

Electronic supplementary information (ESI) to

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Development and field test of a mobile continuous flow system utilizing Chemcatcher for monitoring of rare earth elements in marine environments.

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Contents: Tables S1, S2, and S3.

Table S1. Method limits of detection (LOD) for REEs in Chemcatcher blank sampler and water samples using an Agilent 8800-ICP-MS-MS instrument (see section 2.7 for details)

Element	Chemcatcher LOD [ng L ⁻¹]	Spot sampling LOD [ng L ⁻¹]
Sc	7.44	5.97
Y	0.79	3.24
La	1.28	2.74
Ce	4.36	3.15
Pr	0.27	2.72
Nd	0.41	3.33
Sm	0.32	3.20
Eu	0.19	2.70
Gd	3.59	2.60
Tb	0.13	2.48
Dy	0.14	1.94
Ho	0.13	2.35
Er	0.10	2.89
Tm	0.05	2.52
Yb	0.44	2.48
Lu	0.05	2.26

Table S2. Combined uncertainty of TWA concentration of REE elements estimated with the law of error propagation for the sampling area A (see section 3.3 for details)

Element	$s_{m(t)}/m(t) \cdot 100\%$	$s_{R_S}/R_S \cdot 100\%$	$s_t/t \cdot 100\%$	$s_{cTWA} \cdot 100\%$	$s_{cTWA}/[\text{ng/L}]$
Sc	41.0	28.5	0.3	49.9	7.8
Y	16.0	30.2	0.3	34.2	7.1
La	43.7	25.3	0.3	50.5	5.2
Ce	39.5	30.5	0.3	49.8	5.7
Pr	59.3	28.3	0.3	65.7	3.4
Nd	48.4	22.6	0.3	53.4	7.6
Sm	64.1	25.1	0.3	68.9	5.1
Eu	66.0	27.5	0.3	71.5	4.4
Gd	61.1	22.5	0.3	65.1	6.5
Tb	74.2	28.5	0.3	79.5	3.5
Dy	54.7	23.0	0.3	59.3	6.0
Ho	66.2	29.1	0.3	72.3	3.3
Er	56.9	26.7	0.3	62.8	4.8
Tm	70.4	36.2	0.3	79.1	3.5
Yb	53.4	22.8	0.3	58.1	6.2
Lu	68.1	28.3	0.3	73.8	2.9

Table S3. Combined uncertainty of TWA concentration of REE elements estimated with the law of error propagation for the sampling area B (see section 3.3 for details)

Element	$s_{m(t)}/m(t) \cdot 100\%$	$s_{R_S}/R_S \cdot 100\%$	$s_t/t \cdot 100\%$	$s_{cTWA} \cdot 100\%$	$s_{cTWA}/[\text{ng/L}]$
Sc	64.2	28.5	0.4	70.2	23.2
Y	12.0	30.2	0.4	32.5	9.6
La	28.1	25.3	0.4	37.8	6.3
Ce	35.0	30.5	0.4	46.4	9.1
Pr	28.8	28.3	0.4	40.4	3.9
Nd	30.7	22.6	0.4	38.1	9.2
Sm	35.7	25.1	0.4	43.7	6.3
Eu	27.6	27.5	0.4	39.0	4.2
Gd	28.0	22.5	0.4	35.9	6.3
Tb	29.2	28.5	0.4	40.8	3.2
Dy	24.0	23.0	0.4	33.2	6.1
Ho	31.8	29.1	0.4	43.1	3.5
Er	29.0	26.7	0.4	39.4	5.6
Tm	34.0	36.2	0.4	49.6	3.9
Yb	25.2	22.8	0.4	34.0	6.2
Lu	33.4	28.3	0.4	43.8	3.1