**Table 1. Classification system for the correlation and linear regression analysis**

|  |  |
| --- | --- |
| R2-value | Indication |
| -1 | A perfect negative linear relationship; dissimilar source of contamination |
| ≥ -0.70 | A strong negative linear relationship; dissimilar source of contamination |
| ≥ -0.50 | A moderate negative relationship; dissimilar source of contamination |
| ≥ -0.30 | A weak negative linear relationship; dissimilar source of contamination |
| 0 | No linear relationship |
| ≥ 0.30 | A weak positive linear relationship; similar source of contamination |
| ≥ 0.50 | A moderate positive relationship; similar source of contamination |
| ≥ 0.70 | A strong positive linear relationship; similar source of contamination |
| +1 | A perfect positive linear relationship; similar source of contamination |

Table 2. Characteristics of River Nworie

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters | NDW1 | NDW2 | NDW3 | NDW4 | NDW5 | WHO (2007) | Max | Min | Mean | SDV |
| Temp (oC) | 31 | 32 | 32 | 32.4 | 32 | 20-30 | 32.4 | 31 | 31.88 | 0.55 |
| pH | 5.61 | 5.48 | 6.2 | 5.59 | 5.2 | 6.5-9.0 | 6.2 | 5.2 | 5.62 | 0.37 |
| EC (µS/cm) | 90 | 91 | 92 | 92 | 97 | 100 | 97 | 90 | 92.40 | 2.70 |
| DO (mg/L) | 2.78 | 2.98 | 2.85 | 3.89 | 2.27 | 4 | 3.89 | 2.27 | 2.95 | 0.59 |
| TDS (mg/L) | 123.94 | 123.84 | 143.78 | 122 | 123.98 | 250 | 143.78 | 122 | 127.51 | 9.13 |
| TSS (mg/L) | 87.74 | 86.64 | 96.74 | 96.43 | 87.44 | 50 | 96.74 | 86.64 | 90.99 | 5.12 |

\*EC-Electrical conductivity, DO-Dissolved Oxygen, TDS-Total Dissolved Solids, TSS-Total Suspended solids

Table 3. Ionic composition of water from Nworie in the dry season

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ions | NDW1 | NDW2 | NDW3 | NDW4 | NDW5 | WHO (2007) | Max | Min | Mean | SDV |
| Major cations | | | | | | | | | | |
| Na+(mg/L) | 1.33 | 1.673 | 1.37 | 1.30 | 1.37 | N/A | 1.673 | 1.3 | 1.41 | 0.15 |
| K+(mg/L) | 0.89 | 0.791 | 0.898 | 0.189 | 0.819 | N/A | 0.898 | 0.189 | 0.72 | 0.30 |
| Mg2+(mg/L) | 2.23 | 2.78 | 2.27 | 2.22 | 1.13 | 0.5 | 2.78 | 1.13 | 2.13 | 0.60 |
| Ca2+ (mg/L) | 23.2 | 24.6 | 23.8 | 23.5 | 22.92 | 70 | 24.6 | 22.92 | 23.60 | 0.67 |
| Heavy metals | | | | | | | | | | |
| Cu (mg/L) | 0.13 | 0.79 | 0.53 | 0.15 | 0.13 | 0.3 | 0.79 | 0.13 | 0.35 | 0.30 |
| Cd (mg/L) | 0.002 | 0.180 | 0.072 | 0.006 | 0.012 | 0.003 | 0.18 | 0.002 | 0.05 | 0.08 |
| Mn (mg/L) | 0.08 | 1.02 | 0.78 | 0.085 | 0.089 | 0.4 | 1.02 | 0.08 | 0.41 | 0.45 |
| Zn (mg/L) | 2.6 | 1.2 | 2.21 | 2.61 | 2.63 | <0.1 | 2.63 | 1.2 | 2.25 | 0.61 |
| Fe (mg/L) | 0.097 | 0.19 | 0.191 | 0.097 | 0.091 | 0.3 | 0.191 | 0.091 | 0.13 | 0.05 |
| Pb (mg/L) | 0.127 | 0.178 | 0.521 | 0.123 | 0.127 | 0.01 | 0.521 | 0.123 | 0.22 | 0.17 |
| Major anion | | | | | | | | | | |
| NO3- (mg/L) | 1.96 | 1.91 | 1.92 | 1.91 | 1.916 | 10 | 1.96 | 1.91 | 1.92 | 0.02 |
| SO42-(mg/L) | 24.8 | 23.4 | 24.8 | 23.98 | 24.8 | 250 | 24.8 | 23.4 | 24.36 | 0.64 |
| PO43- (mg/L) | 1.37 | 1.65 | 1.36 | 1.34 | 1.37 | 5 | 1.65 | 1.34 | 1.42 | 0.13 |
| Cl- (mg/L) | 24.15 | 32.24 | 36.19 | 33.16 | 32.18 | 250 | 36.19 | 24.15 | 31.58 | 4.47 |

\*WHO=World Health Organization

**Table 4. Correlation matrix of various ions in River Nworie**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Na+ | K+ | Mg2+ | Ca2+ | Cu | Cd | Mn | Zn | Fe | Pb | N | SO42- | PO43- | Cl- |
| Na+ | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| K+ | 0.291 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Mg2+ | **0.515** | -0.081 | 1 |  |  |  |  |  |  |  |  |  |  |  |
| Ca2+ | **0.834** | 0.032 | **0.838** | 1 |  |  |  |  |  |  |  |  |  |  |
| Cu | **0.864** | 0.306 | **0.675** | **0.942** | 1 |  |  |  |  |  |  |  |  |  |
| Cd | **0.953** | 0.272 | **0.638** | **0.938** | **0.975** | 1 |  |  |  |  |  |  |  |  |
| Mn | **0.805** | 0.357 | **0.643** | **0.907** | **0.992** | **0.941** | 1 |  |  |  |  |  |  |  |
| Zn | **-0.968** | -0.240 | **-0.676** | **-0.942** | **-0.951** | **-0.993** | **-0.907** | 1 |  |  |  |  |  |  |
| Fe | **0.671** | 0.371 | **0.635** | **0.850** | **0.949** | **0.856** | **0.979** | **-0.808** | 1 |  |  |  |  |  |
| Pb | -0.012 | 0.374 | 0.215 | 0.289 | 0.462 | 0.259 | **0.567** | -0.167 | **0.715** | 1 |  |  |  |  |
| NO3- | -0.359 | 0.439 | 0.013 | -0.411 | -0.405 | -0.424 | -0.386 | 0.377 | -0.338 | -0.130 | 1 |  |  |  |
| SO42- | **-0.726** | 0.431 | **-0.640** | **-0.789** | **-0.596** | **-0.700** | **-0.502** | **0.747** | -0.371 | 0.288 | 0.544 | 1 |  |  |
| PO43- | **0.989** | 0.223 | **0.568** | **0.831** | **0.818** | **0.923** | **0.745** | **-0.954** | **0.602** | -0.119 | -0.298 | **-0.780** | 1 |  |
| Cl- | 0.143 | -0.220 | -0.012 | 0.345 | 0.429 | 0.334 | 0.475 | -0.245 | **0.524** | **0.598** | **-0.858** | -0.193 | 0.039 | 1 |

\*Bold numbers are significant at 5 %.