Medium- to fine-grained	~10%	~45%	~40%	~3%		Ap, Opa, Zrn
Yushulinzi	Syenogranite (16XJ17-1,2)	Medium- to fine-grained	~10%	~50%	~38%			Ap, Opa, Zrn
Laoling	Quarte diorite (16XJ7-1,2,5)	Medium- to fine-grained	~67%	~8%	~15%	~8%		Ap, Opa, Zrn

Ap: apatite; Opa: opaque minerals; Ttn: titanite; Zrn: zircon.

Supplementary Table 2 Zircon U-Pb dating data for the the Late Jurassic –Early Cretaceous granitoids in the northeastern North China Craton

Sample No.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
				Ratio	1s	Ratio	1s	Ratio	1s	Age(Ma)	1s	Age(Ma)	1s	Age(Ma)	1s
16XJ4-1															
16XJ4-1-01	332	1124	0.30	0.05335	0.00226	0.18505	0.00786	0.02505	0.00027	344	77	172	7	159	2
16XJ4-1-02	167	750	0.22	0.04981	0.00244	0.17200	0.00784	0.02514	0.00032	186	82	161	7	160	2
16XJ4-1-04	375	1394	0.27	0.04859	0.00213	0.16980	0.00735	0.02529	0.00029	128	78	159	6	161	2
16XJ4-1-05	508	1522	0.33	0.04935	0.00157	0.17280	0.00536	0.02530	0.00024	164	55	162	5	161	1
16XJ4-1-06	354	1196	0.30	0.05091	0.00198	0.17749	0.00675	0.02527	0.00026	237	68	166	6	161	2
16XJ4-1-07	206	982	0.21	0.04932	0.00223	0.17348	0.00796	0.02541	0.00033	163	83	162	7	162	2
16XJ4-1-08	361	1156	0.31	0.04486	0.00197	0.15566	0.00645	0.02517	0.00028	-27	65	147	6	160	2
16XJ4-1-09	422	1496	0.28	0.05049	0.00171	0.17523	0.00578	0.02519	0.00021	218	61	164	5	160	1
16XJ4-1-10	319	1096	0.29	0.04617	0.00169	0.16181	0.00618	0.02529	0.00028	6	59	152	5	161	2
16XJ4-1-11	331	1194	0.28	0.04727	0.00181	0.16504	0.00606	0.02538	0.00026	63	62	155	5	162	2
16XJ4-1-12	254	777	0.33	0.05244	0.00383	0.18625	0.01529	0.02518	0.00039	305	158	173	13	160	2
16XJ4-1-13	335	1251	0.27	0.05090	0.00215	0.17754	0.00758	0.02529	0.00032	236	75	166	7	161	2
16XJ4-1-14	706	1716	0.41	0.05093	0.00191	0.17627	0.00644	0.02513	0.00021	238	69	165	6	160	1
16XJ4-1-15	681	1804	0.38	0.04967	0.00160	0.17237	0.00539	0.02522	0.00026	179	54	161	5	161	2
16XJ4-1-16	2617	4752	0.55	0.05337	0.00278	0.18097	0.00802	0.02489	0.00031	344	78	169	7	159	2
16XJ4-1-17	239	984	0.24	0.05170	0.00236	0.17960	0.00809	0.02528	0.00030	272	81	168	7	161	2
16XJ4-1-18	611	1561	0.39	0.04957	0.00162	0.17233	0.00586	0.02525	0.00027	175	59	161	5	161	2
16XJ4-1-19	405	1213	0.33	0.04968	0.00173	0.17158	0.00585	0.02526	0.00027	180	59	161	5	161	2
16XJ4-1-20	951	1899	0.50	0.04789	0.00148	0.16685	0.00525	0.02530	0.00025	94	55	157	5	161	2
16XJ4-1-21	1149	2125	0.54	0.04902	0.00153	0.17051	0.00515	0.02531	0.00023	149	54	160	4	161	1
16XJ4-1-22	1028	1758	0.58	0.04929	0.00208	0.17159	0.00725	0.02526	0.00026	162	79	161	6	161	2
16XJ4-1-23	306	992	0.31	0.04989	0.00263	0.17227	0.00824	0.02534	0.00043	190	80	161	7	161	3
16XJ4-1-24	379	1532	0.25	0.05045	0.00198	0.17523	0.00676	0.02528	0.00026	216	70	164	6	161	2
16XJ4-1-25	514	1735	0.30	0.05014	0.00180	0.17359	0.00584	0.02529	0.00026	201	59	163	5	161	2
16XJ1-1															
16XJ1-1-01	164	286	0.57	0.04855	0.0038	0.18442	0.01328	0.02768	0.00049	126	128	172	11	176	3

Continued Supplementary Table 2

Sample No.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
				Ratio	1s	Ratio	1s	Ratio	1s	Age(Ma)	1s	Age(Ma)	1s	Age(Ma)	1s
16XJ1-1-02	812	883	0.92	0.05033	0.00247	0.19017	0.00924	0.02769	0.00045	210	82	177	8	176	3
16XJ1-1-04	1080	1695	0.64	0.05150	0.00197	0.17295	0.00651	0.02436	0.00025	263	67	162	6	155	2
16XJ1-1-05	664	450	1.48	0.05175	0.00365	0.17282	0.01150	0.02436	0.00043	274	120	162	10	155	3
16XJ1-1-06	694	949	0.73	0.04734	0.00225	0.16028	0.00784	0.02445	0.00032	66	83	151	7	156	2
16XJ1-1-07	1775	2645	0.67	0.05206	0.00147	0.19785	0.00547	0.02755	0.00021	288	49	183	5	175	1
16XJ1-1-09	1565	2045	0.77	0.05215	0.00163	0.19920	0.00606	0.02769	0.00020	292	56	184	5	176	1
16XJ1-1-10	361	366	0.99	0.04998	0.00254	0.16559	0.00752	0.02438	0.00038	194	76	156	7	155	2
16XJ1-1-11	20495	19785	1.04	0.05203	0.00085	0.19885	0.00354	0.02757	0.00020	287	27	184	3	175	1
16XJ1-1-12	4314	4282	1.01	0.04943	0.00182	0.18870	0.00690	0.02759	0.00024	168	69	176	6	175	2
16XJ1-1-14	201	238	0.84	0.05304	0.00406	0.19796	0.01319	0.02753	0.00050	330	119	183	11	175	3
16XJ1-1-15	3634	5641	0.64	0.05232	0.00108	0.19939	0.00426	0.02764	0.00030	300	29	185	4	176	2
16XJ1-1-17	273	286	0.96	0.04957	0.00383	0.16587	0.01124	0.02441	0.00046	175	119	156	10	155	3
16XJ1-1-18	1144	10705	0.11	0.05007	0.00156	0.19673	0.00682	0.02771	0.00073	198	38	182	6	176	5
16XJ1-1-19	2912	2986	0.98	0.04773	0.00135	0.18341	0.00519	0.02769	0.00023	86	51	171	4	176	1
16XJ1-1-20	1618	1432	1.13	0.05035	0.00243	0.16763	0.00787	0.02447	0.00055	211	68	157	7	156	3
16XJ1-1-21	4721	7108	0.66	0.04959	0.00108	0.16991	0.00391	0.02469	0.00030	176	31	159	3	157	2
16XJ1-1-23	293	625	0.47	0.05492	0.00279	0.21060	0.01095	0.02767	0.00047	409	86	194	9	176	3
16XJ1-1-24	339	411	0.82	0.04847	0.00316	0.18534	0.01065	0.02766	0.00057	122	91	173	9	176	4
16XJ1-1-25	233	256	0.91	0.05087	0.00631	0.16589	0.01629	0.02441	0.00056	235	179	156	14	155	4
16XJ1-1-29	1207	1048	1.15	0.04998	0.00247	0.16773	0.00790	0.02444	0.00029	194	88	157	7	156	2
16XJ8-1															
16XJ8-1-01	817	1172	0.70	0.04891	0.00201	0.13271	0.00545	0.01963	0.00021	143	75	127	5	125	1
16XJ8-1-03	437	712	0.61	0.04980	0.00253	0.13476	0.00650	0.01969	0.00030	186	84	128	6	126	2
16XJ8-1-04	535	791	0.68	0.04811	0.00415	0.12959	0.01100	0.01959	0.00038	105	152	124	10	125	2
16XJ8-1-06	546	934	0.58	0.05228	0.00323	0.14059	0.00833	0.01949	0.00029	298	108	134	7	124	2
16XJ8-1-07	686	955	0.72	0.04611	0.00217	0.12548	0.00593	0.01970	0.00024	3	77	120	5	126	1
16XJ8-1-09	344	647	0.53	0.04938	0.00541	0.13226	0.01167	0.01967	0.00042	166	158	126	10	126	3

Continued Supplementary Table 2

Sample No.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
				Ratio	1s	Ratio	1s	Ratio	1s	Age(Ma)	1s	Age(Ma)	1s	Age(Ma)	1s
16XJ8-1-12	447	712	0.63	0.04884	0.00314	0.13183	0.00799	0.01972	0.00027	140	111	126	7	126	2
16XJ8-1-13	560	911	0.61	0.04823	0.00398	0.13231	0.01124	0.01966	0.00040	110	151	126	10	126	3
16XJ8-1-15	632	912	0.69	0.04894	0.00314	0.13189	0.00847	0.01973	0.00031	145	115	126	8	126	2
16XJ8-1-16	422	809	0.52	0.04908	0.00584	0.13142	0.01579	0.01967	0.00055	152	218	125	14	126	3
16XJ8-1-17	1276	1394	0.92	0.05075	0.00301	0.13758	0.00782	0.01959	0.00026	230	106	131	7	125	2
16XJ8-1-19	509	885	0.57	0.05002	0.00446	0.13331	0.01150	0.01936	0.00036	196	160	127	10	124	2
16XJ8-1-20	428	810	0.53	0.05344	0.00351	0.14408	0.00958	0.01945	0.00028	348	125	137	9	124	2
16XJ8-1-22	827	1191	0.69	0.05010	0.00222	0.13448	0.00543	0.01958	0.00022	199	73	128	5	125	1
16XJ8-1-23	928	1070	0.87	0.04626	0.00171	0.12558	0.00460	0.01961	0.00020	11	58	120	4	125	1
16XJ8-1-24	626	902	0.69	0.05256	0.00299	0.14016	0.00736	0.01959	0.00025	310	96	133	7	125	2
16XJ8-1-25	489	769	0.64	0.05085	0.00250	0.13645	0.00647	0.01963	0.00023	234	88	130	6	125	1
16XJ8-1-26	415	682	0.61	0.04981	0.00264	0.13432	0.00668	0.01963	0.00023	186	93	128	6	125	1
16XJ8-1-27	789	1139	0.69	0.05321	0.00427	0.14333	0.01111	0.01950	0.00034	338	144	136	10	125	2
16XJ8-1-28	774	1268	0.61	0.04929	0.00182	0.13427	0.00498	0.01970	0.00021	162	67	128	4	126	1
16XJ8-1-29	425	848	0.50	0.04935	0.00282	0.13391	0.00739	0.01971	0.00025	165	103	128	7	126	2
16XJ8-1-30	448	757	0.59	0.05345	0.00270	0.14381	0.00683	0.01962	0.00027	348	82	136	6	125	2
16XJ14-1															
16XJ14-1-01	2745	2303	1.19	0.04852	0.00247	0.13207	0.00649	0.01978	0.00021	125	92	126	6	126	1
16XJ14-1-03	1233	1480	0.83	0.05064	0.00226	0.13636	0.00581	0.01962	0.00022	225	78	130	5	125	1
16XJ14-1-04	980	1248	0.79	0.04635	0.00191	0.12532	0.00529	0.01959	0.00023	16	67	120	5	125	1
16XJ14-1-05	851	1486	0.57	0.04831	0.00225	0.13105	0.00588	0.01969	0.00021	114	83	125	5	126	1
16XJ14-1-07	657	1106	0.59	0.04856	0.00225	0.13098	0.00558	0.01968	0.00024	126	76	125	5	126	1
16XJ14-1-08	1979	1725	1.15	0.04748	0.00254	0.12783	0.00712	0.01942	0.00032	73	93	122	6	124	2
16XJ14-1-09	1413	1484	0.95	0.04996	0.00337	0.13274	0.00738	0.01966	0.00039	193	92	127	7	126	2
16XJ14-1-10	531	612	0.87	0.04874	0.00301	0.13110	0.00730	0.01959	0.00023	135	103	125	7	125	1
16XJ14-1-11	1271	2139	0.59	0.04964	0.00154	0.13438	0.00413	0.01960	0.00017	178	56	128	4	125	1
16XJ14-1-12	1112	1532	0.73	0.04708	0.00224	0.12568	0.00570	0.01954	0.00029	54	71	120	5	125	2

Continued Supplementary Table 2

Sample No.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
				Ratio	1s	Ratio	1s	Ratio	1s	Age(Ma)	1s	Age(Ma)	1s	Age(Ma)	1s
16XJ14-1-13	1059	1808	0.59	0.05039	0.00183	0.13541	0.00489	0.01953	0.00021	213	64	129	4	125	1
16XJ14-1-15	12736	5049	2.52	0.05011	0.00136	0.13595	0.00384	0.01960	0.00014	200	52	129	3	125.1	0.9
16XJ14-1-16	1248	2309	0.54	0.04928	0.00155	0.13283	0.00409	0.01959	0.00017	161	55	127	4	125	1
16XJ14-1-17	1005	1367	0.74	0.04931	0.00219	0.13301	0.00557	0.01964	0.00019	163	79	127	5	125	1
16XJ14-1-19	2618	2250	1.16	0.05157	0.00177	0.13872	0.00454	0.01958	0.00018	266	58	132	4	125	1
16XJ14-1-20	1345	1564	0.86	0.05057	0.00208	0.13737	0.00577	0.01966	0.00020	221	78	131	5	126	1
16XJ14-1-21	1891	1824	1.04	0.04924	0.00161	0.13254	0.00420	0.01964	0.00019	159	56	126	4	125	1
16XJ14-1-22	1200	1081	1.11	0.04574	0.00256	0.12267	0.00655	0.01964	0.00026	-16	88	117	6	125	2
16XJ14-1-23	1335	907	1.47	0.05045	0.00368	0.13398	0.00909	0.01959	0.00037	216	120	128	8	125	2
16XJ14-1-24	6517	3738	1.74	0.05137	0.00132	0.13865	0.00365	0.01956	0.00020	257	42	132	3	125	1
16XJ14-1-25	842	914	0.92	0.04960	0.00227	0.13311	0.00569	0.01970	0.00024	176	77	127	5	126	2
16XJ15-1															
16XJ15-1-01	2432	1800	1.35	0.05088	0.00175	0.13245	0.00455	0.01893	0.00019	235	61	126	4	121	1
16XJ15-1-03	1334	1629	0.82	0.04977	0.00173	0.12944	0.00446	0.01886	0.00018	184	62	124	4	120	1
16XJ15-1-04	1347	1703	0.79	0.04862	0.00158	0.12622	0.00405	0.01889	0.00021	130	54	121	4	121	1
16XJ15-1-05	727	932	0.78	0.05086	0.00202	0.13159	0.00522	0.01878	0.00020	234	71	126	5	120	1
16XJ15-1-06	666	760	0.88	0.04925	0.00259	0.12749	0.00631	0.01896	0.00022	160	92	122	6	121	1
16XJ15-1-07	817	1248	0.65	0.04747	0.00366	0.12217	0.00916	0.01876	0.00030	73	135	117	8	120	2
16XJ15-1-08	1159	1274	0.91	0.05155	0.00222	0.13375	0.00591	0.01863	0.00024	266	78	127	5	119	2
16XJ15-1-09	1247	868	1.44	0.04894	0.00253	0.12749	0.00627	0.01892	0.00023	145	90	122	6	121	1
16XJ15-1-10	1238	1584	0.78	0.04823	0.00167	0.12538	0.00433	0.01883	0.00017	110	64	120	4	120	1
16XJ15-1-11	606	995	0.61	0.04864	0.00223	0.12571	0.00541	0.01886	0.00024	130	76	120	5	120	2
16XJ15-1-12	1470	2044	0.72	0.04944	0.00191	0.12880	0.00492	0.01892	0.00019	169	71	123	4	121	1
16XJ15-1-14	1853	1790	1.04	0.04758	0.00219	0.12572	0.00495	0.01889	0.00021	78	67	120	4	121	1
16XJ15-1-15	1281	1598	0.80	0.04819	0.00172	0.12601	0.00474	0.01885	0.00021	109	66	121	4	120	1
16XJ15-1-16	1529	1598	0.96	0.04838	0.00170	0.12577	0.00432	0.01891	0.00018	118	63	120	4	121	1
16XJ15-1-18	1169	1614	0.72	0.04928	0.00157	0.12941	0.00427	0.01899	0.00020	161	57	124	4	121	1
16XJ15-1-19	933	1396	0.67	0.04872	0.00187	0.12673	0.00491	0.01884	0.00019	134	71	121	4	120	1

Continued Supplementary Table 2

Sample No.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
				Ratio	1s	Ratio	1s	Ratio	1s	Age(Ma)	1s	Age(Ma)	1s	Age(Ma)	1s
16XJ15-1-20	992	975	1.02	0.04795	0.00227	0.12510	0.00597	0.01889	0.00022	97	85	120	5	121	1
16XJ15-1-21	1379	1246	1.11	0.05082	0.00215	0.13262	0.00586	0.01887	0.00025	233	77	126	5	120	2
16XJ15-1-22	791	1219	0.65	0.05128	0.00201	0.13379	0.00526	0.01896	0.00024	254	67	127	5	121	2
16XJ15-1-23	1528	1815	0.84	0.04817	0.00167	0.12506	0.00426	0.01885	0.00017	108	63	120	4	120	1
16XJ15-1-24	1511	1701	0.89	0.05063	0.00179	0.13203	0.00452	0.01890	0.00018	224	62	126	4	121	1
16XJ15-1-25	835	1013	0.82	0.04992	0.00225	0.12935	0.00575	0.01886	0.00022	191	82	124	5	120	1
16XJ6-1															
16XJ6-1-01	486	921	0.53	0.04935	0.00231	0.12764	0.00571	0.01892	0.00023	165	81	122	5	121	1
16XJ6-1-02	686	1074	0.64	0.04981	0.00392	0.12765	0.00815	0.01875	0.00045	186	103	122	7	120	3
16XJ6-1-03	443	886	0.50	0.04701	0.00232	0.12216	0.00593	0.01889	0.00024	50	82	117	5	121	2
16XJ6-1-05	403	798	0.51	0.04868	0.00275	0.12543	0.00661	0.01888	0.00025	132	95	120	6	121	2
16XJ6-1-06	534	925	0.58	0.04716	0.00224	0.12293	0.00577	0.01898	0.00025	57	78	118	5	121	2
16XJ6-1-07	472	983	0.48	0.04812	0.00233	0.12482	0.00597	0.01891	0.00023	105	85	119	5	121	1
16XJ6-1-08	318	736	0.43	0.04801	0.00258	0.12533	0.00702	0.01889	0.00028	100	97	120	6	121	2
16XJ6-1-10	665	1114	0.60	0.04962	0.00189	0.12794	0.00468	0.01886	0.00024	177	61	122	4	120	2
16XJ6-1-11	535	946	0.57	0.05057	0.00236	0.13111	0.00582	0.01890	0.00026	221	77	125	5	121	2
16XJ6-1-14	833	1210	0.69	0.05053	0.00247	0.13157	0.00627	0.01891	0.00022	220	89	126	6	121	1
16XJ6-1-15	237	531	0.45	0.04712	0.00303	0.12108	0.00729	0.01891	0.00027	55	105	116	7	121	2
16XJ6-1-17	384	754	0.51	0.05119	0.00263	0.13147	0.00663	0.01881	0.00026	249	91	125	6	120	2
16XJ6-1-18	498	959	0.52	0.05155	0.00265	0.13276	0.00641	0.01886	0.00024	266	87	127	6	120	2
16XJ6-1-20	548	840	0.65	0.05080	0.00259	0.13133	0.00658	0.01881	0.00024	232	93	125	6	120	1
16XJ6-1-22	527	956	0.55	0.05270	0.00351	0.13514	0.00926	0.01863	0.00034	316	124	129	8	119	2
16XJ6-1-23	672	1087	0.62	0.04605	0.00161	0.11948	0.00408	0.01882	0.00014		73	115	4	120	1
16XJ6-1-26	641	1084	0.59	0.04896	0.00274	0.12674	0.00705	0.01887	0.00024	146	103	121	6	121	1
16XJ6-1-27	324	729	0.44	0.05036	0.00233	0.12975	0.00565	0.01890	0.00026	212	75	124	5	121	2
16XJ6-1-28	260	654	0.40	0.04876	0.00263	0.12489	0.00582	0.01890	0.00025	136	82	119	5	121	2
16XJ6-1-29	501	857	0.58	0.05091	0.00257	0.13134	0.00649	0.01888	0.00024	237	91	125	6	121	1

Continued Supplementary Table 2

Sample No.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
				Ratio	1s	Ratio	1s	Ratio	1s	Age(Ma)	1s	Age(Ma)	1s	Age(Ma)	1s
16XJ17-1															
16XJ17-1-01	2372	2987	0.79	0.04839	0.00163	0.12699	0.00442	0.01903	0.00030	118	52	121	4	122	2
16XJ17-1-02	267	276	0.97	0.04992	0.00465	0.12632	0.01036	0.01898	0.00042	191	144	121	9	121	3
16XJ17-1-03	6870	5616	1.22	0.04985	0.00107	0.13051	0.00294	0.01894	0.00018	188	35	125	3	121	1
16XJ17-1-05	776	1128	0.69	0.05207	0.00256	0.13586	0.00743	0.01889	0.00032	289	94	129	7	121	2
16XJ17-1-06	867	1760	0.49	0.04677	0.00233	0.12358	0.00635	0.01904	0.00024	37	87	118	6	122	2
16XJ17-1-07	698	876	0.80	0.04851	0.00396	0.12760	0.01036	0.01894	0.00038	124	144	122	9	121	2
16XJ17-1-08	1209	1967	0.61	0.04772	0.00205	0.12596	0.00559	0.01908	0.00022	85	78	120	5	122	1
16XJ17-1-09	612	631	0.97	0.04902	0.00327	0.12493	0.00732	0.01883	0.00042	149	93	120	7	120	3
16XJ17-1-10	454	457	0.99	0.05020	0.00375	0.12766	0.00802	0.01896	0.00032	204	112	122	7	121	2
16XJ17-1-12	1129	1097	1.03	0.04835	0.00216	0.12553	0.00543	0.01896	0.00025	117	74	120	5	121	2
16XJ17-1-13	621	854	0.73	0.04727	0.00302	0.12144	0.00696	0.01889	0.00027	63	98	116	6	121	2
16XJ17-1-14	1063	822	1.29	0.05100	0.00259	0.13267	0.00668	0.01891	0.00026	241	90	126	6	121	2
16XJ17-1-15	537	748	0.72	0.04842	0.00243	0.12357	0.00576	0.01890	0.00025	120	82	118	5	121	2
16XJ17-1-16	344	568	0.61	0.04737	0.00357	0.11814	0.00745	0.01872	0.00035	68	103	113	7	120	2
16XJ17-1-17	613	706	0.87	0.05065	0.00303	0.13103	0.00683	0.01895	0.00022	225	99	125	6	121	1
16XJ17-1-19	725	493	1.47	0.04928	0.00513	0.12652	0.01203	0.01902	0.00049	161	165	121	11	121	3
16XJ17-1-20	421	456	0.92	0.05226	0.00363	0.13161	0.00813	0.01887	0.00045	297	97	126	7	120	3
16XJ17-1-21	3060	5417	0.56	0.04978	0.00203	0.13147	0.00515	0.01916	0.00021	185	96	125	5	122	1
16XJ17-1-22	594	538	1.10	0.04878	0.00284	0.12413	0.00652	0.01881	0.00031	137	89	119	6	120	2
16XJ17-1-23	975	994	0.98	0.04877	0.00208	0.12754	0.00537	0.01903	0.00023	137	76	122	5	122	1
16XJ17-1-24	688	843	0.82	0.04710	0.00259	0.12411	0.00680	0.01908	0.00029	54	91	119	6	122	2
16XJ17-1-25	838	957	0.88	0.05225	0.00246	0.13628	0.00645	0.01897	0.00025	296	84	130	6	121	2
16XJ7-1															
16XJ7-1-01	330	354	0.93	0.05128	0.00402	0.13230	0.00957	0.01894	0.00029	253	136	126	9	121	2
16XJ7-1-02	382	579	0.66	0.05147	0.00334	0.13120	0.00746	0.01889	0.00033	262	98	125	7	121	2
16XJ7-1-03	110	174	0.63	0.04741	0.00449	0.11968	0.00844	0.01864	0.00045	70	110	115	8	119	3
16XJ7-1-04	160	295	0.54	0.04847	0.00429	0.12143	0.00879	0.01874	0.00032	122	130	116	8	120	2

Continued Supplementary Table 2

Sample No.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
				Ratio	1s	Ratio	1s	Ratio	1s	Age(Ma)	1s	Age(Ma)	1s	Age(Ma)	1s
16XJ7-1-05	158	282	0.56	0.04832	0.00551	0.12905	0.01278	0.01926	0.00040	115	182	123	11	123	3
16XJ7-1-06	278	506	0.55	0.04631	0.00287	0.11805	0.00688	0.01867	0.00029	14	95	113	6	119	2
16XJ7-1-07	146	262	0.56	0.04984	0.00381	0.12700	0.00815	0.01904	0.00036	188	111	121	7	122	2
16XJ7-1-08	470	904	0.52	0.04605	0.00250	0.11919	0.00584	0.01892	0.00024		80	114	5	121	2
16XJ7-1-09	375	597	0.63	0.05306	0.00321	0.13871	0.00847	0.01889	0.00035	331	105	132	8	121	2
16XJ7-1-10	204	388	0.53	0.04880	0.00473	0.12781	0.01041	0.01923	0.00045	138	139	122	9	123	3
16XJ7-1-11	570	865	0.66	0.04913	0.00228	0.12631	0.00541	0.01894	0.00025	154	75	121	5	121	2
16XJ7-1-12	240	442	0.54	0.04929	0.00394	0.12528	0.00850	0.01896	0.00030	162	124	120	8	121	2
16XJ7-1-13	532	560	0.95	0.04868	0.00397	0.12361	0.00893	0.01884	0.00028	132	134	118	8	120	2
16XJ7-1-14	112	136	0.83	0.05051	0.00650	0.12831	0.01260	0.01885	0.00057	218	165	123	11	120	4
16XJ7-1-15	197	335	0.59	0.05060	0.00342	0.12809	0.00762	0.01880	0.00031	223	107	122	7	120	2
16XJ7-1-16	477	714	0.67	0.05104	0.00268	0.13006	0.00685	0.01847	0.00022	243	99	124	6	118	1
16XJ7-1-17	107	192	0.56	0.04777	0.00485	0.12578	0.01050	0.01889	0.00046	88	139	120	9	121	3
16XJ7-1-18	112	193	0.58	0.04877	0.00613	0.12440	0.01252	0.01906	0.00052	137	174	119	11	122	3
16XJ7-1-19	116	196	0.59	0.05175	0.00910	0.12634	0.01642	0.01870	0.00082	274	211	121	15	119	5
16XJ7-1-20	966	1349	0.72	0.05344	0.00215	0.14032	0.00547	0.01922	0.00024	348	66	133	5	123	2
16XJ7-1-21	252	463	0.54	0.04970	0.00334	0.12389	0.00755	0.01866	0.00032	181	107	119	7	119	2
16XJ7-1-22	147	225	0.65	0.05066	0.00512	0.12652	0.01061	0.01879	0.00046	225	145	121	10	120	3
16XJ7-1-23	513	576	0.89	0.04789	0.00294	0.12431	0.00723	0.01897	0.00027	94	103	119	7	121	2
16XJ7-1-24	1662	1411	1.18	0.05198	0.00252	0.13493	0.00649	0.01889	0.00027	284	84	129	6	121	2
16XJ7-1-26	1079	1484	0.73	0.05126	0.00204	0.13339	0.00517	0.01895	0.00020	253	70	127	5	121	1
16XJ7-1-27	277	456	0.61	0.05265	0.00407	0.13243	0.00913	0.01880	0.00036	314	123	126	8	120	2
16XJ7-1-28	782	823	0.95	0.04611	0.00206	0.12002	0.00492	0.01906	0.00026	3	60	115	4	122	2
16XJ7-1-30	871	1174	0.74	0.04735	0.00269	0.12248	0.00663	0.01886	0.00026	67	94	117	6	120	2

Supplementary Table 3 Major (wt%) and trace elements (ppm) data for the Late Jurassic–Early Cretaceous granitoids in the northeastern North China Craton

Sample	16XJ4-1	16XJ4-3	16XJ4-5	16XJ4-6	16XJ1-1	16XJ1-3	16XJ8-1	16XJ8-4	16XJ8-5
Pluton	Lishugou				Yaolin		Shengping		
SiO_2	71.14	72.54	72.44	72.31	76.79	78.00	75.60	76.34	75.99
TiO_2	0.19	0.20	0.21	0.23	0.04	0.04	0.15	0.15	0.12
Al_2O_3	15.45	14.55	14.62	14.44	13.31	12.60	11.82	11.61	11.58
TFe_2O_3	1.67	1.64	1.64	1.80	0.42	0.43	2.27	2.32	2.50
MnO	0.04	0.04	0.04	0.04	0.10	0.13	0.05	0.03	0.07
MgO	0.52	0.51	0.53	0.58	0.09	0.09	0.03	0.01	0.02
CaO	2.05	1.97	1.93	1.96	0.35	0.35	0.39	0.30	0.40
Na_2O	4.17	4.12	4.11	3.98	3.89	3.63	3.97	3.95	3.82
K_2O	4.13	3.74	3.50	3.96	3.97	3.74	4.43	4.40	4.42
P_2O_5	0.07	0.06	0.05	0.06	0.03	0.03	0.00	0.00	0.00
LOI	0.56	0.62	0.88	0.68	0.82	0.84	1.12	0.86	1.08
Total	99.99	99.99	99.95	100.04	99.81	99.88	99.83	99.97	100.00
$Mg^{\#}$	38.1	38.1	39.0	38.9	28.6	28.8	2.38	1.10	1.79
A/CNK	1.03	1.01	1.04	1.00	1.17	1.18	0.98	0.98	0.98
Na_2O+K_2O	8.30	7.86	7.61	7.94	7.86	7.37	8.40	8.35	8.24
Li	18.7	18.1	19.6	29.7	54.0	79.1	2.77	2.06	1.54
Be	2.18	1.87	2.08	2.01	15.0	13.3	6.91	6.64	6.74
Sc	1.87	2.06	2.05	2.21	4.60	6.07	0.83	0.84	0.78
V	22.8	23.5	22.7	25.9	1.30	1.50	0.42	0.47	0.47
Cr	2.20	1.99	2.17	2.45	0.39	0.55	0.13	0.20	0.25
Co	2.56	2.48	2.64	2.98	0.13	0.16	0.06	0.05	0.05
Ni	1.57	4.51	1.52	1.87	0.36	0.47	0.22	0.25	0.26
Ga	21.1	20.8	20.2	19.8	27.8	28.0	31.6	29.8	33.2
Rb	109	104	108	114	388	383	244	230	270
Sr	488	450	434	444	27.8	24.9	4.82	4.70	4.53
Y	4.32	4.72	5.09	5.07	16.3	17.9	83.1	65.3	58.0
Zr	97.3	95.9	97.7	90.7	23.5	25.7	851	650	638
Nb	6.32	6.79	7.19	7.01	61.7	71.1	136	91.3	108
Cs	1.77	1.77	2.38	2.28	18.9	19.8	1.19	1.12	1.35
Ba	1078	816	698	926	77.0	71.1	22.3	22.5	24.0
La	13.5	16.0	17.8	14.6	4.56	4.80	87.6	95.3	79.3
Ce	26.4	30.2	32.4	28.7	10.5	11.6	183	195	166
Pr	3.00	3.37	3.49	3.28	1.42	1.59	20.3	20.7	18.2
Nd	10.5	11.7	11.8	11.3	5.50	6.15	66.9	67.5	60.1
Sm	1.98	1.99	1.97	1.93	2.48	3.01	14.8	12.9	12.9
Eu	0.59	0.63	0.60	0.64	0.09	0.10	0.05	0.05	0.04
Gd	1.40	1.39	1.46	1.49	3.38	3.86	13.9	11.0	11.3
Tb	0.17	0.16	0.18	0.17	0.61	0.70	2.22	1.77	1.76
Dy	0.77	0.84	0.87	0.86	3.11	3.47	14.4	11.2	11.1
Ho	0.14	0.15	0.15	0.15	0.42	0.46	2.91	2.21	2.15
Er	0.38	0.38	0.37	0.43	0.97	1.06	8.40	6.68	6.35
Tm	0.05	0.07	0.07	0.07	0.14	0.15	1.22	1.00	0.91
Yb	0.44	0.42	0.44	0.44	0.94	0.96	8.08	6.88	6.67
Lu	0.07	0.08	0.09	0.08	0.12	0.13	1.24	1.06	1.02
Hf	3.00	3.03	2.98	2.77	1.88	2.04	21.4	16.4	18.1
Ta	0.46	0.50	0.50	0.50	6.36	7.21	7.16	4.78	6.43

Continued Supplementary Table 3

Sample	16XJ4-1	16XJ4-3	16XJ4-5	16XJ4-6	16XJ1-1	16XJ1-3	16XJ8-1	16XJ8-4	16XJ8-5
Pluton	Lishugou				Yaolin		Shengping		
Pb	28.0	26.4	27.8	30.2	18.4	17.7	38.3	17.5	12.5
Th	5.61	4.66	5.76	4.78	9.84	10.9	31.1	21.6	25.1
U	2.35	1.50	2.03	3.04	3.23	3.35	7.73	4.41	6.48
Sr/Y	113	95.3	85.3	87.5	1.71	1.39	0.06	0.07	0.08
Eu/Eu*	1.03	1.10	1.05	1.12	0.10	0.09	0.01	0.01	0.01
$(La/Yb)_N$	20.9	25.6	27.6	22.5	3.27	3.35	7.30	9.34	8.02
ΣREE	59.3	67.4	71.7	64.0	34.2	38.0	425	434	378
Zr-T(℃)	741	741	745	735	655	662	955	925	923

Continued Supplementary Table 3

Sample	16XJ14-1	16XJ14-3	16XJ15-1	16XJ15-2	16XJ15-4	16XJ6-1	16XJ6-2	16XJ6-4	16XJ17-1
Pluton			Ji`an				Shihu		Yulin
SiO_2	76.12	76.15	73.07	72.99	73.05	74.92	74.42	74.66	75.60
TiO_2	0.07	0.07	0.17	0.16	0.17	0.19	0.20	0.20	0.11
Al_2O_3	12.87	12.82	14.17	13.89	14.08	13.00	12.99	13.04	12.82
TFe_2O_3	1.07	1.12	1.74	1.67	1.70	1.70	1.83	1.81	1.11
MnO	0.03	0.04	0.05	0.05	0.06	0.04	0.05	0.04	0.06
MgO	0.02	0.02	0.40	0.42	0.39	0.28	0.31	0.30	0.17
CaO	0.26	0.27	0.65	0.76	0.86	0.75	0.78	0.76	0.66
Na_2O	4.15	4.18	3.96	3.90	4.02	3.46	3.41	3.59	3.64
K_2O	4.69	4.69	4.27	4.44	4.46	4.79	4.79	4.70	4.58
P_2O_5	0.01	0.01	0.05	0.04	0.04	0.04	0.04	0.04	0.03
LOI	0.48	0.50	1.38	1.60	1.10	0.64	0.62	0.68	1.06
Total	99.77	99.87	99.90	99.92	99.93	99.81	99.44	99.83	99.83
$Mg^{\#}$	3.57	3.91	31.3	33.2	31.2	24.6	25.1	24.7	23.3
A/CNK	1.04	1.03	1.15	1.10	1.08	1.06	1.06	1.05	1.06
Na_2O+K_2O	8.84	8.87	8.23	8.34	8.48	8.25	8.20	8.29	8.22
Li	7.81	8.22	6.73	8.17	19.0	10.7	11.1	10.5	9.02
Be	2.84	3.15	2.37	1.91	2.29	2.57	2.66	2.75	3.50
Sc	2.86	3.35	1.65	1.60	1.54	2.17	2.12	2.14	1.17
V	0.49	0.55	9.25	9.07	8.61	7.26	8.24	7.91	4.08
Cr	0.18	0.34	0.81	0.66	0.95	1.14	0.76	0.47	0.55
Co	0.07	0.11	1.62	1.63	1.63	1.72	1.67	1.43	0.67
Ni	0.88	0.84	1.23	1.28	1.47	0.83	0.64	0.53	1.38
Ga	18.8	18.5	16.9	16.6	17.1	15.8	16.0	16.0	17.0
Rb	156	153	149	152	156	177	179	171	171
Sr	8.98	10.4	207	213	232	116	119	102	82.9
Y	22.8	23.0	14.5	14.5	16.5	17.5	17.4	18.5	16.9
Zr	146	144	158	159	158	175	173	189	102
Nb	16.7	16.2	12.9	12.8	13.5	16.0	16.4	16.2	18.6
Cs	3.02	3.30	2.14	1.60	1.61	2.95	3.11	2.98	1.32
Ba	38.5	37.4	957	892	914	899	942	849	258
La	26.8	31.8	32.0	28.5	33.8	42.2	41.4	44.7	18.2
Ce	56.6	65.5	57.4	51.0	60.7	81.5	79.3	87.1	38.7
Pr	6.74	7.59	5.79	5.20	6.18	7.86	7.79	8.50	4.29
Nd	24.1	27.8	18.3	16.5	19.7	24.1	23.7	26.3	14.1
Sm	4.98	5.48	2.81	2.74	3.29	3.74	3.73	4.19	2.88
Eu	0.10	0.09	0.49	0.49	0.53	0.46	0.49	0.40	0.33
Gd	3.91	4.53	2.35	2.33	2.49	2.84	2.96	3.13	2.38
Tb	0.64	0.71	0.33	0.35	0.41	0.43	0.45	0.47	0.39
Dy	4.01	4.11	2.16	2.14	2.48	2.77	2.70	2.84	2.48
Ho	0.76	0.82	0.43	0.45	0.51	0.60	0.57	0.60	0.53
Er	2.36	2.45	1.41	1.40	1.69	1.83	1.78	1.88	1.65
Tm	0.37	0.39	0.23	0.24	0.26	0.30	0.32	0.30	0.28
Yb	2.87	2.60	1.78	1.74	2.04	2.25	2.21	2.32	2.09
Lu	0.44	0.41	0.31	0.29	0.32	0.37	0.35	0.41	0.36
Hf	5.17	4.87	4.23	4.43	4.48	4.91	4.90	5.35	3.70
Ta	1.14	1.11	1.06	1.04	1.09	1.31	1.32	1.30	1.68

Continued Supplementary Table 3

Sample	16XJ14-1	16XJ14-3	16XJ15-1	16XJ15-2	16XJ15-4	16XJ6-1	16XJ6-2	16XJ6-4	16XJ17-1
Pluton			Ji`an				Shihu		Yulin
Pb	19.9	19.0	18.6	19.6	25.9	16.9	16.6	17.9	30.6
Th	16.0	14.9	16.5	15.6	17.5	19.2	18.8	20.1	17.2
U	3.59	3.02	3.13	2.90	3.47	3.29	3.17	3.87	4.46
Sr/Y	0.39	0.45	14.3	14.7	14.1	6.63	6.85	5.52	4.89
Eu/Eu*	0.07	0.06	0.56	0.58	0.55	0.41	0.43	0.32	0.37
$(La/Yb)_N$	6.30	8.24	12.1	11.0	11.2	12.7	12.7	13.0	5.89
∑REE	135	154	126	113	134	171	168	183	88.7
Zr-T(℃)	783	781	797	793	790	800	799	807	755

Continued Supplementary Table 3

Sample	16XJ17-2	16XJ7-1	16XJ7-2	16XJ7-5	BHVO-2	BHVO-2（Ref)
Pluton	Yulin		Laoling		Standard analyzed	
SiO_2	74.54	59.89	60.04	60.34		
TiO_2	0.12	0.83	0.80	0.85		
Al_2O_3	13.28	18.40	18.44	18.17		
TFe_2O_3	1.24	5.41	5.37	5.45		
MnO	0.06	0.12	0.11	0.11		
MgO	0.19	1.93	1.88	1.92		
CaO	0.66	4.85	4.71	4.94		
Na_2O	3.67	4.19	4.32	4.22		
K_2O	4.74	2.22	2.32	2.29		
P_2O_5	0.03	0.24	0.22	0.23		
LOI	0.96	1.78	1.70	1.48		
Total	99.49	99.86	99.91	100.00		
$Mg^{\#}$	23.3	41.4	40.9	41.1		
A/CNK	1.07	1.02	1.01	0.99		
Na_2O+K_2O	8.41	6.41	6.64	6.51		
Li	10.0	23.5	24.6	20.9	4.25	4.80
Be	3.57	2.00	1.83	1.91	1.02	1.00
Sc	1.15	9.42	9.63	10.8	32.0	32.0
V	4.55	81.7	79.2	80.1	320	317
Cr	0.40	6.07	6.23	6.14	286	280
Co	0.82	10.2	10.1	10.3	45.2	45.0
Ni	1.39	2.45	2.74	2.59	124	119
Ga	17.6	22.3	22.1	22.0	21.6	21.7
Rb	174	84.8	91.4	85.4	9.21	9.11
Sr	82.1	844	841	723	399	396
Y	18.3	16.2	15.8	16.9	26.5	26.0
Zr	112	324	308	326	168	172
Nb	21.4	12.1	11.7	12.7	18.7	18.1
Cs	1.34	3.49	4.55	5.39	0.14	0.10
Ba	250	830	820	814	132	131
La	27.3	31.2	32.1	31.5	15.3	15.2
Ce	54.1	58.4	59.0	59.6	38.1	37.5
Pr	5.79	6.42	6.38	6.52	5.31	5.35
Nd	19.0	22.5	22.1	22.9	24.3	24.5
Sm	3.48	3.75	3.76	4.02	6.33	6.07
Eu	0.34	1.63	1.52	1.53	2.07	2.07
Gd	2.80	3.48	3.27	3.66	6.26	6.24
Tb	0.46	0.46	0.45	0.48	0.95	0.92
Dy	2.85	2.72	2.69	2.92	5.36	5.31
Ho	0.57	0.54	0.55	0.56	0.99	0.98
Er	1.79	1.63	1.57	1.71	2.57	2.54
Tm	0.30	0.24	0.24	0.23	0.34	0.33
Yb	2.29	1.71	1.64	1.76	2.01	2.00
Lu	0.37	0.26	0.29	0.29	0.29	0.27
Hf	3.80	6.85	6.30	6.56	4.44	4.36
Ta	1.88	0.78	0.77	0.83	1.18	1.14

Continued Supplementary Table 3

Sample	16XJ17-2	16XJ7-1	16XJ7-2	16XJ7-5	BHVO-2	BHVO-2（Ref)
Pluton	Yulin		Laoling		Standard analysed	
Pb	29.4	18.9	19.9	18.2	1.54	1.60
Th	26.3	7.65	7.54	7.75	1.27	1.22
U	5.82	1.77	1.74	1.93	0.43	0.40
Sr/Y	4.48	52.1	53.2	42.9		
Eu/Eu*	0.32	1.36	1.29	1.20		
$(La/Yb)_N$	8.02	12.3	13.2	12.1		
∑REE	121	135	136	138		
Zr-T(℃)	763	830	825	827		

Note: LOI: Loss on ignition; A/CNK=mole [Al_2O_3/(CaO+Na_2O+K_2O)];
∑REE=La+Ce+Pr+Nd+Sm+Eu+Gd+Tb+Dy+Ho+Er+Tm+Yb+Lu ;
Eu/Eu*=(Eu)cn/[(Gd)cn+(Sm)cn]/2; (La/Yb)N=(La/0.310)/(Yb/0.209);

Supplementary Table 4 Lu–Hf and O isotopic data for the Late Jurassic–Early Cretaceous granitoids in the northeastern North China Craton

Sample No.	t(Ma)	$^{176}Yb/^{177}Hf$	$^{176}Lu/^{177}Hf$	$^{176}Hf/^{177}Hf$	$2\sigma_m$	$\varepsilon_{Hf}(0)$	$\varepsilon_{Hf}(t)$	2σ	$T_{DM1}(Hf)(Ma)$	$T_{DM2}(Hf)(Ma)$	$f_{Lu/Hf}$	$\delta^{18}O$ (‰)	2σ
16XJ4-1													
16XJ4-1-01	161	0.030418	0.001028	0.282170	0.000023	-21.3	-17.9	0.8	1526	2342	-0.97	6.68	0.36
16XJ4-1-02	161	0.021594	0.000689	0.282140	0.000026	-22.3	-18.9	0.9	1553	2405	-0.98	6.48	0.27
16XJ4-1-03	161	0.018678	0.000596	0.282157	0.000029	-21.8	-18.3	1.0	1527	2368	-0.98	6.96	0.30
16XJ4-1-04	161	0.025809	0.000814	0.282152	0.000027	-21.9	-18.5	0.9	1543	2381	-0.98	6.12	0.26
16XJ4-1-05	161	0.024184	0.000750	0.282144	0.000025	-22.2	-18.8	0.9	1551	2397	-0.98	5.12	0.20
16XJ4-1-06	161	0.030105	0.000916	0.282188	0.000025	-20.6	-17.2	0.9	1496	2299	-0.97	6.77	0.38
16XJ4-1-07	161	0.029829	0.000967	0.282155	0.000026	-21.8	-18.4	0.9	1544	2373	-0.97	5.97	0.17
16XJ4-1-08	161	0.027969	0.000821	0.282172	0.000023	-21.2	-17.8	0.8	1514	2334	-0.98	6.47	0.22
16XJ4-1-09	161	0.022258	0.000746	0.282173	0.000019	-21.2	-17.7	0.7	1510	2332	-0.98	5.82	0.25
16XJ4-1-10	161	0.020034	0.000642	0.282156	0.000024	-21.8	-18.3	0.8	1530	2370	-0.98	6.92	0.26
16XJ4-1-12	161	0.017864	0.000578	0.282184	0.000025	-20.8	-17.3	0.9	1489	2307	-0.98	6.81	0.22
16XJ4-1-13	161	0.020030	0.000596	0.282178	0.000024	-21.0	-17.5	0.9	1497	2319	-0.98	6.15	0.17
16XJ4-1-14	161	0.025634	0.000736	0.282159	0.000022	-21.7	-18.2	0.8	1530	2364	-0.98	5.63	0.14
16XJ4-1-15	161	0.022068	0.000666	0.282116	0.000022	-23.2	-19.7	0.8	1586	2459	-0.98	5.41	0.22
16XJ1-1													
16XJ1-1-02	156	0.028819	0.000815	0.282088	0.000020	-24.2	-20.9	0.7	1631	2525	-0.98	5.85	0.23
16XJ1-1-03	156	0.022446	0.000589	0.282038	0.000032	-26.0	-22.6	1.1	1690	2635	-0.98	6.31	0.25
16XJ1-1-08	156	0.019531	0.000622	0.282053	0.000024	-25.4	-22.1	0.9	1671	2602	-0.98	5.91	0.18
16XJ1-1-10	156	0.030632	0.000948	0.282063	0.000024	-25.1	-21.8	0.8	1672	2582	-0.97	6.74	0.22
16XJ1-1-11	156	0.061409	0.001556	0.282234	0.000030	-19.0	-15.8	1.1	1456	2204	-0.95	5.96	0.26
16XJ1-1-13	156	0.028400	0.000943	0.282078	0.000034	-24.5	-21.2	1.2	1650	2547	-0.97	6.30	0.20
16XJ8-1													
16XJ8-1-01	125	0.101922	0.002092	0.282638	0.000027	-4.7	-2.2	0.9	895	1320	-0.94	5.65	0.17
16XJ8-1-02	125	0.092777	0.002638	0.282570	0.000065	-7.2	-4.6	2.3	1009	1477	-0.92	5.40	0.22
16XJ8-1-03	125	0.136661	0.002822	0.282635	0.000027	-4.8	-2.3	0.9	918	1331	-0.92	5.68	0.16
16XJ8-1-04	125	0.081062	0.001632	0.282606	0.000025	-5.9	-3.3	0.9	930	1389	-0.95	5.84	0.21
16XJ8-1-05	125	0.064138	0.001277	0.282618	0.000025	-5.5	-2.8	0.9	905	1362	-0.96	5.53	0.21
16XJ8-1-06	125	0.087242	0.001745	0.282605	0.000029	-5.9	-3.3	1.0	935	1393	-0.95	5.64	0.26
16XJ8-1-07	125	0.089327	0.001760	0.282604	0.000027	-5.9	-3.3	0.9	936	1394	-0.95	5.47	0.20
16XJ8-1-08	125	0.132076	0.002568	0.282659	0.000027	-4.0	-1.4	1.0	876	1274	-0.92	5.73	0.28

Continued Supplementary Table 4

Sample No.	t(Ma)	$^{176}Yb/^{177}Hf$	$^{176}Lu/^{177}Hf$	$^{176}Hf/^{177}Hf$	$2\sigma_m$	$\varepsilon_{Hf}(0)$	$\varepsilon_{Hf}(t)$	2σ	T_{DM1}(Hf)(Ma)	T_{DM2}(Hf)(Ma)	$f_{Lu/Hf}$	$\delta^{18}O$ (‰)	2σ
16XJ8-1-09	125	0.073842	0.001465	0.282625	0.000035	-5.2	-2.6	1.2	899	1347	-0.96	5.54	0.29
16XJ8-1-10	125	0.121774	0.002870	0.282597	0.000054	-6.2	-3.7	1.9	976	1417	-0.91	5.32	0.24
16XJ8-1-11	125	0.111147	0.002243	0.282600	0.000025	-6.1	-3.5	0.9	954	1406	-0.93	5.56	0.15
16XJ8-1-12	125	0.082632	0.001706	0.282593	0.000027	-6.3	-3.7	1.0	951	1420	-0.95	5.54	0.22
16XJ8-1-13	125	0.102623	0.002041	0.282587	0.000026	-6.6	-4.0	0.9	969	1436	-0.94	5.40	0.26
16XJ8-1-14	125	0.123688	0.002392	0.282622	0.000032	-5.3	-2.8	1.1	926	1357	-0.93	5.44	0.25
16XJ8-1-15	125	0.082625	0.001625	0.282602	0.000036	-6.0	-3.4	1.3	936	1400	-0.95	5.44	0.24
16XJ14-1													
16XJ14-1-01	125	0.108818	0.003240	0.282337	0.000031	-15.4	-12.9	1.1	1374	2001	-0.90	5.58	0.24
16XJ14-1-02	125	0.065431	0.001857	0.282319	0.000025	-16.0	-13.5	0.9	1348	2035	-0.94	8.67	0.34
16XJ14-1-04	125	0.032714	0.000859	0.282417	0.000024	-12.5	-9.9	0.9	1175	1810	-0.97	6.65	0.31
16XJ14-1-05	125	0.048700	0.001249	0.282342	0.000023	-15.2	-12.6	0.8	1294	1981	-0.96	5.78	0.21
16XJ14-1-06	125	0.046412	0.001316	0.282357	0.000025	-14.7	-12.1	0.9	1275	1948	-0.96	6.82	0.19
16XJ14-1-08	125	0.060327	0.001535	0.282358	0.000020	-14.6	-12.0	0.7	1281	1946	-0.95	6.08	0.13
16XJ14-1-09	125	0.073111	0.002234	0.282326	0.000043	-15.8	-13.2	1.5	1351	2019	-0.93	6.25	0.25
16XJ14-1-10	125	0.233088	0.006864	0.282420	0.000060	-12.4	-10.3	2.1	1391	1832	-0.79	7.37	0.36
16XJ15-1													
16XJ15-1-02	121	0.036945	0.000949	0.282327	0.000022	-15.8	-13.2	0.8	1305	2015	-0.97	8.28	0.41
16XJ15-1-03	121	0.049468	0.001445	0.282331	0.000022	-15.6	-13.0	0.8	1315	2007	-0.96	7.14	0.28
16XJ15-1-04	121	0.041302	0.001383	0.282369	0.000028	-14.3	-11.7	1.0	1260	1923	-0.96	6.44	0.17
16XJ15-1-05	121	0.035467	0.000970	0.282321	0.000027	-15.9	-13.4	1.0	1313	2027	-0.97	6.33	0.18
16XJ15-1-06	121	0.035343	0.001049	0.282310	0.000020	-16.3	-13.8	0.7	1331	2053	-0.97	5.93	0.21
16XJ15-1-07	121	0.038235	0.001160	0.282360	0.000024	-14.6	-12.0	0.9	1265	1941	-0.97	6.65	0.20
16XJ15-1-08	121	0.039953	0.001275	0.282316	0.000035	-16.1	-13.6	1.2	1331	2040	-0.96	5.37	0.20
16XJ15-1-09	121	0.050923	0.001513	0.282295	0.000021	-16.9	-14.3	0.8	1369	2089	-0.95	——	——
16XJ15-1-10	121	0.046996	0.001537	0.282324	0.000034	-15.9	-13.3	1.2	1329	2025	-0.95	6.23	0.20
16XJ6-1													
16XJ6-1-03	121	0.029735	0.000927	0.282560	0.000023	-7.5	-4.9	0.8	978	1493	-0.97	5.82	0.26

Continued Supplementary Table 4

Sample No.	t(Ma)	$^{176}Yb/^{177}Hf$	$^{176}Lu/^{177}Hf$	$^{176}Hf/^{177}Hf$	$2\sigma_m$	$\varepsilon_{Hf}(0)$	$\varepsilon_{Hf}(t)$	2σ	T_{DM1}(Hf)(Ma)	T_{DM2}(Hf)(Ma)	$f_{Lu/Hf}$	$\delta^{18}O$ (‰)	2σ
16XJ6-1-04	121	0.036472	0.001096	0.282576	0.000022	-6.9	-4.4	0.8	959	1458	-0.97	4.49	0.29
16XJ6-1-05	121	0.027307	0.000828	0.282560	0.000021	-7.5	-4.9	0.7	975	1493	-0.98	5.74	0.20
16XJ6-1-06	121	0.030301	0.000932	0.282566	0.000021	-7.3	-4.7	0.7	969	1478	-0.97	5.78	0.21
16XJ6-1-07	121	0.040179	0.001334	0.282560	0.000051	-7.5	-4.9	1.8	987	1493	-0.96	5.84	0.13
16XJ6-1-08	121	0.033511	0.001027	0.282547	0.000021	-8.0	-5.4	0.7	999	1523	-0.97	5.88	0.22
16XJ6-1-10	121	0.034758	0.001106	0.282588	0.000044	-6.5	-3.9	1.6	942	1429	-0.97	5.96	0.24
16XJ6-1-11	121	0.037312	0.001192	0.282570	0.000033	-7.1	-4.6	1.2	970	1471	-0.96	6.22	0.22
16XJ6-1-12	121	0.035324	0.001139	0.282551	0.000041	-7.8	-5.3	1.5	996	1514	-0.97	6.10	0.14
16XJ6-1-13	121	0.026976	0.000836	0.282569	0.000023	-7.2	-4.6	0.8	963	1472	-0.97	8.74	0.38
16XJ6-1-14	121	0.043992	0.001334	0.282563	0.000024	-7.4	-4.8	0.9	983	1486	-0.96	7.91	0.31
16XJ6-1-15	121	0.036523	0.001095	0.282549	0.000021	-7.9	-5.3	0.7	998	1518	-0.97	6.50	0.18
16XJ17-1													
16XJ17-1-01	121	0.062617	0.001531	0.282389	0.000021	-13.6	-11.0	0.8	1237	1879	-0.95	6.09	0.31
16XJ17-1-02	121	0.045842	0.001374	0.282361	0.000047	-14.5	-12.0	1.7	1271	1941	-0.96	5.75	0.25
16XJ17-1-03	121	0.055788	0.001697	0.282367	0.000028	-14.3	-11.8	1.0	1274	1929	-0.95	5.71	0.23
16XJ17-1-04	121	0.044456	0.001072	0.282351	0.000020	-14.9	-12.3	0.7	1274	1961	-0.97	5.74	0.29
16XJ17-1-05	121	0.040452	0.001005	0.282353	0.000020	-14.8	-12.2	0.7	1269	1956	-0.97	6.13	0.20
16XJ17-1-06	121	0.045960	0.001114	0.282345	0.000021	-15.1	-12.6	0.8	1285	1976	-0.97	6.05	0.15
16XJ17-1-07	121	0.036607	0.000949	0.282329	0.000022	-15.7	-13.1	0.8	1301	2010	-0.97	——	——
16XJ17-1-08	121	0.055024	0.001340	0.282367	0.000023	-14.3	-11.8	0.8	1261	1927	-0.96	5.67	0.30
16XJ17-1-09	121	0.031061	0.000748	0.282331	0.000027	-15.6	-13.0	1.0	1292	2005	-0.98	5.64	0.18
16XJ17-1-10	121	0.031073	0.000767	0.282341	0.000029	-15.2	-12.7	1.0	1278	1983	-0.98	6.40	0.27
16XJ17-1-11	121	0.066913	0.001615	0.282325	0.000026	-15.8	-13.3	0.9	1330	2021	-0.95	5.97	0.29
16XJ17-1-12	121	0.042222	0.001398	0.282368	0.000030	-14.3	-11.7	1.1	1262	1925	-0.96	5.90	0.18
16XJ17-1-13	121	0.044618	0.001513	0.282326	0.000067	-15.8	-13.2	2.4	1325	2019	-0.95	6.09	0.21
16XJ17-1-14	121	0.050536	0.001344	0.282331	0.000027	-15.6	-13.1	0.9	1312	2007	-0.96	5.67	0.27
16XJ17-1-15	121	0.049420	0.001571	0.282382	0.000029	-13.8	-11.3	1.0	1248	1894	-0.95	6.80	0.23
16XJ7-1													

Continued Supplementary Table 4

Sample No.	t(Ma)	$^{176}Yb/^{177}Hf$	$^{176}Lu/^{177}Hf$	$^{176}Hf/^{177}Hf$	$2\sigma_m$	$\varepsilon_{Hf}(0)$	$\varepsilon_{Hf}(t)$	2σ	$T_{DM1}(Hf)(Ma)$	$T_{DM2}(Hf)(Ma)$	$f_{Lu/Hf}$	$\delta^{18}O$ (‰)	2σ
16XJ7-1-02	120	0.046567	0.001370	0.282430	0.000023	-12.1	-9.6	0.8	1173	1786	-0.96	6.46	0.20
16XJ7-1-03	120	0.049774	0.001422	0.282500	0.000035	-9.6	-7.1	1.2	1076	1631	-0.96	6.90	0.21
16XJ7-1-04	120	0.036776	0.000892	0.282482	0.000023	-10.3	-7.7	0.8	1086	1668	-0.97	6.32	0.14
16XJ7-1-05	120	0.013245	0.000389	0.282497	0.000031	-9.7	-7.1	1.1	1051	1633	-0.99	6.83	0.22
16XJ7-1-06	120	0.027202	0.000741	0.282478	0.000021	-10.4	-7.8	0.7	1088	1677	-0.98	6.72	0.25
16XJ7-1-07	120	0.026787	0.000683	0.282483	0.000022	-10.2	-7.6	0.8	1078	1664	-0.98	6.63	0.36
16XJ7-1-08	120	0.033709	0.000875	0.282493	0.000029	-9.9	-7.3	1.0	1070	1644	-0.97	7.17	0.29
16XJ7-1-09	120	0.032897	0.000810	0.282440	0.000025	-11.7	-9.2	0.9	1142	1762	-0.98	6.81	0.20
16XJ7-1-10	120	0.042043	0.001080	0.282495	0.000048	-9.8	-7.3	1.7	1073	1640	-0.97	7.19	0.14
16XJ7-1-11	120	0.012364	0.000314	0.282302	0.000024	-16.6	-14.0	0.9	1317	2068	-0.99	6.98	0.24
16XJ7-1-12	120	0.015555	0.000391	0.282477	0.000023	-10.4	-7.8	0.8	1078	1676	-0.99	6.77	0.16
16XJ7-1-14	120	0.036089	0.000890	0.282479	0.000026	-10.4	-7.8	0.9	1090	1674	-0.97	6.81	0.28
16XJ7-1-15	120	0.065488	0.001650	0.282490	0.000028	-10.0	-7.5	1.0	1096	1653	-0.95	7.12	0.25

Supplementary Table 5 Geochronological data for the Late Mesozoic igneous rocks in the North China Craton

Order	Sample	Latitude	Longitude	Location	Lithology	Age (Ma)	Method	Reference
NCC								
1	–	–	–	Dongqing	Alkali feldspar granite	156±3	Rb-Sr WR	Wu et al., 2004
2	Baishi-1	43°28′ 05″ N	126°05′ 23″ E	Baishileizi	Alkali feldspar granite	123±1	TIMS	Wu et al., 2002
3	HP2-2	43°20′ 46″ N	126°01′ 19″ E	Qingyangwaizi	Gabbro	129±1	TIMS	Wu et al., 2011
4	HP4-1	43°21′ 37″ N	126°01′ 02″ E	Qingyangwaizi	Monzogranite	124±4	TIMS	Wu et al., 2011
5	DY0502-1	42°42′ 34″ N	126°06′ 01″ E	Xujiajie	Syenogranite	108±1	LA-ICPMS	Wu et al., 2011
6	MG-42	42°43′ 24″ N	125°49′ 39″ E	Loushan	Alkali feldspar granite	125±4	SHRIMP	Wu et al., 2011
7	MG-109	42°20′ 33″ N	124°45′ 41″ E	Lazishan	Quartz monzodiorite	123±2	SHRIMP	Wu et al., 2011
8	MG-110	42°20′ 33″ N	124°45′ 41″ E	Lazishan	Alkali feldspar granite	127±3	SHRIMP	Wu et al., 2011
9	FW00-96	43°08′ 45″ N	129°32′ 2″ E0	Zongping	Diorite	129±2	TIMS	Wu et al., 2011
10	YZ02-38	42°18′ 32″ N	129°02′ 11″ E	Liudong	Monzogranite	114±2	LA-ICPMS	Wu et al., 2011
11	9905-1	42°59′ 56″ N	124°47′ 20″ E	Tiande	Monzogranite	162±3	LA-ICPMS	Wu et al., 2011
12	DY141-1	43°10′ 12″ N	125°07′ 58″ E	Zumin	Monzogranite	163±1	LA-ICPMS	Wu et al., 2011
13	MG-13	42°59′ 40″ N	124°48′ 11″ E	Tiande	Monzogranite	158±3	SHRIMP	Wu et al., 2011
14	MG-16	42°36′ 34″ N	124°33′ 31″ E	Liushugou	Granodiorite	158±4	SHRIMP	Wu et al., 2011
15	MG-32	42°30′ 46″ N	124°48′ 10″ E	Helong	Monzogranite	163±4	SHRIMP	Wu et al., 2011
16	MG-36	42°20′ 46″ N	125°04′ 35″ E	Tukouzi	Granodiorite	163±7	SHRIMP	Wu et al., 2011
17	MG-40	42°26′ 00″ N	125°33′ 14″ E	Heishantou	Monzogranite	163±4	SHRIMP	Wu et al., 2011
18	MG-108	42°24′ 13″ N	124°39′ 33″ E	Jianshanzi	Granodiorite	163±2	SHRIMP	Wu et al., 2011
19	MG-139	42°19′ 55″ N	124°54′ 53″ E	Tukouzi	Granodiorite	163±4	SHRIMP	Wu et al., 2011
20	FW00-43	42°47′ 50″ N	127°52′ 50″ E	Huangniling	Monzogranite	158±3	TIMS	Wu et al., 2011
21	1709A	42°48′ 31″ N	128°13′ 37″ E	Dongqing	Monzogranite	159±5	CHIME monazite	Sun et al., 2009
22	LK03-1	42°53′ 02″ N	124°26′ 15″ E	Yangmulinzi	Gneissic granodiorite	165±1	LA-ICPMS	Zhang et al., 2016
23	LK05-1	42°42′ 47″ N	124°19′ 14″ E	Weiyuanpu	Granodiorite	163±1	LA-ICPMS	Zhang et al., 2016
24	LK11-1	42°20′ 30″ N	124°20′ 39″ E	Weijiapuzi	Gabbro	163±3	LA-ICPMS	Zhang et al., 2016
25	XBC09	40°44′ 37″ N	118°04′ 22″ E	Chengde basin(Tiaojishan Fm.)	Trachyandesite	156±3	LA-ICPMS	Liu et al., 2006
26	XBC10	420°45′ 27″ N	118°03′ 38″ E	Chengde basin(Tiaojishan Fm.)	Trachyandesite	153±1	LA-ICPMS	Liu et al., 2006
27	HFG-27	41°50′ 29″ N	120°46′ 01″ E	Lanqi Formation	Andesite	160±6	LA-ICPMS	Yang and Li, 2008
28	HFG-29	41°50′ 29″ N	120°46′ 01″ E	Lanqi Formation	Andesite	153±2	LA-ICPMS	Yang and Li, 2008
29	BJ12-01	40°15′ 03″ N	116°15′ 12″ E	Tiaojishan Fm.	Tuff	157±1	LA-ICPMS	Yu et al., 2016
30	BJ12-03	40°14′ 54″ N	116°15′ 36″ E	Tiaojishan Fm.	Volcanic breccia	155±2	LA-ICPMS	Yu et al., 2016
31	BJ12-08	40°14′ 47″ N	116°15′ 51″ E	Tiaojishan Fm.	Andesite	153±2	LA-ICPMS	Yu et al., 2016
32	BJ10-01	39°58′ 45″ N	115°56′ 36″ E	Tombs area-Western hills	Diorite	149±3	SHRIMP	Yu et al., 2016
33	BJ10-02	39°58′ 48″ N	115°56′ 33″ E	Tiaojishan Fm.	Volcanic breccia	152±2	SHRIMP	Yu et al., 2016
34	BJ10-03	39°58′ 53″ N	115°56′ 29″ E	Tiaojishan Fm.	Andesite	149±2	SHRIMP	Yu et al., 2016
35	Zh01	–	–	Zhangjiakou Fm.	Dacite	143±4	LA-ICPMS	Wei et al., 2008
36	Zh02	–	–	Zhangjiakou Fm.	Dacite	139±3	LA-ICPMS	Wei et al., 2008
37	Zh03	–	–	Zhangjiakou Fm.	Dacite	140±3	LA-ICPMS	Wei et al., 2008
38	Zh04	–	–	Zhangjiakou Fm.	Dacite	136±1	LA-ICPMS	Wei et al., 2008
39	LLX020811	–	–	Xingzhangzi, Lingyuan	Quartz porphyry	165±2	SHRIMP	Zhang et al., 2014
40	09018-1	40°26′ 04″ N	118°31′ 04″ E	Nianziyu, Kuancheng	Diorite	165±2	LA-ICPMS	Zhang et al., 2014
41	1021	–	–	Qianzhangzi, Pingquan	Syenite	164±4	SHRIMP	Zhang et al., 2014
42	09064-1	42°18′ 07″ N	120°16′ 37″ E	Nantaxiang, East Chifeng	Rhyolite	164±3	LA-ICPMS	Zhang et al., 2014
43	09354-1	43°05′ 30″ N	124°43′ 03″ E	Shilingzhen, Siping	Granodiorite	164±2	LA-ICPMS	Zhang et al., 2014
44	09061-1	42°01′ 14″ N	120°28′ 48″ E	Daheishan, NW Beipiao	Quartz monzonite	164±1	LA-ICPMS	Zhang et al., 2014
45	09075-1	42°33′ 53″ N	119°39′ 11″ E	East Laohahe, East Chifeng	Rhyolitic tuff	163±2	LA-ICPMS	Zhang et al., 2014
46	08170-2	42°18′ 04″ N	120°16′ 24″ E	Peijiadian, East Chifeng	Rhyolitic tuff	162±2	LA-ICPMS	Zhang et al., 2014
47	08005-4	40°33′ 23″ N	117°44′ 56″ E	Shouwangfen, Xinglong	Andesite	161±2	LA-ICPMS	Zhang et al., 2014
48	10036-1	40°43′ 47″ N	118°07′ 45″ E	Chengde county	Diorite porphyrite	161±2	LA-ICPMS	Zhang et al., 2014

49	SGD-1	40°28′ 34″ N	117°07′ 17″ E	Siganding, Miyun	Quartz monzodiorite	160±5	SHRIMP	Zhang et al., 2014
50	07D010-1	42°05′ 56″ N	119°07′ 34″ E	Zhoujiawopu, SE Chifeng	Quartz monzodiorite	159±2	LA-ICPMS	Zhang et al., 2014
51	08008-1	40°44′ 28″ N	118°08′ 47″ E	Chengde county	Diorite porphyrite	159±2	LA-ICPMS	Zhang et al., 2014
52	D078-2	41°01′ 30″ N	117°04′ 38″ E	Lingying, Fengning	Dacite	156±4	LA-ICPMS	Zhang et al., 2014
53	10107-1	40°04′ 50″ N	115°26′ 38″ E	Guanyindian, Zhuolu	Granite	139±2	LA-ICPMS	Zhang et al., 2014
54	07D044-1	42°33′ 39″ N	118°27′ 52″ E	Gangzi, Chifeng	Quartz syenite porphyry	138±2	LA-ICPMS	Zhang et al., 2014
55	10096-1	41°01′ 04″ N	116°37′ 57″ E	Yunwushan, Fengning	Granodiorite	138±1	LA-ICPMS	Zhang et al., 2014
56	10018-1	40°35′ 53″ N	117°53′ 35″ E	Shouwangfen, Xinglong	Quartz diorite	133±1	LA-ICPMS	Zhang et al., 2014
57	10207-1	41°31′ 00″ N	109°54′ 23″ E	Hejiao, South Bayan Obo	Rhyolitic tuff	131±2	LA-ICPMS	Zhang et al., 2014
58	08005-1	40°33′ 27″ N	117°44′ 56″ E	Shouwangfen, Xinglong	Andesite	128±1	LA-ICPMS	Zhang et al., 2014
59	10205-1	41°25′ 55″ N	109°58′ 32″ E	Hejiao, South Bayan Obo	Rhyolite	128±1	LA-ICPMS	Zhang et al., 2014
60	09043-1	41°12′ 44″ N	119°39′ 06″ E	Liuguanyingzi, Lingyuan	Diorite porphyrite	124±2	LA-ICPMS	Zhang et al., 2014
61	97LW-17	–	–	Laiyang Basin	Trachybasalt	107±2	K-Ar	Guo F et al., 2005
62	97LW-3	–	–	Laiyang Basin	Trachybasalt	105±2	K-Ar	Guo F et al., 2005
Jiaodong Peninsula								
66	JJLL-1	37°26′ 25″ N	120°08′ 28″ E	Linglong	Granite	158±2	LA-ICPMS	Ma et al., 2013
67	JJLL-2	37°26′ 25″ N	120°08′ 28″ E	Linglong	Granite	158±2	LA-ICPMS	Ma et al., 2013
68	JJLL-5	37°26′ 25″ N	120°08′ 28″ E	Linglong	Granite	160±3	LA-ICPMS	Ma et al., 2013
69	JJLL-6	37°26′ 25″ N	120°08′ 28″ E	Linglong	Granite	157±3	LA-ICPMS	Ma et al., 2013
70	08G33	–	–	Linglong	Granite	159±2	LA-ICPMS	Yang et al., 2012
71	08G59	–	–	Linglong	Granite	159±1	LA-ICPMS	Yang et al., 2012
72	08G40	–	–	Luanjiahe	Granite	158±2	LA-ICPMS	Yang et al., 2012
73	08G42	–	–	Luanjiahe	Granite	157±2	LA-ICPMS	Yang et al., 2012
74	08G32	–	–	Guojialing	Granodiorite	129±1	LA-ICPMS	Yang et al., 2012
75	08G37	–	–	Guojialing	Granodiorite	129±1	LA-ICPMS	Yang et al., 2012
76	LD-10	–	–	Linglong	Granodiorite	153±4	SHRIMP	Wang et al., 1998
77	LX-13	–	–	Loushan	Granite	158±4	SHRIMP	Wang et al., 1998
78	JMS-1	–	–	Jiumoushan	Granite	160±3	SHRIMP	Wang et al., 1998
79	MS-1	–	–	Moushan	Granite	158±3	SHRIMP	Wang et al., 1998
80	LJH-1	–	–	Luanjiahe	Granite	154±4	SHRIMP	Wang et al., 1998
81	BG-1	–	–	Biguo	Granite	152±10	SHRIMP	Wang et al., 1998
82	SSD-15	–	–	Guojialing suite	Granodiorite	128±2	SHRIMP	Wang et al., 1998
83	JH-8	–	–	Guojialing suite	Granodiorite	126±2	SHRIMP	Wang et al., 1998
84	TJ-1	–	–	Guojialing suite	Granodiorite	130±3	SHRIMP	Wang et al., 1998
85	MZS-1	–	–	Guojialing suite	Granodiorite	129±3	SHRIMP	Wang et al., 1998
86	NM-1	–	–	Guojialing suite	Granodiorite	128±6	SHRIMP	Wang et al., 1998
87	X-53	–	–	Linglong	Porphyry dyke	120±2	SHRIMP	Wang et al., 1998
88	C3	–	–	Linglong	Granodiorite	154±5	SHRIMP	Zhang et al., 2003
89	SJS-8	–	–	Shijiusuo	Monzogranite	127±2	SHRIMP	Yang et al., 2005
90	SJS-12	–	–	Shijiusuo	Mafic enclave	124±3	SHRIMP	Yang et al., 2005
91	SJS-1	–	–	Shijiusuo	Mafic dyke	111±1	Ar-Ar	Yang et al., 2005
92	FZ-1	–	–	Shichang–Fangzi complex	Monzodiorite	122±2	SHRIMP	Yang et al., 2005
93	SC-1	–	–	Shichang–Fangzi complex	Monzonite	122±2	SHRIMP	Yang et al., 2005
94	03SD47	–	–	Qibaoshan (Wulian region)	Granite porphyry	125±4	SHRIMP	Huang et al., 2006
95	03SD47	–	–	Qibaoshan (Wulian region)	Granite porphyry	121±3	LA-ICPMS	Huang et al., 2006
96	02SD76	35°39′ 49″ N	119°09′ 58″ E	Shichang	Granite	116±2	LA-ICPMS	Huang et al., 2006
97	03SD73	35°20′ 81″ N	118°47′ 19″ E	Dadian	Granite	118±2	LA-ICPMS	Huang et al., 2006
98	JNZ	–	–	Junan	Quartz monzonite	123±2	SHRIMP	Liu et al., 2008
99	DCZ	–	–	Dadian	Quartz monzonite	122±2	SHRIMP	Liu et al., 2008
100	JXZ	–	–	Juxian	Granite	127±2	SHRIMP	Liu et al., 2008
101	WLZ	–	–	Wulian	Granite	125±1	SHRIMP	Liu et al., 2008

102	JCZ	–	–	Jiaonan	Quartz monzonite	120±2	SHRIMP	Liu et al., 2008
103	JNMZ	–	–	Junan	Diabase dike	120±2	SHRIMP	Liu et al., 2008
104	JXMZ	–	–	Juxian	Diabase dike	119±2	SHRIMP	Liu et al., 2008
105	GS1	–	–	Guocheng	Monzonite porphyry	114±2	LA-ICPMS	Tan et al., 2008
106	GS2	–	–	Guocheng	Diorite porphyrite	116±1	LA-ICPMS	Tan et al., 2008
107	B1ZA	–	–	Beibo gold district	Diabase dike	125±2	LA-ICPMS	Liu S et al., 2009
108	B3ZA	–	–	Beibo gold district	Diabase dike	127±2	LA-ICPMS	Liu S et al., 2009
109	B4ZA	–	–	Beibo gold district	Diabase dike	123±2	LA-ICPMS	Liu S et al., 2009
110	B5ZA	–	–	Beibo gold district	Diabase dike	124±2	LA-ICPMS	Liu S et al., 2009
111	B6ZA	–	–	Beibo gold district	Diabase dike	125±1	LA-ICPMS	Liu S et al., 2009
112	SD-11	36°58′ 35″ N	121°43′ 29″ E	Sanfoshan	Monzogranite	118±1	SHRIMP	Goss et al., 2010
113	SD-12	36°58′ 35″ N	121°43′ 29″ E	Sanfoshan	Syenogranite	117±1	SHRIMP	Goss et al., 2010
114	SD-27	37°24′ 48″ N	120°46′ 34″ E	Aishan	Monzogranite	125±3	SHRIMP	Goss et al., 2010
115	SD-28	37°24′ 47″ N	120°46′ 33″ E	Aishan	Monzogranite	116±2	SHRIMP	Goss et al., 2010
116	SD-30	37°12′ 09″ N	120°59′ 54″ E	Yashan Pluton	Monzonite	116±1	SHRIMP	Goss et al., 2010
117	SD-31	37°12′ 09″ N	120°59′ 54″ E	Yashan Pluton	Monzogranite	113±2	SHRIMP	Goss et al., 2010
118	SD-59	36°16′ 02″ N	120°35′ 11″ E	Laoshan	Alkali feldspar granite	115±2	SHRIMP	Goss et al., 2010
119	08LX94	35°22′ 17″ N	118°55′ 41″ E	Dadian alkaline complex	Syenite	124±1	LA-ICPMS	Lan et al., 2011
120	08LX98	35°22′ 59″ N	118°49′ 43″ E	Dadian alkaline complex	Quartz syenite	125±1	LA-ICPMS	Lan et al., 2011
121	00DP01	35°17′ 59″ N	119°11′ 22″ E	Dalincun	Gabbro	129±1	LA-ICPMS	Zhang et al., 2012
122	00SD47	35°40′ 03″ N	119°13′ 28″ E	Wulian	Gabbro	123±2	LA-ICPMS	Zhang et al., 2012
123	00SD10	35°36′ 30″ N	118°56′ 03″ E	Zhonglouxiang	Hornblendite	111±3	LA-ICPMS	Zhang et al., 2012
124	00XHY02	35°25′ 01″ N	119°13′ 31″ E	Xiaohuayuancun	Hornblendite	124±2	LA-ICPMS	Zhang et al., 2012
125	00DP02	35°17′ 59″ N	119°11′ 22″ E	Dalincun	Monzogranite	124±1	LA-ICPMS	Zhang et al., 2012
126	00SD02	35°23′ 33″ N	119°02′ 45″ E	Liangshan	Monzogranite	113±2	LA-ICPMS	Zhang et al., 2012
127	00SD04	35°23′ 36″ N	119°02′ 34″ E	Liangshan	Monzogranite	119±4	LA-ICPMS	Zhang et al., 2012
128	00SD07	35°26′ 28″ N	119°02′ 34″ E	Zhonglouxiang	Monzogranite	120±2	LA-ICPMS	Zhang et al., 2012
129	00XHY05	35°23′ 22″ N	119°11′ 43″ E	Aiguocun	Diorite	123±2	LA-ICPMS	Zhang et al., 2012
130	MJZ-ZC-01	36°04′ 45″ N	119°54′ 52″ E	Houkuang Formation	Rhyolite	106±2	LA-ICPMS	Ling et al., 2007
131	MJZ-ZC-02	36°05′ 36″ N	119°54′ 31″ E	Shiqianzhuang Formation	Rhyolite	105±4	LA-ICPMS	Ling et al., 2007
132	QS001	–	–	Qibaoshan Formation	Trachyandesite	124±1	LA-ICPMS	Liu W et al., 2009
133	TYS52	35°53′ 10″ N	119°04′ 06″ E	Yishu	Trachyandesite	119±1	LA-ICPMS	Zhu et al., 2010
134	TYS63	35°56′ 25″ N	118°41′ 56″ E	Yishu	Rhyolite	120±1	LA-ICPMS	Zhu et al., 2010
135	TYS74	35°41′ 04″ N	117°59′ 15″ E	Mengyin	Andesite	122±1	LA-ICPMS	Zhu et al., 2010
136	TYS15	36°14′ 44″ N	119°06′ 25″ E	Yishu	Trachyte	117±1	LA-ICPMS	Zhu et al., 2010
137	TYS75	35°38′ 31″ N	118°57′ 10″ E	Yishu	Trachyte	124±1	LA-ICPMS	Zhu et al., 2010
138	TYS48	35°48′ 07″ N	119°05′ 55″ E	Yishu	Trachyte	120±1	LA-ICPMS	Zhu et al., 2010
139	TYS66	35°52′ 50″ N	118°40′ 14″ E	Yishu	Trachyandesite	118±2	LA-ICPMS	Zhu et al., 2010
140	TYS17	36°14′ 11″ N	119°06′ 28″ E	Yishu	Trachyandesite	124±1	LA-ICPMS	Zhu et al., 2010
141	TYS04	36°39′ 04″ N	119°16′ 41″ E	Yishu	Rhyolite	122±1	LA-ICPMS	Zhu et al., 2010
142	TYS83	35°16′ 11″ N	118°48′ 24″ E	Yishu	Trachyte	116±1	LA-ICPMS	Zhu et al., 2010
143	TYS78	35°32′ 30″ N	118°55′ 12″ E	Yishu	Trachyte	122±2	LA-ICPMS	Zhu et al., 2010
144	TYS70	35°44′ 25″ N	117°55′ 57″ E	Mengyin	Trachyandesite	134±4	LA-ICPMS	Zhu et al., 2010
145	DG49	–	–	Duofushan Pluton	Granodiorite	161±1	SHRIMP	Guo J H et al., 2005
146	WD13	–	–	Wendeng Pluton	Granite	160±3	SHRIMP	Guo J H et al., 2005
147	KY15	–	–	Kunyushan Pluton	garnet-bearing leucogranite	142±3	SHRIMP	Guo J H et al., 2005
148	KY34	–	–	Liudusi	Diorite	115±1	SHRIMP	Guo J H et al., 2005
149	KY33	–	–	Taiboding Pluton	Alkali feldspar granite	114±1	SHRIMP	Guo J H et al., 2005
150	KY45	–	–	Sanfoshan Pluton	Alkali feldspar granite	113±1	SHRIMP	Guo J H et al., 2005
151	RC13	–	–	Weideshan Pluton	Alkali feldspar granite	108±2	SHRIMP	Guo J H et al., 2005

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152	FW01-28	40°13′ 14″ N	122°28′ 22″ E	Yutun	Mylonitized granite	157±3	LA-ICPMS	Wu et al., 2005a
153	FW01-156	40°46′ 44″ N	123°03′ 44″ E	Hanjialing	Two-mica monzogranite	164±4	LA-ICPMS	Wu et al., 2005a
154	FW01-418	40°18′ 35″ N	124°30′ 48″ E	Jiuliancheng	Monzogranite	156±3	LA-ICPMS	Wu et al., 2005a
155	FW01-129	40°25′ 25″ N	124°26′ 57″ E	Heigou	Monzogranite	161±6	LA-ICPMS	Wu et al., 2005a
156	LJ023	–	–	Jiuliancheng	Monzogranite	157±6	SHRIMP	Li et al., 2004
157	LJ037	–	–	Gaoliduntai	Plagiogranite	156±5	SHRIMP	Li et al., 2004
158	SG-1	40°06′	124°15′	Sanguliu	Granite porphyry	125±3	SHRIMP	Wu et al., 2005b
159	WL11-4	40°10′	124°12′	Wulong gold mine	Granite porphyry	125±4	SHRIMP	Wu et al., 2005b
160	WL11-8	40°10′	124°12′	Wulong gold mine	Diorite dyke	125±2	SHRIMP	Wu et al., 2005b
161	WL11-3	40°10′	124°12′	Wulong gold mine	Diorite dyke	117±7	SHRIMP	Wu et al., 2005b
162	WL11-26	40°10′	124°12′	Wulong gold mine	Diorite dyke	121±4	SHRIMP	Wu et al., 2005b
163	FW01-57	39°11′ 45″ N	121°50′ 19″ E	Zhaotun	Fine-grained monzogranite	128±5	LA-ICPMS	Wu et al., 2005b
164	SK14-1	39°21′ 15″ N	122°09′ 57″ E	Wazidian	Monzogranite	120±4	LA-ICPMS	Wu et al., 2005b
165	SK11-1	39°36′ 21″ N	122°17′ 58″ E	Yinmawanshan	Gneissic granodiorite	122±2	LA-ICPMS	Wu et al., 2005b
166	SK11-4	39°36′ 21″ N	122°17′ 58″ E	Yinmawanshan	Fine-grained monzogranite	124±5	LA-ICPMS	Wu et al., 2005b
167	FW02-39	39°37′ 57″ N	122°22′ 10″ E	Yinmawanshan	Fine-grained monzogranite	122±6	LA-ICPMS	Wu et al., 2005b
168	FW02-41	39°48′ 47″ N	122°23′ 48″ E	Shuangta	Granite porphyry	129±2	LA-ICPMS	Wu et al., 2005b
169	FW01-38	39°56′ 16″ N	122°24′ 07″ E	Miaoling	Quartz diorite	127±4	LA-ICPMS	Wu et al., 2005b
170	FW01-18	39°57′ 14″ N	122°12′ 14″ E	Wanjialing	Granodiorite	121±2	LA-ICPMS	Wu et al., 2005b
171	FW01-21	40°02′ 46″ N	122°12′ 31″ E	Gudaoling	Monzogranite porphyry	118±3	LA-ICPMS	Wu et al., 2005b
172	FW01-26	40°14′ 46″ N	122°24′ 53″ E	Gudaoling	Fine-grained monzogranite	122±2	LA-ICPMS	Wu et al., 2005b
173	FW01-162	41°01′ 14″ N	123°04′ 08″ E	Qianshan	Monzogranite	126±2	LA-ICPMS	Wu et al., 2005b
174	FW01-154	40°55′ 28″ N	123°25′ 38″ E	Tianshui	Diabase dike	126±4	LA-ICPMS	Wu et al., 2005b
175	FW01-98	40°35′ 48″ N	123°58′ 33″ E	Jiguanshan	Monzogranite porphyry	130±3	LA-ICPMS	Wu et al., 2005b
176	FW01-141	41°10′ 49″ N	124°47′ 45″ E	Jiucaidingzi	Monzogranite	121±2	LA-ICPMS	Wu et al., 2005b
177	FW01-144	41°04′ 13″ N	124°21′ 56″ E	Jiucaidingzi	Monzogranite porphyry	128±2	LA-ICPMS	Wu et al., 2005b
178	FW01-404	39°50′ 48″ N	123°20′ 50″ E	Anzishan	Monzogranite porphyry	124±2	LA-ICPMS	Wu et al., 2005b
179	FW02-70	40°29′ 21″ N	123°32′ 26″ E	Chaoyang	Monzonite	127±1	LA-ICPMS	Wu et al., 2005b
180	FW02-79	40°28′ 35″ N	123°33′ 11″ E	Chaoyang	Quartz monzonite	128±2	LA-ICPMS	Wu et al., 2005b
181	FW01-127	40°20′ 45″ N	124°23′ 18″ E	Wulongbei	Granodiorite	127±5	LA-ICPMS	Wu et al., 2005b
182	FW02-84	40°06′ 15″ N	124°15′ 29″ E	Sanguliu	Monzogranite	120±2	LA-ICPMS	Wu et al., 2005b
183	FW01-121	40°06′ 13″ N	124°14′ 20″ E	Sanguliu	Gneissic monzogranite	131±2	LA-ICPMS	Wu et al., 2005b
184	FW01-65	39°50′ 42″ N	122°59′ 17″ E	Dexingjie	Granodiorite	128±3	LA-ICPMS	Wu et al., 2005b
185	FW01-67	39°54′ 54″ N	123°01′ 43″ E	Shimiaoshan	Diorite	120±2	TIMS	Wu et al., 2005b
186	FW01-108	40°25′ 01″ N	124°03′ 40″ E	Fenghuangshan	Alkali feldspar granite	130±2	TIMS	Wu et al., 2005b
187	FW01-109	40°16′ 20″ N	124°16′ 40″ E	Wulongbei	Granodiorite	126±1	TIMS	Wu et al., 2005b
188	FW01-110	40°16′ 17″ N	124°19′ 49″ E	Dingqishan	Syenogranite	121±1	TIMS	Wu et al., 2005b
189	FW01-139	41°06′ 54″ N	124°43′ 56″ E	Sipingjie	Alkaline granite	130±1	TIMS	Wu et al., 2005b
190	DD22-1	–	–	Hujiakouzi	Olivine websterite	130±2	LA-ICPMS	Pei et al., 2011
191	DD17-1	–	–	Qianrentun	Hornblende gabbro-diorite	129±5	SHRIMP	Pei et al., 2011
192	DD3-1	–	–	Yangmuchuan	Hornblende gabbro	132±2	LA-ICPMS	Pei et al., 2011
193	TH4-2	–	–	Tonghua	Gabbro	137±3	LA-ICPMS	Pei et al., 2011
194	TH20-1	–	–	Tonghua	Olive gabbro	134±7	SHRIMP	Pei et al., 2011