**SUPPLEMENTARY TABLES:**

*Supplementary Table 1. Eigenvalues, proportion of variance, and factor loadings of the dimensions identified by the Principal Component Analysis (PCA).*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Dimension 1** | **Dimension 2** | **Dimension 3** | **Dimension 4** | **Dimension 5** |
| Eigenvalues | 5.848 | 1.512 | 0.368 | 0.224 | 0.043 |
| Variance, % | 73.094 | 18.897 | 4.605 | 2.800 | 0.541 |
| TP | -0.285 | 0.558 | 0.272 | 0.316 | -0.227 |
| TOM | -0.293 | -0.462 | 0.658 | -0.189 | -0.378 |
| TN | -0.363 | -0.298 | 0.257 | 0.493 | 0.597 |
| K | -0.321 | -0.380 | -0.590 | 0.453 | -0.375 |
| Cr | -0.397 | 0.223 | -0.057 | -0.095 | 0.123 |
| Pb | -0.406 | 0.037 | -0.124 | -0.310 | -0.356 |
| Ni | -0.353 | 0.421 | -0.018 | 0.055 | 0.048 |
| Hg | -0.388 | -0.117 | -0.246 | -0.555 | 0.406 |

*Supplementary* *Table 2. Elemental and environmental parameter contribution of the dimensions identified by the PCA*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Dimension 1** | **Dimension 2** | **Dimension 3** | **Dimension 4** | **Dimension 5** |
| TP, % | 8.139 | 31.136 | 7.424 | 9.976 | 5.149 |
| TOM, % | 8.613 | 21.342 | 43.259 | 3.562 | 14.305 |
| TN, % | 13.199 | 8.862 | 6.583 | 24.313 | 35.615 |
| K, % | 10.275 | 14.476 | 34.804 | 20.559 | 14.048 |
| Cr, % | 15.742 | 4.958 | 0.330 | 0.897 | 1.513 |
| Pb, % | 16.501 | 0.137 | 1.534 | 9.612 | 12.642 |
| Ni, % | 12.475 | 17.712 | 0.033 | 0.307 | 0.234 |
| Hg, % | 15.057 | 1.377 | 6.031 | 30.774 | 16.494 |

*Supplementary Table 3. Contribution of the dimensions to the sampling locations*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Dimension 1** | **Dimension 2** | **Dimension 3** | **Dimension 4** | **Dimension 5** |
| SS1 | 10.448 | 2.280 | 7.155 | 1.504 | 62.756 |
| SS2 | 41.113 | 30.026 | 10.390 | 2.781 | 0.443 |
| SS3 | 28.605 | 50.543 | 4.768 | 0.740 | 0.069 |
| SS4 | 1.077 | 13.953 | 32.694 | 36.133 | 1.607 |
| SS5 | 5.373 | 0.901 | 20.934 | 53.179 | 5.018 |
| SS6 | 7.000 | 2.295 | 4.793 | 1.873 | 5.929 |
| SS7 | 6.384 | 0.001 | 19.266 | 3.789 | 24.178 |

*Supplementary Table 4. Correlation analysis of the parameters*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Density** | **TP** | **TOM** | **TN** | **Cr** | **Pb** | **Ni** | **Hg** | **K** |
| **Density** | 1.000 |  |  |  |  |  |  |  |  |
| **TP** | -0.040 | 1.000 |  |  |  |  |  |  |  |
| **TOM** | -0.942 | 0.156 | 1.000 |  |  |  |  |  |  |
| **TN** | -0.743 | 0.410 | *0.863* | 1.000 |  |  |  |  |  |
| **Cr** | -0.361 | *0.835* | 0.514 | *0.730* | 1.000 |  |  |  |  |
| **Pb** | -0.514 | 0.679 | 0.660 | *0.791* | *0.962* | 1.000 |  |  |  |
| **Ni** | -0.170 | *0.944* | 0.305 | 0.566 | *0.962* | *0.858* | 1.000 |  |  |
| **Hg** | -0.534 | 0.481 | *0.705* | *0.803* | *0.879* | *0.959* | *0.721* | 1.000 |  |
| **K** | -0.587 | 0.190 | 0.660 | *0.837* | 0.617 | *0.741* | 0.429 | *0.785* | 1.000 |