



Geochemistry, Geophysics, Geosystems

Supporting information for

Yttrium and Rare Earth Element partitioning in seawaters from the Bay of Bengal

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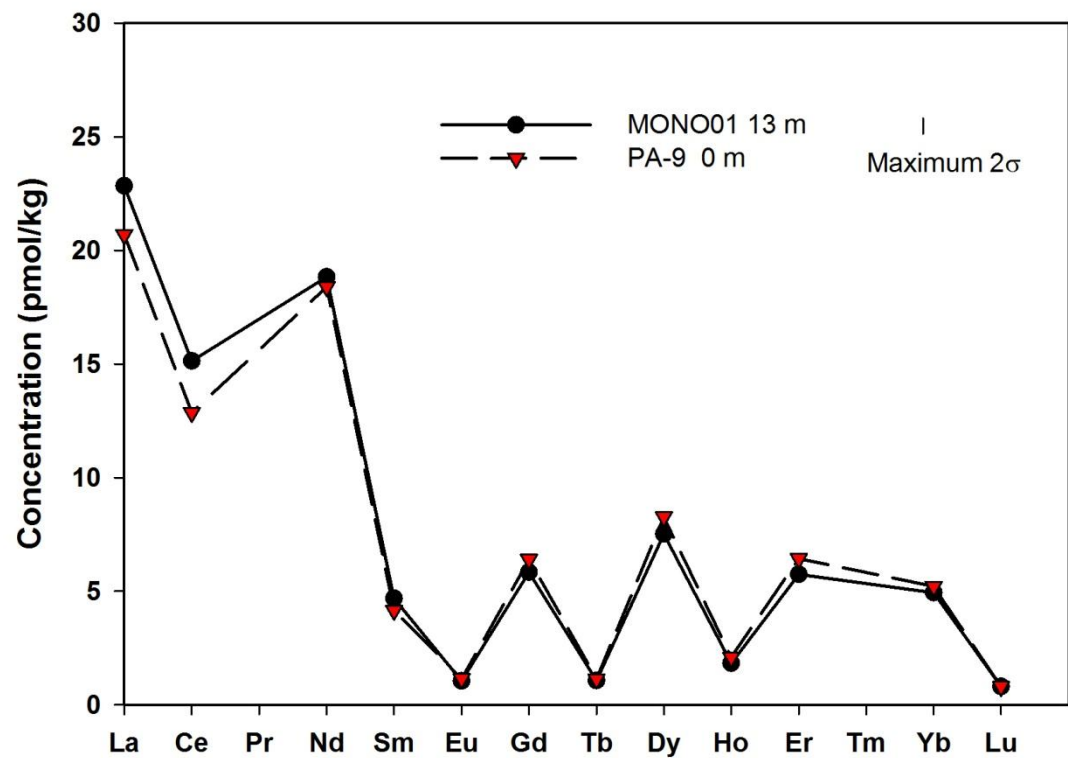


Fig. S1 The concentration profiles of surface water in stations MONO01 and PA-9 [Nozaki and Alibo, 2003].

Table S1. Depth profiles of dissolved REE concentration in the Bay of Bengal (pmol/kg)

Station	Depth (m)	Y	La	Ce	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Yb	Lu	Ce/Ce*	HREE/LREE	MREE/MREE*
MONO09	5	332.1	62.6	41.6	51.6	11.7	3.1	14.1	2.5	16.9	4.0	11.9	9.6	1.5	0.3	2.6	1.3
(16,2°N 87,9°E max. depth≈2607)	300	152.1	31.3	9.3	20.9	4.6	1.2	5.5	0.9	6.4	1.6	4.9	4.6	0.8	0.2	3.0	1.1
	500	158.3	33.3	7.8	22.9	4.7	1.4	6.2	1.0	6.8	1.7	5.4	5.1	0.9	0.1	3.1	1.1
	1500	202.5	40.0	7.3	27.3	5.5	1.4	7.2	1.1	8.2	2.0	6.6	6.6	1.1	0.1	3.3	1.0
	2200	196.6	44.0	15.1	30.6	6.4	1.6	8.5	1.3	9.2	2.4	7.8	8.0	1.4	0.2	3.6	1.0
	2592	220.0	44.8	7.5	30.9	6.3	1.5	8.1	1.3	9.4	2.3	7.9	8.1	1.4	0.1	3.6	1.0
MONO06	5	275.5	40.0	25.5	33.4	8.3	2.0	10.2	1.8	12.6	3.0	9.3	7.5	1.2	0.3	3.1	1.3
(18°N 89,4°E max. depth≈2140)	17	293.2	42.2	27.0	36.5	8.8	2.3	11.1	1.9	13.1	3.2	9.9	8.1	1.2	0.3	3.0	1.3
	30	234.7	34.3	21.6	29.9	7.2	1.8	8.9	1.6	11.0	2.6	8.2	6.8	1.0	0.3	3.1	1.3
	71	155.0	28.8	18.0	22.2	5.0	1.3	7.7	1.1	8.7	2.2	6.7	5.5	0.9	0.3	3.4	1.3
	99	189.5	28.0	11.1	21.2	4.7	1.2	6.5	1.1	7.7	1.9	5.9	5.2	0.8	0.2	3.3	1.2
	129	156.7	27.6	7.0	19.6	4.2	1.1	5.6	1.0	6.8	1.7	5.3	4.6	0.7	0.1	3.2	1.2
	200	153.8	30.7	9.4	20.0	4.4	1.0	5.6	0.9	6.4	1.5	5.0	4.6	0.8	0.2	3.1	1.1
	300	139.0	29.8	8.2	19.7	4.2	1.1	5.7	0.9	6.2	1.6	4.9	4.6	0.8	0.2	3.2	1.1
	400	151.1	31.8	7.8	22.3	4.8	1.2	5.7	1.0	6.8	1.6	5.4	4.9	0.8	0.1	3.0	1.1
	700	153.8	33.8	7.6	22.3	4.8	1.2	6.3	1.0	6.9	1.7	5.5	5.3	0.9	0.1	3.3	1.1
	900	168.5	35.6	6.4	24.6	5.3	1.3	6.5	1.1	7.5	1.9	6.1	6.0	1.0	0.1	3.3	1.0
	1101	142.9	36.8	6.8	24.3	5.2	1.4	7.0	1.1	7.7	2.0	6.3	6.2	1.1	0.1	3.5	1.1
1300	192.3	37.9	6.0	26.0	5.6	1.5	6.8	1.2	7.8	2.0	6.3	6.2	1.0	0.1	3.3	1.0	

	1500	198.4	39.8	6.2	28.1	5.9	1.5	7.5	1.2	8.5	2.1	6.8	7.1	1.1	0.1	3.5	1.0
	1800	217.0	42.9	6.8	30.8	6.6	1.7	8.0	1.3	9.3	2.3	7.6	7.7	1.3	0.1	3.4	1.0
	2100	211.6	41.6	6.0	28.6	6.1	1.6	7.4	1.3	8.7	2.2	7.3	7.6	1.3	0.1	3.6	1.0
	2118	219.7	44.1	6.3	29.8	6.2	1.5	7.7	1.3	9.0	2.2	7.4	7.6	1.3	0.1	3.5	1.0
	2128	212.3	43.1	7.5	29.5	6.2	1.8	7.6	1.3	9.0	2.3	7.5	7.9	1.3	0.1	3.7	0.9
MONO04b	5	296.5	45.5	25.6	38.3	9.4	2.4	13.2	2.1	15.2	3.8	11.5	9.4	1.5	0.3	3.4	1.3
(17,2°N 89,5°E max. depth≈2350)	49	202.1	31.3	17.6	25.7	6.1	1.6	9.0	1.4	10.3	2.6	7.9	6.4	1.0	0.3	3.4	1.3
	98	194.3	32.5	17.4	21.6	4.8	1.2	6.9	1.0	7.2	1.8	5.5	4.7	0.8	0.3	3.0	1.3
	99	160.1	29.3	11.2	20.1	4.4	1.2	6.6	1.0	7.3	1.8	5.5	4.8	0.8	0.2	3.3	1.3
	199	137.4	27.9	11.4	18.2	4.0	1.0	5.6	0.9	6.0	1.5	4.8	4.5	0.8	0.2	3.4	1.1
	300	131.8	31.3	6.3	19.9	4.2	1.0	5.8	0.9	6.1	1.5	4.8	4.6	0.8	0.1	3.1	1.1
	500	161.9	32.7	7.6	22.3	4.9	1.1	6.1	1.0	6.7	1.6	5.1	5.0	0.8	0.1	3.1	1.1
	749	178.1	34.8	7.1	22.5	4.7	1.2	6.3	1.0	6.7	1.7	5.4	5.2	0.9	0.1	3.2	1.1
	998	186.3	36.8	5.6	25.6	5.4	1.5	6.9	1.1	7.6	1.8	6.1	6.0	1.0	0.1	3.2	1.0
	1499	217.8	42.4	8.1	29.0	6.1	1.5	7.3	1.2	8.4	2.1	6.8	6.8	1.1	0.1	3.2	1.0
	1899	222.5	46.3	8.1	29.9	6.4	1.6	8.4	1.3	8.9	2.3	7.4	7.4	1.3	0.1	3.4	1.0
	2300	194.7	43.4	5.9	27.8	5.9	1.5	7.9	1.2	8.6	2.2	7.5	7.7	1.4	0.1	3.8	1.0
2329	205.5	45.5	12.5	29.3	6.0	1.4	8.0	1.2	8.6	2.3	7.5	7.7	1.4	0.2	3.6	1.0	
MONO03	5	389.8	47.8	23.7	36.0	8.7	2.3	12.7	2.0	13.8	3.5	10.4	8.4	1.3	0.2	3.2	1.4
(14,8°N 89,1°E max. depth≈2805)	20	322.0	40.2	22.3	34.4	9.0	2.2	11.3	2.0	14.1	3.3	10.2	8.4	1.3	0.3	3.3	1.3
	45	237.2	32.7	19.2	26.9	6.5	1.7	9.2	1.5	10.5	2.7	8.1	6.6	1.1	0.3	3.4	1.3

	68	163.5	24.4	11.6	19.7	4.7	1.2	7.4	1.2	8.5	2.2	6.7	5.7	0.9	0.2	4.0	1.3
	90	143.7	23.2	8.4	17.1	4.1	1.0	6.0	1.0	7.1	1.8	5.6	5.0	0.8	0.2	4.0	1.2
	120	163.6	30.8	12.8	20.1	4.3	1.1	6.0	0.9	6.3	1.6	4.9	4.4	0.7	0.2	3.0	1.2
	160	122.4	26.2	7.4	17.4	3.8	1.0	5.3	0.9	6.0	1.5	4.7	4.3	0.7	0.2	3.4	1.2
	200	153.8	34.0	11.2	19.2	4.0	1.1	5.4	0.9	6.2	1.5	4.8	4.5	0.7	0.2	3.2	1.1
	300	124.8	27.8	5.6	18.4	3.9	1.0	5.5	0.8	5.9	1.5	4.8	4.5	0.8	0.1	3.4	1.1
	895	180.8	34.0	4.9	22.4	4.8	1.2	6.2	1.0	6.7	1.7	5.5	5.4	0.9	0.1	3.3	1.1
	1100	189.5	39.7	9.6	24.9	5.2	1.3	6.8	1.0	6.9	1.8	5.7	5.5	1.0	0.1	3.1	1.1
	1500	227.1	43.1	7.7	26.1	5.5	1.5	7.1	1.1	7.6	2.0	6.2	6.1	1.1	0.1	3.2	1.0
	1800	176.8	36.8	5.9	25.8	5.5	1.3	7.2	1.1	8.1	2.2	7.0	7.2	1.3	0.1	3.8	1.0
	2100	219.8	43.6	9.7	30.3	6.3	1.5	7.6	1.3	8.9	2.2	7.5	7.8	1.3	0.1	3.5	0.9
	2400	231.1	46.6	8.7	31.6	6.5	1.6	7.9	1.3	9.4	2.4	7.9	7.7	1.4	0.1	3.3	1.0
	2700	256.8	47.9	9.1	30.0	6.2	1.5	8.0	1.2	8.6	2.2	7.3	7.4	1.3	0.1	3.4	1.0
	2780	248.9	51.4	18.3	31.3	6.2	1.5	8.1	1.2	8.4	2.2	7.2	7.5	1.4	0.2	3.3	1.0
MONO02	21	218.3	28.6	17.9	24.8	5.9	1.6	7.6	1.4	9.6	2.3	7.1	6.0	0.9	0.3	3.3	1.3
(11,8°N 88,7°E max. depth≈3175)	45	192.8	24.8	12.8	20.8	5.2	1.2	6.3	1.1	8.1	2.0	6.2	5.0	0.8	0.2	3.3	1.3
	67	160.6	21.3	10.0	17.3	4.2	1.2	5.4	0.9	6.8	1.7	5.2	4.4	0.7	0.2	3.5	1.2
	90	115.9	19.4	7.6	13.2	2.9	0.7	4.4	0.7	5.1	1.3	4.2	3.7	0.6	0.2	3.9	1.2
	200	144.4	28.3	6.9	18.7	4.1	1.0	4.9	0.8	5.9	1.5	4.6	4.3	0.7	0.1	3.2	1.1
	400	145.5	28.6	6.5	19.5	4.2	1.0	5.0	0.8	5.9	1.5	4.7	4.5	0.7	0.1	3.2	1.1
	500	153.8	28.4	5.0	19.1	4.4	1.0	5.2	0.9	5.9	1.5	4.8	4.8	0.8	0.1	3.4	1.0
	1107	170.3	33.4	6.1	22.3	4.8	1.1	5.7	1.0	6.6	1.7	5.6	5.4	1.0	0.1	3.3	1.0

	1299	155.6	32.4	5.0	21.6	4.5	1.1	6.0	1.0	6.8	1.8	5.8	5.9	1.1	0.1	3.7	1.0
	1900	200.2	38.3	6.0	26.7	5.7	1.4	7.1	1.2	8.4	2.1	7.1	7.3	1.2	0.1	3.7	1.0
	2100	193.1	39.3	7.8	27.3	5.6	1.4	7.4	1.1	8.3	2.2	7.2	7.4	1.3	0.1	3.7	1.0
	2400	226.9	46.5	10.4	31.4	6.5	1.7	7.8	1.3	8.8	2.3	7.4	7.6	1.3	0.1	3.3	1.0
	2700	223.9	46.2	7.6	32.2	6.5	1.8	8.4	1.3	9.4	2.4	7.9	8.1	1.4	0.1	3.4	1.0
	3001	218.1	46.3	7.2	31.3	6.3	1.5	8.3	1.3	9.3	2.4	8.0	8.2	1.5	0.1	3.6	1.0
	3102	194.4	43.3	8.0	28.0	5.6	1.4	7.4	1.2	8.4	2.2	7.4	7.7	1.4	0.1	3.8	0.9
	3148	214.3	43.5	6.4	27.8	5.6	1.5	7.2	1.2	8.2	2.2	7.4	7.6	1.4	0.1	3.8	0.9
MONO01	13	182.0	22.8	15.1	18.8	4.7	1.0	5.8	1.1	7.5	1.8	5.7	4.9	0.8	0.3	3.6	1.2
(8°N 89,4°E max. depth=3593)	30	157.4	19.4	13.7	15.9	3.5	0.9	4.5	0.8	6.0	1.5	4.6	3.9	0.6	0.3	3.4	1.2
	59	226.9	45.3	7.0	29.4	6.2	1.3	7.3	1.2	8.7	2.2	7.4	7.8	1.3	0.1	3.6	0.9
	90	135.6	20.1	8.6	14.2	3.1	0.7	4.1	0.7	5.1	1.3	4.2	3.7	0.6	0.2	3.6	1.1
	120	135.6	23.8	6.9	16.1	3.5	1.0	4.4	0.8	5.4	1.3	4.3	4.0	0.6	0.2	3.4	1.1
	160	121.0	24.0	6.1	15.4	3.3	0.8	4.6	0.7	5.2	1.4	4.3	4.1	0.7	0.1	3.6	1.1
	200	144.4	34.2	23.4	24.1	5.0	1.3	5.7	0.9	6.2	1.5	4.7	4.4	0.7	0.4	2.5	1.1
	399	133.5	24.6	5.0	16.0	3.6	0.7	4.5	0.8	5.1	1.3	4.3	4.1	0.7	0.1	3.5	1.0
	600	141.7	27.9	8.3	17.8	3.6	0.9	5.0	0.8	5.5	1.5	4.8	4.8	0.9	0.2	3.7	1.0
	1000	168.8	30.9	5.6	20.4	4.4	1.0	5.2	0.9	6.2	1.6	5.1	5.1	0.9	0.1	3.4	1.0
	1251	173.3	31.1	5.7	20.6	4.0	1.0	5.3	0.9	6.3	1.6	5.4	5.6	1.0	0.1	3.7	0.9
	1600	183.0	33.6	6.4	22.4	4.6	1.3	5.8	1.0	6.7	1.7	5.9	6.0	1.0	0.1	3.7	0.9
	2001	180.9	38.4	8.5	24.7	5.0	1.2	6.9	1.1	7.6	2.0	6.8	6.9	1.3	0.1	3.8	0.9
2500	228.2	42.7	8.0	28.1	5.9	1.4	7.1	1.2	8.2	2.1	7.1	7.4	1.3	0.1	3.6	0.9	

	3420	237.3	51.8	12.9	34.3	6.7	1.7	7.8	1.3	9.1	2.4	8.1	8.4	1.5	0.1	3.4	0.9
	3572	239.4	47.5	6.2	30.8	6.0	1.7	7.5	1.3	8.7	2.3	7.9	8.2	1.4	0.1	3.6	0.9

Table S2. Repeated measurements of REE concentration in the Bay of Bengal (pmol/kg)

Station	Depth (m)	Y	La	Ce	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Yb	Lu
MONO09	5	332.1	62.6	41.6	51.6	11.7	3.1	14.1	2.5	16.9	4.0	11.9	9.6	1.5
	5R	303.7	59.9	39.3	48.8	11.0	3.0	15.6	2.3	16.7	4.1	12.1	9.9	1.6
	500	158.3	33.3	7.8	22.9	4.7	1.4	6.2	1.0	6.8	1.7	5.4	5.1	0.9
	500R	139.2	31.4	7.2	21.1	4.6	1.2	6.1	1.0	6.6	1.7	5.3	5.1	0.9
	1500	202.5	40.0	7.3	27.3	5.5	1.4	7.2	1.1	8.2	2.0	6.6	6.6	1.1
	1500R	194.5	38.5	6.4	27.0	5.6	1.7	7.1	1.2	8.1	2.0	6.6	6.7	1.1
	2592	220.0	44.8	7.5	30.9	6.3	1.5	8.1	1.3	9.4	2.3	7.9	8.1	1.4
	2592R	199.6	42.4	6.9	28.8	6.0	1.5	8.1	1.3	9.2	2.4	8.0	8.4	1.5
MONO06	5	275.5	40.0	25.5	33.4	8.3	2.0	10.2	1.8	12.6	3.0	9.3	7.5	1.2
	5R	250.8	37.5	23.5	31.7	7.5	2.0	10.9	1.7	12.3	3.1	9.4	7.6	1.2
	30	234.7	34.3	21.6	29.9	7.2	1.8	8.9	1.6	11.0	2.6	8.2	6.8	1.0
	30R	213.8	33.5	20.6	28.0	6.6	1.6	9.6	1.5	10.9	2.7	8.3	6.9	1.1
	129	156.7	27.6	7.0	19.6	4.2	1.1	5.6	1.0	6.8	1.7	5.3	4.6	0.7
	129R	133.2	26.0	6.7	18.3	4.0	1.1	5.7	0.9	6.7	1.7	5.2	4.7	0.8

	200	153.8	30.7	9.4	20.0	4.4	1.0	5.6	0.9	6.4	1.5	5.0	4.6	0.8
	200R	142.1	28.8	8.7	18.6	4.0	1.0	5.7	0.9	6.3	1.6	5.0	4.7	0.8
	400	151.1	31.8	7.8	22.3	4.8	1.2	5.7	1.0	6.8	1.6	5.4	4.9	0.8
	400R	144.8	30.6	7.5	20.4	4.4	1.1	6.1	1.0	6.6	1.7	5.3	5.0	0.9
	900	168.5	35.6	6.4	24.6	5.3	1.3	6.5	1.1	7.5	1.9	6.1	6.0	1.0
	900R	153.4	34.3	6.0	23.0	4.9	1.3	6.5	1.0	7.2	1.9	5.9	5.8	1.0
	1500	198.4	39.8	6.2	28.1	5.9	1.5	7.5	1.2	8.5	2.1	6.8	7.1	1.1
	1500R	177.8	37.3	5.8	26.3	5.6	1.4	7.4	1.2	8.4	2.2	7.0	7.1	1.3
	1800	217.0	42.9	6.8	30.8	6.6	1.7	8.0	1.3	9.3	2.3	7.6	7.7	1.3
	1800R	235.5	43.6	8.2	29.3	6.1	1.5	8.1	1.2	8.6	2.2	7.1	7.1	1.3
	2100	211.6	41.6	6.0	28.6	6.1	1.6	7.4	1.3	8.7	2.2	7.3	7.6	1.3
	2100R	192.3	39.7	5.6	27.1	5.7	1.4	7.6	1.2	8.5	2.3	7.4	7.7	1.4
	2118	219.7	44.1	6.3	29.8	6.2	1.5	7.7	1.3	9.0	2.2	7.4	7.6	1.3
	2118R	183.7	51.4	5.7	27.4	5.7	1.5	7.6	1.2	8.6	2.3	7.5	7.7	1.4
	2128	212.3	43.1	7.5	29.5	6.2	1.8	7.6	1.3	9.0	2.3	7.5	7.9	1.3
	2128R	190.5	40.7	6.8	27.5	5.7	1.5	7.8	1.2	8.8	2.3	7.6	8.0	1.5
MONO02	21	218.3	28.6	17.9	24.8	5.9	1.6	7.6	1.4	9.6	2.3	7.1	6.0	0.9
	21R	195.9	29.3	17.4	24.0	5.6	1.3	8.4	1.3	9.5	2.4	7.3	6.1	1.0
	45	192.8	24.8	12.8	20.8	5.2	1.2	6.3	1.1	8.1	2.0	6.2	5.0	0.8
	45R	196.9	23.8	12.0	19.6	4.5	1.2	6.7	1.1	7.8	2.0	6.2	5.1	0.8
	67	160.6	21.3	10.0	17.3	4.2	1.2	5.4	0.9	6.8	1.7	5.2	4.4	0.7
	67R	139.0	20.1	9.4	16.1	3.7	0.9	5.5	0.9	6.6	1.7	5.3	4.5	0.8

	200	144.4	28.3	6.9	18.7	4.1	1.0	4.9	0.8	5.9	1.5	4.6	4.3	0.7
	200R	117.3	26.6	6.3	17.3	3.6	1.0	5.2	0.8	5.8	1.5	4.7	4.4	0.8
	400	145.5	28.6	6.5	19.5	4.2	1.0	5.0	0.8	5.9	1.5	4.7	4.5	0.7
	400R	141.1	27.9	6.3	18.9	3.9	1.1	5.1	0.8	5.8	1.5	4.7	4.6	0.7
	500	153.8	28.4	5.0	19.1	4.4	1.0	5.2	0.9	5.9	1.5	4.8	4.8	0.8
	500R	145.8	26.8	4.6	18.0	3.8	1.0	5.3	0.8	5.9	1.6	5.0	4.9	0.9
	1107	170.3	33.4	6.1	22.3	4.8	1.1	5.7	1.0	6.6	1.7	5.6	5.4	1.0
	1107R	155.5	31.4	5.6	20.8	4.4	1.1	6.0	1.0	6.6	1.8	5.6	5.6	1.0
	1900	200.2	38.3	6.0	26.7	5.7	1.4	7.1	1.2	8.4	2.1	7.1	7.3	1.2
	1900R	190.9	36.4	5.7	25.3	5.3	1.4	7.2	1.2	8.2	2.2	7.1	7.5	1.3
	3148	214.3	43.5	6.4	27.8	5.6	1.5	7.2	1.2	8.2	2.2	7.4	7.6	1.4
	3148R	200.5	41.5	5.9	26.6	5.3	1.4	7.3	1.1	8.2	2.2	7.4	7.7	1.4