Table S. 1. Classification of the contamination indices applied in this study (Hakanson, 1980; Backman et al., 1997; Prasanna et al., 2012).

|  |  |  |
| --- | --- | --- |
| Index | Value | Contamination level |
|  CF | CF < 1 | Low contamination factor |
|  1≤ CF <3 | Moderate contamination factor |
| 3 ≤ CF < 6 | Considerable contamination factor |
|   *C*d  | CF ≥ 6 | Very high contamination factor |
| *C*d<4 | Low contamination degree |
| *C*d = 4-8 | Moderate contamination degree |
| *C*d >8 | Very high contamination degree |
|    m*C*d    | m*C*d < 1.5 | Uncontaminated  |
| 1.5 ≤ m*C*d < 2 | Slightly contaminated |
| 2 ≤ m*C*d < 4 | Moderately contaminated |
| 4 ≤ m*C*d < 8 | Moderately to heavily contaminated |
| 8 ≤ m*C*d < 16 | Heavily contaminated  |
| 16 ≤ m*C*d < 32 | Severely contaminated |
| m*C*d ≥ 32 | Extremely contaminated |
|  HPI  | HPI < 5 | low pollution |
| HPI = 5–10 | medium pollution |
| HPI > 10  | high pollution |

Table S.2. Concentration of HMs (µg/L) along with results of some contamination indices applied in this study.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.N. | Co | Ni | As | Cd | HPI | Cd | mCd |
| Q1 | 0.051 | 0.172 | 2.65 | 0.042 | 4.40 | 0.342 | 0.085 |
| Q2 | 0.05 | 0.091 | 0.81 | 0.05 | 1.76 | 0.158 | 0.040 |
| Q3 | 0.037 | 0.038 | 0.66 | 0.032 | 1.33 | 0.119 | 0.030 |
| Q4 | 0.046 | 0.13 | 0.69 | 0.044 | 1.52 | 0.140 | 0.035 |
| Q5 | 0.069 | 0.241 | 0.89 | 0.076 | 2.16 | 0.202 | 0.050 |
| Q6 | 0.065 | 0.018 | 0.68 | 0.05 | 1.59 | 0.158 | 0.040 |
| Q7 | 0.059 | 0.088 | 1.03 | 0.034 | 1.97 | 0.181 | 0.045 |
| Q8 | 0.055 | 0.351 | 1.12 | 0.193 | 3.43 | 0.272 | 0.068 |
| Q9 | 0.194 | 4.498 | 12.85 | 0.112 | 21.10 | 1.647 | 0.412 |
| Q10 | 0.099 | 0.018 | 18.32 | 0.169 | 28.47 | 2.016 | 0.504 |
| Q11 | 0.082 | 0.118 | 3.32 | 0.059 | 5.60 | 0.447 | 0.112 |
| Q12 | 0.057 | 0.259 | 2.78 | 0.057 | 4.74 | 0.370 | 0.092 |
| Q13 | 0.108 | 0.125 | 9.64 | 0.108 | 15.32 | 1.129 | 0.282 |
| Q14 | 0.078 | 0.017 | 5.39 | 0.087 | 8.82 | 0.661 | 0.165 |
| Q15 | 0.059 | 0.084 | 1.28 | 0.032 | 2.32 | 0.205 | 0.051 |
| Q16 | 0.063 | 2.829 | 1.48 | 0.047 | 3.25 | 0.306 | 0.076 |
| Q17 | 0.215 | 0.296 | 10.56 | 0.185 | 17.64 | 1.371 | 0.343 |
| Q18 | 0.058 | 0.397 | 2.56 | 0.044 | 4.35 | 0.346 | 0.087 |
| Q19 | 0.086 | 0.633 | 4.96 | 0.096 | 8.40 | 0.645 | 0.161 |
| Q20 | 0.117 | 0.983 | 3.62 | 0.112 | 6.72 | 0.559 | 0.140 |
| Q21 | 0.221 | 0.784 | 14.13 | 0.138 | 22.59 | 1.722 | 0.431 |
| Q22 | 0.447 | 0.8 | 10.86 | 0.142 | 18.51 | 1.624 | 0.406 |
| Q23 | 1.129 | 7.634 | 30.27 | 0.091 | 49.74 | 4.392 | 1.098 |
| Q24 | 0.094 | 0.256 | 2.11 | 0.102 | 4.24 | 0.363 | 0.091 |
| Q25 | 0.06 | 0.33 | 1.27 | 0.139 | 3.22 | 0.264 | 0.066 |
| Q26 | 0.074 | 0.657 | 1.27 | 0.048 | 2.58 | 0.241 | 0.060 |
| Q27 | 0.104 | 0.25 | 2.17 | 0.087 | 4.24 | 0.371 | 0.093 |
| Q28 | 0.147 | 0.828 | 1.38 | 0.156 | 3.86 | 0.383 | 0.096 |
| Q29 | 0.115 | 0.111 | 1.11 | 0.039 | 2.29 | 0.248 | 0.062 |
| Min. | 0.037 | 0.017 | 0.66 | 0.032 | 1.33 | 0.119 | 0.030 |
| Max. | 1.129 | 7.634 | 30.27 | 0.193 | 49.74 | 4.392 | 1.098 |
| Aver. | 0.168 | 0.990 | 5.83 | 0.090 | 9.91 | 0.819 | 0.205 |

Table S. 3. The Contamination factor (CF) for HMs in seawater

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | CF |  |  |
| S.N. | As | Cd | Co | Ni |
| Q1 | 0.265 | 0.042 | 0.102 | 0.009 |
| Q2 | 0.081 | 0.05 | 0.1 | 0.005 |
| Q3 | 0.066 | 0.032 | 0.074 | 0.002 |
| Q4 | 0.069 | 0.044 | 0.092 | 0.007 |
| Q5 | 0.089 | 0.076 | 0.138 | 0.012 |
| Q6 | 0.068 | 0.05 | 0.13 | 0.001 |
| Q7 | 0.103 | 0.034 | 0.118 | 0.004 |
| Q8 | 0.112 | 0.193 | 0.11 | 0.018 |
| Q9 | 1.285 | 0.112 | 0.388 | 0.225 |
| Q10 | 1.832 | 0.169 | 0.198 | 0.001 |
| Q11 | 0.332 | 0.059 | 0.164 | 0.006 |
| Q12 | 0.278 | 0.057 | 0.114 | 0.013 |
| Q13 | 0.964 | 0.108 | 0.216 | 0.006 |
| Q14 | 0.539 | 0.087 | 0.156 | 0.001 |
| Q15 | 0.128 | 0.032 | 0.118 | 0.004 |
| Q16 | 0.148 | 0.047 | 0.126 | 0.141 |
| Q17 | 1.056 | 0.185 | 0.43 | 0.015 |
| Q18 | 0.256 | 0.044 | 0.116 | 0.020 |
| Q19 | 0.496 | 0.096 | 0.172 | 0.032 |
| Q20 | 0.362 | 0.112 | 0.234 | 0.049 |
| Q21 | 1.413 | 0.138 | 0.442 | 0.039 |
| Q22 | 1.086 | 0.142 | 0.894 | 0.040 |
| Q23 | 3.027 | 0.091 | 2.258 | 0.382 |
| Q24 | 0.211 | 0.102 | 0.188 | 0.013 |
| Q25 | 0.127 | 0.139 | 0.12 | 0.017 |
| Q26 | 0.127 | 0.048 | 0.148 | 0.033 |
| Q27 | 0.217 | 0.087 | 0.208 | 0.013 |
| Q28 | 0.138 | 0.156 | 0.294 | 0.041 |
| Q29 | 0.111 | 0.039 | 0.23 | 0.006 |
| Min. | 0.066 | 0.032 | 0.074 | 0.001 |
| Max. | 3.027 | 0.193 | 2.258 | 0.382 |
| Aver. | 0.583 | 0.090 | 0.336 | 0.049 |

Table S.4. The KMO Test for HMs of Al Qunfudhah seawater

|  |
| --- |
| KMO and Bartlett's Test |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | 0.683 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 65.188 |
| df | 6 |
| Sig. | 0.000 |