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Title of article Zircon U-Pb ages of super-units in the Coastal batholith, Peru: Implications for magmatic and tectonic processes"

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APPENDIX I

ZIRCON U-Pb ISOTOPIC COMPOSITIONS AND AGES

LIMA SEGMENT

Sample#			Concentration[@]		Isotopic composition[%]			Calculated ages (Ma)[&]		
No	Properties	Location (lat.,long.)	^{206}Pb	^{238}U	$^{208}Pb/^{206}Pb$	$^{207}Pb/^{206}Pb$	$^{204}Pb/^{206}Pb$	$^{206}Pb^*/^{238}U$	$^{207}Pb^*/^{235}U$	$^{207}Pb^*/^{206}Pb^*$
				Jecuan super-unit						
RR-12	n,c, 9.0	12°12.0'S, 76°52.2'W	13.742	1003.9	.1768	.06000	.00080	101.1	101.7	114.5
RR-13	blk, 2.3	12°11.7'S, 76°44.6'W	11.144	819.9	.2149	.05714	.00060	100.4	101.3	121.0
HS-24	n,c, 12.7	11°22.6'S, 77°20.6'W	10.688	881.8	.2128	.08318	.00237	89.4	90.4	109.5
				"Santa Rosa super-unit"						
HS-39	n,c, 7.4	10°39.5'S, 77°44.9'W	4.862	394.9	.1150	.05549	.00052	91.0	91.0	90.5
HS-25	n,c, 16.6	11°20.1'S, 77°19.4'W	5.158	452.3	.1811	.05238	.00032	84.4	84.4	86.0
HS-25	n,f, 10.3	11°20.1'S, 77°19.4'W	13.669	1201.8	.3149	.05123	.00025	84.2	84.0	80.0
HS-26	n,c, 16.9	11°15.8'S, 77°19.4'W	3.166	284.7	.1702	.05471	.00047	82.3	82.7	92.5
HS-26	n,f, 19.0	11°15.8'S, 77°19.4'W	4.661	422.3	.1914	.05590	.00055	81.7	82.0	90.1
RR-17	n,blk, 8.4	12°06.5'S, 76°47.8'W	3.248	295.2	.2400	.05270	.00033	81.4	81.9	95.8
HS-31	n,c, 10.6	11°04.8'S, 77°19.6'W	9.008	928.9	.2042	.05457	.00047	71.8	72.1	82.5
HS-42	n,c, 9.3	11°26.6'S, 77°06.8'W	7.113	736.8	.1273	.05369	.00041	71.5	71.9	85.0
HS-44	n,c, 8.3	10°29.1'S, 77°44.4'W	3.728	392.4	.1321	.05736	.00065	70.3	70.9	89.9
HS-45	n,c, 7.6	9°11.3'S, 78°28.1'W	2.510	262.9	.2292	.07639	.00198	70.7	70.5	65.0
HS-38	n,c, 8.2	10°37.2'S, 77°27.5'W	8.438	979.6	.1436	.05367	.00041	63.8	64.2	79.5
RR- 5	n,c, 14.6	11°51.0'S, 76°38.2'W	5.001	633.1	.1400	.05916	.00078	58.7	59.5	92.5
RR- 5	n,f, 19.0	11°51.0'S, 76°38.2'W	5.463	683.1	.1496	.05916	.00080	59.3	59.6	71.0
HS-46	n,c, 10.2	9°05.6'S, 78°08.3'W	2.460	368.3	.3583	.13615	.00604	49.5	49.9	67.5
				Humaya super-unit						
HS-19A	n,c, 8.5	11°05.4'S, 77°24.5'W	6.967	703.2	.1898	.05439	.00040	73.4	74.1	97.5
HS-19A	n,m, 12.6	11°05.4'S, 77°24.5'W	7.499	767.1	.2004	.05525	.00054	72.4	72.1	63.5
HS-19A	n,f, 12,2	11°05.4'S, 77°24.5'W	8.892	901.3	.2343	.06165	.00094	73.0	73.5	90.0
HS-19B	blk, 1.0	11°05.4'S, 77°24.5'W	82.226	9129.6	.1932	.08026	.00208	66.8	70.1	186.0
				La Mina super-unit						
HS-32	n,c, 9.2	11°6.7'S, 77°18.2'W	6.345	660.6	.0978	.05519	.00053	71.1	71.1	71.0
				San Jerónimo super-unit						
HS-34	n,c, 7.8	11°08.6'S, 77°10.9'W	5.861	643.8	.2462	.09069	.00294	67.4	67.7	77.5
HS-36	m,c, 9.2	10°53.8'S, 77°22.4'W	5.100	549.9	.1786	.06717	.00135	68.7	68.6	67.0
				Puscao super-unit						
HS-29	n,c, 8.3	11°02.7'S, 77°17.8'W	16.863	1887.9	.1308	.05294	.00038	66.2	66.2	68.0
HS-35	n,blk, 8.4	10°53.1'S, 77°26.2'W	8.100	900.8	.1895	.05073	.00023	66.6	66.6	67.0
HS-43	m,c, 10.1	10°15.3'S, 77°34.4'W	22.500	2575.8	.1359	.04930	.00014	64.7	64.6	60.0
				Cañas-Sayán super-unit						
HS-12	n,c, 23.6	11°08.3'S, 77°15.9'W	6.815	738.3	.1621	.05249	.00033	68.4	68.8	82.0
HS-28	n,c, 16.6	11°04,2'S, 77°18.6'W	13.091	1430.2	.1588	.05516	.00051	67.8	68.2	82.0
HS-33	n,c, 8.3	11°08.1'S, 77°13.3'W	8.876	1011.3	.1625	.05407	.00046	65.0	65.1	67.0

Sample#			Concentration[@]		Isotopic composition[%]			Calculated ages (Ma)[&]		
No	Properties	Location (lat.,long.)	$^{206}Pb^*$	$^{208}Pb^*$	$^{208}Pb/^{206}Pb$	$^{207}Pb/^{206}Pb$	$^{204}Pb/^{206}Pb$	$^{206}Pb^*/^{238}U$	$^{207}Pb^*/^{235}U$	$^{207}Pb^*/^{206}Pb$
			"Paccho super-unit"							
HS-27	n,c, 13.6	11°02.4'S, 77°05,6'W	3.439	418.2	.2937	.10772	.00413	61.0	61.0	61.5
HS-41	n,c, 20.6	11°20.9'S, 77°00.0'W	3.659	424.1	.1690	.05477	.00040	63.9	64.1	70.5
RR-19	n,c, 8.7	11°46.9'S, 76°36.1'W	3.439	657.7	.2209	.09632	.00334	38.8	39.1	57.5
			Pativilca super-unit							
HS-37	n,c, 14.5	10°35.9'S, 77°23.9'W	7.997	1613.8	.1429	.05948	.00083	36.8	37.2	65.0
HS-37	n,f, 13.8	10°35.9'S, 77°23.9'W	9.657	1996.4	.1426	.05877	.00081	35.9	36.1	45.0
			Young diorite							
HS-14	n,c, 8.4	11°04.5'S, 77°19.4'W	2.654	282.1	.2747	.08817	.00278	69.7	69.6	66.0
			Lumbre monzogranite							
HS-40	n,c, 18.9	11°23.7'S, 77°03.8'W	9.943	1058.8	.1404	.05156	.00028	69.6	69.7	75.0
			Santa Eulalia granodiorite							
RR-5	n,c, 14.6	11°51.0'S, 76°38.2'W	5.019	633.1	.1400	.05916	.00078	58.8	59.5	88.5
RR-5	n,f, 19.0	11°51.0'S, 76°38.2'W	5.472	683.1	.1496	.05986	.00080	59.4	60.6	105.7
			AREQUIPA SEGMENT							
			Linga (Ica) super-unit							
RP-19	n,c, 7.8	13°41.9'S, 75°49.3'W	11.145	833.8	.2228	.05232	.00030	101.4	101.3	99.0
			Linga (Arequipa) super-unit							
CV-23	n,c, 9.6	16°31.9'S, 71°45.2'W	6.843	721.5	.3247	.10865	.00414	70.2	70.8	89.1
CV-25	n,c, 9.3	16°32.5'S, 71°42.7'W	13.331	1487.8	.3609	.09321	.00310	66.4	66.8	81.0
			Pampahuasi super-unit							
RP-12	blk, 8.3	13°38.6'S, 75°43.8'W	6.958	547.9	.1966	.06266	.00099	93.9	94.3	105.5
RP-18	n,c, 8.7	13°38.8'S, 75°43.9'W	12.182	965.9	.2490	.05948	.00078	93.2	93.4	97.5
			Tiabaya super-unit							
RR-7	n,c, 28.9	11°54.8'S, 76°36.1'W	8.883	762.4	.1364	.05104	.00022	86.2	86.5	94.0
RR-7	n,f, 13.9	11°54.8'S, 76°36.1'W	9.593	841.9	.1370	.04908	.00014	84.3	84.5	90.0
CV-29	n,c, 8.8	16°30.7'S, 71°34.3'W	6.475	571.3	.1930	.05323	.00036	83.8	84.2	95.0
CV-8	n,m, 21.8	16°30.4'S, 71°35.4'W	7.997	510.5	.1661	.06751	.00024	115.6	150.7	745.0
CV-8	n,f, 18.1	16°30.4'S, 71°35.4'W	8.466	653.4	.1684	.06100	.00027	95.8	113.2	497.0
RP-16	n,c, 16.2	13°37.2'S, 75°39.8'W	8.806	833.3	.2353	.05558	.00054	78.2	78.3	81.5
RP-17	n,c, 9.3	13°35.9'S, 75°36.6'W	7.290	426.8	.1778	.06734	.00020	126.0	164.0	755.5

Sample#			Concentration[@]		Isotopic composition[%]			Calculated ages (Ma)[&]		
No	Properties	Location (lat.,long.)	$^{206}Pb^*$	^{238}U	$\frac{^{208}Pb}{^{206}Pb}$	$\frac{^{207}Pb}{^{206}Pb}$	$\frac{^{204}Pb}{^{206}Pb}$	$\frac{^{206}Pb^*}{^{238}U}$	$\frac{^{207}Pb^*}{^{235}U}$	$\frac{^{207}Pb^*}{^{206}Pb^*}$
			Cerro Verde quartz monzonite							
CV-9	n,c, 3.3	16°31.8'S, 71°35.7'W	3.585	439.5	.2669	.06199	.00096	60.5	61.6	105.5
CV-9	n,f, 4.5	16°31.8'S, 71°35.7'W	3.529	437.4	.2782	.05974	.00081	59.8	60.7	97.0
			TOQUEPALA SEGMENT							
			Punta Coles super-unit							
CV-26	n,c, 9.9	16°14.3'S, 71°50.2'W	12.516	489.3	.1968	.07357	.00160	187.7	188.7	201.5
CV-26	n,f, 8.1	16°14.3'S, 71°50.2'W	15.191	592.3	.1749	.06483	.00101	188.2	188.9	197.5
CV-27	n,f1, 2.7	16°17.3'S, 71°46.8'W	5.931	236.2	.1713	.05453	.00032	184.3	185.2	196.4
CV-27	n,f2, 14.2	16°17.3'S, 71°46.8'W	4.862	190.5	.1698	.05381	.00025	187.4	188.6	204.0
CV-27	n,blk, 9.4	16°17.3'S, 71°46.8'W	4.792	184.2	.1803	.05658	.00033	190.9	197.2	273.5
CV-27	n,f3, 3.3	16°17.3'S, 71°46.8'W	5.153	183.4	.2565	.06247	.00056	206.0	221.3	388.0
			Porphyritic diorite							
CV-39	n,f2, 11.6	16°36.8'S, 71°24.4'W	6.707	286.8	.1589	.07111	.00103	171.8	192.9	458.6
CV-39	m,f3, 14.0	16°36.8'S, 71°24.4'W	5.083	211.5	.2758	.11433	.00401	176.5	197.2	452.1
CV-39	n, c, 15.5	16°36.8'S, 71°24.4'W	5.121	210.6	.1834	.08083	.00158	178.6	205.5	527.5
CV-39	n,f3, 12.2	16°36.8'S, 71°24.4'W	5.451	220.2	.3145	.13511	.00524	181.8	212.8	571.3
			Yarabamba super-unit							
CV-32	n,c, 10.3	16°32.5'S, 71°35.8'W	1.155	138.0	.3471	.09584	.00327	62.1	62.7	89.5
CV-40	n,c, 15.4	16°34.8'S, 71°24.9'W	9.057	995.2	.3301	.06409	.00116	67.4	67.0	61.5

#: See Appendix II for sample names and compositions.

c = coarse-grained fraction; M = medium-grainead fraction; and f = fine-grained fraction.

Magnetic properties: blk = bulk sample; m = magnetic fraction; mm = moderately magnetic; and n = nonmagnetic.

Figures in the Properties column are weights in milligrams of the zircon samples dissolved.

@: concentrations given in ppm; (*) indicates radiogenic Pb, corrected for common Pb using the isotopic compositions of cogenetic feldspars.

%: isotopic ratios corrected for instrumental mass fractionation on the basis of replicate analyses of U.S. National Bureau of Standards samples SRM-981 and SRM-983 for Pb, and SRM-U050 for U.

&: constants used in the age calculations are: $\lambda^{238}U = 1.5513 \times 10^{-10}\ yr^{-1}$, $\lambda^{235}U = 9.848 \times 10^{-10}\ yr^{-1}$, and $^{238}U/^{235}U = 137.88$.

APPENDIX II

SAMPLE NAMES, COMPOSITIONS, LOCATIONS AND ELEVATIONS IN METERS

LIMA SEGMENT

HS-12, Sayán monzogranite. Huaral Quadrangle; 11°08.3'S, 77°15.9'W; 600 m; in the Rio Huaura valley at the foot of Cerro Piedra Agacha.

HS-14, unnamed hornblende biotite meladiorite. Huaral Quadrangle; 11°04.5'S, 77°19.4'W; 600 m; in Quebrada San Guillermo 4.4 km NNW of Fundo San Miguel.

HS-19, Humaya granodiorite. Huaral Quadrangle; 11°05.4'S, 77°24.5'W; 350 m; 0.2 km W of Hacienda Humaya along the unpaved road to Hacienda Loreto.

HS-24, Lachay monzogranite. Huaral Quadrangle; 11°22.6'S, 77°20.6'W; 275 m; along Quebrada Rio Seco, between Señal Punto Cambiado and Señal Espolon Hierba Buena.

HS-25, Santa Rosa dioritic border facies. Huaral Quadrangle; 11°20.1'S, 77°19.4'W; 300 m; along Quebrada Rio Seco, at the foot of Cerro Jaguay.

HS-26, Santa Rosa tonalite. Huaral Quadrangle; 11°15.8'S, 77°19.4'W; 450 m; along Quebrada Rio Seco, next to the elementary school of Fundo Don Alberto at the foot of Cerro El Ahorcado.

HS-27, Paccho tonalite-diorite. Huaral Quadrangle; 11°02.4'S, 77°05.6'W; 1,050 m; along the Rio Huaura valley 0.2 km E of Bellavista.

HS-28, Sayán monzogranite. Huaral Quadrangle; 11°04.2'S, 77°18.6'W; 720 m; in Quebrada Santa Elvira 4.6 km due N of Fundo San Miguel.

HS-29, Puscao monzogranite. Huaral Quadrangle; 11°02.7'S, 77°17.8'W; 900 m; along Quebrada Lloclla (Tumaray) 7.8 km NNE of Fundo San Miguel.

HS-31, Santa Rosa monzogranite. Huaral Quadrangle; 11°04.8'S, 77°19.6'W; 750 m; on Cerros Cadena San Guillermo.

HS-32, La Mina tonalite. Huaral Quadrangle; 11°06.7'S, 77°18.2'W; 500 m; 1 km east of Fundo San Miguel.

HS-33, Cañas monzogranite. Huaral Quadrangle; 11°08.1'S, 77°13.3'W; 770 m; along the Rio Huaura valley between Fundo Ibis and Fundo Mani.

HS-34, San Jerónimo granophyre. Huaral Quadrangle; 11°08.6'S, 77°10.9'W; 800 m; in Fundo Vista Alegre along Rio Huanangue 1.2 km south of Sayán.

HS-35, Puscao monzogranite. Ambar Quadrangle; 10°53.1'S, 77°26.2'W; 650 m; at the NNE end of Cerro Limoncillo.

HS-36, San Jerónimo granophyre. Ambar Quadrangle; 10°53.8'S, 77°22.4'W; 880 m; in Jaiva along the Rio Supe valley.

HS-37, Pativilca monzogranite. Ambar Quadrangle;

10°35.9'S, 77°23.9'W; 770 m; 0.2 km E of Quebrada Llamachupán along the Rio Pativilca valley.

HS-38, Cerro Muerto granodiorite. Ambar Quadrangle. 10°37.2'S, 77°27.5'W; 600 m; 0.2 km WNW of Nueva Victoria along the Rio Pativilca valley.

HS-39, Purmacana tonalite. Barranca Quadrangle; 10°39.5'S, 77°44.9'W; 150 m; 1 km S of Hacienda La Cañada.

HS-40, Lumbre monzogranite. Huaral Quadrangle; 11°23.7'S, 77°03.8'W; 620 m; on Cerro Mina in La Laguna along the Rio Chancay.

HS-41, Paccho tonalite-diorite. Huaral Quadrangle; 11°20.9'S, 77°00.0'W; 750 m; 0.2 km NE of Quebrada Huamacho along the Rio Chancay.

HS-42, Santa Rosa tonalite. Huaral Quadrangle; 11°26.6'S, 77°06.8'W; 460 m; 0.1 km SW of Hacienda Hornillos, Rio Chancay valley.

HS-43, Puscao monzogranite (Chasquitambo pluton). Huayllapampa Quadrangle; 10°15.3'S, 77°34.4'W; 1010 m; 0.2 km SSW of Quebrada Huich Huich along the Rio Fortaleza.

HS-44, Santa Rosa tonalite (Huricanga pluton). Huayllapampa Quadrangle; 10°29.1'S, 77°44.4'W; 200 m; between Fundo La Villa and Huaricanga along the Rio Fortaleza.

HS-45, West Santa Rosa tonalite. Casma Quadrangle;

9°11.3'S, 78°28.1'W; 50 m; in La Cumbre along the Pan American Highway.

HS-46, East Santa Rosa tonalite. Casma Quadrangle; 9°05.6'S, 78°08.3'W; 800 m; in Quebrada Chullhuay.

RR-5, Santa Eulalia granodiorite. Chosica Quadrangle; 11°51.0'S, 76°38.2'W; 1350 m; 1.1 km NE of Palle Nuevo along the Rio Santa Eulalia.

RR-12, Atocongo monzogranite (Jecuan super-unit). Lurin Quadrangle; 12°12.0'S, 76°52.2'W; 300 m; 0.6 km SW of Guayabo, Rio Lurin valley.

RR-13, Jecuan monzogranite. Lurin Quadrangle; 12°11.7'S, 76°44.6'W; 970 m; between the Quebradas Peña Gavilán and Olleria.

RR-17, Santa Rosa tonalite. Lurin Quadrangle; 12°06.5'S, 76°47.8'W; 370 m; 1.6 km NE of Hacienda Cieneguilla, Rio Lurin valley.

RR-19, San Pedro tonalite-diorite. Chosica Quadrangle; 11°46.9'S, 76°36.1'W; 1850 m; between the Quebradas Negro and San Antonio, Rio Santa Eulalia valley.

AREQUIPA SEGMENT

RR-7, Tiabaya tonalite-granodiorite. Chosica Quadrangle; 11°54.8'S, 76°36.1'W; 1200 m; 0.9 km E of Cupiche in the Rio Rimac valley.

RP-11, Pampahuasi diorite-tonalite. Guadalupe Quadrangle; 13°38.9'S, 75°44.3'W; 750 m; in Petroleo, Rio Pisco valley.

RP-12, Pampahuasi diorite-tonalite. Guadalupe Quadrangle; 13°38.6'S, 75°43.8'W; 800 m; between Petroleo and Quitasol, Rio Pisco valley.

RP-16, Tiabaya granodiorite. Guadalupe Quadrangle; 13°37.2'S, 75°39.8'W; 950 m; between La Esquina and Oroya, Rio Pisco valley.

RP-17, Tiabaya monzogranite. Guadalupe Quadrangle; 13°35.9'S, 75°36.6'W; 1070 m; in Quebrada Huancano between Huancano and Hacienda El Reposo, Rio Pisco valley.

RP-18, Pampahuasi diorote-tonalite. Guadalupe Quadrangle; 13°38.8'S, 75°43.9'W; 780 m; in Petroleo, Rio Pisco valley.

RP-19, Linga (Ica) monzogranite (zone A1). Guadalupe Quadrangle; 13°41.9'S, 75°49.3'W; 700 m; 0.2 km E of the Inca ruins of Tambo Colorado, Rio Pisco valley.

CV-8, Tiabaya granodiorite. La Joya Quadrangle; 16°30.4'S, 71°35.4'W; 2600 m; 2.2 km NNE of the Cerro Verde copper mine.

CV-9, Porphyritic quartz monzonite. La Joya Quadrangle; 16°31.8'S, 71°35.7'W; 2730 m; in the open pit mine at Cerro Verde.

CV-23, Linga (Arequipa) monzonite. La Joya Quadrangle; 16°31.9'S, 71°45.2'W; 1830 m; on Cerro Chascoso.

CV-25, Linga (Arequipa) monzotonalite-monzogranite. La Joya Quadrangle; 16°32.5'S, 71°42.7'W; 2000 m; in unnamed quebrada between Cerro de Las Lomas and Cerro de San José.

CV-26, "Incahuasi" diorite-tonalite. Arequipa Quadrangle; 16°14.3'S, 71°50.2'W; 2500 m; on Cerro Torconta along the new unpaved road to Gramadal.

CV-27, "Incahuasi" monzotonalite. Arequipa Quadrangle; 16°17.3'S, 71°46.8'W; 2300 m; 0.9 km due W of Agua Salada.

CV-29, Tiabaya granodiorite. La Joya Quadrangle; 16°30.7'S, 71°34.3'W; 2600 m; 3.1 km NE of the Cerro Verde copper mine.

TOQUEPALA SEGMENT

CV-32, Yarabamba monzodiorite. La Joya Quadrangle; 16°32.5'S, 71°35.8'W; 2700 m; 1.4 km S of the Cerro Verde mine.

CV-39, Plagioclase-phyric diorite. Puquina Quadrangle; 16°36.8'S, 71°24.4'W; 3320 m; on top of Cerro Chujal.

CV-40, Yarabamba monzonite. Puquina Quadrangle; 16°34.8'S, 71°24.9'W; 3000 m; on Cerro Corotillar.