

Supplementary files

Pantanal Basin river muds from source to sink: compositional changes in a tropical back-bulge depozone

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Watershed environmental characteristics

Sampling Date	Sample	Latitude	Longitude	River	Elevation (m.a.s.l)	Temp. (°C)	Mean rain (mm yr ⁻¹)	Avg. slope (°)	Distance from PR (km)
25 Nov 2020	A1	-22.0843	-57.9877	Paraguay	74	24.5	1178	2.51	0
25 Nov 2020	A2	-21.7705	-57.9095	Paraguay	71	24.7	1178	2.51	0
26 Nov 2020	A3	-21.4907	-57.9382	Paraguay	72	25	1201	2.58	0
Nov 2020	A5	-18.8531	-57.6172	Paraguay	87	26.2	1441	3.1	0
Nov 2020	A6	-18.6412	-57.5345	Paraguay	87	26.1	1441	3.1	0
Nov 2020	A7	-18.3156	-57.3763	Taquari	91	26.1	1444	3.1	0
Nov 2020	A8	-18.3906	-57.3795	Paraguay	89	26.1	1444	3.1	0
Nov 2020	A9	-17.73	-57.6632	Paraguay	98	26.2	1432	2.97	0
Nov 2020	A10	-17.8111	-57.2407	Cuiabá	98	26.1	1477	3.25	35
3 Jul 2019	A22	-16.0615	-57.7056	Paraguay	116	25.5	1552	3.5	0
Nov 2020	A23	-18.4027	-57.3517	Paraguai Mirim	93	4	1496	4.22	4
Feb 2021	A25	-18.7093	-56.9459	Taquari	100	25.7	1505	4.34	104
Feb 2021	A26	-18.2534	-56.0671	Taquari	139	25.2	1510	4.39	173
Feb 2021	A27	-18.257	-55.9575	Taquari	140	25.2	1510	4.39	198
Feb 2021	A28	-18.2646	-55.9618	Taquari	136	25.2	1510	4.39	254
Feb 2021	A29	-18.2625	-55.9539	Taquari	139	25.2	1510	4.39	255
Feb 2021	A30	-18.2185	-55.1583	Taquari	175	25	1513	4.47	377
25 Nov 2020	A34	-22.0869	-57.9657	Apa	71	24.5	1178	3.66	3
26 Nov 2020	A35	-20.9269	-57.8414	Nabileque	78	25.3	1165	2.43	6
26 Nov 2020	A36	-20.9702	-57.8177	Aquidabã	78	25.2	1203	4.13	1
26 Nov 2020	A37	-20.9981	-57.8177	Branco	80	25.2	1229	4.33	1
23 Nov 2020	A38	-20.6459	-57.6328	Nabileque	79	25.4	1153	2.09	73
	Avg.				100	24	1376	3	67
	St. Dev				29	5	151	1	111
2 Jul 2019	B1	-16.1435	-58.0157	Jauru	125	26	1557	3.41	59
1 Jul 2019	B2	-15.4731	-58.0129	Bugres	158	25.4	1513	3.93	141
1 Jul 2019	B3	-15.7355	-58.539	Jauru	159	26.1	1624	3.8	194
1 Jul 2019	B4	-15.4687	-57.8937	Cabaçal	145	25.4	1566	4.75	112
1 Jul 2019	B5	-15.8615	-58.5339	Aguapeí	159	26.3	1527	3.93	185
1 Jul 2019	B6	-15.8097	-58.3999	Córrego Pitas	147	26.1	1512	2.66	172
1 Jul 2019	B7	-15.3103	-57.8521	Vermelho, C	153	25.4	1182	4.18	143
1 Jul 2019	B8	-15.3491	-58.0207	Branco	155	25.4	1589	5.72	144
29 Jun 2019	B9	-14.5951	-57.8949	Formoso, MT	264	24.9	1750	3.71	220
	Avg.				163	26	1536	4	152
	St. Dev				39	0	152	1	48
24 Nov 2020	C1	-22.2229	-57.303	Apa	114	24.1	1384	3.4	127
23 Nov 2020	C2	-20.6281	-57.5758	Naitaca	81	25.4	1183	2.82	81
24 Nov 2020	C3	-21.9418	-57.2543	Perdido	153	24.1	1307	5.13	163
23 Nov 2020	C4	-20.8398	-57.2639	Aquidabã	120	24.9	1239	4.67	115
24 Nov 2020	C5	-21.2335	-57.4236	Branco, MS	126	24.8	1260	5.3	109
25 Nov 2020	C6	-21.6523	-57.8246	Amonguijá	84	24.9	1232	3.97	15
25 Nov 2020	C7	-21.8504	-57.8246	Córrego Progresso	76	24.7	1220	2.5	29
7 Jul 2019	C8	-21.6575	-57.4987	Amonguijá	124	24.6	1253	5.28	77
	Avg.				110	25	1260	4	90
	St. Dev				27	0	61	1	50
6 Jul 2019	D1	-20.4784	-55.8027	Aquidauana	143	24.3	1428	3.81	484
5 Jul 2019	D2	-18.5256	-54.7505	Taquari	201	24.8	1513	4.55	466
9 Jul 2019	D3	-20.2086	-56.4943	Miranda	115	24.7	1363	4.03	294
5 Jul 2019	D4	-18.5348	-54.7402	Coxim	207	24.8	1493	4.42	468

27 Jun 2019	D5	-16.4796	-54.6475	Vermelho, SL	200	24.4	1609	6.01	608
5 Jul 2019	D6	-18.5013	-54.6855	Taquari	207	24.8	1544	4.82	475
5 Jul 2019	D7	-16.3114	-54.9237	São Lourenço	199	24.4	1595	5.16	592
23 Nov 2020	D9	-21.2879	-56.225	Miranda	206	23.9	1403	3.5	136
5 Jul 2019	D10	-17.2516	-54.7613	Itiquira	441	23.6	1606	4.12	611
4 Jul 2019	D11	-15.9977	-54.9218	São Lourenço	240	24.2	1617	6.13	642
24 Nov 2020	D12	-22.1143	-56.5195	Apa	181	23.7	1433	4.16	298
Feb 2021	D13	-19.3159	-55.1768	Negro	159	25	1438	4.78	418
23 Nov 2020	D14	-21.4484	-56.1475	Miranda	223	23.7	1426	3.87	168
27 Jun 2019	D15	-16.5529	-54.4207	Tadarimana	230	24.3	1601	6.41	643
Feb 2021	D16	-20.0715	-55.6466	Taboco	150	24.6	1419	5.11	331
5 Jul 2019	D17	-17.9144	-54.6892	Piquiri	199	24.7	1517	3.75	664
6 Jul 2019	D18	-21.1472	-55.8336	Nioaque	192	24	1416	4.34	585
27 Nov 2020	D19	-21.1596	-55.8368	Canindé	189	24	1416	4.21	587
	Avg.				205	24	1491	5	471
	St. Dev				67	0	86	1	165
8 Jul 2019	E1	-20.5013	-56.7901	Salobra	139	24.6	1286	9.67	393
8 Jul 2019	E3	-20.6942	-56.4864	Rio do Peixe	168	24.2	1326	5.94	423
8 Jul 2019	E4	-21.2878	-56.2955	Córrego Mutum	221	23.7	1367	2.21	134
8 Jul 2019	E5	-20.7138	-56.5208	Chapena	175	24.2	1319	5.47	434
9 Jul 2019	E6	-20.0509	-56.7818	Terere	118	25	1240	5.19	222
8 Jul 2019	E7	-20.718	-56.5806	Taquarussu	207	24.1	1317	6.79	440
	Avg.				171	24	1309	6	341
	St. Dev				39	0	43	2	130
4 Jul 2019	F1	-15.8741	-56.0741	Cuiabá	143	25.1	1480	4.41	540
28 Jun 2019	F2	-15.2021	-56.3781	Cuiabá	174	24	1516	4.52	652
28 Jun 2019	F3	-14.9291	-56.4349	Cuiabá	186	24.2	1558	4.62	711
28 Jun 2019	F4	-14.8475	-56.4236	Cuiabá	194	24.4	1562	4.65	730
29 Jun 2019	F5	-14.608	-57.7349	Sepotuba	225	24.9	1745	2.91	220
4 Jul 2019	F6	-16.3204	-56.5434	Bento Gomes	124	25.4	1339	2.13	215
28 Jun 2019	F7	-14.4896	-56.8066	Santana	206	25	1724	3.01	28
29 Jun 2019	F9	-15.1261	-57.1075	Jauquara	162	24.8	1370	6.9	6
29 Jun 2019	F10	-15.0765	-57.1845	Paraguay	153	25	1531	3.97	0
29 Jun 2019	F11	-15.0036	-56.8883	Parí	174	24.7	1434	5.99	23
2 Jul 2019	F12	-16.0585	-57.5772	Piraputanga	164	25.2	1336	11.5	18
	Avg.				173	25	1509	5	286
	St. Dev				29	0	139	3	309

Table S1: Sampling locations and relevant environmental data. *Vermelho, C* is a tributary of the Cabaçal River, and *Vermelho, SL* is a tributary of the São Lourenço River. A, Lowlands. B, Amazon craton. C, Rio Apa craton. D, Plateau. E, South Paraguay Belt. F, North Paraguay Belt. PR = Paraguay River. Mean annual precipitation and temperature were derived from WorldClim data (Fick & Hijmans, 2017), and average slope was calculated from the SRTM digital elevation models.

Representative flow rates on date of collection

Reported date	Station #	Station name	Station latitude	Station longitude	Discharge	Nearest sample
24 Nov 2020	67100000	Porto Murtinho	-21.7003	-57.8911	805	A2
27 Nov 2020	66895000	Porto da Manga	-19.2583	-57.2353	708.23	A5
28 Nov 2020	66810000	São Francisco	-18.3939	-57.3911	543.13	A7
29 Nov 2020	66750000	Porto do Alegre	-17.6233	-56.965	421.19	A10
1 Jul 2019	66070004	Cáceres (DNPVN)	-16.0761	-57.7022	322.31	A22
14 Jun 2019	66072000	Porto Esperidião	-15.8517	-58.4628	90.1	B1
1 Jul 2019	66071400	Água Suja	-15.4997	-58.5997	76.18	B3
1 Jul 2019	66065000	Estrada MT-125	-15.4686	-57.8936	38.92	B4
24 Nov 2020	67170000	São Carlos	-22.2236	-57.3039	33.21	C1
23 Nov 2020	67176000	Fazenda Esperança	-21.9697	-57.3772	17.91	C3
7 Jul 2019	66945000	Aquidauana	-20.4783	-55.8014	111.11	D1
3 Jul 2019	66870000	Coxim	-18.5078	-54.7619	225.05	D2
8 Jul 2019	66910000	Miranda	-20.2408	-56.3992	132.99	D3
25 Jun 2019	66450001	Rondonópolis	-16.4789	-54.6506	69.37	D5
3 Jul 2019	66845000	Pedro Gomes	-18.1672	-54.4708	114.88	D6
3 Jul 2019	66400000	São Lourenço de Fátima	-16.3108	-54.9228	96.08	D7
6 Jul 2019	66520000	Itiquira	-17.2078	-54.1511	32.58	D10
2 Jul 2019	66380000	São Pedro da Cipa	-15.9981	-54.9217	37.96	D11
5 Jul 2019	66280000	Barão de Melgaço	-16.1928	-55.9669	186.62	F1
28 Jun 2019	66050000	Tapirapuã	-14.8508	-57.7689	100.57	F5
26 Jun 2019	66006000	Nortelândia	-14.4517	-56.8142	20.71	F7
30 Jun 2019	66010000	Barra do Bugre	-15.0761	-57.1819	69.55	F10

Table S2: Data were derived from the Brazilian National Water Agency's online information database. Where possible, we selected the reported discharge date closest to the sampling date for the nearest stream gauge station.

Lithologies by watershed

Site	Area (km ²)	Source	M.I.	Surface	S.C.	Biochem	Volcanic	Plutonic	Foliated	NFoliated	Other
A1	446863	Lowland	10	47.8	28	4.2	4.6	2	8.2	3	2.2
A2	445637	Lowland	7	47.2	28.4	4.5	4.6	2	8.4	3.1	1.8
A3	441437	Lowland	30	47.2	28.7	4.3	4.6	1.9	8.3	3.1	1.9
A5	244190	Lowland	122	44	26	5	4	2	12	4	3
A6	243910	Lowland	492	44	26	5	3	2	12	4	4
A7	241900	Lowland	12	44	26	5	4	2	12	4	3
A8	241570	Lowland	98	44	26	5	3	2	12	4	4
A9	123800	Lowland	44	45	16	8	3	6	15	3	4
A10	106835	Lowland	7	38	44	1	2	0	7	7	1
A22	32188	Lowland	60	38	40	3	8	5	4	1	1
A23	30898	Lowland	26	12	83	2	2	0	0	0	1
A25	29620	Lowland	7	10	88	0	2	0	0	0	0
A26	29179	Lowland	4	8	88	0	2	0	0	0	2
A27	29158	Lowland	4	8	88	0	2	0	0	0	2
A28	29146	Lowland	7	8	88	0	2	0	0	0	2
A29	29120	Lowland	28	8	88	0	2	0	0	0	2
A30	28532	Lowland	7	6	90	0	2	0	0	0	2
A34	15180	Lowland	3	6	32	11	6	2	42	1	0
A35	7011	Lowland	16	54	5	1	0	1	39	0	0
A36	3265	Lowland	6	37	1	3	0	9	45	5	0
A37	2337	Lowland	11	34	0	2	0	12	45	5	2
A38	1352	Lowland	15	44	14	0	0	0	42	0	0
Avg.	127415		46	31	43	3	3	2	14	2	2
St. Dev	155241		104	18	33	3	2	3	17	2	1
B1	10564	Amazon	10	7	28	7	25	25	6	2	0
B2	9217	Amazon	7	7	0	4	19	21	47	0	2
B3	5247	Amazon	26	3	38	0	22	30	7	0	0
B4	3596	Amazon	31	7	0	4	19	21	47	0	2
B5	1770	Amazon	9	3	25	0	0	51	10	9	2
B6	1203	Amazon	15	4	0	0	74	19	3	0	0
B7	1182	Amazon	6	0	99	0	0	0	0	0	1
B8	1010	Amazon	22	0	7	0	0	15	45	33	0
B9	574	Amazon	69	0	81	0	1	17	0	0	1
Avg.	3818		22	3	31	2	18	22	18	5	1
St. Dev	3761		20	3	37	3	24	14	21	11	1
C1	10170	Apa	2	0	48	9	9	0	33	1	0
C2	3859	Apa	0	50	2	1	0	2	44	1	0
C3	2513	Apa	2	4	0	27	0	1	66	0	2
C4	1785	Apa	1	16	0	7	0	2	66	7	2
C5	1728	Apa	1	14	0	4	0	16	58	7	1
C6	964	Apa	2	30	0	0	3	37	30	0	0
C7	716	Apa	6	61	0	0	16	0	19	4	0
C8	453	Apa	1	0	0	0	0	69	30	0	1
Avg.	2774		2	22	6	6	4	16	43	3	1
St. Dev	3183		2	23	17	9	6	25	18	3	1
D1	156858	Plateau	15	0	53	0	45	0	0	0	2
D2	27196	Plateau	17	4	93	0	2	0	0	0	1
D3	17508	Plateau	19	6	31	13	20	0	17	10	3
D4	15576	Plateau	19	7	90	0	3	0	0	0	0
D5	12295	Plateau	495	19	9	0	0	69	3	0	0

D6	10952	Plateau	16	0	98	0	1	0	0	0	1
D7	6973	Plateau	31	0	100	0	0	0	0	0	0
D9	4672	Plateau	5	0	43	8	45	0	0	4	0
D10	3727	Plateau	96	1	87	0	11	0	0	0	1
D11	3182	Plateau	37	0	99	0	1	0	0	0	0
D12	2981	Plateau	23	0	68	0	32	0	0	0	0
D13	2866	Plateau	4	3	96	0	0	0	0	0	1
D14	2856	Plateau	8	0	26	0	74	0	0	0	0
D15	2702	Plateau	24	0	100	0	0	0	0	0	0
D16	2158	Plateau	27	0	92	0	0	3	5	0	0
D17	2136	Plateau	48	0	100	0	0	0	0	0	0
D18	1658	Plateau	15	0	17	0	83	0	0	0	0
D19	1270	Plateau	5	0	100	0	0	0	0	0	0
Avg.	15420		50	2	72	1	18	4	1	1	1
St. Dev	35994		113	5	33	4	27	16	4	2	1
E1	861	SouthPB	0	1	9	85	0	1	0	3	1
E3	334	SouthPB	1	0	11	38	0	0	7	44	0
E4	253	SouthPB	21	0	33	6	0	0	20	41	0
E5	215	SouthPB	3	3	25	28	0	0	0	42	2
E6	185	SouthPB	2	0	0	5	0	0	73	22	0
E7	142	SouthPB	2	0	14	54	0	0	0	32	0
Avg.	332		5	1	15	36	0	0	17	31	1
St. Dev	267		8	1	12	31	0	0	29	16	1
F1	24665	NorthPB	18	2	36	6	2	0	21	33	0
F2	19259	NorthPB	91	0	44	8	2	0	8	38	0
F3	15956	NorthPB	68	0	51	7	0	0	6	36	0
F4	15697	NorthPB	33	0	52	7	0	0	6	35	0
F5	3580	NorthPB	160	0	72	0	28	0	0	0	0
F6	2824	NorthPB	27	32	0	0	0	0	58	10	0
F7	1775	NorthPB	23	0	66	0	34	0	0	0	0
F9	1325	NorthPB	12	5	81	14	0	0	0	0	0
F10	1072	NorthPB	22	36	53	3	8	0	0	0	0
F11	1018	NorthPB	31	13	86	1	0	0	0	0	0
F12	107	NorthPB	13	0	46	54	0	0	0	0	0
Avg.	7934		45	8	53	9	7	0	9	14	0
St. Dev	9031		45	13	24	16	12	0	17	17	0

Table S3: Pour points and compositions of watersheds in **percentage values (sample sum = 100%)** organized by region. Surface, unconsolidated alluvium. S.C., siliciclastic sedimentary rock. Biochem, (bio)chemical sedimentary rock. Volcanic, volcanic igneous rock. Plutonic, plutonic igneous rock. Foliated, foliated metamorphic rock. NFoliated, non-foliated metamorphic rock. Other, sum of remaining minor components of the watershed lithotypes. Watershed area was calculated from the SRTM digital elevation models.

Semi-quantitative clay mineral estimates

Site	Kaolinite	Illite	Vermiculite	Smectite	Goethite + Gibbsite?	Illite I(001)/I(002)
A2	57	8	35	0	Both	1.7
A3	51	4	46	0	Both	1.3
A6	77	5	18	0	Goethite	1.1
A7	74	11	15	0	Goethite	1.8
A8	77	3	20	0	None	0.9
A9	57	3	41	0	Both	0.6
A23	79	7	14	0	Gibbsite	1.8
A25	43	2	55	0	None	0.8
A26	36	3	0	61	Both	1.9
A27	52	4	43	0	Gibbsite	2.1
A28	54	5	41	0	Goethite	1.5
A29	46	4	50	0	Gibbsite	1.3
A30	49	3	48	0	Gibbsite	1.8
A34	43	13	44	0	Gibbsite	1.6
A35	60	6	34	0	Gibbsite	1.5
A36	54	8	38	0	Gibbsite	1.8
A37	51	9	40	0	Gibbsite	1.8
A38	49	3	48	0	Gibbsite	0.9
Avg.	56	5.6	35			1.5
St. Dev.	12.7	3.1	15.2			0.4
B1	77	7	15	0	Goethite	3.1
B2	56	9	35	0	None	5.4
B3	28	12	59	0	Gibbsite	4.3
B4	48	19	33	0	Both	2.3
B5	43	19	38	0	None	2.6
B6	65	10	26	0	None	2.7
B8	42	36	22	0	Both	2.2
Avg.	51.3	16	32.6			3.2
St. Dev.	16.2	10	14.1			1.2
C1	39	13	48	0	Gibbsite	2.1
C2	5	35	60	0	None	4.1
C3	47	10	43	0	None	2.8
C4	32	41	27	0	None	2.7
C5	42	26	31	0	None	2.5
C6	36	11	53	0	None	1.7
C7	11	2	0	87	None	0.6
C8	39	13	48	0	Goethite	2.4
Avg.	37.4	18.9	38.8			2.4
St. Dev.	15.1	13.6	19.1			1.0
D1	25	6	70	0	Goethite	3.0
D3	12	9	79	0	Both	1.5
D4	43	8	50	0	Gibbsite	2.6
D6	71	4	25	0	None	2.5
D9	0	2	98	0	Goethite	1.2
D10	78	11	11	0	Gibbsite	2.4
D11	21	64	15	0	Both	2.6
D12	21	4	75	0	Goethite	1.8
D13	70	21	10	0	None	3.0
D14	24	0	76	0	Both	-
D15	54	16	31	0	Both	2.4

D16	61	21	19	0	Goethite	2.5
D17	32	63	5	0	Goethite	2.6
D18	11	0	89	0	Goethite	-
D19	37	0	63	0	Goethite	-
Avg.	37.3	15.3	47.7			2.4
St. Dev.	24.4	20.8	32.5			0.6
E1	17	10	73	0	Both	1.1
E3	15	46	39	0	Gibbsite	-
E4	17	36	47	0	None	3.0
E5	28	44	28	0	Goethite	1.9
E6	7	0	93	0	Gibbsite	-
E7	27	46	27	0	None	1.8
Avg.	18.5	30.3	51.2			2.0
St. Dev.	7.9	20.2	26.5			0.8
F1	73	18	9	0	Both	2.3
F2	34	55	11	0	Both	2.6
F3	31	55	14	0	Both	2.4
F4	22	57	21	0	Both	2.7
F6	51	2	47	0	None	-
F9	24	55	21	0	Both	2.9
F10	13	50	37	0	Both	2.7
F11	44	37	20	0	None	3.2
F12	33	54	13	0	Goethite	2.8
Avg.	36.1	42.6	21.4			2.7
St. Dev.	17.9	19.8	12.7			0.3
A22	42	34	24	0	Both	3.1
B7	53	13	34	0	Both	2.2
B9	43	10	48	0	Both	1.9
D2	19	3	78	0	Gibbsite	1.0
D5	54	30	16	0	Goethite	2.9
D7	74	15	11	0	Both	2.0
F5	82	1	17	0	Goethite	-
F7	79	8	0	13	Both	2.1

Table S4: Semi-quantitative clay mineral estimates based on known diagnostic peaks (Biscaye, 1965; Moore & Reynolds, 1989). The last eight rows did not have accompanying XRF geochemical data, so although they were used in the spatial distribution maps, they were not calculated in the regional averages.

XRF bulk (sand, silt, clay) geochemistry

	SiO ₂ (%)	Al ₂ O ₃ (%)	Fe ₂ O ₃ (%)	K ₂ O (%)	Na ₂ O (%)	CaO (%)	MgO (%)
A22	69.98	11.67	11.38	1.5	0.62	0.54	0.68
B01	90.76	5.32	1	2.39	0.54	0.32	0.1
B02	65.67	18.21	6.81	1.85	0.91	1.56	0.98
B03	88.39	5.05	2.43	1.24	0.7	0.79	0.55
B04	86.39	6.49	2.82	1.26	0.85	0.58	0.34
B05	84.1	7.97	1.51	3.36	1.05	0.5	0.13
B06	85.96	7.29	2.65	1.24	0.59	0.79	0.28
B07	79.48	8.98	5.69	1.06	0.35	0.32	0.33
B08	84.25	6.66	4.13	1.04	0.4	0.31	0.32
B09	86.96	6.36	2.66	1.21	0.33	0.38	0.58
C03	69.3	15.75	3	4.54	1.94	2.55	0.64
C08	77.82	11.24	1.55	5.92	1.56	0.43	0.17
D01	83.39	6.8	4.46	1.32	0.39	0.59	0.51
D02	89.77	5.25	1.55	2.06	0.33	0.31	0.36
D03	79.61	7.83	6	0.95	0.55	1.24	0.64
D04	83.04	9.16	2.92	2.21	0.32	0.45	0.6
D05	99.1	0.85	0.87	0.19	0.25	0.16	0.06
D06	81.18	10.31	3.01	2.19	0.31	0.55	0.55
D07	95.1	2.36	2.09	0.41	0.25	0.16	0.1
D09	76.34	7.7	9.44	1.02	0.56	1.05	0.64
D10	95.34	2.81	1.35	0.68	0.26	0.18	0.2
D11	92.06	3.9	2.32	1.12	0.27	0.24	0.19
D12	77.53	7.12	7.37	1.08	0.57	0.77	0.5
D14	67.95	9.37	11.82	0.73	0.51	1.09	0.78
D15	89.94	5.33	2.31	1.73	0.31	0.24	0.31
D17	84.19	8.8	3.03	1.58	0.28	0.3	0.4
D18	70.23	8.51	10.76	0.67	0.58	1.2	0.81
D21	96.9	1.61	1.68	0.13	0.24	0.21	0.14
E01	34.35	8.43	2.76	1.3	0.15	38.68	0.93
E03	71.44	8.13	2.99	1.34	0.46	10.09	1.31
E04	91.49	4.68	2.09	0.65	0.39	0.42	0.23
E05	72	8.01	3.32	1.56	0.28	9.55	1.23
E06	71.72	6.36	2.49	0.55	0	13.18	1.35
E07	52.52	9.22	7.23	1.76	0.01	20.44	1.29
F01	85.7	4.39	6.59	0.87	0.34	0.4	0.35
F02	73.24	14.75	6.04	2.66	0.12	0.86	1.16
F03	88.3	6.03	2.95	1.2	0.38	0.29	0.46
F04	82.04	8.93	3.92	1.75	0.49	0.42	0.68
F05	95.65	1.88	1.19	0.09	0.24	0.21	0.11
F06	74.77	7.66	13.61	0.25	0.25	0.31	0.26
F07	97.14	1.42	1.95	0.04	0.26	0.2	0.12
F09	84.28	8.1	3.16	1.37	0.58	0.33	0.64
F10	74.39	10.82	8.1	2.21	0.27	0.26	1.32
F11	92.93	3.81	1.63	0.86	0.33	0.34	0.25
F12	91.9	3.84	2	0.64	0.36	1.05	0.31
F13	92.1	1.78	1.92	0.48	0.23	2.68	0.24

Table S5: Where available, major elemental geochemistry was determined from bulk sediment samples using WD-XRF and calibrated to USGS standards. The weight percent values were converted to molar proportions by dividing each value by the elemental atomic weight and used

to calculate the weathering indices. The last three rows did not have accompanying XRD data, so although they were used in the spatial distribution maps, they were not calculated in the regional averages.

XRF major elemental geochemistry and weathering indices

Site	SiO ₂ wt%	Al ₂ O ₃ wt%	Fe ₂ O ₃ wt%	K ₂ O wt%	Na ₂ O wt%	CaO wt%	MgO wt%	SiO ₂ mol	Al ₂ O ₃ mol	Fe ₂ O ₃ mol	K ₂ O mol	Na ₂ O mol	CaO mol	MgO mol	CIA	WIP
A2	72.1	14.1	6.9	1.5	0.1	0.4	0.6	1.20	0.14	0.04	0.02	0.00	0.01	0.02	85.6	15.9
A3	77.7	11.2	5.2	1.3	0.1	0.3	0.5	1.29	0.11	0.03	0.01	0.00	0.01	0.01	84.9	13.3
A6	67.8	16.2	7.4	1.6	0.0	0.2	0.8	1.13	0.16	0.05	0.02	0.00	0.00	0.02	88.6	16.1
A7	74.5	13.4	5.7	1.5	0.0	0.2	0.6	1.24	0.13	0.04	0.02	0.00	0.00	0.01	87.1	14.9
A8	73.2	14.5	5.9	1.5	0.0	0.1	0.7	1.22	0.14	0.04	0.02	0.00	0.00	0.02	88.4	15.2
A9	76.9	12.8	4.6	0.9	0.0	0.2	0.5	1.28	0.13	0.03	0.01	0.00	0.00	0.01	90.5	9.7
A23	60.3	24.5	8.5	1.6	0.0	0.4	0.9	1.00	0.24	0.05	0.02	0.00	0.01	0.02	91.0	17.2
A25	64.6	18.5	6.5	2.3	0.0	0.7	1.4	1.08	0.18	0.04	0.02	0.00	0.01	0.03	83.3	24.8
A26	71.9	15.2	4.5	2.2	0.0	0.4	0.9	1.20	0.15	0.03	0.02	0.00	0.01	0.02	82.8	22.6
A27	71.9	15.4	4.7	2.3	0.0	0.5	1.0	1.20	0.15	0.03	0.02	0.00	0.01	0.02	82.1	23.5
A28	69.3	17.5	5.2	2.3	0.0	0.6	1.1	1.15	0.17	0.03	0.02	0.00	0.01	0.03	83.1	23.8
A29	65.5	20.0	5.2	2.3	0.0	0.8	1.5	1.09	0.20	0.03	0.02	0.00	0.01	0.04	83.4	25.9
A30	71.6	14.7	4.5	2.2	0.5	0.4	0.9	1.19	0.14	0.03	0.02	0.01	0.01	0.02	79.1	26.7
A34	61.9	19.8	7.9	2.1	0.4	1.2	0.9	1.03	0.19	0.05	0.02	0.01	0.02	0.02	79.6	27.1
A35	78.0	11.3	3.8	1.1	0.0	0.4	0.4	1.30	0.11	0.02	0.01	0.00	0.01	0.01	85.6	11.6
A36	75.7	12.2	5.0	1.3	0.1	0.2	0.5	1.26	0.12	0.03	0.01	0.00	0.00	0.01	86.7	13.8
A37	76.9	10.0	6.1	1.1	0.0	0.3	0.5	1.28	0.10	0.04	0.01	0.00	0.01	0.01	84.3	11.8
A38	82.0	9.1	3.4	1.0	0.1	0.3	0.3	1.36	0.09	0.02	0.01	0.00	0.01	0.01	83.8	10.6
Avg.	71.8	15.0	5.6	1.7	0.1	0.4	0.8								85.0	18.0
S.D.	5.9	3.9	1.4	0.5	0.1	0.3	0.3								3.3	6.0
B1	63.5	19.9	6.0	2.2	0.5	1.4	0.8	1.06	0.20	0.04	0.02	0.01	0.03	0.02	77.2	29.5
B2	65.8	17.3	6.2	1.9	0.8	1.5	0.7	1.09	0.17	0.04	0.02	0.01	0.03	0.02	73.8	29.3
B3	59.7	20.1	8.4	2.4	0.4	2.1	2.6	0.99	0.20	0.05	0.03	0.01	0.04	0.06	73.9	36.8
B4	71.1	13.1	6.3	1.8	0.6	0.8	0.5	1.18	0.13	0.04	0.02	0.01	0.01	0.01	74.7	24.2
B5	65.5	17.7	7.6	2.5	0.4	0.6	0.5	1.09	0.17	0.05	0.03	0.01	0.01	0.01	79.9	27.9
B6	58.9	23.5	7.7	1.7	0.2	1.0	0.7	0.98	0.23	0.05	0.02	0.00	0.02	0.02	85.3	21.1
B8	64.2	17.6	9.4	2.2	0.0	0.2	0.8	1.07	0.17	0.06	0.02	0.00	0.00	0.02	86.0	21.8
Avg.	64.1	18.4	7.4	2.1	0.4	1.1	0.9								78.7	27.2
S.D.	4.1	3.2	1.3	0.3	0.3	0.6	0.7								5.2	5.5
C1	65.6	17.2	6.8	2.3	0.5	0.9	0.8	1.09	0.17	0.04	0.02	0.01	0.02	0.02	77.8	28.6
C2	56.1	23.9	8.1	5.2	0.0	0.6	1.7	0.93	0.23	0.05	0.06	0.00	0.01	0.04	77.8	50.7
C3	57.0	21.3	6.3	3.0	0.9	6.2	0.9	0.95	0.21	0.04	0.03	0.01	0.11	0.02	57.3	51.7
C4	62.5	20.1	6.2	3.1	0.8	1.0	0.7	1.04	0.20	0.04	0.03	0.01	0.02	0.02	75.5	37.9
C5	63.2	19.1	6.1	3.5	0.9	1.1	0.6	1.05	0.19	0.04	0.04	0.01	0.02	0.02	72.5	42.1
C6	71.2	14.6	3.6	3.6	1.2	0.8	0.5	1.18	0.14	0.02	0.04	0.02	0.01	0.01	66.9	44.4
C7	74.9	13.8	4.1	1.3	0.6	0.9	0.6	1.25	0.14	0.03	0.01	0.01	0.02	0.01	77.1	20.7
C8	68.0	15.8	3.9	4.4	1.5	0.6	0.4	1.13	0.16	0.02	0.05	0.02	0.01	0.01	65.7	53.7
Avg.	64.8	18.2	5.7	3.3	0.8	1.5	0.8								71.3	41.2
S.D.	6.5	3.5	1.6	1.2	0.4	1.9	0.4								7.4	11.7
D1	59.2	16.8	11.9	1.9	0.0	1.3	1.3	0.99	0.16	0.07	0.02	0.00	0.02	0.03	79.4	22.7
D3	60.1	17.8	11.3	1.5	0.0	2.5	1.4	1.00	0.17	0.07	0.02	0.00	0.04	0.04	74.0	23.5
D4	72.3	14.6	3.6	2.3	0.0	0.7	1.1	1.20	0.14	0.02	0.02	0.00	0.01	0.03	79.4	24.1
D6	77.3	11.5	3.4	2.2	0.0	0.2	0.6	1.29	0.11	0.02	0.02	0.00	0.00	0.02	80.5	20.7
D9	51.9	15.9	17.7	0.7	0.0	2.0	1.3	0.86	0.16	0.11	0.01	0.00	0.04	0.03	78.1	14.8
D10	82.7	8.4	4.8	1.2	0.0	0.0	0.6	1.38	0.08	0.03	0.01	0.00	0.00	0.01	87.9	11.4
D11	74.1	11.6	7.1	1.7	0.0	0.1	0.5	1.23	0.11	0.04	0.02	0.00	0.00	0.01	85.2	16.2
D12	61.6	12.3	13.4	1.3	0.2	1.2	0.9	1.02	0.12	0.08	0.01	0.00	0.02	0.02	75.8	18.3
D13	75.5	13.3	3.6	2.9	0.0	0.0	0.5	1.26	0.13	0.02	0.03	0.00	0.00	0.01	80.9	26.4
D14	48.9	13.9	18.6	0.7	0.1	1.8	1.1	0.81	0.14	0.12	0.01	0.00	0.03	0.03	77.2	13.9

D15	78.1	10.2	4.1	2.1	0.0	0.1	0.6	1.30	0.10	0.03	0.02	0.00	0.00	0.01	80.8	19.6
D16	74.4	12.1	5.4	2.4	0.1	0.9	0.6	1.24	0.12	0.03	0.03	0.00	0.02	0.01	73.4	25.3
D17	78.2	10.9	3.8	1.7	0.0	0.0	0.5	1.30	0.11	0.02	0.02	0.00	0.00	0.01	85.2	16.0
D18	50.6	16.5	18.1	0.8	0.1	2.3	1.5	0.84	0.16	0.11	0.01	0.00	0.04	0.04	76.1	17.6
D19	54.9	16.5	15.2	0.9	0.3	1.9	1.1	0.91	0.16	0.10	0.01	0.01	0.03	0.03	77.3	18.1
Avg.	66.6	13.5	9.5	1.6	0.1	1.0	0.9								79.4	19.2
S.D.	11.7	2.8	5.9	0.7	0.1	0.9	0.4								4.2	4.5
E1	41.1	12.7	3.9	1.3	0.0	44.0	1.1	0.68	0.12	0.02	0.01	0.00	0.78	0.03	13.5	126.3
E3	65.2	12.5	5.0	2.1	0.4	10.6	1.6	1.08	0.12	0.03	0.02	0.01	0.19	0.04	35.8	53.5
E4	70.9	16.0	6.4	1.5	0.0	1.0	0.8	1.18	0.16	0.04	0.02	0.00	0.02	0.02	82.6	17.1
E5	66.1	10.1	4.1	1.9	0.2	13.4	1.2	1.10	0.10	0.03	0.02	0.00	0.24	0.03	27.4	55.5
E6	69.1	10.4	3.8	0.9	0.0	13.0	1.5	1.15	0.10	0.02	0.01	0.00	0.23	0.04	29.8	44.6
E7	43.7	13.3	9.9	2.3	0.0	30.4	1.6	0.73	0.13	0.06	0.02	0.00	0.54	0.04	18.7	101.6
Avg.	59.3	12.5	5.5	1.7	0.1	18.7	1.3								34.6	66.4
S.D.	13.3	2.2	2.4	0.6	0.2	15.6	0.3								24.8	40.1
F1	64.8	11.5	14.0	2.1	0.1	0.3	0.8	1.08	0.11	0.09	0.02	0.00	0.00	0.02	79.2	22.3
F2	62.4	19.3	7.5	3.4	0.0	0.3	1.4	1.04	0.19	0.05	0.04	0.00	0.01	0.03	82.0	33.7
F3	65.5	16.6	7.7	3.0	0.0	0.2	1.3	1.09	0.16	0.05	0.03	0.00	0.00	0.03	82.0	29.7
F4	65.6	16.7	7.8	3.0	0.0	0.3	1.3	1.09	0.16	0.05	0.03	0.00	0.01	0.03	81.3	29.8
F6	70.9	18.4	3.3	1.0	0.0	0.1	0.8	1.18	0.18	0.02	0.01	0.00	0.00	0.02	93.8	10.9
F9	71.0	14.3	5.8	2.4	0.2	0.3	1.2	1.18	0.14	0.04	0.03	0.00	0.01	0.03	80.5	26.0
F10	62.9	17.1	8.9	3.7	0.0	0.1	2.1	1.05	0.17	0.06	0.04	0.00	0.00	0.05	80.5	37.2
F11	76.8	11.1	4.1	1.8	0.0	0.3	0.8	1.28	0.11	0.03	0.02	0.00	0.01	0.02	81.5	18.1
F12	73.3	12.6	5.4	2.0	0.3	1.2	0.8	1.22	0.12	0.03	0.02	0.00	0.02	0.02	72.1	24.7
Avg.	68.1	15.3	7.2	2.5	0.1	0.3	1.1								81.4	25.8
S.D.	5.0	3.0	3.2	0.9	0.1	0.4	0.5								5.6	8.0
A1	61.5	21.4	8.4	2.0	0.2	0.3	0.9	1.14	0.16	0.05	0.02	0.00	0.01	0.02	86.5	17.5
A5	66.1	18.5	7.5	2.1	0.0	0.1	0.8	1.02	0.21	0.05	0.02	0.00	0.01	0.02	87.3	22.4
A10	68.5	16.2	7.4	1.6	0.1	0.3	0.7	1.10	0.18	0.05	0.02	0.00	0.00	0.02	88.5	20.1

Table S6: Following calibration with laboratory standards, XRF major elemental geochemistry was measured on the <math><53\mu\text{m}</math> fraction and used as weight percent (wt%) to plot the discrimination plots in Fig. 6. The wt% values were converted to molar proportions by dividing each value by the elemental atomic weight and used to calculate the weathering indices. The last three rows did not have accompanying XRD data, so although they were used in the spatial distribution maps, they were not calculated in the regional averages.

Plata River Literature Review

Site	Latitude	Longitude	Smectite	Illite	Kaolinite	Chlorite	Ill/Smec	Kao/Chl	Source
Pilcomayo									
mouth	-25.3536	-57.6681	15.0	43.3	16.7	1.7	23.3	0.0	Manassero
Paraguay	-25.3647	-57.6511	18.3	35.0	18.3	6.7	21.7	0.0	Manassero
Arroyo Monte									
Lindo	-25.8786	-57.875	5.0	65.0	15.0	5.0	10.0	0.0	Manassero
Riacho Pilaga	-26.0811	-57.9872	20.0	20.0	20.0	0.0	40.0	0.0	Manassero
Rio Bermejo	-26.8703	-58.3844	10.0	60.0	5.0	10.0	15.0	0.0	Manassero
Rio Iguazu	-25.5931	-54.5803	6.5	8.5	75.0	2.5	7.5	0.0	Manassero
Rio Parana	-25.5908	-54.5931	5.0	12.5	62.5	10.0	10.0	0.0	Manassero
Rio Negro	-27.4019	-58.7981	5.0	65.0	15.0	10.0	5.0	0.0	Manassero
Rio Uruguay	-25.8758	-54.5583	5.0	32.5	52.5	0.0	10.0	0.0	Manassero
Arroyo San									
Lorenzo	-32.7197	-60.7275	15.0	55.0	5.0	0.0	25.0	0.0	Manassero
Rio Santa									
Lucia	-29.0761	-59.2256	10.0	30.0	10.0	0.0	50.0	0.0	Manassero
Rio Corrientes	-30.0167	-59.5367	20.0	20.0	10.0	0.0	50.0	0.0	Manassero
Rio									
Guayquiraro	-30.3419	-59.5136	20.0	20.0	10.0	0.0	50.0	0.0	Manassero
Rio Feliciano	-31.1069	-59.8789	10.0	40.0	20.0	0.0	30.0	0.0	Manassero
Rio Salado	-31.6556	-60.7442	10.0	55.0	5.0	5.0	25.0	0.0	Manassero
Rio Coronda	-32.4778	-60.7978	20.0	40.0	15.0	0.0	25.0	0.0	Manassero
Rio Carcarana	-32.4436	-60.8056	5.0	70.0	15.0	0.0	10.0	0.0	Manassero
Arroyo									
Luduena	-32.9069	-60.6769	5.0	70.0	15.0	0.0	10.0	0.0	Manassero
Rio Saladillo	-32.9994	-60.6144	7.5	77.5	5.0	0.0	10.0	0.0	Manassero
Arroyo Pavon	-33.2417	-60.4406	5.0	85.0	0.0	0.0	10.0	0.0	Manassero
Arroyo del									
Medio	-33.3306	-60.3039	10.0	62.5	5.0	2.5	20.0	0.0	Manassero
Rio Arrecifes	-33.8172	-59.5922	12.5	40.0	10.0	2.5	35.0	0.0	Manassero
Rio Areco	-34.0561	-59.3019	20.0	60.0	15.0	0.0	5.0	0.0	Manassero
1C	-34.8567	-57.9572	16.4	16.9	7.6	0.0	0.0	0.0	Ronco
2B	-34.9686	-57.7798	23.0	23.0	10.1	0.0	0.0	0.0	Ronco
3B	-34.8732	-58.0901	2.9	29.1	0.0	0.0	0.0	0.0	Ronco
4A	-34.9226	-58.0829	12.8	30.0	2.7	0.0	0.0	0.0	Ronco
4B	-34.8783	-58.07	3.7	20.7	0.0	0.0	0.0	0.0	Ronco
5C	-34.8568	-58.0617	21.1	31.3	15.6	0.0	0.0	0.0	Ronco
5D	-34.8095	-58.0417	24.7	34.9	13.1	0.0	0.0	0.0	Ronco
ParanaSF	-31.735	-60.6522	16.0	36.0	32.0	16.0	0.0	0.0	DePetris
Coronda	-31.6802	-60.7362	22.0	42.0	22.0	14.0	0.0	0.0	DePetris
Colastine	-31.6853	-60.6503	17.5	38.5	26.5	17.5	0.0	0.0	DePetris
Salado	-31.6458	-60.7578	23.8	56.0		0.0	0.0	18.0	DePetris
ParanaR	-32.8823	-60.6815	36.0	44.0	13.0	7.0	0.0	0.0	DePetris
Uruguay	-32.4805	-58.2045	32.0	15.0	53.0	0.0	0.0	0.0	DePetris
Buenos Aires	-34.5532	-58.3894	34.0	44.0	13.0	8.0	0.0	0.0	DePetris
La Plata	-34.8175	-57.9034	26.0	44.0		0.0	0.0	31.0	DePetris
1	-22.7615	-64.3382	10.0	73.0	3.0	13.0	0.0	0.0	Bertolino
2	-22.6977	-64.5648	5.0	75.0		20.0	0.0	0.0	Bertolino
3	-23.2275	-64.2064	35.0	56.0	6.0	3.0	0.0	0.0	Bertolino
4	-23.3574	-64.1843	24.0	68.0	1.0	7.0	0.0	0.0	Bertolino
7	-24.2159	-61.9426	26.0	61.0	3.0	9.0	0.0	0.0	Bertolino

8	-25.6508	-60.1357	27.0	63.0	3.0	5.0	0.0	0.0	Bertolino
9	-26.1312	-59.5794	35.0	59.0	2.0	4.0	0.0	0.0	Bertolino
10	-26.6604	-58.634	33.0	57.0	3.0	7.0	0.0	0.0	Bertolino
11	-26.8623	-58.3798	41.0	54.0	2.0	3.0	0.0	0.0	Bertolino
12	-22.3783	-62.5185	10.0	81.0	3.0	7.0	0.0	0.0	Bertolino
13	-26.1818	-58.1594	55.0	30.0	15.0	0.0	0.0	0.0	Bertolino
14	-26.6548	-58.2046	37.0	46.0	15.0	4.0	0.0	0.0	Bertolino
17	-27.0617	-58.5093	27.0	64.0	4.0	7.0	0.0	0.0	Bertolino
B1	-22.1907	-64.6525	5.6	80.1	0.0	0.0	0.0	14.3	McGlue
B17	-22.2477	-64.5878	2.4	79.1	0.0	0.0	0.0	18.5	McGlue
B4	-23.7259	-63.1559	12.7	68.1	0.0	0.0	0.0	19.2	McGlue
B5	-25.3882	-60.3053	25.1	63.1	0.0	0.0	0.0	11.7	McGlue
B6	-23.3594	-63.7195	39.2	55.1	0.0	0.0	0.0	5.6	McGlue
B7	-24.1284	-62.6143	40.3	54.0	0.0	0.0	0.0	5.7	McGlue
B8	-24.0801	-62.3331	32.8	55.3	0.0	0.0	0.0	12.0	McGlue
B9	-26.1149	-59.6022	29.8	57.6	0.0	0.0	0.0	12.5	McGlue
B12	-24.2553	-61.9257	29.7	60.0	0.0	0.0	0.0	10.3	McGlue
B13	-24.4583	-61.5824	23.5	66.0	0.0	0.0	0.0	10.5	McGlue
B14	-25.6551	-60.1295	22.9	64.6	0.0	0.0	0.0	12.5	McGlue
B15	-26.3342	-59.361	19.4	63.3	0.0	0.0	0.0	17.4	McGlue
B16	-26.3326	-59.3599	23.8	67.8	0.0	0.0	0.0	8.3	McGlue
B18	-23.1485	-64.2071	21.3	71.7	0.0	0.0	0.0	7.0	McGlue
B19	-23.3856	-63.6699	17.2	72.1	0.0	0.0	0.0	10.7	McGlue
B20	-23.3856	-63.6698	19.6	69.4	0.0	0.0	0.0	11.0	McGlue
B21	-25.1668	-60.5401	23.5	64.9	0.0	0.0	0.0	11.6	McGlue
B22	-26.5231	-58.8279	33.9	61.0	0.0	0.0	0.0	5.0	McGlue

Table S7: All available data considered for the n = 84 sampling stations. Average values were reported if duplicate samples were available from the same study. All values were normalized to 100. In the Source column, data were from Manassero, Ronco, DePetris, Bertolino, and McGlue (Depetris & Griffin, 1968; Bertolino & Depetris, 1992; Ronco et al., 2001; Manassero et al., 2008; McGlue et al., 2016)

Site	Latitude	Longitude	Kaolinite cts	Kaolinite FWHM	Illite cts	Illite FWHM	Vm/Sm cts	Vm/Sm FWHM	Kaolinite	Illite	Vermiculite	Smectite	Kao%	Illite%	Verm%	Smec%	Quartz peak in glycolated sample	Rel. Int. %
A02	-21.7705	-57.9095	3313.84	0.3542	450.5	0.3542	1763.56	0.4133	1174	160	729	0	57	8	35	0	4.286	1.58
A03	-21.4907	-57.9382	4937.45	0.4723	453.61	0.3542	4431.69	0.4723	2332	161	2093	0	51	4	46	0	4.28	0.72
A06	-18.6412	-57.5345	4215.78	0.4723	466.15	0.2952	961.19	0.4723	1991	138	454	0	77	5	18	0	4.277	1.06
A07	-18.3156	-57.3763	5114.44	0.3542	767.55	0.3542	1199.41	0.2952	1812	272	354	0	74	11	15	0	4.276	1.89
A08	-18.3906	-57.3795	3869.49	0.4723	263.88	0.2952	1168.81	0.4133	1828	78	483	0	77	3	20	0	4.265	0.65
A09	-17.73	-57.6632	4470.95	0.4723	333.57	0.2952	2868.27	0.5314	2112	98	1524	0	57	3	41	0	4.284	2.81
A22	-16.0615	-57.7056	597.76	0.3542	477.21	0.3542	416.16	0.2952	212	169	123	0	42	34	24	0	4.257	10.3
A23	-18.4027	-57.3517	7903.42	0.3542	693.05	0.3542	1408.15	0.3542	2799	245	499	0	79	7	14	0	4.27	1.37
A25	-18.7093	-56.9459	4854.96	0.3542	253.09	0.3542	6179.67	0.3542	1720	90	2189	0	43	2	55	0	4.284	0.96
A26	-18.2534	-56.0671	8499.06	0.3542	641.51	0.3542	14510.22	0.3542	3010	227	-	5140	36	3	0	61	4.271	0.76
A27	-18.257	-55.9575	8407.57	0.3542	656.33	0.3542	6959.71	0.3542	2978	232	2465	0	52	4	43	0	4.287	1.94
A28	-18.2646	-55.9618	9247.83	0.3542	846.47	0.3542	6014.58	0.4133	3276	300	2486	0	54	5	41	0	4.276	0.8
A29	-18.2625	-55.9539	6439.7	0.3542	507.05	0.3542	7002.48	0.3542	2281	180	2480	0	46	4	50	0	4.3	3.31
A30	-18.2185	-55.1583	9424.26	0.3542	638.09	0.3542	9339.01	0.3542	3338	226	3308	0	49	3	48	0	4.286	1.56
A34	-22.0869	-57.9657	2573.76	0.3542	582.27	0.4723	2582.13	0.3542	912	275	915	0	43	13	44	0	4.274	1.14
A35	-20.9269	-57.8414	6438.86	0.3542	651.02	0.3542	4300.68	0.2952	2281	231	1270	0	60	6	34	0	4.274	1.39
A36	-20.9702	-57.8177	5445.2	0.3542	780.74	0.3542	3895.02	0.3542	1929	277	1380	0	54	8	38	0	4.283	1.14
A37	-20.9981	-57.8177	3861.67	0.4723	898.5	0.3542	4110.17	0.3542	1824	318	1456	0	51	9	40	0	4.28	1.37
A38	-20.6459	-57.6328	4955.11	0.3542	285.67	0.3542	5914.22	0.2952	1755	101	1746	0	49	3	48	0	4.285	1.94
B01	-16.1435	-58.0157	3800.33	0.3542	357.86	0.3542	760.53	0.3542	1346	127	269	0	77	7	15	0	4.241	2.11
B02	-15.4731	-58.0129	1980.08	0.3542	304	0.3542	1243.52	0.3542	701	108	440	0	56	9	35	0	4.27	0.84
B03	-15.7355	-58.539	1818.59	0.2952	674.49	0.3542	2408.15	0.4723	537	239	1137	0	28	12	59	0	4.262	3.51
B04	-15.4687	-57.8937	2433.71	0.2952	778.88	0.3542	1050.74	0.4723	718	276	496	0	48	19	33	0	4.257	5.9
B05	-15.8615	-58.5339	1612.12	0.3542	703.15	0.3542	597.55	0.8266	571	249	494	0	43	19	38	0	4.277	8.13
B06	-15.8097	-58.3999	1628.19	0.3542	250.97	0.3542	642.94	0.3542	577	89	228	0	65	10	25	0	4.294	3.11
B07	-15.3103	-57.8521	1882.81	0.2952	389.28	0.3542	683.65	0.5314	556	138	363	0	53	13	34	0	4.275	7.38
B08	-15.3491	-58.0207	937.98	0.3542	805.13	0.3542	478.22	0.3542	332	285	169	0	42	36	22	0	4.268	27.14
B09	-14.5951	-57.8949	1260.22	0.3542	293.58	0.3542	1208.21	0.4133	446	104	499	0	43	10	48	0	4.252	27.94
C01	-22.2229	-57.303	2609.2	0.3542	859.87	0.3542	3156.8	0.3542	924	305	1118	0	39	13	48	0	4.285	1.15

C02	-20.6281	-57.5758	927.91	0.3542	6961.14	0.3542	4508.01	0.9446	329	2466	4258	0	5	35	60	0	4.267	0.65
C03	-21.9418	-57.2543	2500.21	0.4133	644.97	0.3542	2033.47	0.4723	1033	228	960	0	47	10	43	0	4.263	0.82
C04	-20.8398	-57.2639	1811.39	0.3542	2279.96	0.3542	1822.11	0.2952	642	808	538	0	32	41	27	0	4.28	2.44
C05	-21.2335	-57.4236	2419.43	0.3542	1126.23	0.4723	1779.51	0.3542	857	532	630	0	42	26	31	0	4.272	1.25
C06	-21.6523	-57.8246	1186.49	0.3542	454.16	0.2952	1483.17	0.4133	420	134	613	0	36	11	53	0	4.29	7.28
C07	-21.8504	-57.8246	1009.38	0.3542	176.53	0.3542	5336.88	0.5314	358	63	2836	11	2	0	87	4.302	2.57	
C08	-21.6575	-57.4987	442.73	0.3542	140.59	0.3542	647.34	0.2952	157	50	191	0	39	13	48	0	4.243	21.31
D01	-20.4784	-55.8027	1911.76	0.3542	448.34	0.3542	2954.27	0.6494	677	159	1919	0	25	6	70	0	4.245	1.04
D02	-18.5256	-54.7505	1075.17	0.3542	167.5	0.3542	3774.95	0.4133	381	59	1560	0	19	3	78	0	4.27	10.78
D03	-20.2086	-56.4943	622.24	0.3542	460.11	0.3542	2964.37	0.4723	220	163	1400	0	12	9	79	0	4.261	4.37
D04	-18.5348	-54.7402	3216.28	0.3542	566.32	0.3542	4466.05	0.2952	1139	201	1318	0	43	8	50	0	4.295	4.51
D05	-16.4796	-54.6475	1718.8	0.3542	958.8	0.3542	391.39	0.4723	609	340	185	0	54	30	16	0	4.261	21.88
D06	-18.5013	-54.6855	3898.76	0.3542	216.89	0.3542	1662.23	0.2952	1381	77	491	0	71	4	25	0	4.259	6.03
D07	-16.3114	-54.9237	2691.33	0.3542	544.66	0.3542	263.13	0.5314	953	193	140	0	74	15	11	0	4.275	3.63
D09	-21.2879	-56.225	974.83	0.4723	133.46	0.3542	2867.51	0.6494	460	47	1862	0	19	2	79	0	4.275	2.84
D10	-17.2516	-54.7613	2151.05	0.3542	298.88	0.3542	357.38	0.2952	762	106	105	0	78	11	11	0	4.259	22.32
D11	-15.9977	-54.9218	707.78	0.2952	1813.42	0.3542	434.51	0.3542	209	642	154	0	21	64	15	0	4.267	10.98
D12	-22.1143	-56.5195	387.82	0.3542	71.57	0.3542	1395.39	0.3542	137	25	494	0	21	4	75	0	4.255	8.3
D13	-19.3159	-55.1768	5387.26	0.3542	1593.74	0.3542	910.49	0.2952	1908	565	269	0	70	21	10	0	4.252	0.9
D14	-21.4484	-56.1475	1263.22	0.3542	-	-	3379.81	0.4133	447	0	1397	0	24	0	76	0	4.266	1.72
D15	-16.5529	-54.4207	4050.17	0.3542	1191.13	0.3542	1744.88	0.4723	1435	422	824	0	54	16	31	0	4.277	4.4
D16	-20.0715	-55.6466	3063.81	0.3542	1061.51	0.3542	624.82	0.5314	1085	376	332	0	61	21	19	0	4.279	3.48
D17	-17.9144	-54.6892	5638.29	0.3542	1109.83	0.3542	813	0.2952	1997	393	240	0	76	15	9	0	4.268	3.8
D18	-21.1472	-55.8336	876.69	0.3542	-	-	4447.96	0.5904	311	0	2626	0	11	0	89	0	4.265	0.84
D19	-21.1596	-55.8368	1192.44	0.3542	-	-	1340.43	0.5314	422	0	712	0	37	0	63	0	4.253	5.18
E01	-20.5013	-56.7901	514.28	0.4723	403.17	0.3542	2893.81	0.3542	243	143	1025	0	17	10	73	0	4.252	9.38
E03	-20.6942	-56.4864	861.55	0.2952	2175.97	0.3542	1387.25	0.4723	254	771	655	0	15	46	39	0	4.244	0.3
E04	-21.2878	-56.2955	430.07	0.4723	1194.56	0.3542	1180.06	0.4723	203	423	557	0	17	36	47	0	4.271	10.82
E05	-20.7138	-56.5208	98.2	0.4723	201.84	0.3542	98.21	0.4723	46	71	46	0	28	44	28	0	4.292	4.35
E06	-20.0509	-56.7818	552.92	0.2952	-	-	6083.68	0.3542	163	0	2155	0	7	0	93	0	4.274	1.35
E07	-20.718	-56.5806	332.41	0.3542	558.29	0.3542	245.88	0.4723	118	198	116	0	27	46	27	0	4.249	5.21
F01	-15.8741	-56.0741	3547.85	0.3542	892.13	0.3542	381.59	0.4133	1257	316	158	0	73	18	9	0	4.28	7.53
F02	-15.2021	-56.3781	742.9	0.4723	1208.39	0.4723	310.55	0.3542	351	571	110	0	34	55	11	0	4.281	5.37

F03	-14.9291	-56.4349	1128.47	0.3542	1970.77	0.3542	511.85	0.3542	400	698	181	0	31	55	14	0	4.266	7.05
F04	-14.8475	-56.4236	983	0.2952	2137.6	0.3542	584.13	0.4723	290	757	276	0	22	57	21	0	4.272	12.03
F05	-14.608	-57.7349	1993.76	0.3542	21.54	0.3542	302.54	0.4723	706	8	143	0	82	1	17	0	4.263	16.01
F06	-16.3204	-56.5434	2816	0.4723	98.38	0.3542	1642.23	0.4723	1330	35	776	0	62	2	36	0	4.267	5.88
F07	-14.4896	-56.8066	1352.01	0.3542	139.64	0.3542	260.36	0.2952	479	49	-	77	79	8	0	13	4.264	11.72
F09	-15.1261	-57.1075	756.87	0.3542	1312.16	0.4723	661.96	0.3542	268	620	234	0	24	55	21	0	4.271	14.09
F10	-15.0765	-57.1845	449.49	0.2952	1447.21	0.3542	811.08	0.4723	133	513	383	0	13	50	37	0	4.247	7.04
F11	-15.0036	-56.8883	540.19	0.3542	456.32	0.3542	243.09	0.3542	191	162	86	0	44	37	20	0	4.272	19.96
F12	-16.0585	-57.5772	888.76	0.2952	1200.58	0.3542	282.82	0.3542	262	425	100	0	33	54	13	0	4.287	13.97
DuplicateA07	-18.3156	-57.3763	3026.37	0.3542	510.82	0.3542	817.51	0.2952	1072	181	241	0	72	12	16	0	4.262	5.94
DuplicateC03	-21.9418	-57.2543	1796	0.3542	920	0.3542	1146.65	0.3542	636	326	406	0	46	24	30	0	4.251	4.13
DuplicateD09	-21.2879	-56.225	257.47	0.3542	-	-	2127.6	0.7085	91	0	-	1507	6	0	0	94	4.26	3.64
DuplicateD12	-22.1143	-56.5195	967.02	0.3542	135.9	0.3542	1699	0.3542	343	48	602	0	35	5	61	0	4.272	5.67

Calibrated XRD data: Vm or verm = vermiculite, Sm or smec = smectite, Ill = illite, Kao = kaolinite, Rel. Int. = relative intensity, cts = counts, FWHM = full width at half maximum, Vm/Sm = either vermiculite or smectite was estimated. Kaolinite = (Kao cts) x (Kao FWHM). Illite = (Ill cts) x (Ill FWHM). Vermiculite or smectite = (Vm/Sm cts) x (Vm/Sm FWHM). Kao% = Kaolinite/(sum of kaolinite, illite, vermiculite, smectite). Illite% = Illite/(sum of kaolinite, illite, vermiculite, smectite). Verm% = Vermiculite/(sum of kaolinite, illite, vermiculite, smectite). Smec% = Smectite/(sum of kaolinite, illite, vermiculite, smectite). All other values were reported or measured from the XRD numerical values and diffractograms.