

Supplementary file 1 - Summary of the age data of each unit.

Major Geotectonic Units	Units	Sub-Domain	Lithology/Name	Crystallization Age (Ma)	Metamorphic Age (Ma)	Maximum age of deposition (Ma)	Age distribution (Ma)	Method	Reference	
Camaquã Basin	Guaritas Group	Varzinha Formation	Sandstone (illite)			473.7 ± 9.4		K-Ar in authigenic illite	Maraschin et al. (2010)	
			Sandstone			535 ± 10	535 to 2766	SHIRIMP: U-Pb in zircon	Hartmann et al. (2008b)	
		Pedra Pintada Formation	Sandstone			551.9 ± 8.9 for detrital zircon. Authors consider as 547 ± 6.3 (andesite)	565 to 2812	LA-MC-ICP-MS: U-Pb in zircon	Oliveira et al. (2014)	
		Rodeio Velho Formation	Andesite	547 ± 6.3				LA-ICPMS-MC: U-Pb in zircon	Almeida et al. (2012)	
	Santa Bárbara Group	Upper Acampamento Velho Formation	Rhyolite	553 ± 5.4				LA-ICPMS-MC: U-Pb in zircon	Almeida et al. (2012)	
			Rhyolite	549.3 ± 5				SHIRIMP: U-Pb in zircon	Sommer et al. (2005)	
		Bom Jardim Window	Conglomerate and sandstone			566 ± 7	564 to 2962	LA-MC-ICP-MS: U-Pb in zircon	Bicca et al. (2013)	
		Sequence III	Conglomerate			553 ± 22	535 to 2824	LA-MC-ICP-MS: U-Pb in zircon	Oliveira et al. (2014)	
		Sequence II	Conglomerate and sandstone			562.5 ± 5.5	553 ± 30.9 to 3389 ± 189			
		Sequence I	Conglomerate			567.9 ± 5.9	556 ± 24.1 to 2760 ± 160			
		Lower Acampamento Velho Formation	Rhyolite	574 ± 7					TIMS: U-Pb in zircon	Janikian et al. (2008)
			Rhyolite	573 ± 18					LA-ICP-MS: U-Pb in zircon	Chemale et al. (2000)
	Bom Jardim Group	Picada das Graças Formation	Tuff	580 ± 3.6 Ma				SHIRIMP: U-Pb in zircon	Janikian et al. (2008)	
		Hilário Formation	Lamprophyre intrusion	591.8 ± 3				LA-ICPMS-MC: U-Pb in zircon	Almeida et al. (2012)	
			Lapilli tuf	590.5 ± 5.7					TIMS: U-Pb in zircon	Janikian et al. (2008)
			Andesite	593 ± 6					SHIRIMP: U-Pb in zircon	Remus et al. (1999)
	Maricá Group	São Rafael Formation	Sandstone			601 ± 13	601 ± 13 to 2611 ± 97	MC-ICP-MS: U-Pb in zircon	Almeida et al. (2012)	
		Passo da Promessa Formation	Rhyolite Clast	630.2 ± 3.4				SHIRIMP: U-Pb in zircon	Borba et al. (2008)	
	Pelotas Batholith	Itapuã Suite		Rhyolite	581.9 ± 1.9				LA-ICP-MS: U-Pb in zircon	Oliveira et al. (2015)
				Santana Granite	600 ± 3				SHIRIMP: U-Pb in zircon	Koester et al. (2001a)
Dom Feliciano Suite			Capão do Leão Granite	583±3				SHIRIMP: U-Pb in zircon	Philipp et al. (2002)	
Encruzilhada do Sul Suite			Encruzilhada do Sul Granite	595 ± 8				LA-ICP-MS: U-Pb in zircon	Philipp et al. (2016a)	
			Granite	595 ± 4				TIMS: U-Pb in zircon	Babinski et al. (1997)	
Piquiri Suite			Piquiri Syenite	611 ± 3				TIMS: Pb-Pb in zircon	Philipp et al. (2002)	
			Arroio do Silva Syenite	612 ± 3						
Viamão Suite			Arroio do Moinho Granite	595 ± 1				TIMS: U-Pb in zircon	Babinski et al. (1997)	
			Viamão Granite	630 ± 6				LA-ICP-MS: U-Pb in zircon	Philipp et al. (2016a)	
			Barão do Triunfo Granite	627 ± 16				LA-ICP-MS: U-Pb in zircon	Philipp et al. (2016a)	
Pinheiro Machado Complex			Granodiorite	609 ± 17				SHIRIMP: U-Pb in zircon	Silva et al. (1999)	
			Granodiorite gneiss	623 ± 2				TIMS: U-Pb in zircon	Babinski et al. (1997)	
			Piratini Gneiss	781 ± 5				SHIRIMP: U-Pb in zircon	Silva et al. (1999)	
Cordilheira Suite			Cordilheira Granite	625 ± 6				SHIRIMP: U-Pb in zircon	Frantz et al. (2003)	
			Granito Figueiras Granite	605 ± 8						

			Francisquinho Granite	634 ± 6						
			Chácara das Pedras Gneiss	777 ± 4				SHIRIMP: U-Pb in zircon	Koester et al. (2016)	
Encruzilhada Block	Várzea do Capivarita Complex		Orthogneiss	788 ± 5.3	648.4 ± 5.4			SHIRIMP: U-Pb in zircon	Martil, 2016	
			Orthogneiss	782 ± 9.7	650 ± 22					
			Pelitic gneisses		618 ± 7.3	728 ± 11	728 ± 11 to 2497.3 ± 6.9	SHIRIMP: U-Pb in zircon	Gruber et al. (2017)	
	Capivarita Meta-anorthosite		Meta-anorthosite	1573 ± 21	606 ± 6			LA-ICP-MS: U-Pb in zircon	Chemale et al. (2011)	
			Metagabbro	1530 ± 33	652 ± 9					
	Arroio dos Ratos Complex		Metatonalite	2148 ± 33						
			Metatonalite	2150 ± 28						
			Metatonalite	2136 ± 27						
			Metatonalite	2099 ± 10						
		Granodioritic gneiss	2081 ± 7							
	Granodioritic gneiss	2077 ± 13	635 ± 6							
Tijucas Terrane	Porongos Complex		Metasedimentary			570-650	550 to 2424	SHIRIMP: U-Pb in zircon	Pertile et al. (2017)	
			Quartz-muscovite schist				751 to 2251			
			Quartzite				1045 to 1997			
			Schists				576 to 2490			
			Riodacite	773 ± 3.4						
			Riodacite	801 ± 4.7						
			Riodacite	809 ± 4.1						
	Tupi Silveira Amphibolite		Gt-Diop-Hb gneiss	1567 ± 21	643 ± 3			LA-ICP-MS: U-Pb in zircon	Camozzato et al. (2013a, b)	
	Seival Metagranite		Granodiorite	1785 ± 42					LA-ICP-MS: U-Pb in zircon	Camozzato et al. (2013a, b)
			Monzogranite	1768 ± 24						
			Granodiorite	1764 ± 29						
	Vigia Complex		Monzogranite	1763 ± 28						
			Granitic gneiss	2056 ± 38					LA-ICP-MS: U-Pb in zircon	Camozzato et al. (2017)
		Dioritic gneiss	2008 ± 52							
	Santana Formation		Coxilha do Raio Quartzite			1700-2030	1980 ± 34 to 2506 ± 38	LA-ICP-MS: U-Pb in zircon	Pertile et al. (2015)	
			Godinho Quartzite				1766 ± 40 to 3384 ± 24			
	Encantadas Complex		tonalitic gneiss	2263 ± 18	2045 ± 10				SHIRIMP: U-Pb in zircon	Hartmann et al. (2000)
			pegmatite	2263 ± 6	2021 ± 11					
			Granodiorite	2078 ± 13	631 ± 6					
			Metahornblendite	2257 ± 12	1989 ± 21	702 ± 21				Hartmann et al. (2003)
		Tonalitic gneiss	2234 ± 28					LA-ICP-MS: U-Pb in zircon	Saalmann et al. (2011)	
		Tonalitic gneiss	2112 ± 22					LA-ICP-MS: U-Pb in zircon	Camozzato et al. (2013a, b)	
		Augen gneiss	2153 ± 20	643 ± 3						
		Tonalitic gneiss	2340 ± 19	875 ± 160						
		Metamonzogranite	2211 ± 17					LA-ICP-MS: U-Pb in zircon	Lusa et al. (2017)	
		Metasienogranite	2210 ± 16							
		Granodiritic gneiss	2404 ± 23	679 ± 49				LA-ICP-MS: U-Pb in zircon	Camozzato et al. (2017)	
	Granitic gneiss	2231 ± 19					LA-ICP-MS: U-Pb in zircon	Camozzato et al. (2017)		
	Gneiss Encantadas	2263 ± 18					LA-ICP-MS: U-Pb in zircon	Chemale Jr. (2000)		
São Gabriel Terrane	Ponta do Salso Complex		Meta-arkose			685 ± 18	684 to 897	LA-ICP-MS: U-Pb in zircon	Vedana et al. (2017)	
			Phyllite				709 to 793			
	Passo Feio Complex	Youngest Basin	Schist			774	803 ± 43 to 3054 ± 10	LA-ICP-MS: U-Pb in zircon	Remus et al. (2000); Lopes et al. (2015)	

		Oldest Basin	Phylites			1104	1104 ± 7 to 3377 ± 8	LA-ICP-MS: U-Pb in zircon	Lopes et al. (2015)		
	Cambaizinho Complex		grd-bt-gneiss			650	575 ± 52 to 864 ± 72	LA-ICP-MS: U-Pb in zircon	Lena et al. (2014)		
			ky-bt-hbl-act-gneiss				595 ± 26 to 811 ± 32				
			Zt-act-hbl-ept-gneiss				607 ± 25 to 863 ± 53				
			Grd-act-hbl-gneiss				693 ± 35 to 803 ± 42				
	Cambaí Complex	Sanga do Jobim Suite	Sanga do Jobim Tonalite	680 ± 2				SHIRIMP: U-Pb in zircon	Hartmann et al. (2011)		
				Cerca da Pedra Granodiorite	682 ± 1				LA-ICP-MS: U-Pb in zircon	Cerva-Alves et al. (2020)	
				Sanga do Jobim Granodiorite	673.9 ± 6.8 698.9 ± 4.2						
			Lagoa da Meia-Lua Suite	Tonalites	690 ± 2 703 ± 7				SHIRIMP: U-Pb in zircon	Hartmann et al. (2011)	
				Trondjemite	694 ± 5						
				Santa Zélia Granite	704 ± 3 Ma						
			Vila Nova Gneiss	Ortogneiss	718 ± 2 735 ± 7						
	Cambaizinho Ophiolite		Clorite-tremolite schist			787.6 ± 2.6		LA-ICP-MS: U-Pb in rutile	Cerva-Alves et al. (2020)		
	Cerro Mantiqueira Ophiolite		Albitite	923.2 ± 3		786 ± 13		SHIRIMP: U-Pb in zircon	Arena et al. (2016)		
	Ibaré Ophiolite		Albitite	892.4 ± 2.8							
	Bossoroca Ophiolite		Tourmalinite	920.4 ± 9.8				LA-ICP-MS: U-Pb in zircon	Hartmann et al. (2019)		
<b>Taquarembó Terrane</b>	Bagé Supersuite	Santo Afonso Suite	Biotite granite	624.8 ± 7.1				SHIRIMP: U-Pb in zircon	Camozzato et al. (2018)		
	São Sebastião Supersuite	Cerro Preto Suite		Diorite	590.8 ± 3.6				LA-ICP-MS: U-Pb in zircon	Laux et al. (2017)	
				Granite	588.6 ± 1.5						
		Vauthier Suite				597 ± 6					
				Santo Antonio Monzogranite		640 ± 52			Rb-Sr	Barros and Nardi (1992)	
			Santa Rita Monzogranite		646 ± 52			Rb-Sr	Naumann (1984)		
	Saibro Suite			Jaguari granite		567 ± 4			Pb-Pb	Gastal et al. (2005)	
						537 ± 10			Rb-Sr	Gastal and Lafon (1998)	
						541 ± 42				Rb-Sr	Soliani Júnior (1986)
					Saibro granite	557 ± 9				Rb-Sr	
	Cerro Batovi Metamorphic Complex		Volcanoclastic rock		1764 ± 33			LA-ICP-MS: U-Pb in zircon	Laux et al. (2010b)		
	Santa Maria Chico Granulitic Complex			Mafic Granulite	2509 ± 13		2022 ± 18		SHIRIMP: U-Pb in zircon	Hartmann et al. (1999)	
				Trondjemite	2553 ± 9		2031 ± 40				
				granodiorite gneiss	2366 ± 8		2035 ± 9			SHIRIMP: U-Pb in zircon	Hartmann et al. (2008)
				quartzofeldspathic gneiss				2164 ± 16	2133 - 3255	LA-ICP-MS: U-Pb in zircon	Girelli et al. (2018)
				amphibolite				2135 ± 10	2102 - 2596		
				acid quartzofeldspathic gneiss				2141 ± 7.8	2126 - 2493		
				banded quartzofeldspathic gneiss				2131 ± 12	2134 - 2321		
				quartzofeldspathic gneiss				2158 ± 13	2126 - 2493		
amphibolite							2290 ± 19	2204 - 2962			
metanorite				2238 ± 28		2096 ± 78					
granite				2371.3 ± 6.9							
gabbro				2413 ± 13							
pyroxenite				2153 ± 11							
gabbro	2160 ± 12		2014 ± 48								
granite	1824 ± 5.3										
	mafic granulite	2413 ± 13					LA-ICP-MS: U-Pb in zircon	Laux et al. (2010)			



Supplementary file 3 - U-Pb dating of the MC-04 Sample

a concentration uncertainty ca. 20%  
 b data not corrected for common Pb  
 c data corrected for common Pb

Decay constants as (2009-2010) age00709-2006 age100

Decay constants of Jaffey et al. (1971) used  
 bd = below detection; #NA = not available

Uncertainties quoted without components related to systematic error unless otherwise stated  
 Total systematic uncertainties (ssys): 206Pb/238U = 2.0%, 207Pb/206Pb = 0.55% (2s)

Identifier	Comments	I206c	207Pb		206Pb		U (µg g <sup>-1</sup> ) ± ThU	Ratios b					Ratios c					Dates c					% conc d	estimate age																
			CPS		CPS			1s	1s	1s	1s	1s	2s (%)	Data for Wetherill plot			2s (%)	2s (%)	2s (%)	2s	2s	2s			2s	2s	2s													
			CPS	CPS	207Pb/206Pb	207Pb/238U								207Pb/235U	206Pb/238U	206Pb/235U												Rho	207Pb/238U	206Pb/238U	206Pb/235U									
1.5MFPAB007			1	29002.64	3481.869	46.52607	3.053164	30.8016	0.42028	0.00147	0.28211	0.00264	4.672794	0.002888	0.07428	0.00216	0.120898	2.817642	4.683414	3.42103	0.28211	1.043038	0.567129	0.07428	0.818883	1962.130	60.27188	63.36848	1601.981	27.62487	34.8338	1784.241	20.020	22.88620	1448.3	81.24	82.20209	90.70481	1962.130	60.27188
1.5MFPAB008	0.238381			433858.2	5391869	276.6117	1.530468	122.2606	0.12487	0.00124	0.252131	0.00217	4.330637	0.002499	0.08737	0.00093	0.124273	2.023147	4.330214	2.672851	0.252131	1.786234	0.646881	0.08737	2.760879	2018.464	36.02179	40.17868	1449.459	22.52947	29.81265	1697.227	22.26990	26.94460	1317.8	35.34	37.52320	65.30974	2018.464	36.02179
1.5MFPAB009				295874	38120.41	125.6538	0.36214	7624.081	0.12884	0.00128	0.374883	0.0033	6.723545	0.00354	0.10365	0.00164	0.12884	1.989661	6.723545	2.646574	0.374883	1.748391	0.660599	0.10365	3.164498	2082.204	34.96528	39.17584	2069.193	30.96109	40.83565	2075.721	23.65997	28.721	1993.4	60.16	63.31146	99.2311	2082.204	34.96528
1.5MFPAB010	0.097348			191239.3	20776.91	95.28238	1.507114	273.3803	0.10875	0.00110	0.321624	0.00278	4.822571	0.002979	0.10082	0.00166	0.108843	2.069659	4.817848	2.922283	0.321624	1.721889	0.639564	0.10082	3.292997	1776.794	37.76165	41.9706	1797.554	27.0153	35.88089	1788.010	22.88389	27.52581	1941.5	60.98	63.83717	100.4327	1776.794	37.76165
1.5MFPAB011				112182	13337.51	61.0092	1.304076	952.6793	0.10948	0.00113	0.320992	0.00279	4.845409	0.00301	0.09202	0.00141	0.10948	2.064304	4.845409	2.761697	0.320992	1.742933	0.645125	0.09202	3.064551	1790.777	37.59889	41.81047	1794.572	27.3054	36.07727	1792.818	22.98759	27.72089	1779.3	52.1	55.03407	99.9187	1790.777	37.59889
1.5MFPAB012				88521	12222.98	34.85358	1.203171	1222.98	0.13808	0.00145	0.408271	0.00359	7.772857	0.003872	0.12584	0.0023	0.13808	2.100232	7.772857	2.74273	0.408271	1.763261	0.642993	0.12584	3.655435	2023.264	36.46463	40.41729	2207.012	32.97594	43.36142	2205.069	24.96771	29.97572	2395.7	82.54	85.78066	99.97281	2023.264	36.46463
1.5MFPAB013	0.040096			168893.9	26936.05	57.3641	0.554137	518.0009	0.16146	0.00165	0.461687	0.00404	10.4117	0.004368	0.1098	0.00386	0.161394	2.07692	10.40746	2.689777	0.461687	1.722784	0.644025	0.1098	3.030965	2470.32	34.74002	38.65556	2475.41	35.61891	47.19532	2471.714	25.2223	30.46505	2105.7	140.6	142.5219	99.94887	2470.32	34.74002
1.5MFPAB014	0.133814			643443.7	64344.37	410.4831	1.249201	205.0451	0.141817	0.00148	0.219818	0.00184	3.467508	0.002186	0.05029	0.00179	0.141817	2.012628	3.467508	2.462860	0.219818	1.738288	0.636646	0.05029	2.969096	1626.434	36.06228	40.30063	1624.816	18.65074	26.98810	1618.801	25.1661	26.83886	1040.4	80.54	82.64671	81.81068	1626.434	36.06228
1.5MFPAB015	0.02013			156229.6	24830.86	53.71233	1.242672	172.4366	0.156229	0.00164	0.467537	0.00404	10.26653	0.00436	0.11334	0.00241	0.156229	2.079292	10.24579	2.708024	0.467537	1.734918	0.640658	0.11334	3.252691	2444.397	35.19668	39.08528	2472.749	35.66538	47.22604	2457.221	25.35995	30.56673	2170.1	87.34	90.13551	100.512	2444.397	35.19668
1.5MFPAB016	0.11201			161765.5	16258.43	89.0483	1.635745	194.4521	0.10229	0.00106	0.293535	0.00257	4.165337	0.00278	0.0772	0.00138	0.10229	2.086458	4.166533	2.712039	0.293535	1.746638	0.641901	0.0772	3.575713	1664.008	38.61184	42.84995	1668.133	25.67066	33.88525	1666.308	22.51156	27.08521	1503.2	51.68	53.97895	100.0071	1664.008	38.61184
1.5MFPAB017				161539	17851.67	80.01481	1.878992	238.0223	0.1051	0.00115	0.324531	0.00279	4.946923	0.00318	0.08919	0.0017	0.1051	2.08126	4.949233	2.70251	0.324531	1.723925	0.637898	0.08919	3.812087	1807.813	37.82849	43.00063	1811.821	27.23243	36.15096	1809.959	23.65997	28.721	1993.4	60.16	63.31146	99.2311	1807.813	37.82849
1.5MFPAB018				79989	8389.393	37.88906	1.751256	839.835	0.11041	0.00117	0.3241	0.00288	4.933886	0.00309	0.09905	0.00215	0.11041	2.119373	4.933886	2.762973	0.3241	1.705238	0.640907	0.09905	4.341242	1806.169	38.52901	42.63995	1809.722	27.92025	36.65024	1808.072	32.97114	28.2364	1909	78.96	81.36303	99.9848	1806.169	38.52901
1.5MFPAB019				277596	62803.32	74.26143	1.852637	62803.32	0.22624	0.00221	0.600896	0.00526	18.74435	0.005705	0.12154	0.00239	0.22624	1.953678	18.74435	2.62407	0.600896	1.755233	0.668336	0.12154	3.932862	3025.638	31.33682	35.2002	3033.449	45.54327	56.06207	3028.753	25.63494	31.20271	2318.5	86.16	89.20553	100.029	3025.638	31.33682
1.5MFPAB020				50498	5488.628	25.44865	2.09467	288.8751	0.10869	0.00117	0.318977	0.00285	4.780243	0.003081	0.07751	0.00229	0.10869	2.152912	4.780243	2.800909	0.318977	1.791664	0.639672	0.07751	5.908915	1777.575	39.27684	43.33814	1784.73	27.93651	36.48581	1781.434	23.78548	28.37078	1509	85.88	87.43282	100.0793	1777.575	39.27684
1.5MFPAB022	0.643245			147911.2	26174.08	66.64738	1.106191	69.36007	0.1713	0.00178	0.420473	0.0037	6.931088	0.004108	0.12868	0.00288	0.1713	2.224279	6.927167	2.88576	0.420473	1.78106	0.627127	0.12868	4.86883	2686.684	37.29164	40.83804	2682.627	34.20438	44.6847	2423.446	26.66933	31.63816	2366.4	103.74	106.2808	93.28912	2686.684	37.29164
1.5MFPAB028				456462	79479.16	144.446	0.793532	130.1399	0.17412	0.00179	0.507983	0.0041	12.13548	0.004759	0.13359	0.00289	0.17412	2.056053	12.13548	2.604049	0.507983	1.740847	0.646182	0.13359	4.342851	2597.645	34.27935	38.14832	2548.011	37.8485	50.04418	2619.161	25.59677	30.90307	2570	102.74	105.9378	100.9633	2597.645	34.27935
1.5MFPAB029				465460	69271.84	144.0786	0.793532	132.2084	0.17412	0.00179	0.507983	0.0041	12.13548	0.004759	0.13359	0.00289	0.17412	2.056053	12.13548	2.604049	0.507983	1.740847	0.646182	0.13359	4.342851	2597.645	34.27935	38.14832	2548.011	37.8485	50.04418	2619.161	25.59677	30.90307	2570	102.74	105.9378	100.9633	2597.645	34.27935
1.5MFPAB030				46599	5479.576	21.95514	0.939452	421.5059	0.11759	0.00133	0.341185	0.00318	5.531739	0.00347	0.15	0.00564	0.11759	2.627097	5.531739	2.94318	0.341185	1.868994	0.636943	0.15	7.51	1919.917	40.56294	44.37902	1892.368	30.6626	39.37086	1905.542	25.54147	30.06383	2824.9	198.32	201.0108	99.20037	1919.917	40.56294
1.5MFPAB031	0.121782			366722.4	65131.6	163.8636	1.744336	260.3366	0.16091	0.00161	0.368821	0.00231	7.466166	0.003511	0.07787	0.00148	0.16091	2.501039	7.466166	2.680234	0.368821	1.77285	0.661454	0.07787	4.810996	2354.181	34.34311	38.38882	2356.885	30.19138	39.60671	2167.846	24.27713	29.38365	1611.9	65.62	67.49131	81.07006	2354.181	34.34311
1.5MFPAB032				713143	13240.44	339.6894	3.383257	93.30385	0.06212	0.00071	0.103865	0.00099	0.863916	0.00118	0.00561	0.00063	0.06212	2.285898	0.863916	2.965108	0.103865	1.888668	0.636945	0.00561	4.919953	678.2424	48.85234	53.35708	619.4739	11.18246	14.23706	632.2584	14.03181	16.45233	511.2	74.82	75.44129	97.94169	619.4739	11.18246
1.5MFPAB033	1.480821			61460.12	8654.46	40.14436	1.488627	24.46608	0.14866	0.00149	0.290129	0.00283	3.442448	0.002	0.014861	0.00047	0.14866	0.989277	3.442448	2.604144	0.290129	1.430978	0.644229	0.014861	4.746078	1844.062	28.08669	31.76499	1846.928	23.4268	24.8146	1149.404	33.2804	39.42339	206.6	148.68	160.0620	102.4540	1844.062	28.08669
1.5MFPAB034				22202	1346.551	34.46885	1.346297	46.4328	0.060																															

