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Table 1. Modern redox-sensitive environments considered in this study. Water depths are included for context.

Depositional environment	Location	Bottom water H_2S/O_2 (μM)	Water depth at study site (m)	Data source
Silled basins with weakly euxinic to highly euxinic bottom water	Landsort Deep	12	440	Noordmann et al., 2015; Häusler et al., 2018
	Saanich Inlet	20	28-234	Crusius et al., 1996
	Cariaco Basin	50	1350	Calvert et al., 2015
	Black Sea	145-348	380-2164	Ravizza et al., 1991; Lüschen, 2004; Crusius et al., 1996
	Kyllaren Fjord	4000	10, 28	Noordmann et al., 2015
Oxygen minimum zone settings with various O_2 contents	Namibian margin	41	83	Brüchert et al., 2003; Borchers et al., 2005
	Chilean margin	0.1-220	126-798	Nameroff et al., 2002
	Arabian Sea	0.1-83	885-3010	Morford and Emerson, 1999; Vollebregt et al., 2023; Dellwig et al., 2010
	Peru margin	4.5-67.5	85-1357	Böning et al., 2004
	Pakistan margin	5	135-2111	Crusius et al., 1996
	Mexico margin	5-12	97-1020	Nameroff et al., 2002
	NW US margin	25-100	110-1994	Morford and Emerson, 1999
	Washington margin	40	434-3866	Morford et al., 2005
Open ocean oxic settings	Japan Sea	200	817, 1473	Crusius et al., 1996
	African margin	200-240	1445, 2981, 3804	Morford and Emerson, 1999
	Skagerrak	230	380, 695	Bennett and Canfield, 2020
	Long Island Sound	250	9, 18	Bennett and Canfield, 2020
	Svalbard	280	115-329	Bennett and Canfield, 2020

Table 2. Characteristics of RSTM enrichment factors in modern marine sediments. Broad descriptions (i.e., low, moderate, high) are subjective and relate to median ± one standard deviation for each particular elemental enrichment factor. As discussed in the text, some redox groupings have particularly variable ranges either within or amongst different locations, limiting their use as a single defining characteristic. Namibian data are not included in the weakly euxinic U_{EF} category due to abnormal characteristics (see text for details).

	Euxinic	**Anoxic**	**Highly Dysoxic** (<30 µM O_2)	**Weakly Dysoxic** (30-90 µM O_2)	**Oxic** (90-200 µM O_2)	**Oxic** (> 200 µM O_2)
U_{EF}^*	High (2.4 ± 1.8)	High (2.3 ± 0.6)	Moderate (1.4 ± 2.0)	Low (1.1 ± 0.6)	Low (1.2 ± 0.3)	Low (1.0 ± 0.3)
Mo_{EF}^*	High (26 ± 17)	Moderate (5.0 ± 2.1)	Moderate (1.1 ± 12.4)	Low (0.77 ± 1.8)	Low (1.1 ± 0.2)	Low (0.90 ± 0.27)
Re_{EF}^*	High (85 ± 99)	High (119 ± 24)	High (49 ± 100)	Moderate (18 ± 24)	Moderate (57 ± 19)	Low (12 ± 22)
V_{EF}^*	High (1.6 ± 0.3)	Low (1.2 ± 0.1)	Low (1.2 ± 0.3)	Low (1.3 ± 0.1)	Low (1.1 ± 0.1)	Low (1.2 ± 0.4)

Table 3. Characteristics of RSTM ratios in modern marine sediments. Broad descriptions (i.e., low, moderate, high) are subjective and relate to median ± one standard deviation for each particular elemental ratio. As discussed in the text, some redox groupings have particularly variable ranges either within or amongst different locations, limiting their use as a single defining characteristic. Namibian data are not included for Re/U and Mo/U ratios in the weakly euxinic category due to abnormal characteristics (see text for details).

	Euxinic	**Anoxic**	**Highly Dysoxic** (<30 µM O_2)	**Weakly Dysoxic** (30-90 µM O_2)	**Oxic** (90-200 µM O_2)	**Oxic** (> 200 µM O_2)
Re/Mo (ppb/ppm)	Very low (0.32 ± 0.52)	Low (3.8 ± 2.3)	High (18 ± 16)	Moderate (8.7 ± 19)	Moderate (9.0 ± 2.3)	Low (2.5 ± 4.4)
Re/U (ppb/ppm)	Low (1.3 ±1.5)	High (5.1 ± 1.9)	High (5.3 ± 8.2)	Moderate (2.4 ± 1.7)	Moderate (3.9 ± 0.73)	Low (1.0 ± 1.7)
Re/V (ppb/ppm)	High (0.20 ± 0.22)	High (0.20 ± 0.26)	High (0.22 ± 0.24)	Low (0.05 ± 0.06)	moderate (0.12 ± 0.04)	Low (0.02 ± 0.06)
Mo/U	High (4.6 ± 3.4)	Moderate (1.1 ± 0.5)	Low (0.45 ± 1.4)	Low (0.28 ± 1.7)	Low (0.46 ± 0.14)	Low (0.39 ± 0.36)