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Table S1. Chemical compositions of soil Fe coating. Note: b.d.l. = below the detection limit.

Table S2. Chemical compositions of soil Fe/Mn coating. Spots 1–5 are for outer Mn-rich layer and spots 6–10 are for inner Fe-rich layer. Note: b.d.l. = below the detection limit.

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Table S3. Chemical compositions of rock Fe coating. Note: b.d.l. = below the detection limit.

Elements (wt.%)	Spot 1	Spot 2	Spot 3	Spot 4	Spot 5	Spot 6	Spot 7	Spot 8	Spot 9	Spot 10
O	38.99	39.03	37.2	39.54	38.13	38.18	38.73	39.7	38.63	39.26
Al	0.43	b.d.l.	b.d.l.	0.55	0.83	b.d.l.	0.83	b.d.l.	0.72	0.87
Si	1.1	1.37	1.19	1.33	1.95	1.38	1.85	1.17	1.23	1.69
Fe	59.48	59.6	61.61	58.58	59.09	60.44	58.59	59.13	59.42	58.18
Total	100	100	100	100	100	100	100	100	100	100

Table S4. Chemical compositions of rock Fe/Mn coating. Note: b.d.l. = below the detection limit.

Elements (wt.%)	Spot 1	Spot 2	Spot 3	Spot 4	Spot 5	Spot 6	Spot 7	Spot 8	Spot 9	Spot 10
C	16.76	10.00	16.68	6.49	8.00	5.41	11.47	15.76	10.69	7.32
O	40.36	41.23	42.12	48.98	49.92	47.60	46.34	46.10	42.47	42.82
Na	0.62	0.68	0.61	b.d.l.	0.85	0.58	0.75	1.10	b.d.l.	b.d.l.
Mg	1.17	1.12	0.96	2.21	1.22	2.31	1.16	1.09	0.65	0.85
Al	4.93	6.02	4.39	5.47	6.70	5.61	6.13	5.15	3.18	3.11
Si	7.31	12.79	7.80	7.55	11.12	8.69	9.60	7.98	4.83	4.60
P	0.56	b.d.l.	b.d.l.	0.43	0.53	0.80	0.73	0.63	b.d.l.	b.d.l.
K	1.39	2.20	1.19	1.49	2.13	1.73	1.99	1.92	0.72	0.73
Ca	1.19	b.d.l.	0.87	1.05	1.14	1.58	0.94	1.40	0.71	0.88
Mn	11.73	12.34	15.46	17.61	12.16	19.67	12.42	11.76	25.12	27.61
Fe	13.98	13.62	9.92	5.30	6.23	6.02	6.48	7.11	6.32	6.49
Ba	b.d.l.	b.d.l.	b.d.l.	3.42	b.d.l.	b.d.l.	1.99	b.d.l.	5.31	5.59
Total	100	100	100	100	100	100	100	100	100	100



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