**Table S1** Concentrations of heavy metals in surface waters of coastal of Zhuhai and comparison with other areas (mg/L).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Area | As | Cd | Cr | Cu | Hg | Pb | Zn | Reference |
| Coastal of Zhuhai | 1.3-2.1(1.62) | ND-0.19(0.076) | ND-8.8(2.69) | 1.0-7.4(2.43) | ND-0.03(0.012) | ND-3.24(0.338) | ND-39.0(8.93) |  |
| Shandong Peninsula, China | ND-1.86(0.98) | 0.08-0.73(0.17) | 0.84-3.56(2.01) | 0.83-5.38(2.46) | ND-0.47(0.04) | 0.52-3.60(1.51) | 2.22-40.7(17.2) | Liu et al. 2021 |
| Northern Liaodong Bay, China | 1.92-10.10(5.46) | 0.1-1.4(0.66) | NA | 0.7-6.2(2.86) | 0.01-0.59(0.14) | 0.6-17.2(3.98) | 1.2-82.8(17.76) | Zhang et al., 2017 |
| Meishan Bay, China | 10.35-11.67(11.15) | 4.62-4.71(4.65) | 3.89-4.18(4.23) | 3.06-5.31(4.23) | 0.06-0.07(0.06) | 1.19-1.55(1.34) | 92.40-392.82(172.05) | Zhang et al., 2020 |
| Xiangshan Bay China | 0.9-8.5(2.6) | 0.01-1.61(0.22) | ND-2(0.7) | 0.2-44.5(3.4) | ND-0.262(0.062) | 0.22-8.08(1.93) | 0.7-65.9(16.8) | Zhao et al., 2018 |
| Persian Gulf, Iran | 1.0-82.5(62.78) | 0.06-0.53(0.35) | 0.75-4.2(1.03) | 0.08-3.2(0.3) | 0.08-25.3(1.51) | 0.08-0.8(0.7) | 2.1-230(70.74) | Lahijia et al., 2019 |
| Abu Zenima coast, Egypt | NA | 0.013–0.13(0.09) | NA | 0.26–0.62(0.43) | NA | 0.08–1.80(0.51) | 0.22–0.25(0.23) | Nour et al., 2020 |
| Tyrrhenian coast, Italy | NA | 0.01-0.62(0.44) | NA | 0.3-5(2.2) | NA | 0.04-6.53(0.44) | 0.07-34.78(6.71) | Manfra et al., 2005 |

NA: Not available

**Table S2** Evaluation results of benthic biodiversity index and evenness in coastal of Zhuhai.

|  |  |  |  |
| --- | --- | --- | --- |
| Site | 2017 |  | 2018 |
| Species | Diversity Index *H*＇ | Uniformity index *J’* |  | Species | Diversity Index *H*＇ | Uniformity index *J’* |
| 1 | 14 | 2.27 | 0.86 |  | 8 | 1.266 | 0.609 |
| 2 | 12 | 2.39 | 0.96 |  | 9 | 1.647 | 0.750 |
| 4 | 12 | 1.99 | 0.80 |  | 11 | 1.575 | 0.657 |
| 5 | 11 | 0.60 | 0.25 |  | 10 | 1.262 | 0.548 |
| 7 | 9 | 1.74 | 0.79 |  | 10 | 2.175 | 0.945 |
| 8 | 5 | 1.43 | 0.89 |  | 2 | 0.451 | 0.650 |
| 10 | 13 | 2.16 | 0.84 |  | 9 | 1.965 | 0.894 |
| 12 | 8 | 1.64 | 0.79 |  | 14 | 1.494 | 0.566 |
| 13 | 7 | 1.75 | 0.90 |  | 5 | 1.359 | 0.845 |
| 15 | 9 | 1.82 | 0.83 |  | 9 | 0.590 | 0.268 |
| 16 | 9 | 0.66 | 0.30 |  | 7 | 1.226 | 0.630 |
| 17 | 5 | 1.61 | 1.00 |  | 6 | 1.271 | 0.709 |
| 19 | 4 | 0.21 | 0.15 |  | 11 | 2.199 | 0.917 |
| Mean | 9 | 1.56 | 0.72 |  | 9 | 1.421 | 0.691 |
| Range | 4~14 | 0.21~2.39 | 0.15~1.00 |  | 2～14 | 0.451～2.199 | 0.268～0.945 |

**Table S3** Potential hazard ratio (PAF) in seawater of Zhuhai (%).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time | Research stance | As | Cd | Cr | Cu | Hg | Pb | Zn |
| 2017 | S1 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S2 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S3 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S4 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S5 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S6 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S7 | 0.00 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S8 | 0.00 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S9 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S10 | 0.00 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S11 | 0.00 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S12 | 0.00 | 3.00 | 0.00 | 3.00 | 0.00 | 0.00 | 1.00 |
| S13 | 0.00 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S14 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S15 | 0.00 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 |
| S16 | 0.00 | 2.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S17 | 0.00 | 3.00 | 0.00 | 3.00 | 0.00 | 0.00 | 1.00 |
| S18 | 0.00 | 4.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S19 | 0.00 | 3.00 | 0.00 | 3.00 | 0.00 | 0.00 | 1.00 |
| S20 | 0.00 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 |
| 2018 | S1 | 0.00 | 2.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S2 | 0.00 | 4.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S3 | 0.00 | 2.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S4 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S5 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S6 | 0.00 | 4.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S7 | 0.00 | 2.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S8 | 0.00 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 1.00 |
| S9 | 0.00 | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S10 | 0.00 | 2.00 | 0.00 | 3.00 | 0.00 | 0.00 | 1.00 |
| S11 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S12 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S13 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S14 | 0.00 | 2.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S15 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S16 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S17 | 0.00 | 3.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| S18 | 0.00 | 2.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| S19 | 0.00 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.00 |
| S20 | 0.00 | 2.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |

**Table S4** The informationg of specific marine orgnisms

|  |  |  |
| --- | --- | --- |
| Site | Names | Species |
| 1 | Mouth shrimp mayfly | Crustaceans |
| 2 | Japanese sea-crab | Crustaceans |
| 3 | Japanese sea-crab | Crustaceans |
| 4 | Coilia nasus | Fishes |
| 5 | Japanese sea-crab | Crustaceans |
| 6 | Japanese sea-crab | Crustaceans |
| 7 | Dense Scale Oyster | Shellfishes |
| 8 | Isohye small male fish | Fished |
| 9 | Mouth shrimp mayfly | Crustaceans |
| 10 | Mouth shrimp mayfly | Crustaceans |
| 11 | New Prawns | Crustaceans |
| 12 | Mussel | Shellfishes |

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