|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **LOI** | **SiO2** | **Al2O3** | **Fe2O3** | **CaO** | **MgO** | **SO3** | **Na2O** | **K2O** | **TiO2** | **P2O5** | **Mn2O3** | **Total** |
| L2-l9 (I) | 17.38 | 40.68 | 18.6 | 10.98 | 2.92 | 1.34 | 0.77 | 0.35 | 3.42 | 3.31 | 0.11 | 0.06 | 99.92 |
| L3-l1 (I) | 17.24 | 39.49 | 19.04 | 10.98 | 3.12 | 1.45 | 0.77 | 0.35 | 3.42 | 3.31 | 0.15 | 0.39 | 99.71 |
| L4-l1 (I) | 20.49 | 36.09 | 16.85 | 14.28 | 3.02 | 2.21 | 0.76 | 0.34 | 2.64 | 3.05 | 0.17 | 0.1 | 100 |
| L2-l1 (II) | 33.6 | 5.99 | 1.98 | 31.11 | 17 | 6.33 | 2.89 | 0.06 | 0.19 | 0.32 | 0.19 | 0.25 | 99.91 |
| L4-l6 (II) | 23.77 | 20.84 | 6.71 | 14 | 20.53 | 6.24 | 0.85 | 0.85 | 4.41 | 1.41 | 0.18 | 0.21 | 100 |
| L6-l2 (II) | 17.38 | 40.68 | 18.6 | 10.98 | 2.92 | 1.34 | 0.77 | 0.35 | 3.42 | 3.31 | 0.11 | 0.06 | 99.92 |
| L7-l3 (II) | 24.26 | 10.1 | 17 | 29.1 | 7.51 | 4.75 | 0.72 | 0.7 | 3.95 | 1.2 | 0.42 | 0.24 | 99.95 |
| L4-l4 (III) | 18.42 | 24.99 | 8.53 | 25.94 | 8.53 | 3.34 | 0.99 | 0.86 | 5.57 | 2.37 | 0.22 | 0.23 | 99.99 |
| L4-l10(III) | 32.21 | 14.4 | 6.76 | 25.44 | 12.89 | 5.2 | 1.29 | 0.06 | 0.49 | 0.79 | 0.29 | 0.18 | 100 |
| L5-l1 (III) | 23.26 | 23.94 | 9.06 | 24.34 | 9.68 | 4.79 | 0.71 | 0.31 | 1.93 | 1.49 | 0.26 | 0.23 | 100 |
| L2-l6 (IV) | 36.01 | 5.51 | 2.62 | 37.68 | 6.04 | 8.95 | 1.51 | 0.05 | 0.19 | 0.35 | 0.81 | 0.27 | 99.99 |
| L4-l5 (IV) | 23.24 | 11.54 | 4.51 | 42.04 | 7.51 | 4.75 | 0.72 | 0.77 | 3.15 | 1.2 | 0.12 | 0.44 | 99.99 |
| L4-l9 (V) | 38.83 | 19 | 7.2 | 4.73 | 20.1 | 1.87 | 1.68 | 0.15 | 0.71 | 0.64 | 4.72 | 0.06 | 99.69 |
| L6-l5 (V) | 29.21 | 15.5 | 5.55 | 25.81 | 10.78 | 6.87 | 0.4 | 0.16 | 0.56 | 0.69 | 4.23 | 0.23 | 99.99 |
| L6-l9 (V) | 26.57 | 36 | 17.84 | 8.56 | 4.97 | 1.35 | 0.74 | 0.1 | 1.41 | 2 | 0.41 | 0.06 | 100.01 |
| L7-l6 (V) | 18.38 | 39.68 | 18.7 | 10.8 | 2.22 | 2.34 | 0.73 | 0.25 | 3.32 | 3.31 | 0.17 | 0.07 | 99.97 |
| L2-l5 (VI) | 24.66 | 9.25 | 4.27 | 17.66 | 32.28 | 4.22 | 3.38 | 0.11 | 0.33 | 0.39 | 3.28 | 0.16 | 99.99 |
| L3-l7 (VI) | 24.61 | 9.25 | 4.27 | 16.51 | 33.01 | 3.97 | 3.28 | 0.09 | 0.32 | 0.29 | 4.21 | 0.15 | 99.96 |
| L4-l3 (VI) | 33.45 | 6.45 | 2.55 | 31.11 | 16.2 | 6.33 | 1.89 | 0.06 | 0.19 | 0.32 | 1.19 | 0.25 | 99.99 |
| L6-l4 (VI) | 29.61 | 12.89 | 4.54 | 33.39 | 12.39 | 4.8 | 0.34 | 0.14 | 0.76 | 0.6 | 0.31 | 0.23 | 100 |
| **Min** | | 5.51 | 1.98 | 4.73 | 2.22 | 1.34 | 0.34 | 0.05 | 0.19 | 0.29 | 0.11 | 0.06 |  |
| **Max** | | 40.68 | 19.04 | 42.04 | 33.01 | 8.95 | 3.38 | 0.86 | 5.57 | 3.31 | 4.72 | 0.44 |
| **Mean** | | 21.11 | 9.76 | 21.27 | 11.68 | 4.12 | 1.26 | 0.31 | 2.02 | 1.52 | 1.08 | 0.19 |
| **STDEV** | | 13.07 | 6.54 | 10.69 | 9.17 | 2.19 | 0.92 | 0.27 | 1.70 | 1.17 | 1.59 | 0.11 |
| **Table 2:** Elemental Concentrations of the Measured Oxides | | | | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ***SiO2*** | ***Al2O3*** | ***Fe2O3*** | ***CaO.*** | ***MgO.*** | ***SO3*** | ***Na2O*** | ***K2O*** | ***TiO2*** | ***P2O3*** | ***Mn2O3*** |
| ***SiO2*** | **1** |  |  |  |  |  |  |  |  |  |  |
| ***Al2O3*** | **0.88** | **1** |  |  |  |  |  |  |  |  |  |
| ***Fe2O3*** | **-0.72** | **-0.63** | **1** |  |  |  |  |  |  |  |  |
| ***CaO.*** | **-0.62** | **-0.66** | **0.00** | **1** |  |  |  |  |  |  |  |
| ***MgO,*** | **-0.81** | **-0.77** | **0.76** | **0.29** | **1** |  |  |  |  |  |  |
| ***SO3*** | **-0.53** | **-0.52** | **0.01** | **0.80** | **0.21** | **1** |  |  |  |  |  |
| ***Na2O*** | **0.18** | **0.23** | **0.08** | **-0.24** | **-0.11** | **-0.43** | **1** |  |  |  |  |
| ***K2O*** | **0.57** | **0.59** | **-0.21** | **-0.48** | **-0.42** | **-0.54** | **0.89** | **1** |  |  |  |
| ***TiO2*** | **0.95** | **0.89** | **-0.55** | **-0.70** | **-0.74** | **-0.54** | **0.36** | **0.72** | **1** |  |  |
| ***P2O5*** | **-0.37** | **-0.40** | **-0.20** | **0.67** | **0.09** | **0.49** | **-0.38** | **-0.53** | **-0.51** | **1** |  |
| ***Mn2O3*** | **-0.45** | **-0.41** | **0.71** | **-0.02** | **0.50** | **-0.06** | **0.31** | **0.05** | **-0.29** | **-0.20** | **1** |
| **Table 3:** Matrix of Pearson’s correlation coefficients of major elements in the carbonate-bearing argillites of Likomba. | | | | | | | | | | | |

|  |  |  |
| --- | --- | --- |
| **Variables** | **Factors** | |
| **1** | **2** |
| SiO2 | -.810 | .**572** |
| Al2O3 | -.739 | .552 |
| Fe2O3 | **.985** | .138 |
| CaO | .128 | -.962 |
| MgO | **.831** | -.226 |
| SO3 | .112 | -.788 |
| Na2O | .009 | .314 |
| K2O | -.321 | **.522** |
| TiO2 | -.672 | **.684** |
| P2O5 | -.081 | -.745 |
| Mn2O3 | **.684** | .154 |
| % of Variance  Eigen Values | 72.56%  308.084 | 23.20 %  98.521 |
| **Table 4:** Varimax rotated of factor matrix (two factor model) of major elements in the carbonate-argillites of Likomba | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Facies** | **Mosture Content (%)** | **Insoluble Component** | | | | **Insoluble Reisdue(%)** |
| Clay | Quartz | Pyrite | Others |
| Massive to faintly laminated shales | 6.07 | 50 | 30 | 17 | 3 | 82.37 |
| Laminated shales | 5.25 | 45 | 30 | 23 | 2 | 69.93 |
| Carbonate interbeds | 3.93 | 40 | 30 | 25 | 2 | 51.84 |
| Shaly Carbonates | 1.93 | 50 | 25 | 18 | 2 | 46.68 |
| Carbonates | 3.37 | 55 | 20 | 24 | 1 | 28.86 |
| Concretions | 0.86 | 40 | 28 | 30 | 2 | 12.20 |
| **Table 5:** Insoluble Residue and Moisture content expressed as weight percent | | | | | | |