

# Recent threats on coastal ecosystems by new pollutants: a multiple trace elements study



Jonathan Richir, Jean-Marie Bouquegneau and Sylvie Gobert

MARE Center, Laboratory of Oceanology, University of Liège ULg, Liège, Belgium

## Introduction and objectives:

Some previously poorly studied trace elements can now be considered as chemical pollutants further to the recent modification of their production and industrial uses (fig. 1). In this project, we investigate:

- the potential use of the purple sea urchin (grazer), the posidonia (primary producer) and the Mediterranean mussel (filter feeder) as bioindicators (fig. 2) ;
- bioconcentration and biomagnification processes in the Mediterranean coastal environment ;
- dynamics of absorption and excretion of selected elements in experimental mesocosms ;
- the cartography of the seagrass bed health status of PACA area (Provence-Alpes-Côte d'Azur) and Corsica coast (trace element measures associated to biometry, stable isotopes and C:N:P ; in collaboration with the IFREMER) (fig. 3) ;
- the past evolution of Mediterranean coastal trace element pollutions by lepidochronological analyses<sup>(1)</sup>.

Group 1	Group 2	d transition elements										Group 13	Group 14	Group 15	Group 16																																																																																																																																																																																									
3 Li 0.98 6.941	4 Be 1.57 9.012	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210
11 Na 0.93 22.990	12 Mg 1.31 24.305	19 K 0.82 39.102	20 Ca 1.00 40.08	21 Sc 44.956	22 Ti 47.90	23 V 50.941	24 Cr 51.596	25 Mn 54.938	26 Fe 55.847	27 Co 58.933	28 Ni 58.71	29 Cu 63.546	30 Zn 65.37	31 Al 26.98	32 Si 28.086	33 Ga 69.72	34 Ge 74.922	35 As 72.59	36 Sb 110.69	37 Te 121.75	38 In 114.82	39 Sn 118.69	40 Cd 112.40	41 La 138.31	42 Hf 178.49	43 Ta 180.95	44 W 183.85	45 Re 186.2	46 Os 190.2	47 Ir 192.22	48 Au 195.09	49 Hg 196.97	50 Un 200.59	51 Pb 204.37	52 Bi 207.19	53 Po 208.98	54 (210)																																																																																																																																																																			
35 Cs 0.79 132.91	36 Ba 137.34	37 Rb 85.47	38 Sr 87.62	39 Y 88.906	40 Zr 91.22	41 Nb 92.906	42 Mo 95.94	43 Tc (99)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.4	47 Ag 107.87	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Cd 121.75	52 Te 127.60	53 In 127.60	54 Pb 127.60	55 (210)																																																																																																																																																																																				
55 Cs 0.79 132.91	56 Ba 137.34	57 Rb 85.47	58 Sr 87.62	59 Y 88.906	60 Zr 91.22	61 Nb 92.906	62 Mo 95.94	63 Tc (99)	64 Ru 101.07	65 Rh 102.91	66 Pd 106.4	67 Ag 107.87	68 Cd 112.40	69 In 114.82	70 Sn 118.69	71 Cd 121.75	72 Te 127.60	73 In 127.60	74 Pb 127.60	75 (210)																																																																																																																																																																																				
75 Cs 0.79 132.91	76 Ba 137.34	77 Rb 85.47	78 Sr 87.62	79 Y 88.906	80 Zr 91.22	81 Nb 92.906	82 Mo 95.94	83 Tc (99)	84 Ru 101.07	85 Rh 102.91	86 Pd 106.4	87 Ag 107.87	88 Cd 112.40	89 In 114.82	90 Sn 118.69	91 Cd 121.75	92 Te 127.60	93 In 127.60	94 Pb 127.60	95 (210)																																																																																																																																																																																				
95 Cs 0.79 132.91	96 Ba 137.34	97 Rb 85.47	98 Sr 87.62	99 Y 88.906	100 Zr 91.22	101 Nb 92.906	102 Mo 95.94	103 Tc (99)	104 Ru 101.07	105 Rh 102.91	106 Pd 106.4	107 Ag 107.87	108 Cd 112.40	109 In 114.82	110 Sn 118.69	111 Cd 121.75	112 Te 127.60	113 In 127.60	114 Pb 127.60	115 (210)																																																																																																																																																																																				
115 Cs 0.79 132.91	116 Ba 137.34	117 Rb 85.47	118 Sr 87.62	119 Y 88.906	120 Zr 91.22	121 Nb 92.906	122 Mo 95.94	123 Tc (99)	124 Ru 101.07	125 Rh 102.91	126 Pd 106.4	127 Ag 107.87	128 Cd 112.40	129 In 114.82	130 Sn 118.69	131 Cd 121.75	132 Te 127.60	133 In 127.60	134 Pb 127.60	135 (210)																																																																																																																																																																																				
135 Cs 0.79 132.91	136 Ba 137.34	137 Rb 85.47	138 Sr 87.62	139 Y 88.906	140 Zr 91.22	141 Nb 92.906	142 Mo 95.94	143 Tc (99)	144 Ru 101.07	145 Rh 102.91	146 Pd 106.4	147 Ag 107.87	148 Cd 112.40	149 In 114.82	150 Sn 118.69	151 Cd 121.75	152 Te 127.60	153 In 127.60	154 Pb 127.60	155 (210)																																																																																																																																																																																				
155 Cs 0.79 132.91	156 Ba 137.34	157 Rb 85.47	158 Sr 87.62	159 Y 88.906	160 Zr 91.22	161 Nb 92.906	162 Mo 95.94	163 Tc (99)	164 Ru 101.07	165 Rh 102.91	166 Pd 106.4	167 Ag 107.87	168 Cd 112.40	169 In 114.82	170 Sn 118.69	171 Cd 121.75	172 Te 127.60	173 In 127.60	174 Pb 127.60	175 (210)																																																																																																																																																																																				
175 Cs 0.79 132.91	176 Ba 137.34	177 Rb 85.47	178 Sr 87.62	179 Y 88.906	180 Zr 91.22	181 Nb 92.906	182 Mo 95.94	183 Tc (99)	184 Ru 101.07	185 Rh 102.91	186 Pd 106.4	187 Ag 107.87	188 Cd 112.40	189 In 114.82	190 Sn 118.69	191 Cd 121.75	192 Te 127.60	193 In 127.60	194 Pb 127.60	195 (210)																																																																																																																																																																																				
195 Cs 0.79 132.91	196 Ba 137.34	197 Rb 85.47	198 Sr 87.62	199 Y 88.906	200 Zr 91.22	201 Nb 92.906	202 Mo 95.94	203 Tc (99)	204 Ru 101.07	205 Rh 102.91	206 Pd 106.4	207 Ag 107.87	208 Cd 112.40	209 In 114.82	210 Sn 118.69	211 Cd 121.75	212 Te 127.60	213 In 127.60	214 Pb 127.60	215 (210)																																																																																																																																																																																				
215 Cs 0.79 132.91	216 Ba 137.34	217 Rb 85.47	218 Sr 87.62	219 Y 88.906	220 Zr 91.22	221 Nb 92.906	222 Mo 95.94	223 Tc (99)	224 Ru 101.07	225 Rh 102.91	226 Pd 106.4	227 Ag 107.87	228 Cd 112.40	229 In 114.82	230 Sn 118.69	231 Cd 121.75	232 Te 127.60	233 In 127.60	234 Pb 127.60	235 (210)																																																																																																																																																																																				
235 Cs 0.79 132.91	236 Ba 137.34	237 Rb 85.47	238 Sr 87.62	239 Y 88.906	240 Zr 91.22	241 Nb 92.906	242 Mo 95.94	243 Tc (99)	244 Ru 101.07	245 Rh 102.91	246 Pd 106.4	247 Ag 107.87	248 Cd 112.40	249 In 114.82	250 Sn 118.69	251 Cd 121.75	252 Te 127.60	253 In 127.60	254 Pb 127.60	255 (210)																																																																																																																																																																																				
255 Cs 0.79 132.91	256 Ba 137.34	257 Rb 85.47	258 Sr 87.62	259 Y 88.906	260 Zr 91.22	261 Nb 92.906	262 Mo 95.94	263 Tc (99)	264 Ru 101.07	265 Rh 102.91	266 Pd 106.4	267 Ag 107.87	268 Cd 112.40	269 In 114.82	270 Sn 118.69	271 Cd 121.75	272 Te 127.60	273 In 127.60	274 Pb 127.60	275 (210)																																																																																																																																																																																				
275 Cs 0.79 132.91	276 Ba 137.34	277 Rb 85.47	278 Sr 87.62	279 Y 88.906	280 Zr 91.22	281 Nb 92.906	282 Mo 95.94	283 Tc (99)	284 Ru 101.07	285 Rh 102.91	286 Pd 106.4	287 Ag 107.87	288 Cd 112.40	289 In 114.82	290 Sn 118.69	291 Cd 121.75	292 Te 127.60	293 In 127.60	294 Pb 127.60	295 (210)																																																																																																																																																																																				
295 Cs 0.79 132.91	296 Ba 137.34	297 Rb 85.47	298 Sr 87.62	299 Y 88.906	300 Zr 91.22	301 Nb 92.906	302 Mo 95.94	303 Tc (99)	304 Ru 101.07	305 Rh 102.91	306 Pd 106.4	307 Ag 107.87	308 Cd 112.40	309 In 114.82	310 Sn 118.69	311 Cd 121.75	312 Te 127.60	313 In 127.60</																																																																																																																																																																																						