

1044 **Supplementary informations**

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1046 **Strong interplays between eustacy, nitrogen dynamic, and**
1047 **biodiversification between the Ediacaran and Silurian interval**

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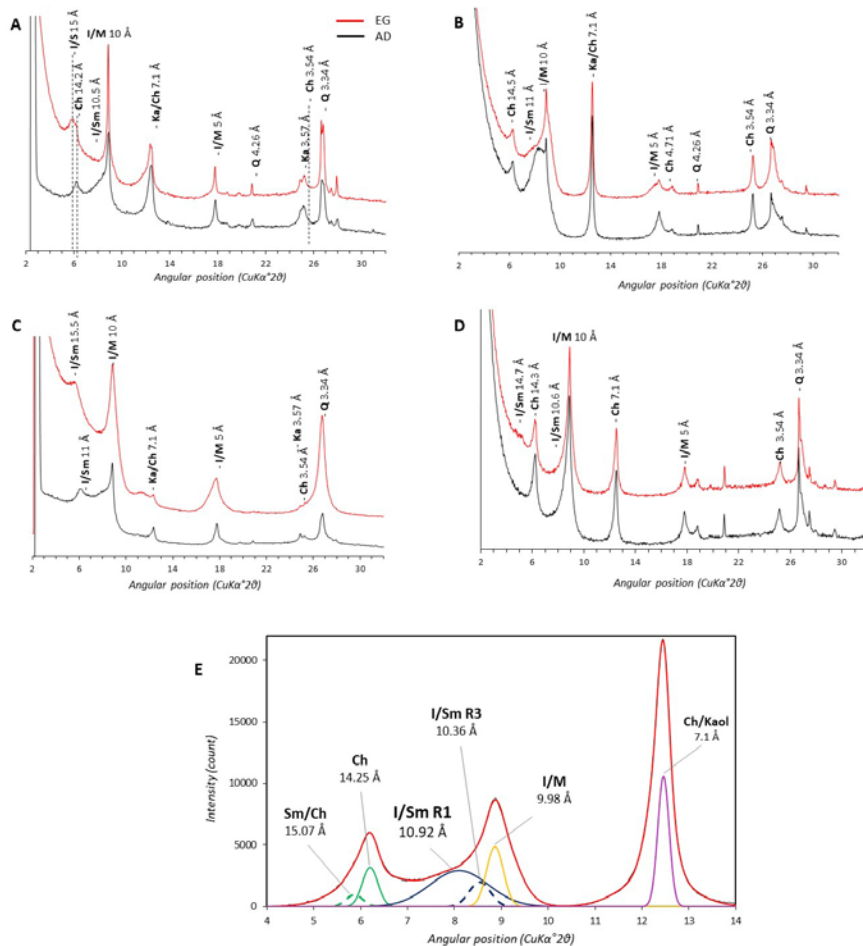
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Supplementary figures

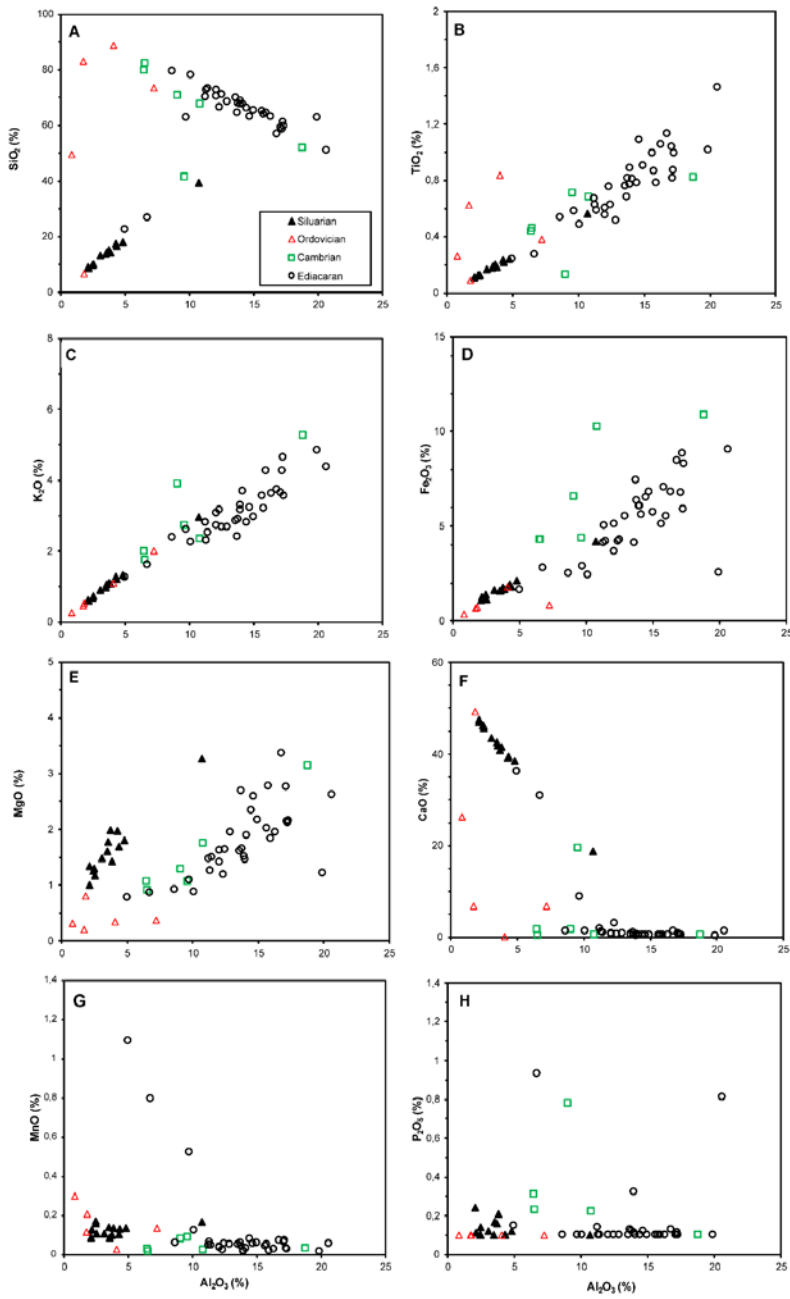


1076 **Figure S1:** Microphotographs showing the exceptional diversity of the Ediacaran biota in the Podolia
 1077 basin, southwestern Ukraine: **(a)** *Podolimirus mirus*. **(b)** *Hiemalora stellarsis*. **(c)** *Dickinsonia costata*.
 1078 **(d)** *Cyclomedusa plana*. **(e)** *Charniodiscus procerus*. **(f)** *Finkoella Ukrainica*. **(g)** *Tirasiana*
 1079 *disciformis* **(h)** *Astropolichnus* *sf. Hispanicus*. **(i)** *Conomedusites lobatus*. **(j)** *Aspidella terranovica*.
 1080 **(k)** *Tribrachidium heraldicum*. **(l)** *Burykhia hunti*, **(m)** *Palaeopascichnus delicatus*, **(n)** *Harlaniella*
 1081 *podolica* **(o)** *Shaanxilithes ningqiangensis*. Scale bars are 1 cm.



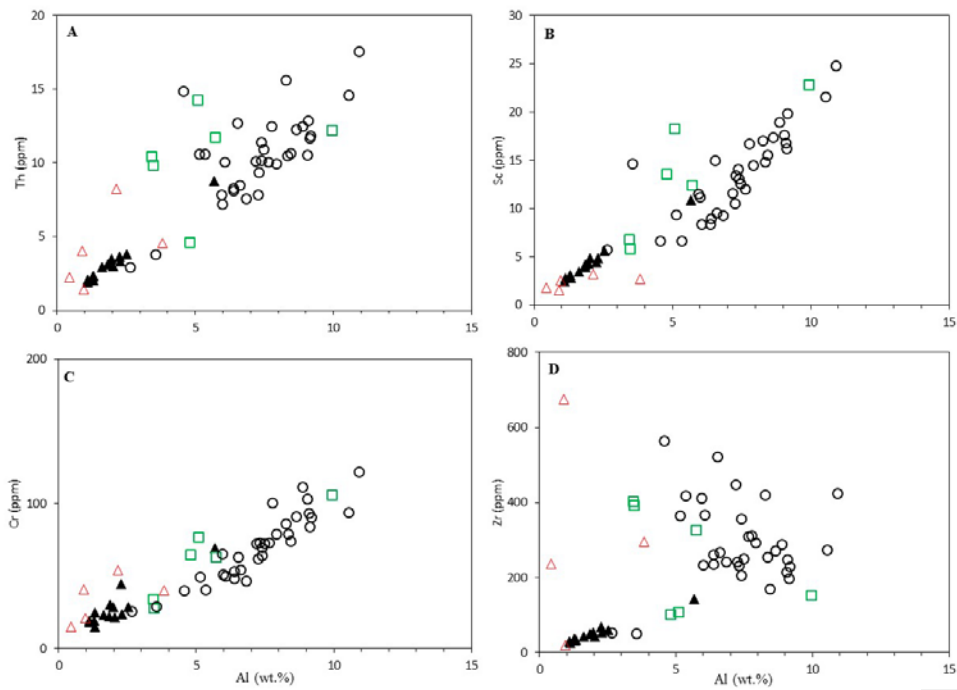
1082 **Figure S2.** Representative XRD mineralogical patterns of the oriented <2μm clay-size fractions
 1083 Ediacaran to Silurian samples after air-drying (black lines) and glycolation (red lines) in the
 1084 studied samples of Podolia Basin. **(A)** Ediacaran (Kanilivska Group). **(B)** Cambrian. **(C)**
 1085 Ordovician. **(D)** Silurian. **(E)** Decomposed pattern of <0.5 μm fraction. AD: air-dried, EG:
 1086 ethylene glycol, I/Sm: illite-smectite, I/M: illite/mica, Ka: kaolinite, Ch: chlorite, Sm/Ch:
 1087 chlorite/smectite.

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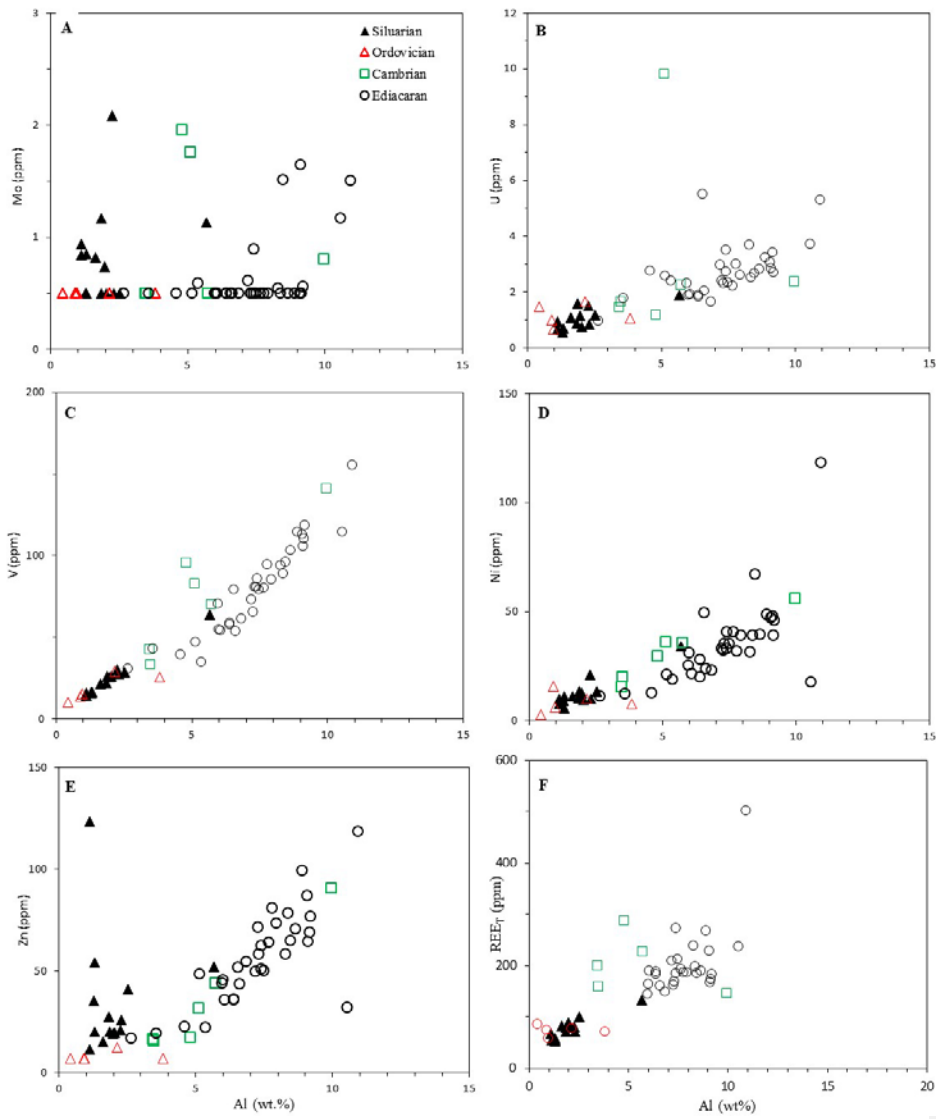
1093 **Figure S3.** Major elements composition and their variability with Al_2O_3 to trace mineralogical
 1094 influence on elemental distribution.



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1096 **Figure S4:** Plots of selected trace elements against Al

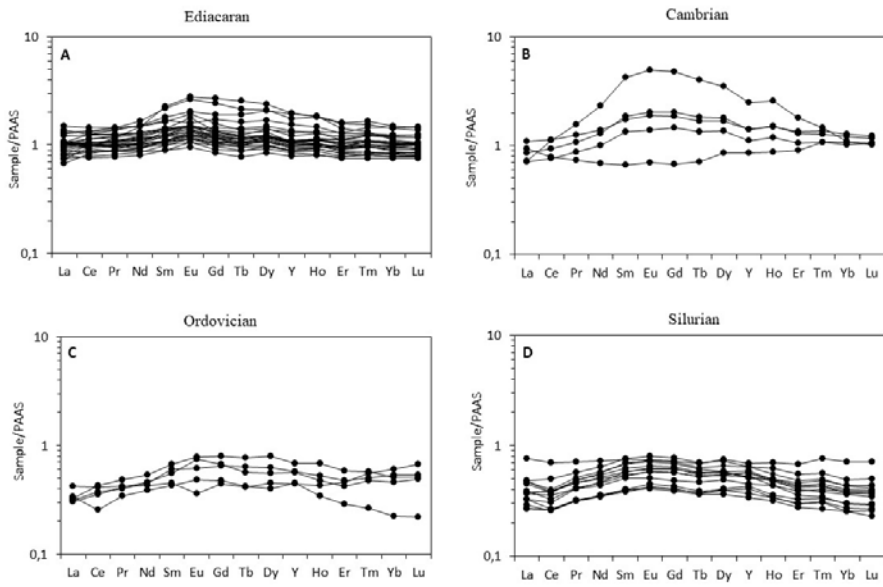
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1099 **Figure S5:** Plots of selected redox sensitive trace elements and total rare earth elements against Al

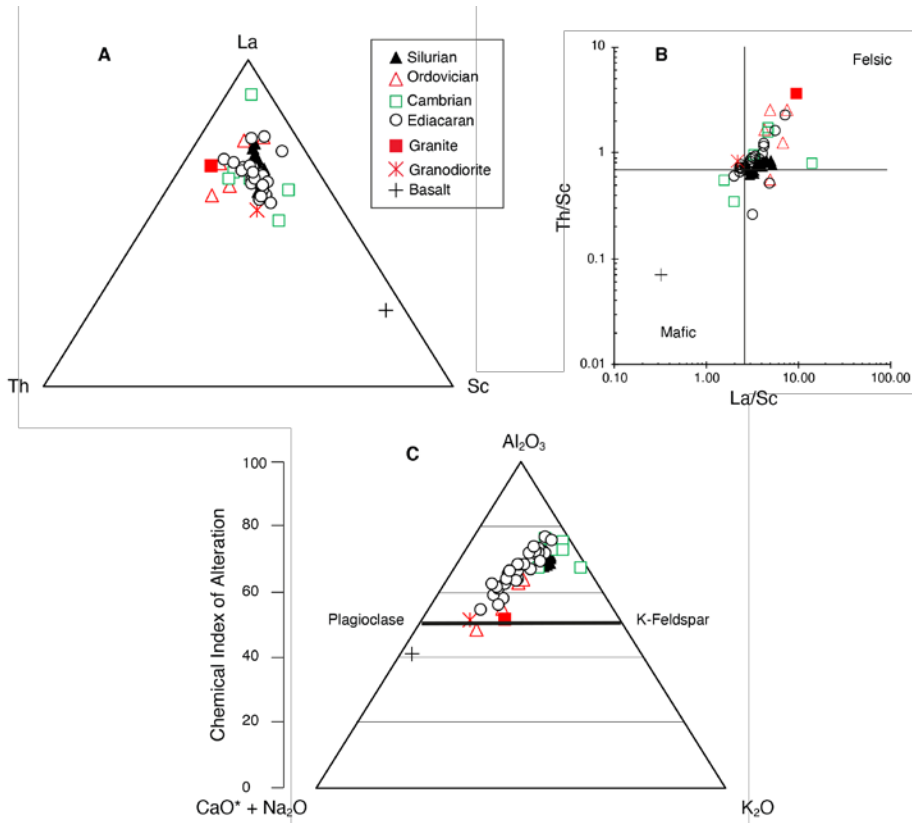
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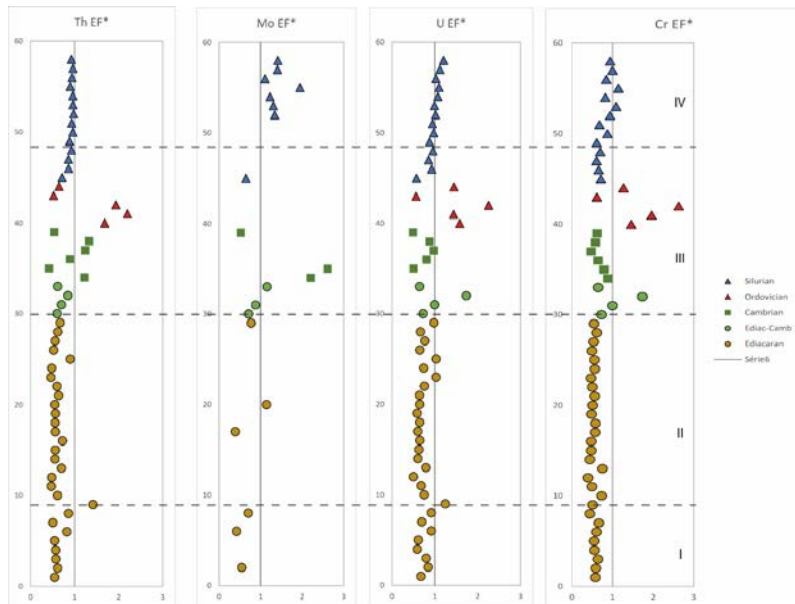
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 1102 **Figure S6:** PAAS-normalized Rare Earth Element patterns for the studied samples. PAAS
 1103 (Post-Archean Australian Shale) values are from Taylor and McLennan, 1985.

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 1107 **Figure S7.** Major and trace element composition of the Ediacaran to Silurian sediments.
 1108 Ternary La-Th-Sc (A) and cross plot of Th/Sc versus La/Sc (B) diagrams constraining the
 1109 provenance of the primary source rocks (modified after Bhatia and Crook, 1986). (C)
 1110 Calculated chemical index of alteration values and relative positions of sampled areas in A-CN-
 1111 K diagram illustrating the weathering trends of the sediments after Nesbitt and Young, 1984
 1112 and Fedo et al., 1995. Compositions of granite, granodiorite, and basalt are from Condie, 1993.



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 1114 **Figure S8.** Stratigraphic variations of Enrichment factors (EF) of selected redox trace elements
 1115 across the Ediacaran to Silurian strata in the studied section, southwestern Ukraine.

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Supplementary Tables

Table S1.

Lithology	Age	samples	SiO2 %	Al2O3 %	Fe2O3 %	MnO %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %	PF %	Total %	Al wt%	Ti wt%	Fe wt%	Mn wt%	K wt%	Na wt%	Ca wt%	Mg wt%	P wt%	CIA %
limestone	Silurian	S-20	14.24	3.53	1.58	0.09	1.77	41.93	0.13	1.06	0.19	0.17	35.44	100.12	1.87	0.12	1.10	0.09	0.88	0.10	29.95	1.06	0.07	69.0
limestone	Silurian	S-18	8.89	2.10	1.08	0.09	1.34	47.00	0.10	0.61	0.11	0.24	38.20	99.76	1.11	0.07	0.76	0.09	0.50	0.08	33.57	0.81	0.10	67.9
limestone	Silurian	S-17	15.20	3.72	1.73	0.10	1.99	40.91	0.15	1.11	0.20	0.16	34.44	99.70	1.97	0.12	1.21	0.10	0.92	0.11	29.22	1.19	0.07	68.8
limestone	Silurian	S-16	17.26	4.27	1.92	0.10	1.97	39.11	0.18	1.27	0.24	0.10	33.43	99.74	2.26	0.14	1.34	0.10	1.05	0.13	27.93	1.18	0.04	68.6
limestone	Silurian	S-15	13.05	3.08	1.63	0.11	1.48	43.48	0.14	0.90	0.17	0.12	35.77	99.90	1.63	0.10	1.14	0.11	0.75	0.10	31.06	0.89	0.05	68.5
limestone	Silurian	S-14	10.10	2.50	1.13	0.11	1.17	46.12	0.09	0.71	0.13	0.10	37.51	99.57	1.32	0.08	0.79	0.11	0.59	0.07	32.94	0.70	0.04	69.9
limestone	Silurian	S-13	8.51	2.13	1.25	0.13	1.01	47.50	0.08	0.59	0.12	0.11	38.09	99.49	1.13	0.07	0.87	0.13	0.49	0.06	33.93	0.60	0.05	70.3
limestone	Silurian	S-12	9.76	2.46	1.10	0.16	1.30	45.68	0.08	0.68	0.13	0.14	38.02	99.51	1.30	0.08	0.77	0.16	0.57	0.06	32.63	0.78	0.06	71.1
limestone	Silurian	S-11	9.86	2.43	1.39	0.17	1.26	46.38	0.08	0.67	0.13	0.10	37.54	99.90	1.29	0.08	0.97	0.17	0.56	0.06	33.13	0.75	0.04	71.3
limestone	Silurian	S-10	14.28	3.84	1.67	0.14	1.42	41.60	0.12	1.06	0.19	0.21	35.44	99.97	2.03	0.11	1.17	0.14	0.88	0.09	29.71	0.85	0.09	71.3
limestone	Silurian	S-7	13.67	3.48	1.58	0.14	1.61	42.58	0.12	0.97	0.18	0.10	35.48	99.80	1.84	0.11	1.10	0.14	0.81	0.09	30.41	0.96	0.04	70.8
limestone	Silurian	S-4	16.41	4.34	1.77	0.13	1.70	39.53	0.13	1.20	0.22	0.10	34.26	99.70	2.30	0.13	1.24	0.13	1.00	0.10	28.24	1.02	0.04	71.4
shaly limestone	Silurian	S-3	18.02	4.78	2.13	0.13	1.80	38.43	0.15	1.31	0.26	0.12	32.89	100.00	2.53	0.15	1.49	0.13	1.09	0.11	27.45	1.08	0.05	71.5
shaly limestone	Silurian	S-2	39.41	10.71	4.20	0.17	3.28	18.73	0.45	2.96	0.56	0.10	15.95	99.81	5.67	0.34	2.94	0.17	2.46	0.33	13.38	1.95	0.04	69.5
limestone	Ordovician	O-7	6.56	1.81	0.72	0.21	0.80	49.15	0.07	0.51	0.09	0.10	39.90	99.82	0.96	0.06	0.50	0.21	0.42	0.05	35.10	0.48	0.04	69.9
limestone	Ordovician	O-6	73.38	7.22	0.83	0.13	0.36	6.86	1.67	2.01	0.38	0.10	6.57	99.42	3.82	0.23	0.58	0.13	1.67	1.24	4.90	0.22	0.04	48.5
calcareous sandstone	Ordovician	O-5	82.90	1.71	0.66	0.12	0.20	6.76	0.16	0.45	0.63	0.10	5.88	99.46	0.90	0.38	0.46	0.12	0.37	0.12	4.83	0.12	0.04	62.7
calcareous sandstone	Ordovician	O-4	49.51	0.83	0.35	0.30	0.31	26.23	0.13	0.25	0.26	0.10	20.96	99.13	0.44	0.16	0.24	0.30	0.20	0.09	18.74	0.19	0.04	55.1
calcareous sandstone	Ordovician	O-3	88.69	4.05	1.79	0.03	0.34	0.17	0.50	1.09	0.84	0.10	1.48	98.97	2.14	0.50	1.25	0.03	0.91	0.37	0.12	0.20	0.04	63.8
shale	Cambrian	Cm-17	51.86	18.80	10.83	0.03	0.14	0.46	0.16	5.26	0.82	0.10	8.41	99.77	9.95	0.49	7.57	0.03	4.36	0.12	0.33	1.88	0.04	75.2
calcareous glauconitic siltstone	Cambrian	Cm-16	79.68	6.95	4.17	0.03	1.06	1.74	0.10	2.58	0.44	0.31	3.43	99.64	3.43	0.35	2.92	0.05	2.08	0.57	0.25	0.64	0.04	75.5
calcareous glauconitic siltstone	Cambrian	Cm-12	82.29	5.56	4.25	0.02	0.91	0.39	0.17	1.74	0.46	0.23	2.75	99.74	3.47	0.27	2.97	0.02	1.44	0.12	0.28	0.54	0.10	75.9
glauconitic siltstone	Cambrian	Cm-8	67.44	10.82	10.21	0.03	1.75	0.53	0.26	3.22	0.68	0.22	5.43	99.67	5.73	0.41	7.14	0.03	1.93	0.19	0.38	1.05	0.10	76.3
lenticular psophoric silty shale	Cambrian	Cm-2	70.75	9.07	6.55	0.08	1.28	1.68	0.08	3.87	0.13	0.78	5.53	99.79	4.80	0.08	4.58	0.08	3.21	0.06	1.20	0.77	0.34	67.1
glauconitic sand	Cambrian	Cm-1	41.23	9.62	4.35	0.09	1.06	19.39	0.52	2.72	0.71	13.41	5.64	98.73	5.09	0.43	3.04	0.09	2.26	0.38	13.85	0.63	5.85	67.5
silty shale	Ediacaran	Ed-12	58.60	17.19	8.81	0.07	2.14	0.51	0.62	4.26	0.82	0.10	6.82	99.84	9.10	0.49	6.16	0.07	3.53	0.46	0.36	1.28	0.04	72.5
shale	Ediacaran	Ed-10	66.49	12.35	4.20	0.02	1.18	3.06	0.43	3.16	0.75	2.05	5.04	98.74	6.54	0.45	2.94	0.02	2.62	0.32	2.19	0.71	0.89	71.9
shale	Ediacaran	Ed-6	50.99	20.63	9.02	0.06	2.62	1.38	0.49	4.37	1.46	0.81	7.77	99.58	10.92	0.87	6.31	0.06	3.63	0.36	0.99	1.57	0.35	76.5
shale	Ediacaran	Ed-3	62.86	19.91	2.54	0.02	1.22	0.36	0.37	4.82	1.02	0.10	6.79	99.69	10.54	0.61	1.78	0.02	4.00	0.28	0.26	0.73	0.04	75.5
silty shale	Ediacaran	Ed-20	67.61	13.98	6.07	0.02	1.45	0.58	0.63	3.28	0.89	0.32	4.57	99.37	7.40	0.53	4.24	0.02	2.72	0.47	0.41	0.87	0.14	71.4
siltstone	Ediacaran	Ed-19	63.04	16.34	6.80	0.03	1.95	0.40	0.79	3.62	1.05	0.10	5.66	99.67	8.65	0.63	4.76	0.03	3.00	0.58	0.29	1.17	0.04	73.4
calcareous siltstone	Ediacaran	Ed-14	61.07	17.27	5.86	0.03	2.11	0.56	1.02	4.64	0.87	0.11	6.48	100.00	9.14	0.52	4.10	0.03	3.85	0.75	0.40	1.26	0.05	69.3
calcareous siltstone	Ediacaran	Ed-12	72.61	11.32	5.02	0.06	1.25	1.09	1.08	2.28	0.62	0.10	4.08	99.41	5.99	0.37	3.51	0.06	1.90	0.80	0.78	0.75	0.04	65.3
shale	Ediacaran	Ed-11	62.63	9.72	2.88	0.52	1.08	8.84	1.31	2.61	0.58	0.10	9.39	99.56	5.15	0.35	2.02	0.52	2.16	0.97	6.32	0.65	0.04	57.7
limestone	Ediacaran	Ed-10	22.37	5.01	1.62	1.09	0.77	36.15	0.45	1.25	0.24	0.15	29.90	99.00	2.65	0.15	1.13	1.09	1.04	0.34	25.82	0.46	0.07	63.8
silty shale	Ediacaran	Ed-9	26.78	6.73	2.77	0.80	0.86	31.00	0.27	1.61	0.28	0.93	27.30	99.32	3.56	0.16	1.93	0.80	1.34	0.20	22.14	0.52	0.41	71.8
Shale	Ediacaran	Ed-7	68.57	13.97	6.05	0.02	1.51	0.36	0.84	3.16	0.77	0.11	4.63	99.96	7.39	0.46	4.23	0.02	2.62	0.62	0.25	0.91	0.05	72.0
Silty shale	Ediacaran	Ed-6	67.56	14.13	5.57	0.03	1.89	0.55	1.24	3.67	0.81	0.10	4.20	99.64	7.48	0.49	3.90	0.03	3.05	0.92	0.39	1.13	0.04	66.9
Weathered shale	Ediacaran	Ed-4	64.48	15.96	5.50	0.02	1.83	0.44	1.02	4.25	0.78	0.10	5.50	99.78	8.45	0.47	3.84	0.02	3.53	0.76	0.31	1.10	0.04	69.4
Silty shale	Ediacaran	Ed-3	70.42	12.08	5.12	0.04	1.63	0.87	1.33	3.07	0.60	0.10	3.83	98.98	6.39	0.36	3.58	0.04	2.55	0.98	0.62	0.98	0.04	63.2
Silty sandstone	Ediacaran	Ed-2	67.72	13.80	6.35	0.04	1.65	0.41	0.99	2.89	0.82	0.12	4.62	99.41	7.30	0.49	4.44	0.04	2.40	0.74	0.29	0.99	0.05	71.6
Silty shale	Ediacaran	Ed-1	59.52	17.33	8.28	0.03	2.16	0.49	0.86	3.56	1.00	0.10	6.51	99.73	9.18	0.60	5.79	0.03	2.95	0.64	0.35	1.29	0.04	73.9
siltstone	Ediacaran	Ed-18	73.02	11.45	4.17	0.05	1.50	1.00	2.14	2.50	0.59	0.10	3.12	99.53	6.06	0.35	2.92	0.05	2.08	1.59	0.71	0.90	0.04	58.9
siltstone	Ediacaran	Ed-17	71.03	12.49	4.28	0.05	1.63	0.83	2.43	2.67	0.83	0.10	3.64	99.49	6.61	0.38	2.99	0.05	2.22	1.80	0.45	0.98	0.04	60.9
siltstone	Ediacaran	Ed-16	72.57	12.07	3.67	0.04	1.41	0.57	2.08	2.72	0.55	0.10	3.17	98.85	6.39	0.33	2.56	0.04	2.26	1.54	0.41	0.84	0.04	62.1
laminated siltstone	Ediacaran	Ed-14	62.88	14.68	6.80	0.06	2.59	0.48	1.89	3.23	1.09	0.12	4.79	98.60	7.77	0.65	4.76	0.06	2.68	1.40	0.34	1.55	0.05	66.3
siltstone	Ediacaran	Ed-13	68.48	12.91	5.51	0.05	1.95	0.84	2.35	2.66	0.52	0.10	3.59	98.85	6.83	0.31	3.85	0.05	2.21	1.74	0.60	1.17	0.04	61.1
laminated siltstone	Ediacaran	Ed-12	64.50	13.72	7.39	0.06	2.69	0.96	2.45	2.39	0.68	0.13	4.47	99.44	7.26	0.41	5.17	0.06	1.98	1.82	0.69	1.61	0.06	62.3
shale	Ediacaran	Ed-11	56.92	16.77	8.45	0.07	3.36	1.33	1.37	3.72	1.13	0.13	7.30	100.55	8.88	0.68	5.91	0.07	3.09	1.01	0.95	2.02	0.06	66.3
Silty sandstone	Ediacaran	Ed-10	79.29	8.64	2.49	0.06	0.92	1.32	1.29	2.37	0.54	0.10	2.98	99.90	4.57	0.32	1.74	0.06	1.97	0.96	0.94	0.55	0.04	55.9
Silty sandstone	Ediacaran	Ed-9	77.99	10.12	2.39	0.12	0.98	1.30	2.32	2.25	0.49	0.10	3.08	100.93	5.36	0.29	1.67	0.12	1.87	1.72	0.93	0.53	0.04	53.3
Silty sandstone	Ediacaran	Ed-8	58.95	17.11	6.74	0.06	2.76	0.83	1.57	3.63	1.04	0.10	6.75	99.54	9.06	0.62	4.71	0.06	3.01	1.16	0.60	1.66	0.04	68.2
Shale	Ediacaran	Ed-7	65.00</																					

1 Table S2.

Lithology	Age	samples	Cr ppm	Mo ppm	Ni ppm	Sc ppm	Th ppm	U ppm	V ppm	Zn ppm	Zr ppm
limestone	Silurian	S-20	30,21	1,17	13,55	3,91	3,12	1,59	26,13	19,96	50,10
limestone	Silurian	S-18	19,13	0,94	10,22	2,44	1,91	0,94	15,72	11,54	31,18
limestone	Silurian	S-17	28,63	0,74	12,64	4,24	3,50	1,15	25,80	19,28	54,08
limestone	Silurian	S-16	44,51	2,08	21,31	4,48	3,66	1,51	30,05	21,07	68,49
limestone	Silurian	S-15	23,02	0,82	11,26	3,44	2,96	1,09	21,44	15,08	43,91
limestone	Silurian	S-14	24,71	0,85	11,43	2,81	2,35	0,70	16,70	54,14	35,78
limestone	Silurian	S-13	18,23	0,84	7,76	2,77	2,10	0,66	14,50	123,21	26,83
limestone	Silurian	S-12	15,16	<D.L	5,93	3,13	2,01	0,56	15,92	20,16	32,51
limestone	Silurian	S-11	19,37	<D.L	9,20	2,92	2,26	0,63	16,53	35,13	36,55
limestone	Silurian	S-10	21,37	<D.L	9,68	4,84	3,01	0,77	26,38	19,77	43,40
limestone	Silurian	S-7	22,07	<D.L	10,49	4,20	3,10	0,88	22,00	27,52	49,88
limestone	Silurian	S-4	23,95	<D.L	10,15	4,87	3,30	0,84	27,74	25,78	53,02
shaly limestone	Silurian	S-3	28,70	<D.L	13,36	5,59	3,83	1,18	28,58	41,02	61,19
shaly limestone	Silurian	S-2	69,67	1,13	34,37	10,89	8,78	1,80	63,75	51,98	142,09
limestone	Ordovician	O-7	20,97	<D.L	6,22	2,57	1,42	0,67	15,56	7,00	19,93
limestone	Ordovician	O-6	40,25	<D.L	7,94	2,75	4,58	1,05	25,81	7,00	295,32
calcareous sandstone	Ordovician	O-5	40,90	<D.L	16,03	1,57	4,01	0,99	14,06	7,00	674,98
calcareous sandstone	Ordovician	O-4	14,89	<D.L	2,73	1,78	2,22	1,47	10,28	7,00	236,54
calcareous sandstone	Ordovician	O-3	53,80	<D.L	9,94	3,22	8,26	1,65	29,38	12,53	800,96
shale	Cambrian	Cam-17	106,21	0,81	56,34	22,77	12,21	2,38	140,82	90,83	152,34
calcareous glauconitic siltstone	Cambrian	Cam-13	34,07	<D.L	15,61	6,79	10,44	1,45	42,53	16,70	403,24
calcareous glauconitic siltstone	Cambrian	Cam-12	28,13	<D.L	20,32	5,78	9,83	1,64	33,26	15,99	391,76
glauconitic siltstone	Cambrian	Cam-8	63,31	<D.L	35,72	12,42	11,70	2,24	70,25	43,95	325,74
lenticular phosphoric silty shale	Cambrian	Cam-2	65,02	1,96	29,80	13,57	4,59	1,18	95,60	17,61	101,02
glauconitic sand	Cambrian	Cam-1	77,04	1,76	36,17	18,25	14,27	9,81	82,74	31,96	108,10
silty shale	Ediacaran	Ed-12	93,20	1,65	48,18	16,80	12,84	2,86	105,89	64,67	247,68
shale	Ediacaran	Ed-10	63,26	<D.L	49,75	14,95	12,68	5,51	79,19	51,99	521,26
shale	Ediacaran	Ed-6	121,85	1,51	118,40	24,79	17,55	5,29	155,50	118,49	423,42
shale	Ediacaran	Ed-3	93,93	1,17	17,98	21,55	14,57	3,73	114,40	32,39	274,04
silty shale	Ediacaran	Ed-20	69,52	0,90	40,82	13,09	11,39	3,52	86,14	51,20	355,97
siltstone	Ediacaran	Ed-19	91,22	<D.L	39,90	17,34	12,25	2,81	103,10	70,86	271,28
calcareous siltstone	Ediacaran	Ed-14	84,13	<D.L	39,28	16,19	11,67	3,41	110,49	69,09	197,01
calcareous siltstone	Ediacaran	Ed-12	50,75	<D.L	31,15	11,17	7,21	1,89	54,97	45,88	233,11
shale	Ediacaran	Ed-10	49,10	<D.L	21,36	9,33	10,60	2,58	47,34	48,67	365,68
limestone	Ediacaran	Ed-10	25,71	<D.L	11,58	5,73	2,92	0,96	30,95	17,10	52,40
silty shale	Ediacaran	Ed-9	28,78	<D.L	12,51	14,66	3,78	1,78	42,90	19,62	50,17
Shale	Ediacaran	Ed-7	64,14	<D.L	33,12	14,09	10,17	2,72	80,65	62,37	205,74
Silty shale	Ediacaran	Ed-6	72,30	<D.L	35,37	12,56	10,89	2,33	79,05	50,29	250,90
Weathered shale	Ediacaran	Ed-4	73,85	1,52	67,31	15,54	10,63	2,66	96,07	65,18	170,31
Silty shale	Ediacaran	Ed-3	53,03	<D.L	28,43	8,93	8,29	1,83	58,63	36,21	235,55
Silty sandstone	Ediacaran	Ed-2	72,99	<D.L	35,51	13,41	9,33	2,30	80,64	58,49	231,51
Silty shale	Ediacaran	Ed-1	90,62	0,57	46,28	19,84	11,83	2,70	118,47	76,77	228,66
siltstone	Ediacaran	Ed-18	49,89	<D.L	21,59	8,36	10,05	1,92	54,21	35,86	367,33
siltstone	Ediacaran	Ed-17	54,30	<D.L	23,88	9,48	8,50	2,03	53,77	43,86	266,78
siltstone	Ediacaran	Ed-16	48,43	<D.L	20,15	8,40	8,12	1,88	57,68	36,00	260,58
laminated siltstone	Ediacaran	Ed-14	100,26	<D.L	32,22	16,70	12,51	2,99	94,80	80,84	311,74
siltstone	Ediacaran	Ed-13	46,74	<D.L	23,27	9,30	7,55	1,67	61,27	54,80	240,71
laminated siltstone	Ediacaran	Ed-12	61,77	<D.L	32,58	10,55	7,92	2,41	65,62	71,39	241,80
shale	Ediacaran	Ed-11	111,59	<D.L	49,09	19,95	12,49	3,24	114,55	99,46	288,91
Silty sandstone	Ediacaran	Ed-10	39,96	<D.L	13,10	6,67	14,84	2,77	39,49	22,96	564,76
Silty sandstone	Ediacaran	Ed-9	40,67	0,59	19,11	6,59	10,57	2,39	34,96	22,42	417,11
Silty sandstone	Ediacaran	Ed-8	103,45	<D.L	47,43	17,59	10,52	3,07	112,82	87,28	213,36
Shale	Ediacaran	Ed-7	86,08	0,55	31,88	17,04	15,64	3,69	94,25	58,27	419,74
Silty sandstone	Ediacaran	Ed-6	78,88	<D.L	39,28	14,76	10,46	2,51	88,95	78,65	253,96
Silty shale	Ediacaran	Ed-5	72,99	<D.L	40,80	11,98	10,04	2,21	80,55	64,20	308,44
Silty shale	Ediacaran	Ed-4	65,58	<D.L	25,53	11,52	7,84	2,31	70,57	44,21	410,58
Silty shale	Ediacaran	Ed-3	72,72	0,62	33,39	11,62	10,12	2,95	73,30	50,00	447,75
Silty shale	Ediacaran	Ed-2	79,13	<D.L	39,29	14,49	9,92	2,60	85,17	73,39	293,49

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4 Table S3.

Lithology	Age	samples	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm	Eu ppm	Gd ppm	Tb ppm	Dy ppm	Ho ppm	Y ppm	Er ppm	Tm ppm	Yb ppm	Lu ppm
limestone	Silurian	S-20	14.90	26.25	3.70	14.73	3.00	0.64	2.69	0.41	2.40	0.48	15.61	1.23	0.17	1.09	0.16
limestone	Silurian	S-18	12.57	24.66	3.65	15.13	3.25	0.69	2.91	0.42	2.36	0.44	14.19	1.03	0.14	0.84	0.12
limestone	Silurian	S-17	17.97	32.46	4.61	18.78	3.82	0.81	3.36	0.49	2.88	0.56	17.51	1.41	0.20	1.22	0.18
limestone	Silurian	S-16	18.09	30.57	4.16	16.11	3.08	0.64	2.68	0.41	2.45	0.50	15.27	1.33	0.19	1.22	0.19
limestone	Silurian	S-15	17.25	30.32	4.37	17.47	3.49	0.73	3.02	0.44	2.57	0.49	16.00	1.27	0.17	1.03	0.16
limestone	Silurian	S-14	12.52	21.65	2.87	11.28	2.15	0.47	1.91	0.29	1.79	0.36	11.65	0.96	0.13	0.84	0.13
limestone	Silurian	S-13	11.02	20.75	2.83	11.42	2.26	0.50	2.01	0.30	1.75	0.34	11.06	0.88	0.12	0.72	0.11
limestone	Silurian	S-12	10.19	21.03	2.81	11.12	2.26	0.45	1.82	0.28	1.61	0.32	9.21	0.81	0.11	0.71	0.10
limestone	Silurian	S-11	10.45	21.18	2.83	11.29	2.22	0.46	1.91	0.29	1.73	0.34	10.04	0.87	0.13	0.77	0.12
limestone	Silurian	S-10	14.24	31.21	4.31	18.19	3.92	0.78	3.23	0.47	2.59	0.48	13.69	1.18	0.15	1.03	0.15
limestone	Silurian	S-7	14.28	30.92	4.08	16.52	3.28	0.68	2.87	0.44	2.53	0.49	14.30	1.27	0.18	1.12	0.17
limestone	Silurian	S-4	13.99	28.75	3.62	14.08	2.86	0.56	2.28	0.36	2.17	0.44	12.21	1.13	0.16	1.08	0.16
shaly limestone	Silurian	S-3	18.52	39.99	5.11	20.85	4.28	0.89	3.65	0.55	3.20	0.62	17.45	1.60	0.23	1.38	0.22
shaly limestone	Silurian	S-2	29.03	56.47	6.41	23.17	4.22	0.82	3.39	0.54	3.32	0.70	18.61	1.98	0.31	2.01	0.31
limestone	Ordovician	O-7	12.72	20.47	3.07	12.29	2.39	0.53	2.24	0.32	1.77	0.34	12.12	0.83	0.11	0.62	0.09
limestone	Ordovician	O-6	11.59	28.16	3.69	14.69	3.13	0.82	3.15	0.44	2.43	0.47	15.17	1.23	0.19	1.29	0.21
limestone	Ordovician	O-5	11.99	29.81	3.58	14.44	3.37	0.68	3.02	0.49	2.77	0.53	15.43	1.38	0.20	1.51	0.23
calcareous	Ordovician	O-4	12.28	34.39	4.29	17.28	3.77	0.86	3.71	0.60	3.48	0.68	18.48	1.70	0.23	1.43	0.22
calcareous	Ordovician	O-3	16.13	33.06	3.72	13.72	2.51	0.39	2.07	0.32	1.97	0.43	11.88	1.32	0.22	1.68	0.29
shale	Cambrian	Cam-17	35.40	62.61	6.58	21.97	3.71	0.77	3.17	0.55	3.79	0.87	23.10	2.62	0.43	2.87	0.45
calcareous	Cambrian	Cam-13	32.76	74.87	9.57	41.23	10.40	2.25	9.60	1.40	7.98	1.52	38.46	3.79	0.51	3.42	0.50
calcareous	Cambrian	Cam-12	27.02	61.29	7.96	32.33	6.99	1.53	6.99	1.03	6.02	1.19	30.13	3.05	0.43	2.98	0.45
glauconitic	Cambrian	Cam-8	41.32	91.19	11.23	44.66	9.79	2.10	8.70	1.29	7.39	1.49	38.21	3.91	0.54	3.56	0.53
lenticular p	Cambrian	Cam-2	27.31	89.45	13.95	74.30	23.70	5.51	22.49	3.13	15.61	2.56	66.90	5.23	0.59	3.05	0.44
glauconitic	Cambrian	Cam-1	263.53	1025.41	208.39	1238.49	403.73	93.63	386.28	51.18	238.96	36.79	1001.77	65.30	5.75	24.39	3.06
silty shale	Ediacaran	Te-12	38.89	71.98	7.77	26.73	4.41	0.94	3.76	0.62	4.24	0.95	26.28	2.79	0.45	2.97	0.47
shale	Ediacaran	Te-10	86.51	240.01	35.37	181.92	56.57	12.84	58.98	7.93	38.72	6.75	193.31	14.00	1.47	7.99	1.10
shale	Ediacaran	Te-6	77.43	196.50	24.12	104.59	26.97	6.63	26.70	3.78	19.88	3.77	102.03	8.89	1.11	6.90	1.01
shale	Ediacaran	Te-3	50.39	102.42	11.96	43.38	7.07	1.38	5.23	0.84	5.42	1.19	31.41	3.43	0.55	3.68	0.56
silty shale	Ediacaran	FS2-20	49.45	108.95	13.00	52.81	12.21	2.90	11.49	1.67	9.33	1.81	47.17	4.55	0.62	4.01	0.60
siltstone	Ediacaran	FS2-19	40.91	81.82	8.88	31.52	5.85	1.27	4.91	0.80	5.24	1.16	28.89	3.27	0.48	3.32	0.50
calcareous	Ediacaran	FS2-14	39.70	74.44	7.79	28.02	5.01	1.18	4.25	0.67	4.36	0.95	24.04	2.77	0.43	2.85	0.43
calcareous	Ediacaran	FS2-12	25.96	67.00	8.11	33.33	7.55	1.68	6.52	1.00	5.87	1.11	28.50	2.86	0.40	2.71	0.40
shale	Ediacaran	FS2-11	40.19	101.32	12.20	48.44	10.24	2.25	9.03	1.47	9.21	1.84	52.18	4.68	0.67	4.17	0.62
limestone	Ediacaran	FS2-10	27.92	75.99	10.44	47.23	12.71	3.07	12.72	1.96	10.51	1.86	53.22	4.14	0.53	3.13	0.46
silty shale	Ediacaran	FS2-9	46.00	135.63	21.66	111.43	34.60	8.25	33.55	4.45	20.97	3.37	94.48	6.43	0.64	3.56	0.49
Shale	Ediacaran	FS2-7	37.44	77.51	9.00	33.54	6.72	1.37	5.61	0.87	5.39	1.11	28.33	3.04	0.44	3.03	0.44
Silty shale	Ediacaran	FS2-6	38.44	91.49	10.79	42.05	7.98	1.68	6.02	0.90	5.42	1.12	29.24	3.01	0.44	2.89	0.44
Weathered	Ediacaran	FS2-4	39.51	79.98	8.97	32.83	6.00	1.25	4.86	0.77	4.89	1.02	26.70	2.83	0.43	2.85	0.43
Silty shale	Ediacaran	FS2-3	31.22	79.20	9.68	39.10	7.97	1.60	6.23	0.92	5.37	1.05	27.91	2.69	0.39	2.45	0.36
Silty sands	Ediacaran	FS2-2	33.61	69.98	7.95	30.12	6.28	1.33	5.49	0.87	5.42	1.14	29.75	3.04	0.44	3.01	0.45
Silty shale	Ediacaran	FS2-1	39.86	78.24	8.47	30.86	5.64	1.17	4.68	0.76	5.12	1.14	28.80	3.25	0.49	3.31	0.50
siltstone	Ediacaran	FS1-18	35.68	81.06	9.39	35.89	6.97	1.47	5.81	0.87	5.23	1.03	29.32	2.73	0.38	2.55	0.39
siltstone	Ediacaran	FS1-17	30.58	68.87	7.85	29.83	6.02	1.33	4.87	0.74	4.29	0.87	23.85	2.30	0.32	2.20	0.34
siltstone	Ediacaran	FS1-16	34.20	79.25	9.16	35.14	6.74	1.49	5.50	0.83	4.92	0.98	28.90	2.54	0.35	2.29	0.34
laminated	Ediacaran	FS1-14	40.06	78.35	8.60	32.14	6.15	1.40	5.10	0.80	5.18	1.14	29.75	3.27	0.49	3.42	0.53
siltstone	Ediacaran	FS1-13	28.36	63.29	7.24	27.62	5.52	1.27	4.56	0.69	4.10	0.83	22.74	2.17	0.30	2.09	0.32
laminated	Ediacaran	FS1-12	31.15	68.60	7.81	30.21	6.18	1.45	5.35	0.81	4.75	0.93	25.45	2.40	0.33	2.19	0.33
shale	Ediacaran	FS1-11	57.06	115.26	12.82	48.03	9.16	2.15	7.43	1.05	6.31	1.28	32.71	3.49	0.51	3.47	0.54
Silty sands	Ediacaran	FS1-10	48.70	106.26	12.53	47.77	9.49	1.77	8.09	1.26	7.42	1.47	42.10	3.74	0.51	3.47	0.53
Silty sands	Ediacaran	FS1-9	36.99	83.66	9.88	38.02	7.72	1.58	6.86	1.09	6.59	1.30	36.37	3.27	0.44	2.92	0.44
Silty sands	Ediacaran	FS1-8	46.70	98.83	11.04	41.60	7.94	1.97	6.33	0.92	5.41	1.11	28.10	2.86	0.42	2.85	0.44
Shale	Ediacaran	FS1-7	52.45	100.22	11.23	41.49	7.78	1.65	6.25	0.96	6.12	1.34	35.46	3.80	0.58	4.07	0.64
Silty sands	Ediacaran	FS1-6	40.01	85.15	9.65	36.29	7.01	1.68	5.46	0.80	4.69	0.97	25.43	2.63	0.39	2.62	0.40
Silty shale	Ediacaran	FS1-5	38.01	83.32	9.66	36.97	6.99	1.58	5.47	0.76	4.47	0.92	24.22	2.44	0.35	2.34	0.37
Silty shale	Ediacaran	FS1-4	30.52	61.02	6.88	25.77	4.99	1.05	4.01	0.60	3.75	0.80	21.55	2.24	0.33	2.37	0.37
Silty shale	Ediacaran	FS1-3	40.64	90.49	10.48	40.12	7.54	1.52	5.94	0.86	5.08	1.02	27.59	2.75	0.40	2.70	0.42
Silty shale	Ediacaran	FS1-2	39.17	80.52	8.83	33.00	6.21	1.37	5.05	0.77	4.74	1.01	26.49	2.78	0.41	2.75	0.43

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7 Table S4.

Samples	Age	Rock interval	$\delta^{15}\text{N}$ ‰	TN wt.‰	$\delta^{13}\text{C}$ ‰	TOC wt.‰	C/N mol/mol	K2O %
S-19	Silurian	IV	0,6	0,05	-28,8	0,25	5,6	-
S-17	Silurian	IV	2,5	0,04	-28,6	0,31	9,1	1,11
S-15	Silurian	IV	1,6	0,05	-28,7	0,30	7,9	0,90
S-14	Silurian	IV	2,8	0,04	-28,5	0,43	11,6	0,71
S-13	Silurian	IV	1,8	0,05	-27,7	0,41	9,7	0,59
S-12	Silurian	IV	3,4	0,05	-27,0	0,37	8,9	0,68
S-11	Silurian	IV	1,9	0,04	-27,3	0,37	9,6	0,67
S-10	Silurian	IV	3,5	0,04	-27,7	0,29	8,7	1,06
S-9	Silurian	IV	3,0	0,05	-27,6	0,21	5,2	-
S-7	Silurian	IV	3,0	0,03	-27,3	0,34	11,4	0,97
S-6	Silurian	III	3,9	0,05	-28,6	0,24	5,9	-
S-4	Silurian	III	3,9	0,06	-25,9	0,32	6,4	1,20
S-2	Silurian	III	4,0	0,05	-26,9	0,23	5,2	2,96
S-1	Silurian	III	3,6	0,02	-28,6	0,10	5,6	-
O-9	Ordovician	III	0,8	0,04	-27,9	0,22	6,0	-
O-8	Ordovician	III	3,3	0,01	-28,5	0,09	7,7	-
O-7	Ordovician	III	3,3	0,05	-30,2	0,62	15,0	0,51
O-4	Ordovician	III	b.d.	b.d.	-29,0	0,03	-	0,25
Cm-17	Cambrian	III	5,1	0,07	-28,7	0,14	2,4	5,26
Cm-15	Cambrian	III	4,9	0,01	-28,4	0,06	4,9	-
Cm-14	Cambrian	III	4,0	0,01	-28,8	0,04	4,6	-
Cm-13	Cambrian	III	b.d.	b.d.	-28,0	0,03	-	1,98
Cm-12	Cambrian	III	b.d.	b.d.	-28,3	0,02	-	1,74
Cm-10	Cambrian	III	3,7	0,03	-27,6	0,08	3,3	-
Cm-2	Cambrian	III	5,2	0,02	-27,9	0,05	3,4	-
Tr-14	Ediacaran	III	5,3	0,04	-28,6	0,14	3,6	-
Tr-12	Ediacaran	III	4,8	0,04	-28,9	0,21	6,5	4,26
Tr-8	Ediacaran	III	4,9	0,04	-28,1	0,14	4,3	-
Tr-3	Ediacaran	III	4,6	0,04	-26,9	0,17	5,6	4,82
FS2-19	Ediacaran	III	4,6	0,04	-30,0	0,11	3,5	-
FS2-15	Ediacaran	III	b.d.	b.d.	-29,9	0,04	-	-
FS2-13	Ediacaran	II	1,8	0,02	-31,9	0,06	3,2	-
FS2-12	Ediacaran	II	2,5	0,02	-29,5	0,04	2,2	2,28
FS2-10	Ediacaran	II	3,3	0,04	-29,8	0,27	7,8	1,25
FS2-9	Ediacaran	II	2,9	0,05	-29,1	0,15	3,8	1,61
FS2-6	Ediacaran	II	4,6	0,03	-29,6	0,12	5,4	3,67
FS1-9	Ediacaran	II	b.d.	b.d.	-27,9	0,03	-	2,25
FS1-4	Ediacaran	II	4,7	0,02	-28,7	0,09	4,1	2,80
FN2-16	Ediacaran	I	5,1	0,10	-27,4	0,86	9,8	-
FN2-14	Ediacaran	I	3,9	0,08	-28,5	0,58	8,2	-
FN2-12	Ediacaran	I	4,8	0,07	-29,0	0,63	10,9	-
FN2-11	Ediacaran	I	4,8	0,06	-28,0	0,45	9,0	-
FN2-9	Ediacaran	I	5,4	0,09	-28,3	0,78	10,2	-
FN2-5	Ediacaran	I	4,9	0,07	-27,2	0,42	6,8	-
FN2-3	Ediacaran	I	3,0	0,05	-26,5	0,52	11,2	4,00
FN2-1	Ediacaran	I	5,0	0,07	-27,4	0,33	5,3	3,61
FY3-5	Ediacaran	I	4,2	0,01	-29,1	0,11	9,5	5,92

b.d., below detection

-, not measured

8

9