

Supporting information

Table S1 Average activity concentrations (Bq.kg⁻¹ dry weight) of Edale sediments (total dissolution) and loss on ignition (wt.%) of the hierarchical cluster analysis (S.D. = standard deviation).

Group T1

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E3	24	24	20	45	5
E6	24	27	19	29	6
E9	22	24	45	36	5
E10	36	41	20	39	6
E13	19	21	21	15	3
E14	18	18	13	29	2
E15	9	12	9	18	4
E20	14	15	19	36	2
E21	20	24	20	33	4
Mean	21	23	21	31	4
S.D.	8	8	10	10	2

Group T2

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E2	43	49	46	53	7
E5	34	38	34	66	6
E11	46	45	37	70	5
E12	35	38	33	61	3
Mean	40	42	38	63	5
S.D.	6	5	6	7	2

Group T3

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E1	72	75	30	70	6
E4	30	32	31	131	5
E22	86	84	64	119	6
Mean	63	64	42	106	6
S.D.	29	28	19	32	0.6

Group T4

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E19	64	59	33	107	19
E24	48	65	56	104	15
E25	51	63	38	89	15
Mean	54	62	42	100	16
S.D.	9	3	12	10	2

Group T5

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E7	25	29	19	57	13
E16	24	23	25	40	18
E17	41	53	38	44	18
E18	33	47	27	48	11
Mean	31	38	27	47	15
S.D.	8	14	8	7	4

Table S2 Average activity concentrations (Bq.kg⁻¹ dry weight) of Edale sediments (leached) and loss on ignition (wt.%) of the hierarchical cluster analysis (S.D. = standard deviation).

Group L1

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E3	7	9	6	17	5
E5	14	18	19	21	6
E6	7	8	7	13	6
E9	10	13	13	14	5
E10	17	20	20	19	6
E11	9	10	19	24	5
E13	18	22	6	9	3
E14	5	6	5	10	2
E15	5	5	3	8	4
E20	8	10	14	11	2
E21	11	15	14	35	4
Mean	10	12	12	16	4
S.D.	5	6	6	8	2

Group L2

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E1	25	31	18	56	6
E2	19	25	28	53	7
E12	25	27	40	20	3
E18	17	20	15	39	11
Mean	21	26	25	42	7
S.D.	4	4	12	16	3

Group L3

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E7	7	8	6	14	13
E16	7	9	6	9	18
E17	13	15	9	41	18
Mean	9	11	7	22	17
S.D.	4	4	2	17	3

Group L4

	²³⁸ U	²³⁴ U	²³⁰ Th	²²⁶ Ra	L.O.I
E19	32	33	30	86	19
E22	40	47	42	84	6
E24	29	39	22	115	15
E25	34	47	24	92	15
Mean	34	41	30	94	14
S.D.	5	7	9	15	5

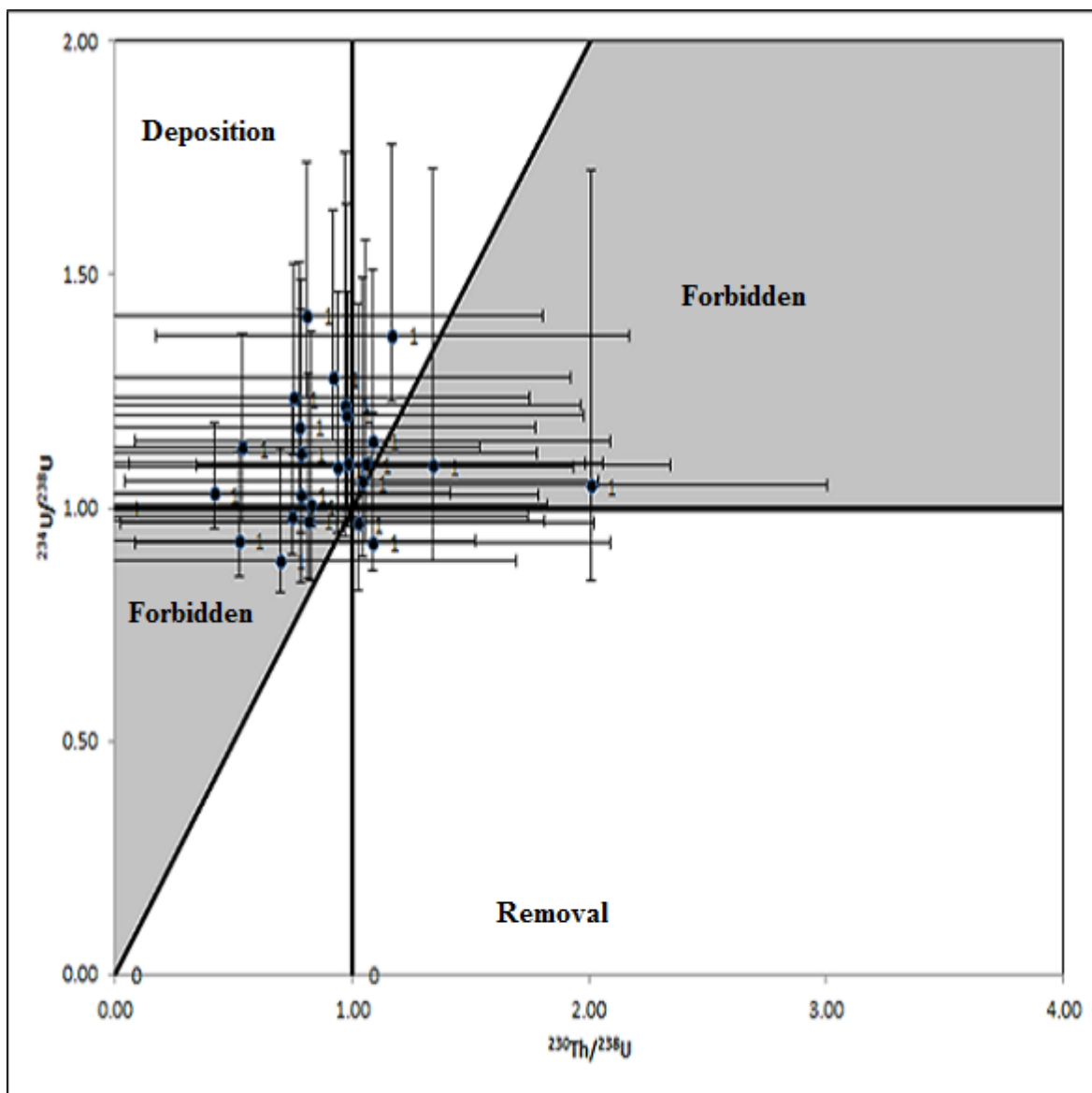


Figure S1 $^{234}\text{U}/^{238}\text{U}$ vs $^{230}\text{Th}/^{238}\text{U}$ diagram for total dissolution analyses of sediments from Edale Valley (Grey colour represents forbidden zones)

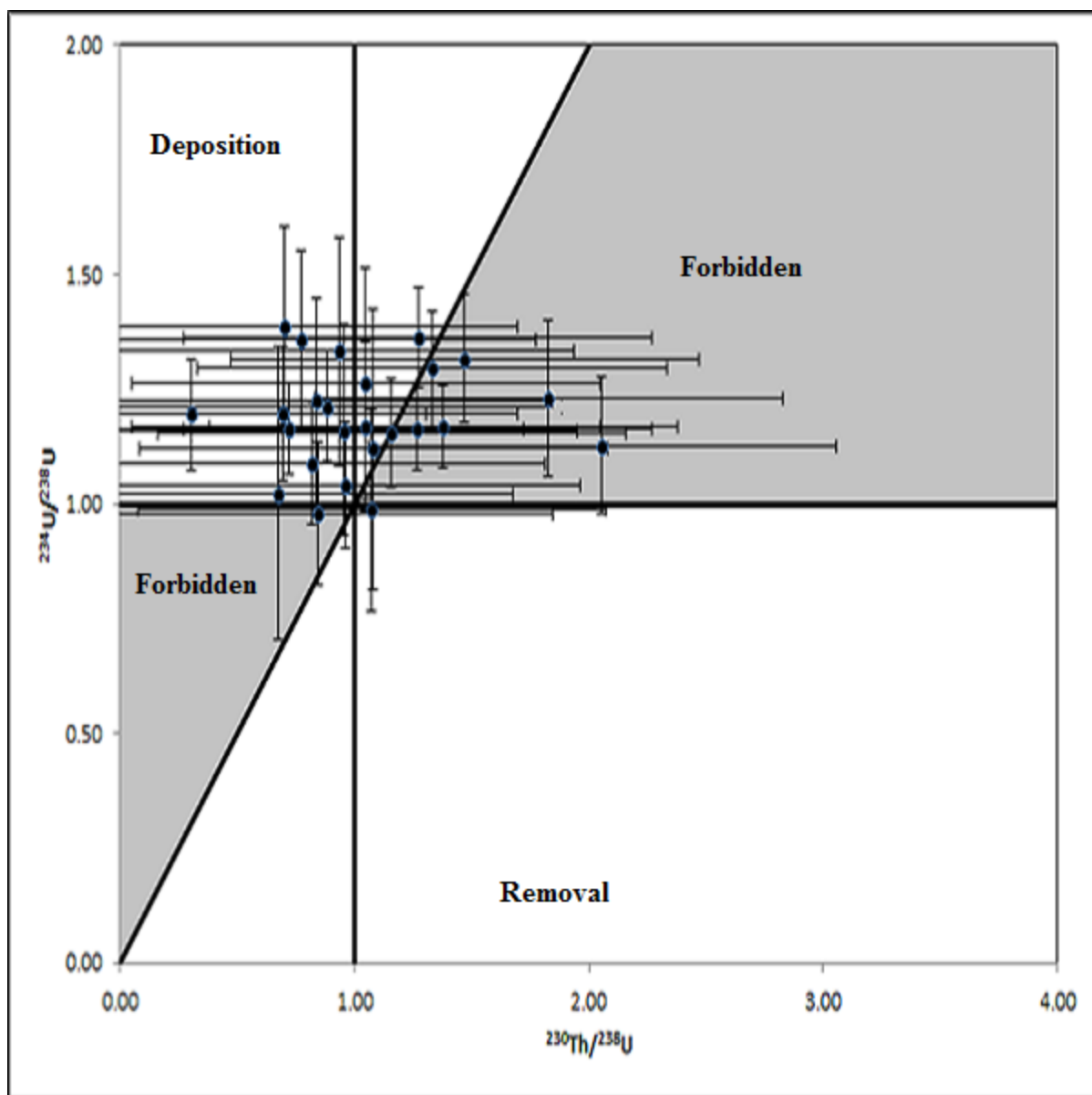


Figure S2 $^{234}\text{U}/^{238}\text{U}$ vs $^{230}\text{Th}/^{238}\text{U}$ diagram for aqua regia leaching of sediments from Edale Valley (Grey colour represents forbidden zones)

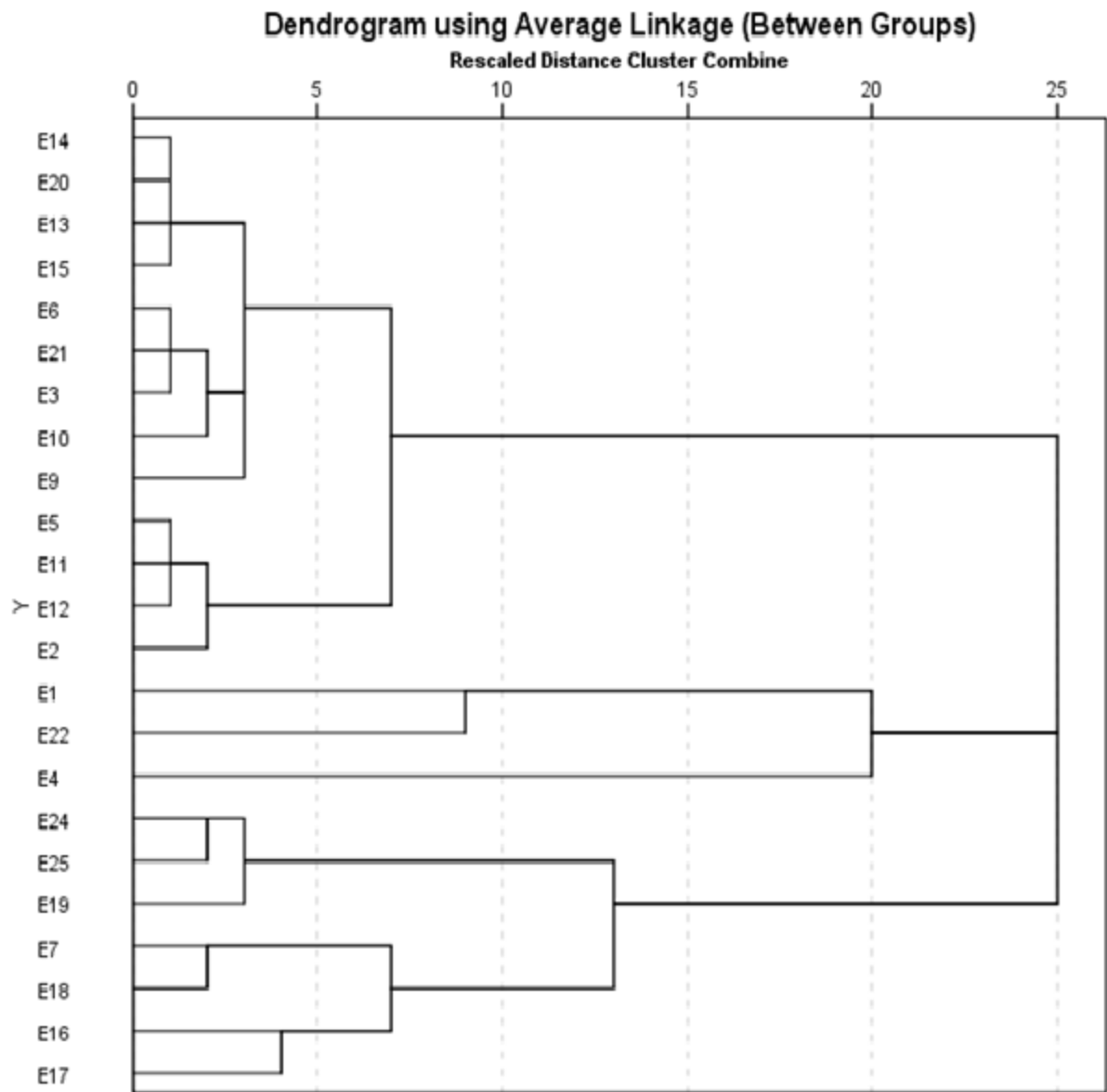


Figure S3 Dendrogram illustrating cluster analysis, from total dissolution data, for sediments from Edale valley based on five variables: $[^{238}\text{U}]$, $[^{234}\text{U}]$, $[^{230}\text{Th}]$, $[^{226}\text{Ra}]$ and loss on ignition

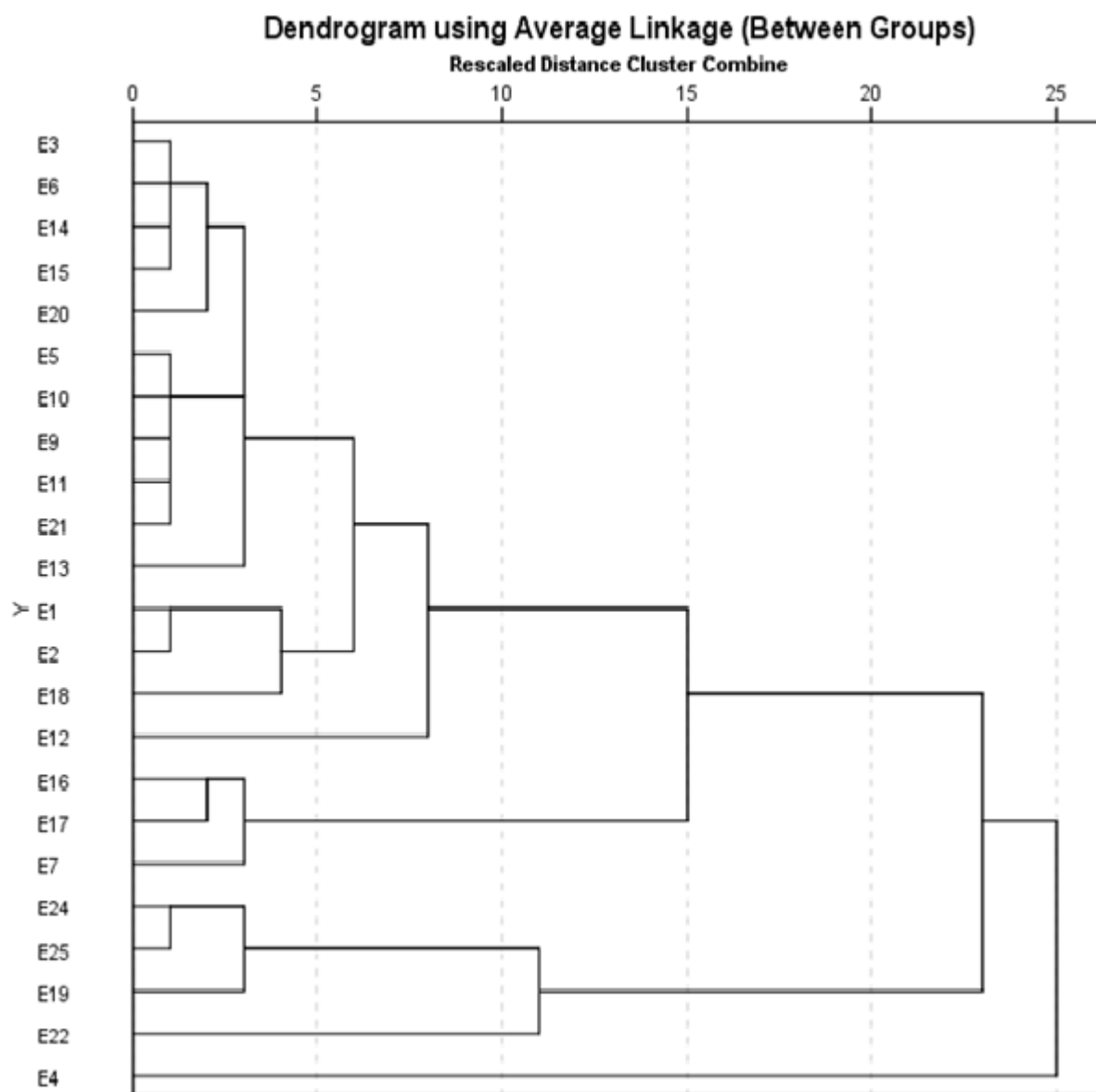


Figure S4 Dendrogram illustrating cluster analysis, from aqua regia leaching, of sediments from Edale valley based on five variables: $[^{238}\text{U}]$, $[^{234}\text{U}]$, $[^{230}\text{Th}]$, $[^{226}\text{Ra}]$ and loss on ignition