

Research Article

Geochemical characterisation of Palk Bay seabed sediments: An appraisal on source-sink dynamics and provenance

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Supplementary Tables

Table S1 — Supplementary table on analysis data of Major oxides and trace elements																													
Longitude	Latitude	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	Na ₂ O	K ₂ O	CaO	MgO	MnO	CaCO ₃	MgCO ₃	Cu	Pb	Zn	Ni	Co	Cd	Cr	Sr	Ba	CIA	ICV	SiO ₂ /Al ₂ O ₃	K ₂ O/Al ₂ O ₃	K ₂ O/Na ₂ O	MgO/Al ₂ O ₃	SiO ₂ /TiO ₂	Fe ₂ O ₃ /K ₂ O
(%)												(ppm)																	
79.31930	9.85938	67.24	7.43	3.60	0.48	0.44	0.98	2.88	2.86	0.04	1.20	0.96	32	18	45	40	43	6	320	53	205	83.4704	1.1376	9.0498	0.1319	2.2273	0.3849	140.0833	3.6735
79.46753	9.89650	46.20	15.00	8.20	0.81	0.58	1.56	2.16	5.24	0.05	1.15	2.15	36	28	64	48	40	6	202	46.7	615	87.3184	1.0983	3.0800	0.1040	2.6897	0.3493	57.0370	5.2564
79.43154	9.89659	45.15	14.87	8.18	0.80	0.55	1.50	2.35	5.15	0.05	1.50	2.20	33	30	68	45	46	8	175	43.1	650	87.6670	1.0942	3.0363	0.1009	2.7273	0.3463	56.4375	5.4533
79.41364	9.89671	46.72	14.60	7.50	0.77	0.64	1.58	2.20	5.50	0.05	1.75	2.18	38.5	45	73.95	60.5	52	5	159	43	485	86.5994	1.1014	3.2000	0.1082	2.4688	0.3767	60.6753	4.7468
79.35919	9.89652	57.64	9.25	4.43	0.56	0.50	1.18	3.15	3.98	0.05	2.01	2.14	41	22	48	42	62	8	321	61.6	525	84.1968	1.1623	6.2314	0.1276	2.3600	0.4303	102.9286	3.7542
79.32315	9.89662	71.02	5.62	1.43	0.26	0.37	0.56	3.36	3.65	0.04	1.79	1.98	28	25	4	35	89	6	364	47.2	570	72.5779	1.1332	12.6370	0.0996	1.5135	0.6495	273.1538	2.5536
79.49863	9.98500	82.32	6.09	0.75	0.12	0.31	0.43	3.25	5.21	0.05	2.02	2.67	34	20	56	40	120	6	294	55.3	540	72.3696	1.1370	13.5172	0.0706	1.3871	0.8555	686.0000	1.7442
79.53466	9.98499	77.31	4.96	1.92	0.22	0.37	0.82	3.26	5.26	0.05	1.45	2.21	41	28	58	46	63	6	87	47.7	535	79.8952	1.7533	15.5867	0.1653	2.2162	1.0605	351.4091	2.3415
79.57060	9.98502	67.15	6.98	2.85	0.32	0.40	0.99	3.15	5.68	0.05	2.01	2.54	55	5	61	55	105	6	340	42.8	580	82.8372	1.4822	9.6203	0.1418	2.4750	0.8138	209.8438	2.8788
79.60661	9.98485	46.77	12.65	6.59	0.76	0.73	1.42	3.22	5.42	0.05	1.79	2.57	51	28	68	40	50	6	223	51.8	485	85.1427	1.1881	3.6972	0.1123	1.9452	0.4285	61.5395	4.6408
79.63894	10.03493	40.90	11.26	5.91	0.70	0.80	1.27	3.21	5.23	0.05	1.87	2.15	26	38	49	40	57	6	158	71.3	515	84.1099	1.2447	3.6323	0.1128	1.5875	0.4645	58.4286	4.6535
79.45869	10.07665	45.91	14.77	7.49	0.80	0.56	1.42	3.47	6.09	0.04	1.92	2.60	25	50	59.15	29.5	45	5	183	49	360	87.8543	1.1147	3.1083	0.0961	2.5357	0.4122	57.3875	5.2746
79.49502	10.07653	47.50	15.24	7.99	0.83	0.57	1.52	2.60	5.43	0.05	1.83	2.40	24.5	50	64.15	28.5	33	4	190	46.5	440	87.7055	1.0782	3.1168	0.0997	2.6667	0.3562	57.2289	5.2566
79.53114	10.07654	46.91	14.19	6.86	0.81	0.69	1.50	3.61	5.53	0.05	2.11	2.50	22	70	60.6	33	34	8	207	54.5	420	86.2906	1.0925	3.3058	0.1057	2.1739	0.3898	57.9136	4.5733
79.56684	10.07658	44.32	13.62	6.99	0.78	0.65	1.41	5.76	5.91	0.05	3.01	2.35	20.5	60	56.7	38	42	6.5	184	63.5	540	86.2969	1.1667	3.2540	0.1035	2.1692	0.4339	56.8205	4.9574
79.60280	10.07652	44.08	13.22	6.24	0.76	0.72	1.37	4.63	5.66	0.06	2.68	2.40	23.5	70	60.1	56	27	6	231	67	485	85.8860	1.1265	3.3343	0.1036	1.9028	0.4284	58.0000	4.5547
79.63883	10.07673	38.79	11.73	6.04	0.66	0.72	1.24	5.56	5.57	0.05	3.10	2.10	24.5	65	59.8	43	31	6.5	164	76	545	85.0668	1.2263	3.3069	0.1057	1.7222	0.4750	58.7727	4.8710
79.67495	10.07675	37.62	11.67	5.79	0.65	0.69	1.19	7.65	5.64	0.05	4.05	2.10	19.5	70	58.9	34.5	45	7.5	154	87	510	85.2672	1.2125	3.2237	0.1020	1.7246	0.4832	57.8769	4.8655
79.54910	10.12154	29.50	11.71	8.82	0.49	5.22	1.69	2.62	6.96	0.04	1.01	2.40	49.5	70	68.35	31	45	4	273	43	495	58.2600	1.9870	2.5192	0.1443	0.3238	0.5940	60.2041	5.2197
79.45854	10.16828	43.20	12.52	10.27	0.70	3.68	1.87	2.87	5.76	0.14	1.45	2.40	45	80	72.95	47	59	5	392.5	48.5	505	38.5918	1.7952	3.4505	0.1494	0.5082	0.4602	61.7143	5.4917
79.58503	10.16876	36.60	9.61	7.98	0.37	3.18	1.50	2.84	5.46	0.05	1.34	2.50	45	76	55	42	46	6	100.2	50.4	475	67.0123	1.9344	3.8085	0.1561	0.4717	0.5682	100.2740	5.3200
79.67480	10.16837	38.90	8.14	4.70	0.84	2.98	0.89	3.53	3.83	0.12	2.21	1.56	45	75	65.05	60	72	5	315.5	68	475	67.4231	1.6490	4.7789	0.1093	0.2987	0.4706	46.1447	5.2803
79.36279	9.71706	46.90	14.87	8.01	0.79	0.57	1.54	6.50	1.93	0.07	1.10	0.32	39	0	34.45	10.1	43	8	170	98	506	86.9799	0.8761	3.1540	0.1036	2.7018	0.1299	59.3671	5.2013
79.33356	9.73888	46.20	14.67	7.61	0.76	0.61	1.51	3.75	6.11	0.06	1.00	0.46	38	0	77.1	32.5	82	10	696.5	45.5	572	87.0270	1.1404	3.1493	0.1029	2.4754	0.4166	60.7895	5.0397
79.30461	9.76052	46.09	14.94	8.30	0.80	0.54	1.52	3.62	5.67	0.07	1.00	0.47	45	20	75.55	53.5	46	15	624	42	540	87.5498	1.1355	3.0850	0.1017	2.8148	0.3795	57.6125	5.4605
79.27541	9.78280	44.86	13.78	7.49	0.73	0.50	1.40	6.55	5.65	0.07	1.07	0.47	47.5	15	56.1	10	33	12	562	53	305	87.2328	1.1579	3.2554	0.1016	2.8000	0.4100	61.4521	5.3500
79.24577	9.80413	68.56	6.01	2.96	0.32	0.39	0.72	6.40	5.97	0.04	1.07	0.46	48	0	90.4	12	90	11	538	56.5	384	83.0785	1.7500	11.4077	0.1198	1.8462	0.9939	214.2500	4.1111
79.21730	9.82621	79.15	5.19	0.66	0.07	0.33	0.41	6.55	2.99	0.02	1.08	0.43	37	0	30.95	14.5	82	10	233.5	98	649	58.1396	0.8865	15.2505	0.0790	1.2424	0.5769	1130.7143	1.6098
79.35223	9.61217	51.20	14.36	7.00	0.83	0.88	1.86	3.77	5.12	0.06	0.97	0.45	44	40	32.4	80	37	6	634	57	704	83.6480	1.1017	3.5655	0.1295	2.1136	0.3568	61.6867	3.7634
79.32313	9.63421	49.61	13.91	6.96	0.81	0.88	1.80	4.17	5.35	0.07	1.00	0.45	33	25	61.15	38.5	33	11	612	56	511	83.4720	1.1459	3.5665	0.1294	2.0455	0.3843	61.2469	3.8667
79.26466	9.67754	46.17	14.51	7.82	0.77	0.61	1.51	3.06	8.53	0.07	0.98	0.47	40	0	70.4	45.5	49	8	717.5	37	654	86.9667	1.3344	3.1819	0.1041	2.4754	0.5877	59.9610	5.1788
79.23470	9.69893	46.36	14.89	7.98	0.78	0.53	1.50	3.13	6.88	0.07	0.97	0.46	43	0	67.1	45	44	9	593	39.5	569	87.7134	1.1949	3.1135	0.1007	2.8302	0.4619	59.4359	5.3200
79.20562	9.72224	50.40	13.32	7.18	0.70	0.48	1.40	4.42	7.68	0.06	1.03	0.47	36.5	25	56.45	40	58	11	537.5	43	780	87.1797	1.3194	3.7838	0.1051	2.9167	0.5762	72.0000	5.1286
79.17702	9.74345	72.83	5.04	2.00	0.40	0.46	0.98	6.06	4.41	0.03	1.05	0.44	26.5	0	34.6	20.5	39	16	492	60	1079	76.5031	1.6637	14.4504	0.1944	2.1304	0.8744	182.0750	2.0408
79.14776	9.76466	86.48	6.38	8.40	0.05	0.39	1.51	3.10	2.86	0.01	0.97	0.25	29.5	0	19.95	8.5	157	6	147.5	44.5	1168	54.8994	1.9244	13.5549	0.2367	3.8718	0.4486	1729.6000	5.5629
78.96710	9.44110	68.81	7.29	6.37	0.11	2.04	2.49	6.25	3.47	0.02	3.37	0.49	10	155	7.5	37.1	23.5	9	486	37	1215	53.2445	1.8666	9.4387	0.3421	1.2221	0.4755	625.5731	2.5525

(Contd.)

Longitude	Latitude	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	Na ₂ O	K ₂ O	CaO	MgO	MnO	CaC O ₃	MgCO ₃	Cu	Pb	Zn	Ni	Co	Cd	Cr	Sr	Ba	CIA	ICV	SiO ₂ / Al ₂ O ₃	K ₂ O/ Al ₂ O ₃	K ₂ O/ Na ₂ O	MgO/ Al ₂ O ₃	SiO ₂ / TiO ₂	Fe ₂ O ₃ / K ₂ O		
		(%)												(ppm)																	
79.01910	9.42850	58.84	4.26	2.06	0.12	1.58	1.26	11.65	1.68	0.05	4.51	1.08	45	22	39	15	0	8	536	34	1089	58.2724	1.6355	13.8241	0.2960	0.7975	0.3957	490.3058	1.6320		
78.99190	9.39990	62.76	6.06	2.55	0.10	1.82	1.33	9.81	1.56	0.05	5.62	1.25	39	17	76	21	0	0	463	35	1063	64.5591	1.2521	10.3619	0.2196	0.7308	0.2583	627.5980	1.9156		
79.04120	9.39230	69.71	6.24	2.17	0.16	2.31	1.44	3.14	1.64	0.04	4.50	0.97	23.8	15.4	40.65	11.1	0	0	511	65	1069.55	62.1215	1.2518	11.1724	0.2307	0.6232	0.2621	439.9095	1.5098		
79.01160	9.35270	78.71	6.17	1.98	0.11	1.39	0.87	4.82	2.84	0.02	2.93	0.32	11.5	140	40	52	26	10.5	465	19.5	305	48.1644	1.1815	12.7503	0.1402	0.6240	0.4608	715.5101	2.2879		
79.07870	9.36970	60.25	6.68	2.89	0.16	2.35	1.58	8.14	1.98	0.06	7.94	2.15	15.25	70.7	53.75	45.4	0	0	652	32	1082.15	62.1634	1.3711	9.0169	0.2358	0.6716	0.2959	376.5490	1.8371		
79.05860	9.34010	75.85	6.65	3.72	0.13	1.35	0.90	4.92	2.30	0.02	3.27	0.26	8	135	6	60.25	22	11.5	556	40.5	345	53.0407	1.2810	11.4142	0.1354	0.6644	0.3466	583.4604	4.1351		
79.05230	9.33050	63.80	6.50	3.15	0.12	2.10	1.12	9.40	4.05	0.01	3.28	0.23	26	140	21.5	68.25	26.5	10	498	19	90	42.4462	1.6500	9.8095	0.1729	0.5351	0.6228	531.6386	2.8033		
79.09560	9.30690	54.99	6.25	6.25	0.14	1.63	1.41	11.12	2.64	0.07	4.42	0.43	11.5	170	82.5	69	40	12	432	34.5	755	56.8256	1.9723	8.7963	0.2248	0.8642	0.4227	392.7749	4.4455		
79.14260	9.30050	65.37	7.75	3.14	0.11	2.76	2.32	6.21	3.10	0.04	3.43	0.21	7	130	8.5	53.15	34	12.5	363	16.5	1350	59.8673	1.4948	8.4380	0.3001	0.8429	0.3999	594.2520	1.3516		
79.18750	9.29230	57.17	7.35	4.02	0.09	1.58	1.83	13.73	3.24	0.03	4.57	0.49	5	170	44	48	34.5	14	378	41	830	47.8531	1.5013	7.7746	0.2492	1.1621	0.4410	635.2563	2.1960		
79.22990	9.33080	50.68	10.58	6.09	0.11	1.72	1.28	5.49	3.84	0.08	2.62	5.01	40.9	55.35	100	74.75	23.6	0	398	36	743.85	77.3268	1.2486	4.7883	0.1212	0.7445	0.3626	460.6989	4.7465		
79.23160	9.31460	52.82	10.07	5.85	0.15	1.84	1.18	9.35	2.65	0.09	5.37	4.87	25	76	81	80.3	9	0	401	27	859	75.9610	1.1836	5.2460	0.1172	0.6413	0.2631	363.8072	4.9548		
79.23410	9.30460	67.56	10.98	6.57	0.13	1.35	1.07	6.40	3.69	0.02	3.62	0.42	11	180	5.5	63															

(Contd.)

Table S1 — Supplementary table on analysis data of Major oxides and trace elements

Longitude	Latitude	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	Na ₂ O	K ₂ O	CaO	MgO	MnO	CaCO ₃	MgCO ₃	Cu	Pb	Zn	Ni	Co	Cd	Cr	Sr	Ba	CIA	ICV	SiO ₂ / Al ₂ O ₃	K ₂ O/ Al ₂ O ₃	K ₂ O/ Na ₂ O	MgO/ Al ₂ O ₃	SiO ₂ / TiO ₂	Fe ₂ O ₃ / K ₂ O	
							(%)												(ppm)											
79.42600	9.20920	57.54	5.65	1.56	0.16	1.62	1.05	10.26	1.87	0.05	7.64	1.73	27	73	85	81	0	8	115	53	1021	66.4389	1.1495	10.1879	0.1859	0.6481	0.3303	363.1032	1.4897	
79.50440	9.23130	55.23	6.09	3.24	0.13	1.69	1.43	15.11	4.39	0.04	4.83	0.91	13	235	69	76.25	36	16	201	32.5	650	64.2515	1.8361	9.0637	0.2355	0.8511	0.7211	424.8434	2.2568	
79.49150	9.21840	60.18	5.57	1.89	0.11	2.25	1.00	9.42	2.06	0.03	8.94	2.22	21.45	134.65	67.15	48.5	0	5.45	156	42	1044.5	61.9650	1.3467	10.8014	0.1796	0.4443	0.3690	547.0825	1.8858	
79.46690	9.19150	64.04	4.59	2.12	0.12	1.45	1.12	8.55	2.34	0.02	4.72	0.79	7.5	170	24.5	57.1	27	14.5	125	37	675	56.8404	1.5968	13.9532	0.2440	0.7706	0.5092	533.7059	1.8957	
79.49560	9.18150	39.92	5.96	2.00	0.13	1.66	1.30	20.80	4.95	0.02	4.91	0.61	8	220	28.5	56.9	26	18	137	21.5	545	59.8258	1.7518	6.6981	0.2180	0.7826	0.8311	307.0747	1.5404	
79.09780	9.39920	40.73	13.79	9.36	0.23	4.53	1.76	6.55	4.37	0.06	3.67	2.09	46	135	78.6	34.5	16.5	0	769	57.5	1121	68.2692	1.4806	2.9531	0.1278	0.3891	0.3165	177.0985	5.3081	
79.12070	9.41090	44.23	11.68	6.32	0.18	4.06	1.48	6.87	4.64	0.03	3.85	2.22	44	118	92	44	10	0	601	49	1098	67.3535	1.4409	3.7854	0.1266	0.3643	0.3970	245.7222	4.2745	
79.10750	9.35830	40.80	13.60	6.79	0.32	4.12	1.86	7.67	4.40	0.05	4.30	2.10	52	115	83.2	19	6	4.5	378	65	953	69.0089	1.2989	2.9989	0.1364	0.4508	0.3235	127.4901	3.6572	
79.15240	9.38870	38.12	15.49	7.43	0.25	4.57	1.67	4.25	4.75	0.05	2.38	2.27	49	89	72	46	9	0	612	55	1138	71.0488	1.2131	2.4604	0.1078	0.3657	0.3068	152.4800	4.4470	
79.18930	9.41940	42.42	16.82	8.50	0.32	5.27	1.86	4.32	5.17	0.06	2.42	2.47	44.5	130	93.9	70	16.5	0	654	38	1069	70.0059	1.2632	2.5227	0.1107	0.3534	0.3072	132.5710	4.5652	
79.18830	9.34730	44.34	17.71	8.15	0.36	4.99	2.04	6.74	5.25	0.06	3.78	2.51	57	122	92	49	9	5	432	56	998	71.2371	1.1840	2.5041	0.1152	0.4090	0.2965	124.5506	3.9956	
79.22210	9.40410	40.22	17.67	9.11	0.22	5.07	1.86	5.78	5.13	0.05	3.24	2.45	68.5	105	97.2	71.5	6.5	0	512	43.5	863	71.5047	1.2197	2.2766	0.1055	0.3674	0.2902	182.8146	4.8865	
79.26470	9.42650	41.07	18.00	8.67	0.36	5.86	2.67	5.82	5.16	0.06	3.26	2.47	65.5	65	97.1	58	39	6	794	43	932	67.5851	1.2716	2.2823	0.1483	0.4557	0.2870	114.0971	3.2468	
79.27250	9.35370	42.44	17.48	8.72	0.43	5.18	2.14	5.00	5.42	0.06	2.80	2.59	69.5	90	106.1	72	27	6	369	36.5	695	70.2269	1.2612	2.4285	0.1224	0.4130	0.3103	98.7072	4.0761	
79.31240	9.40820	42.58	15.68	7.35	0.21	4.36	1.82	4.49	4.25	0.04	2.52	2.03	42	45	56	87	36	7	654	49	760	71.4846	1.1545	2.7151	0.1161	0.4178	0.2712	199.9061	4.0381	
79.34790	9.42700	40.05	15.30	7.13	0.25	4.95	1.45	4.67	4.01	0.05	2.62	1.92	51	74	59	71	25	0	721	39	802	70.2240	1.1716	2.6169	0.0950	0.2935	0.2620	160.2000	4.9074	
79.91882	10.27065	76.30	11.80	5.52	0.22	1.55	1.23	0.90	5.54	0.01	1.60	0.75	59	16	117	53	17	8	38	208	55	80.8432	1.1935	6.4686	0.1042	0.7927	0.4695	351.9908	4.4908	
79.91882	10.27065	79.60	10.70	5.05	0.15	1.24	0.82	0.73	5.32	0.03	1.30	0.37	64	16	89	37	22	11	126	112	65	83.7914	1.1794	7.4386	0.0763	0.6586	0.4973	530.5146	6.1786	
79.94733	10.25119	66.50	9.44	8.19	0.15	1.39	1.48	0.57	5.97	0.05	1.02	1.30	71	11	72	56	35	15	115	30	64	69.1060	1.8263	7.0472	0.1567	1.0650	0.6325	442.9524	5.5384	
79.84323	10.18781	73.00	10.46	4.42	0.13	0.98	1.20	0.70	4.94	0.01	1.25	0.89	82	25	80	61	51	19	124	65	67	71.2493	1.1196	6.9822	0.1152	1.2243	0.4725	547.0296	3.6669	
79.93602	10.22765	78.00	7.42	5.90	0.12	1.21	1.29	0.39	6.23	0.01	0.70	1.30	90	24	71	63	55	22	156	35	105	74.6940	1.9929	10.5158	0.1743	1.0656	0.8404	667.9970	4.5673	
79.94914	10.19687	75.00	8.32	4.92	0.20	1.75	0.99	0.67	5.79	0.02	1.20	1.98	121	19	97	69	57	27	191	350	88	75.1516	1.6433	9.0112	0.1187	0.5635	0.6952	374.6778	4.9802	
79.93919	10.14979	79.30	11.38	5.19	0.23	1.48	0.92	0.50	5.22	0.05	0.90	1.31	125	20	101	80	66	27	245	280	64	82.5314	1.1511	6.9686	0.0806	0.6183	0.4589	339.5651	5.6606	
79.90705	10.10045	73.20	10.34	5.36	0.17	0.98	1.18	0.39	5.92	0.02	0.70	1.50	133	24	90	85	72	26	306	290	108	82.6450	1.3189	7.0781	0.1142	1.1998	0.5723	438.8226	4.5409	
79.85590	10.13078	69.00	12.29	5.79	0.18	0.94	1.20	0.67	6.42	0.01	1.20	1.40	156	26	131	95	85	27	176	185	78	85.0447	1.1853	5.6165	0.0981	1.2768	0.5223	376.0402	4.8061	
79.08707	9.47598	42.76	7.15	4.44	0.12	1.47	0.88	1.62	1.52	0.03	2.85	1.06	35	95	81.3	61	35	0	608	39.5	1357	75.0497	1.1867	5.9769	0.1233	0.6014	0.2129	368.9387	5.0329	
79.15509	9.47623	41.65	7.34	4.56	0.11	1.40	0.93	2.09	1.52	0.04	2.82	0.93	33.5	110	78.3	56	35	0	635.5	36	1122	75.5773	1.1714	5.6720	0.1268	0.6630	0.2063	364.7110	4.9015	
79.18883	9.47636	45.63	5.38	3.27	0.15	1.01	0.69	1.45	1.19	0.02	2.78	0.92	23.5	105	57.85	47	25	0	430.5	53	1069	75.7270	1.1801	8.4761	0.1284	0.6856	0.2205	304.2000	4.7270	
79.25870	9.47538	39.62	8.00	4.01	0.10	1.40	0.92	1.78	1.52	0.03	2.29	1.04	26	90	68.75	47.5	27.5	0	640	48.5	711	77.3483	0.9996	4.9499	0.1144	0.6558	0.1894	411.4226	4.3812	
79.32653	9.47542	36.25	8.00	4.80	0.17	1.16	0.91	1.65	1.42	0.04	2.43	0.94	28	110	78.85	53.5	34.5	0	599.5	50.5	756	79.2308	1.0641	4.5289	0.1134	0.7822	0.1770	219.6970	5.2882	
79.42774	9.47190	40.12	8.00	4.49	0.10	1.34	1.02	2.02	1.50	0.04	2.70	0.94	31.5	140	98.05	64.5	37	0	762	49.5	862	76.9958	1.0647	5.0124	0.1274	0.7639	0.1876	391.4146	4.4028	
78.98443	9.52070	69.49	8.00	2.50	1.15	0.72	1.26	3.93	0.72	0.03	3.29	0.50	10	160	52.55	45.5	25	12	551	127	1364	79.6307	0.8053	8.6817	0.1576	1.7635	0.0896	60.2165	1.9783	
79.01834	9.52021	62.35	5.01	2.01	0.06	0.91	1.40	3.11	0.59	0.03	3.02	0.27	10	140	56.85	37.5	29.5	11.5	535	105.5	1236	67.9499	1.0086	12.4561	0.2788	1.5332	0.1181	1097.7113	1.4371	
79.05272	9.52033	59.16	6.71	5.76	0.09	1.29	0.94	1.66	1.47	0.04	2.27	1.00	24.5	130	99.8	52	35.5	11	682.5	43	1254	74.8461	1.4325	8.8225	0.1399	0.7297	0.2187	664.7191	6.1339	
79.12051	9.51925	31.47	7.23	4.99	0.15	1.13	0.88	1.65	1.53	0.04	2.78	1.02	31.5	130	94.7	60	38.5	9.5	839.5	34.5	1155	77.9981	1.2112	4.3557	0.1212	0.7726	0.2117	204.0856	5.7029	
79.18864	9.51963	53.64	6.47	4.51	0.18	1.23	0.87	1.49	1.46	0.03	2.44	1.06	83.5	145	98.15	73.5	37	10.5	683.5	38.5	1006	75.2405	1.2847	8.2912	0.1349	0.7094	0.2262	298.0000	5.1639	
79.25826	9.52005	43.44	6.61	4.21	0.15	1.23	0.90	1.61	1.45	0.03	2.41	0.95	23.5	160	91.05	81.5	39	12.5	588	45.5	896	75.4109	1.2116	6.5707	0.1364	0.7361	0.2200	282.0779	4.6710	
79.32532	9.51930	41.06	6.47	4.01	0.20	1.49	0.87	1.90	1.41	0.03	2.81	0.95	24	155	92.2	67.5	38.5	10.5	702.5	50.5	724	72.9937	1.2442	6.3467	0.1343	0.5829	0.2183	205.3000	4.6153	

(Contd.)

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Table S1 — Supplementary table on analysis data of Major oxides and trace elements

Longitude	Latitude	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	Na ₂ O	K ₂ O	CaO	MgO	MnO	CaCO ₃	MgCO ₃	Cu	Pb	Zn	Ni	Co	Cd	Cr	Sr	Ba	CIA	ICV	SiO ₂ /	K ₂ O/	K ₂ O/	MgO/	SiO ₂ /	Fe ₂ O ₃ /
		(%)																						Al ₂ O ₃	Al ₂ O ₃	Na ₂ O	Al ₂ O ₃	TiO ₂	K ₂ O
79.40987	9.51850	50.36	6.33	3.90	0.26	1.23	0.97	1.72	1.34	0.03	2.57	0.85	24.5	60	89	55	18.5	12.5	706	50	766	73.9312	1.2266	7.9585	0.1530	0.7852	0.2116	193.6923	4.0273
79.01857	9.56509	61.54	3.85	1.60	0.06	0.69	1.16	5.79	0.89	0.03	3.38	0.63	10	60	47.9	26.5	13.5	9.5	617.5	172.5	1302	66.3153	1.1789	15.9901	0.3007	1.6675	0.2309	1068.4028	1.3853
79.08686	9.56447	45.76	5.74	4.16	0.13	1.14	0.91	1.91	1.41	0.04	2.61	0.96	40	80	82.45	44.5	27.5	0	368	40	1426	73.3371	1.3654	7.9756	0.1586	0.7966	0.2464	363.1746	4.5770
79.12170	9.56564	38.23	6.42	4.48	0.12	1.20	0.82	1.88	1.53	0.04	2.76	1.12	57.5	45	96.7	50.5	26	0	362	36.5	1365	75.7800	1.2797	5.9527	0.1275	0.6822	0.2376	315.1690	5.4714
79.18964	9.56511	36.50	6.21	4.22	0.15	1.41	0.89	1.94	1.52	0.04	2.92	1.08	51.5	30	107.6	54	26.5	0	751.5	40.5	743	72.7031	1.3298	5.8778	0.1433	0.6325	0.2448	251.7241	4.7475
79.25874	9.56523	43.63	6.85	4.25	0.18	1.43	1.00	2.26	1.48	0.04	3.40	0.95	38	45	84.6	44	22.5	0	744.5	50.5	766	73.4718	1.2307	6.3719	0.1465	0.7017	0.2167	239.7253	4.2396
79.32727	9.56413	54.21	6.87	4.09	0.15	1.46	1.09	2.08	1.52	0.04	2.99	1.01	35	30	76.2	38	18.5	0	326	50	956	72.6491	1.2216	7.8898	0.1586	0.7466	0.2217	354.3137	3.7568
79.37791	9.56544	45.89	5.74	3.54	0.14	1.31	0.94	2.22	1.04	0.03	3.53	0.85	33	60	71.1	41.5	21.5	0	1088.5	52.5	852	71.4416	1.2283	7.9982	0.1646	0.7210	0.1809	322.4877	3.7499
79.05286	9.60995	68.69	3.21	1.54	0.07	0.64	1.02	6.39	0.76	0.03	4.26	0.56	16.5	65	40.55	30.5	10.5	0	239.5	141.5	1325	64.4358	1.2993	21.3912	0.3181	1.6040	0.2370	996.9521	1.5068
79.08658	9.60956	60.25	5.27	1.57	0.07	0.99	0.94	2.39	1.40	0.05	4.02	1.01	24.5	55	58.55	31	24.5	0	551	47.5	1011	72.7624	0.9590	11.4428	0.1791	0.9570	0.2659	921.2538	1.6606
79.12090	9.60963	46.72	5.74	4.44	1.05	1.07	0.87	2.75	1.57	0.05	4.18	1.10	29	75	61.25	36	26.5	0	593.5	46.5	1166	74.2496	1.5858	8.1429	0.1525	0.8205	0.2741	44.3516	5.0730
79.15497	9.61054	36.98	6.61	4.68	0.12	1.48	0.87	1.95	1.63	0.04	3.95	1.06	39	65	74.3	53	26.5	0	786	36	1056	73.4683	1.3377	5.5936	0.1313	0.5847	0.2458	319.8132	5.3873
79.22346	9.60910	37.52	6.26	4.41	0.13	1.48	0.90	1.94	1.52	0.04	3.98	0.96	44.5	70	76.4	105	28.5	0	1220.5	42	823	72.1713	1.3609	5.9965	0.1431	0.6042	0.2425	278.9591	4.9245
79.27500	9.60890	48.76	6.30	3.98	0.16	1.20	0.84	2.07	1.42	0.04	3.91	0.88	35	65	69.05	43.5	25	0	761.5	49.5	564	75.2223	1.2184	7.7345	0.1330	0.6982	0.2260	304.7500	4.7465
79.05285	9.65516	70.15	3.87	2.95	0.07	0.65	0.89	3.54	0.94	0.04	4.33	0.62	31	85	65.05	37	14.5	0	597.5	79.5	1173	70.7501	1.4455	18.1166	0.2290	1.3621	0.2424	1072.6606	3.3246
79.08682	9.65475	65.49	4.08	2.46	0.10	0.78	0.77	2.61	0.87	0.04	4.16	0.56	19	80	40.85	25.5	19.5	0	551	49.5	1068	71.8932	1.2383	16.0328	0.1897	0.9992	0.2130	680.7692	3.1709
79.15500	9.65438	32.78	6.00	4.32	0.11	1.35	0.73	1.65	1.46	0.04	3.96	1.06	41.5	80	76	53	28	0	707.5	34.5	1024	74.0133	1.3398	5.4658	0.1213	0.5397	0.2441	291.3778	5.9306
79.20654	9.65292	31.78	6.75	4.79	0.13	1.54	0.84	1.68	1.65	0.04	3.93	1.11	41	65	77.35	63.5	32.5	0	928.5	35	796	73.7249	1.3338	4.7062	0.1238	0.5423	0.2444	253.4290	5.7264
79.07080	9.70021	71.69	2.15	1.26	0.08	0.42	0.62	3.28	0.68	0.02	4.37	0.57	60.5	50	59.45	38.5	14	0	672	70.5	1125	66.0465	1.4627	33.3655	0.2898	1.4710	0.3168	919.1026	2.0242
79.13826	9.70051	59.26	4.34	2.92	0.11	0.67	0.70	2.68	1.08	0.04	4.23	0.75	23.5	55	47.85	33.5	23.5	0	681.5	48	1079	75.4293	1.2809	13.6403	0.1602	1.0361	0.2493	538.7273	4.1984
	Minimum	29.50	2.15	0.66	0.05	0.31	0.41	0.39	0.59	0.01	0.70	0.21	5	5	4	7	6	4	38	16.5	55	38.5918	0.8053	13.7297	0.1908	1.3226	0.2751	590.0000	1.6098
	Maximum	86.48	18.00	10.27	1.15	5.86	2.67	26.24	8.53	0.14	16.37	7.63	156	235	131	105	157	27	1220.5	350	1426	87.8543	1.9929	4.8052	0.1483	0.4557	0.4738	74.9393	3.8468
	Average	52.83	9.15	4.98	0.29	1.63	1.22	5.57	3.60	0.05	3.57	1.91	36.5	79.76	67.890	52.737	34.824	10.215	449.426	58.08	751.96	72.5493	1.3239	5.7723	0.1331	0.7493	0.3934	183.5899	4.0905
													49	9						6	0								

Table S2 — Supplementary table on analysis data of Rare Earth Elements

S. No	Sample No	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	ΣREE	LREE	HREE	LREE/ HREE	Eu/Eu*	Ce/Ce*
1	ST-228/G-04	20.50	39.20	4.31	16.76	2.99	0.73	2.73	0.37	2.10	0.38	1.12	0.18	1.10	0.17	92.63	87.22	5.42	16.11	9.12	0.94
2	ST-228/G-16	31.28	63.41	6.98	26.54	4.62	1.18	4.48	0.62	3.51	0.66	1.86	0.28	1.85	0.28	147.53	138.48	9.05	15.30	14.83	0.97
3	ST-228/G-18	33.59	69.74	7.76	29.64	5.33	1.32	5.00	0.69	4.07	0.73	2.11	0.32	2.00	0.31	162.58	152.36	10.23	14.90	16.52	0.98
4	ST-228/G-22	23.63	46.90	5.18	20.02	3.42	0.93	3.30	0.46	2.56	0.47	1.33	0.21	1.35	0.22	109.98	103.39	6.59	15.69	10.98	0.96
5	ST-228/G-24	28.19	54.64	6.04	22.79	3.68	0.67	3.07	0.40	2.09	0.38	1.10	0.18	1.09	0.18	124.49	119.08	5.42	21.99	10.18	0.94
6	ST-228/G-36	26.69	57.44	5.86	23.28	3.61	0.73	3.56	0.48	2.05	0.38	1.14	0.14	1.23	0.14	126.74	121.18	5.56	21.79	11.80	1.04
7	ST-228/G-38	14.27	27.89	2.58	10.15	1.71	0.50	1.64	0.23	1.25	0.23	0.66	0.11	0.67	0.11	61.97	58.73	3.24	18.11	5.58	1.01
8	ST-228/G-40	15.05	27.86	3.03	11.79	2.13	0.59	1.91	0.27	1.48	0.27	0.78	0.12	0.74	0.11	66.13	62.36	3.77	16.53	6.45	0.92
9	ST-228/G-42	36.05	74.61	8.27	31.40	5.54	1.39	5.22	0.72	4.02	0.73	2.20	0.35	2.19	0.34	173.02	162.48	10.54	15.41	17.24	0.98
10	ST-228/G-48	37.35	72.17	7.74	29.64	5.21	1.29	4.93	0.71	4.10	0.80	2.20	0.35	2.14	0.35	168.97	158.33	10.64	14.89	16.31	0.95
11	ST-228/G-59	31.26	84.28	6.69	25.78	4.46	1.13	4.53	0.63	3.56	0.69	1.99	0.31	1.94	0.30	167.54	158.12	9.41	16.80	14.99	1.31
12	ST-228/G-61	42.32	87.37	9.56	37.27	6.46	1.66	6.16	0.87	4.96	0.92	2.60	0.41	2.59	0.39	203.54	190.80	12.74	14.97	20.34	0.99
13	ST-228/G-63	35.06	71.91	7.85	30.43	5.41	1.39	5.13	0.73	4.30	0.80	2.26	0.35	2.24	0.35	168.21	157.18	11.03	14.25	16.97	0.98
14	ST-228/G-65	41.03	84.34	9.30	35.73	6.12	1.46	5.93	0.82	4.57	0.86	2.38	0.39	2.45	0.38	195.76	183.91	11.85	15.52	19.56	0.98
15	ST-228/G-67	37.72	77.64	8.35	32.50	5.50	1.37	5.21	0.73	3.94	0.75	2.13	0.33	2.10	0.32	178.58	168.29	10.29	16.35	17.22	0.99
16	ST-228/G-69	31.93	66.29	7.26	27.85	4.82	1.23	4.42	0.62	3.45	0.66	1.78	0.27	1.78	0.27	152.63	143.79	8.83	16.28	14.63	0.99
17	ST-228/G-71	37.27	75.42	8.15	31.83	5.46	1.33	5.02	0.72	4.03	0.77	2.18	0.34	2.14	0.33	174.98	164.48	10.49	15.68	16.59	0.98
18	ST-235/G-19	45.44	91.87	10.01	39.04	6.87	1.73	6.46	0.89	5.09	0.96	2.73	0.42	2.59	0.42	214.53	201.43	13.10	15.37	21.30	0.98
19	ST-235/G-21	34.02	70.58	7.92	30.73	5.24	1.39	5.10	0.72	4.01	0.74	2.05	0.33	2.02	0.30	165.14	154.98	10.16	15.25	16.86	0.98
20	ST-235/G-23	38.42	78.90	8.77	33.66	5.98	1.52	5.65	0.80	4.42	0.83	2.36	0.37	2.27	0.34	184.29	172.91	11.38	15.19	18.66	0.98
21	ST-235/G-25	37.42	76.90	8.46	32.83	5.68	1.45	5.44	0.75	4.33	0.80	2.22	0.34	2.17	0.33	179.12	168.19	10.94	15.38	17.97	0.98
22	ST-235/G-27	16.09	30.82	3.39	13.26	2.24	0.58	1.92	0.28	1.54	0.29	0.81	0.13	0.79	0.12	72.27	68.30	3.97	17.23	6.48	0.94
23	ST-235/G-29	19.36	36.44	3.71	13.05	2.18	0.53	1.91	0.32	1.50	0.28	0.75	0.18	0.85	0.17	81.22	77.18	4.04	19.12	6.44	0.95
24	ST-235/G-41	45.37	93.72	10.56	39.83	6.81	1.72	6.23	0.87	4.86	0.92	2.53	0.39	2.49	0.38	216.67	204.24	12.43	16.44	20.57	0.98
25	ST-235/G-42	39.30	81.30	9.16	35.81	6.18	1.58	5.96	0.84	4.64	0.89	2.40	0.38	2.45	0.38	191.28	179.29	11.99	14.96	19.67	0.98
26	ST-235/G-43	40.86	85.84	9.48	37.51	6.49	1.69	6.04	0.83	4.66	0.90	2.45	0.39	2.53	0.39	200.07	187.91	12.16	15.45	19.93	0.99
27	ST-235/G-47	37.55	78.39	8.80	34.01	5.81	1.49	5.58	0.79	4.35	0.82	2.32	0.36	2.27	0.35	182.90	171.64	11.26	15.24	18.43	0.98
28	ST-235/G-49	35.55	73.22	8.11	31.96	5.75	1.42	5.21	0.75	4.27	0.81	2.19	0.34	2.17	0.33	172.08	161.22	10.86	14.84	17.21	0.98
29	ST-235/G-51	28.94	61.24	6.69	26.13	4.58	1.16	4.29	0.61	3.36	0.63	1.76	0.28	1.75	0.27	141.69	133.03	8.66	15.36	14.21	1.00
30	ST-235/G-53	16.21	29.97	3.39	13.30	2.22	0.71	2.09	0.29	1.67	0.31	0.93	0.14	0.88	0.15	72.25	67.87	4.37	15.53	7.07	0.91
31	ST-235/G-54	19.54	32.98	3.65	14.58	2.18	0.76	2.14	0.22	1.95	0.32	0.99	0.17	0.85	0.18	80.49	75.83	4.66	16.25	7.25	0.86
32	ST-220/G-01	42.04	86.61	9.63	37.39	6.36	1.73	5.97	0.84	4.73	0.91	2.61	0.41	2.58	0.42	202.25	189.74	12.50	15.17	19.73	0.98
33	ST-220/G-06	41.42	84.57	9.34	35.92	6.06	1.66	5.61	0.79	4.50	0.85	2.49	0.39	2.50	0.41	196.52	184.58	11.93	15.47	18.54	0.98
34	ST-220/G-07	47.25	95.62	10.42	39.54	6.45	1.75	5.94	0.83	4.68	0.89	2.67	0.42	2.74	0.43	219.63	206.97	12.66	16.35	19.61	0.98
35	ST-220/G-24	19.61	40.35	4.33	17.16	3.15	0.82	3.09	0.44	2.58	0.47	1.34	0.20	1.16	0.17	94.87	88.51	6.36	13.92	10.29	0.99
36	ST-220/G-30	15.90	27.80	3.14	12.74	2.35	0.63	2.27	0.33	1.92	0.38	1.07	0.16	0.99	0.16	69.84	64.84	5.00	12.97	7.63	0.88
37	ST-220/G-36	49.18	97.94	10.95	41.69	6.86	1.86	6.56	0.92	5.41	1.08	3.12	0.50	3.28	0.54	229.89	215.04	14.85	14.48	21.63	0.96
38	ST-220/G-44	28.05	34.24	3.95	16.19	2.76	0.80	2.69	0.42	2.33	0.47	1.31	0.20	1.25	0.19	94.83	88.67	6.16	14.39	9.01	0.68
39	ST-220/G-50	40.49	60.45	6.80	26.75	4.52	1.41	4.25	0.62	3.69	0.73	2.13	0.34	2.20	0.36	154.74	144.68	10.07	14.37	14.11	0.79
40	ST-220/G-55	27.52	57.72	3.43	13.96	2.52	0.67	2.50	0.37	2.01	0.39	1.05	0.16	0.96	0.15	113.41	108.32	5.08	21.31	8.38	1.21

(Contd.)

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Table S2 — Supplementary table on analysis data of Rare Earth Elements																					
S. No	Sample No	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	ΣREE	LREE	HREE	LREE/ HREE	Eu/Eu*	Ce/Ce*
41	ST-220/G-60	38.67	54.66	6.14	23.68	4.04	1.07	3.66	0.53	2.96	0.58	1.66	0.26	1.71	0.27	139.87	131.92	7.96	16.58	12.15	0.76
42	ST-220/G-69	36.31	52.13	5.68	21.55	3.64	0.92	3.34	0.50	2.88	0.59	1.73	0.28	1.81	0.30	131.65	123.57	8.08	15.29	11.11	0.78
43	ST-220/G-74	39.11	57.30	6.29	24.28	4.11	1.11	3.90	0.57	3.20	0.62	1.78	0.29	1.83	0.29	144.68	136.11	8.57	15.88	12.96	0.79
44	ST-237/G-2/4	46.24	74.61	8.66	31.75	5.14	1.42	4.56	0.58	3.12	0.63	1.92	0.50	1.98	0.50	181.62	172.39	9.24	18.66	15.12	0.82
45	ST-237/G-3/4	42.28	68.66	8.26	31.46	5.30	1.47	5.05	0.65	3.56	0.74	2.25	0.50	2.27	0.50	172.96	162.48	10.48	15.51	16.71	0.82
46	ST-237/G-10/6	43.94	74.36	9.03	34.47	5.97	1.51	5.79	0.79	4.45	0.90	2.67	0.50	2.67	0.50	187.53	175.06	12.47	14.03	19.10	0.84
47	ST-237/G-11/4	73.89	125.59	15.81	62.14	11.53	2.62	16.51	2.64	22.19	5.61	18.86	3.38	21.28	3.42	385.47	308.09	77.38	3.98	54.12	0.83
48	ST-237/G-13/2	44.25	74.49	9.22	35.78	6.27	1.59	6.06	0.79	4.47	0.87	2.55	0.50	2.45	0.50	189.78	177.65	12.13	14.64	19.98	0.83
49	ST-237/G-14/1	43.97	73.54	9.00	34.87	6.04	1.58	5.94	0.78	4.36	0.86	2.58	0.50	2.39	0.50	186.89	174.93	11.97	14.61	19.60	0.83
50	ST-237/G-14/4	43.88	73.56	9.03	34.70	6.08	1.53	5.82	0.79	4.22	0.84	2.49	0.50	2.35	0.50	186.29	174.60	11.69	14.93	19.22	0.83
51	ST-237/G-15/7	27.99	45.16	5.50	20.82	3.49	0.86	3.25	0.50	2.19	0.50	1.28	0.50	1.15	0.50	113.70	107.08	6.62	16.17	10.82	0.81
52	ST-237/GC-6/5/1	39.40	65.74	8.09	31.23	5.44	1.38	5.19	0.68	3.80	0.74	2.16	0.50	2.05	0.50	166.89	156.47	10.42	15.02	17.16	0.83
53	ST-237/GC-7/7/1	45.97	77.02	9.31	35.58	6.13	1.52	5.81	0.76	4.19	0.84	2.49	0.50	2.29	0.50	192.91	181.34	11.56	15.68	19.18	0.83
54	ST-237/GC-8/6/1	36.95	63.81	7.51	28.83	4.88	1.28	4.87	0.61	3.49	0.67	1.96	0.50	1.95	0.50	157.80	148.13	9.67	15.32	16.11	0.86
55	ST-237/GC-9/3/1	37.82	65.55	7.86	30.39	5.18	1.33	5.18	0.67	3.75	0.75	2.12	0.50	1.97	0.50	163.55	153.30	10.25	14.95	17.11	0.85
56	ST-237/GC-10/1/1	37.69	64.95	7.77	30.51	5.17	1.34	5.15	0.67	3.82	0.75	2.13	0.50	2.01	0.50	162.96	152.59	10.38	14.70	17.03	0.85
57	ST-237/VC-1/1	55.46	90.41	10.41	38.04	6.13	1.55	5.66	0.71	3.78	0.76	2.30	0.50	2.38	0.50	218.58	207.66	10.92	19.01	18.69	0.83
58	ST-237/VC-4/1	35.97	62.05	7.33	28.06	4.90	1.28	4.89	0.63	3.52	0.69	1.96	0.50	1.92	0.50	154.21	144.48	9.72	14.86	16.18	0.86
59	ST-237/VC-9/1	30.87	52.44	6.36	25.29	4.14	1.14	3.92	0.50	2.56	0.52	1.46	0.50	1.31	0.50	131.50	124.16	7.34	16.92	13.00	0.84
	Minimum	14.27	27.80	2.58	10.15	1.71	0.50	1.64	0.22	1.25	0.23	0.66	0.11	0.67	0.11	61.97	58.73	3.24	3.98	5.58	0.68
	Maximum	73.89	125.59	15.81	62.14	11.53	2.62	16.51	2.64	22.19	5.61	18.86	3.38	21.28	3.42	385.47	308.09	77.38	21.99	54.12	1.31
	Average	35.41	66.18	7.39	28.54	4.90	1.26	4.74	0.66	3.81	0.76	2.21	0.40	2.22	0.39	158.88	148.43	10.45	15.72	15.69	0.92