**Modelling the origin, fate, and ecological and health impacts of heavy metals in an abandoned Hg mine in Palawan, Philippines**

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**SUPPORTING TABLES**

**Supplementary Table** **4**. Chronic reference dose (RfD, mg kg-1 d-1) for different heavy metal exposure pathways for the assessment of non-carcinogenic risks (Diami et al., 2016; Doležalová Weissmannová et al., 2019; Luo et al., 2012; Samaniego et al., 2020).

|  |  |  |  |
| --- | --- | --- | --- |
| **Heavy metal** | **RfD Ing** | **RfD Derm** | **RfD Inh** |
| **As** | 3.00E-04 | 1.23E-04 | 3.01E-04 |
| **Ba** | 7.00E-02 | 4.90E-03 | 1.43E-04 |
| **Cd** | 1.00E-03 | 1.00E-05 | 5.70E-05 |
| **Co** | 2.00E-02 | 4.90E-03 | 1.43E-04 |
| **Cr** | 3.00E-03 | 6.00E-05 | 2.86E-05 |
| **Cu** | 4.00E-02 | 1.20E-02 | 4.00E-02 |
| **Hg** | 3.00E-04 | 2.10E-05 | 8.57E-05 |
| **Mn** | 4.60E-02 | 1.84E-03 | 1.43E-05 |
| **Ni** | 2.00E-02 | 5.40E-03 | 2.06E-02 |
| **Pb** | 3.50E-03 | 5.25E-04 | 3.45E-03 |
| **Sb** | 4.00E-04 | 8.00E-06 | - |
| **V** | 7.00E-03 | 7.00E-05 | 7.00E-03 |
| **Zn** | 3.00E-01 | 6.00E-02 | 3.00E-01 |

**Supplementary Table 5**. Eigenvalues, proportion of variance, cumulative variance, and factor loadings of the five principal components identified by the PCA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **PC1** | **PC2** | **PC3** | **PC4** | **PC5** | **PC6** |
| **Eigenvalues** | 7.89 | 4.40 | 2.08 | 0.44 | 0.18 | 0.00 |
| **Proportion of Variance (%)** | 52.63% | 29.34% | 13.88% | 2.97% | 1.19% | 0.00% |
| **Cumulative Variance (%)** | 52.63% | 81.97% | 95.85% | 98.81% | 100.00% | 100.00% |
| **As** | 0.3379 | -0.1208 | 0.0269 | 0.2579 | 0.1367 | -0.5349 |
| **Ba** | -0.0577 | 0.4298 | -0.2495 | 0.2508 | 0.1344 | 0.2120 |
| **Cd** | 0.3212 | 0.0356 | -0.2229 | -0.4139 | 0.0230 | 0.3996 |
| **Co** | -0.2325 | 0.3396 | 0.1765 | -0.0426 | 0.0174 | -0.3746 |
| **Cr** | 0.1672 | 0.2195 | 0.4971 | -0.2677 | -0.3444 | -0.1472 |
| **Cu** | 0.3278 | 0.0704 | -0.2214 | 0.0411 | 0.3889 | -0.2610 |
| **Fe** | 0.2191 | 0.2666 | 0.3549 | 0.2572 | -0.3060 | 0.3203 |
| **Hg** | 0.3444 | 0.0508 | 0.1573 | 0.0392 | 0.0155 | -0.0371 |
| **Mn** | -0.1847 | 0.3280 | -0.3472 | 0.0698 | -0.1493 | -0.1053 |
| **Ni** | -0.1682 | 0.2765 | 0.4291 | -0.1055 | 0.5417 | -0.0208 |
| **Pb** | 0.2802 | 0.1794 | -0.2511 | -0.4512 | -0.3050 | -0.3308 |
| **Sb** | 0.3492 | -0.0464 | 0.0234 | 0.2431 | 0.0493 | 0.0678 |
| **Tl** | 0.3468 | -0.0010 | 0.0606 | 0.3110 | 0.0169 | 0.1205 |
| **V** | -0.0101 | 0.4442 | -0.1910 | 0.3201 | -0.2276 | -0.0814 |
| **Zn** | 0.2001 | 0.3762 | -0.0301 | -0.2803 | 0.3680 | 0.1688 |

**Supplementary Table 6.** Pearson correlation matrix of the heavy metals. A correlation r ≥ 0.700 was deemed as strong correlation for this study.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **As** | **Ba** | **Cd** | **Co** | **Cr** | **Cu** | **Fe** | **Hg** | **Mn** | **Ni** | **Pb** | **Sb** | **Tl** | **V** | **Zn** |
| **As** | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Ba** | -0.36 | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Cd** | 0.78 | -0.01 | 1.00 |  |  |  |  |  |  |  |  |  |  |  |  |
| **Co** | -0.80 | 0.65 | -0.61 | 1.00 |  |  |  |  |  |  |  |  |  |  |  |
| **Cr** | 0.32 | 0.04 | 0.28 | 0.21 | 1.00 |  |  |  |  |  |  |  |  |  |  |
| **Cu** | 0.84 | 0.11 | 0.94 | -0.58 | 0.24 | 1.00 |  |  |  |  |  |  |  |  |  |
| **Fe** | 0.48 | 0.24 | 0.38 | 0.12 | 0.90 | 0.47 | 1.00 |  |  |  |  |  |  |  |  |
| **Hg** | 0.91 | -0.14 | 0.80 | -0.50 | 0.66 | 0.84 | 0.78 | 1.00 |  |  |  |  |  |  |  |
| **Mn** | -0.68 | 0.89 | -0.27 | 0.70 | -0.29 | -0.23 | -0.17 | -0.54 | 1.00 |  |  |  |  |  |  |
| **Ni** | -0.57 | 0.38 | -0.56 | 0.88 | 0.47 | -0.51 | 0.31 | -0.26 | 0.32 | 1.00 |  |  |  |  |  |
| **Pb** | 0.58 | 0.28 | 0.94 | -0.33 | 0.36 | 0.87 | 0.47 | 0.71 | 0.03 | -0.39 | 1.00 |  |  |  |  |
| **Sb** | 0.99 | -0.23 | 0.82 | -0.71 | 0.41 | 0.89 | 0.59 | 0.95 | -0.59 | -0.51 | 0.67 | 1.00 |  |  |  |
| **Tl** | 0.97 | -0.16 | 0.79 | -0.62 | 0.48 | 0.88 | 0.68 | 0.97 | -0.54 | -0.42 | 0.67 | 0.99 | 1.00 |  |  |
| **V** | -0.24 | 0.97 | 0.07 | 0.61 | 0.19 | 0.19 | 0.41 | 0.01 | 0.81 | 0.35 | 0.38 | -0.10 | -0.01 | 1.00 |  |
| **Zn** | 0.31 | 0.61 | 0.63 | 0.19 | 0.61 | 0.67 | 0.71 | 0.61 | 0.25 | 0.21 | 0.79 | 0.45 | 0.50 | 0.68 | 1.00 |