

**Supplementary Table 1 Summary of the granitoid samples from the late Paleozoic plutons**

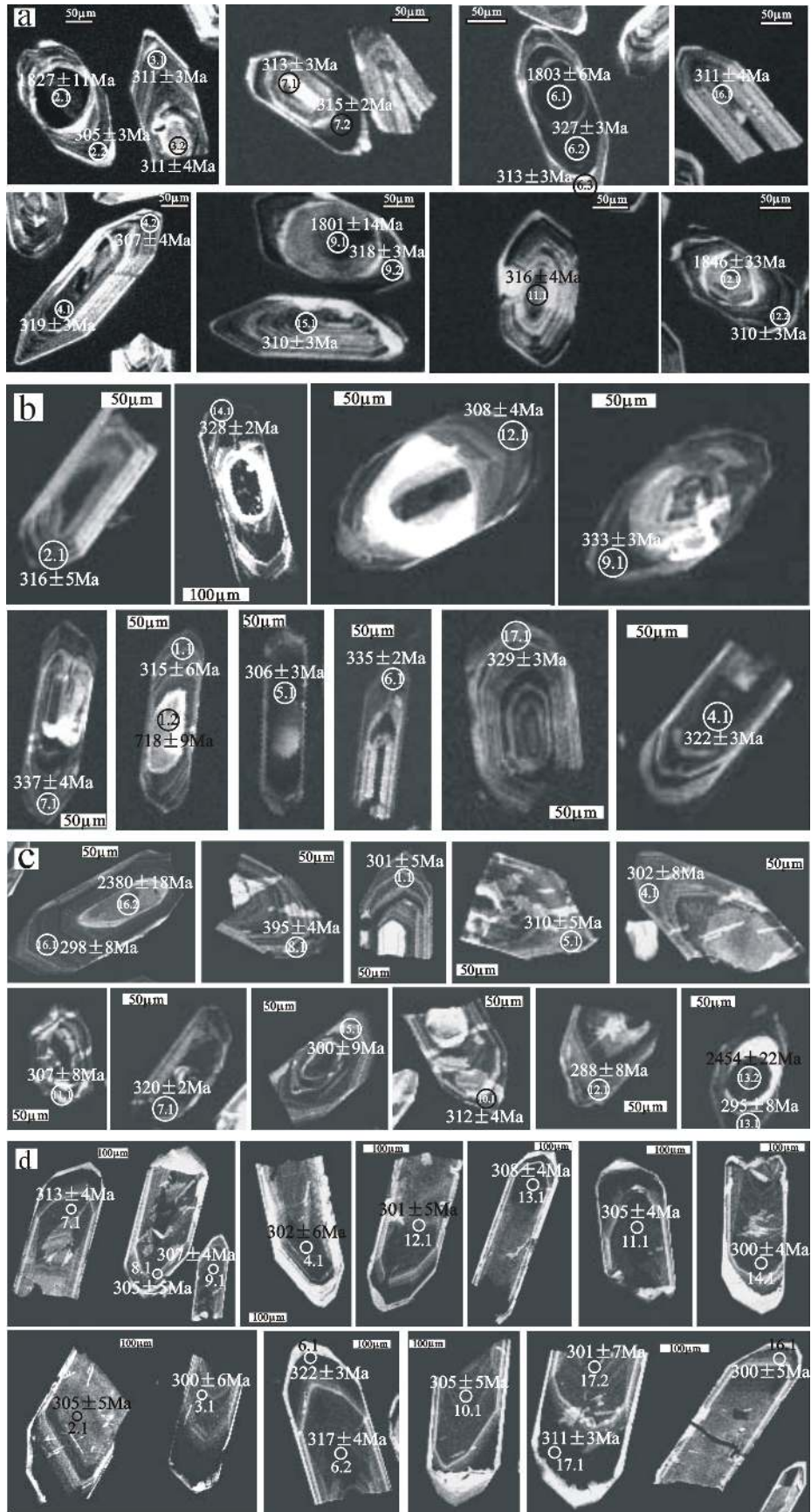
Sample no.	Longitude	Latitude	Rock type	Main mineral assemblage	Subordinate minerals	Secondary minerals
Longhua pluton (LH)						
SD020-3	117°46'40"	41°20'00"	Quartz diorite	Pl + Qtz + Bt + Hbl + Kfs	Mt + Zr + Ap + Tnt + Ant	Chl + Epi + Ser
SD020-1	117°47'17"	41°19'40"	Quartz diorite	Pl + Qtz + Hbl + Bt + Kfs	Mt + Zr + Ap + Tnt	Chl + Epi + Cal + Ser
D017-1	117°47'35"	41°20'21"	Quartz diorite	Pl + Hbl + Qtz + Bt + Kfs	Mt + Zr + Ap + Tnt	Chl + Epi + Ser
D026-1	117°52'03"	41°17'13"	Quartz diorite	Pl + Hbl + Bt + Qtz + Kfs	Mt + Zr + Ap + Tnt + Ant	Chl + Epi + Cal + Ser
D034-1	117°53'20"	41°19'07"	Quartz monzodiorite	Pl + Kfs + Qtz + Hbl + Cpx	Mt + Zr + Ap + Tnt	Chl + Cal + Ser
D036-1	117°56'37"	41°20'07"	Quartz monzodiorite	Pl + Kfs + Hbl + Qtz + Cpx + Bt	Mt + Zr + Ap + Tnt	Chl + Ser
Daguangding pluton (DGD)						
D018-1	117°38'06"	41°16'10"	Quartz diorite	Pl + Qtz + Hbl + Bt + Kfs	Mt + Zr + Ap + Tnt + Ant	Chl + Epi + Zoi + Ser
D019-1	117°37'20"	41°16'23"	Quartz diorite	Pl + Qtz + Hbl + Bt + Kfs	Mt + Zr + Ap + Tnt + Ant	Chl + Epi + Zoi + Ser
D159-1	117°23'06"	41°13'47"	Quartz diorite	Pl + Qtz + Bt + Hbl + Kfs	Mt + Zr + Ap + Tnt	Chl + Ser
D169-2	117°26'49"	41°14'14"	Quartz diorite	Pl + Qtz + Bt + Hbl + Kfs	Mt + Zr + Ap + Tnt	Chl + Ser
Boluonuo pluton (BLN)						
HLB-G	117°20'25"	41°03'54"	Quartz diorite	Pl + Bt + Qtz + Hbl + Kfs	Mt + Zr + Ap	Chl + Epi + Ser
D091-1	117°20'52"	41°04'38"	Quartz diorite	Pl + Qtz + Kfs + Bt + Hbl	Mt + Zr + Ap + Tnt	Epi + Zoi + Ser
D097-1	117°21'20"	41°05'27"	Quartz diorite	Pl + Qtz + Kfs + Hbl + Bt	Mt + Zr + Ap + Tnt	Chl + Epi + Ser
Hushiha pluton (HSH)						
FP2	116°59'01"	40°59'17"	granodiorite	Pl + Kfs + Qtz + Mus + Bt	Mt + Zr + Ap	Cal + Ser

Mineral abbreviations: Pl, plagioclase; Bt, biotite; Hbl, hornblende; Kfs, K-feldspar; Qtz, quartz; Cpx, clinopyroxene; Mus, muscovite; Tnt, titanite; Mt, magnetite; Ap, apatite; Zr, zircon; Ant, Allanite; Chl, chlorite; Epi, epidote; Zoi, zoisite; Cal, calcite; Ser, sericite; Order of minerals in main mineral assemblage aligned according to their contents.

**Supplementary Table 2 Petrographic description of rocks in the investigated plutons**

Rock type	Longhua			Daguangding			Boluonuo			Hushiha
	Quartz diorite*	Quartz monzodiorite	Diorite	Quartz diorite*	Diorite	Gabbroic diorite	Quartz diorite*	Diorite	Granodiorite	Granodiorite*
Primary phases										
Plagioclase	50-75%	50-55%	55-65%	65-75%	55-75%	55-60%	60-75%	60%	50-60%	60-70%
Quartz	5-20%	5-10%	<5%	15-20%	<5%	<5%	5-15%	5%	20-25%	15-25%
K-feldspar	<5%	20-35%	3-5%	<5%	<5%	<1%	3-10%	<5%	15-20%	5-10%
Hornblende	5-25%	5-25%	15-20%	3-15%	15-20%	30-40%	5-15%	20%	<1%	<1%
Biotite	5-20%	<1%	10%	5-10%	5-15%	5-10%	5-15%	10-15%	<5%	<5%
Muscovite	x	x	x	x	x	x	x	x	x	<5%
Clinopyroxene	x	<10%	x	x	x	5-10%	x	x	x	x
Titanite	+	+	+	+	+	+	+	+	+	+
Magnetite	+	+	+	+	+	+	+	+	+	+
Apatite	+	+	+	+	+	+	+	+	+	+
Zircon	+	+	+	+	+	+	+	+	+	+
Allanite	+	x	x	+	x	x	x	x	x	x
Secondary phases										
Chlorite	+	+	+	+	+	+	+	+	+	x
Epidote	x	x	+	+	+	+	+	+	x	x
Zoisite	x	x	x	x	x	x	x	x	x	x
Calcite	x	x	x	x	x	x	x	x	x	+
Sericite	+	+	+	+	+	+	+	+	+	+
Limonite	x	x	x	x	x	x	x	x	x	+

“+” and “x” in the appendix table represent “common” and “rare”, respectively; Rock types marked with star are the most common rocks of the corresponding pluton



Supplementary Figure CL image and dating spots of zircons from different samples

(a) Sample SD020-3; (b) Sample D018-1; (c) Sample HLB-G; (d) Sample FP2