|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Fe2O3 (wt. %)** | | **TiO2 (wt. %)** | | **CaO (wt. %)** | | **K2O (wt. %)** | | **Al2O3 (wt. %)** | | **SiO2 (wt. %)** | |
| **Sample** | **Basin** | Meas. | Error +/- | Meas. | Error +/- | Meas. | Error +/- | Meas. | Error +/- | Meas. | Error +/- | Meas. | Error +/- |
| SC-01 | Tweed | 0.08 | 0.00 | 0.10 | 0.00 | 0.08 | 0.01 | bdl |  | 3.98 | 0.19 | 69.98 | 0.24 |
| SC-02 | Tweed | 0.09 | 0.00 | 0.07 | 0.00 | bdl |  | bdl |  | 2.52 | 0.21 | 78.66 | 0.25 |
| SC-03 | Tweed | 2.24 | 0.01 | 0.08 | 0.00 | bdl |  | 0.04 | 0.00 | 5.27 | 0.19 | 68.16 | 0.23 |
| SC-04 | Tweed | 0.03 | 0.00 | 0.07 | 0.00 | bdl |  | bdl |  | 5.42 | 0.19 | 74.91 | 0.24 |
| SC-05 | Tweed | 0.04 | 0.00 | 0.11 | 0.00 | bdl |  | bdl |  | 2.76 | 0.20 | 80.23 | 0.24 |
| SC-06 | Tweed | 1.13 | 0.01 | 0.14 | 0.00 | bdl |  | 0.01 | 0.00 | 6.31 | 0.20 | 61.83 | 0.23 |
| SC-07 | Tweed | 0.18 | 0.00 | 0.11 | 0.00 | bdl |  | bdl |  | 4.99 | 0.19 | 79.07 | 0.24 |
| SC-08 | Tweed | 0.09 | 0.00 | 0.17 | 0.00 | bdl |  | bdl |  | 3.69 | 0.20 | 60.37 | 0.25 |
| SC-09 | Tweed | 0.21 | 0.01 | 0.17 | 0.00 | bdl |  | bdl |  | 4.11 | 0.19 | 63.24 | 0.24 |
| SC-10 | Tweed | 0.68 | 0.01 | 0.13 | 0.00 | bdl |  | bdl |  | 9.33 | 0.22 | 61.11 | 0.23 |
| SC-11 | Tweed | 0.06 | 0.00 | 0.09 | 0.00 | bdl |  | bdl |  | 4.29 | 0.18 | 76.94 | 0.24 |
| SC-12 | Tweed | 0.16 | 0.00 | 0.10 | 0.00 | bdl |  | bdl |  | 3.69 | 0.19 | 73.96 | 0.24 |
| SC-13 | Tweed | 0.03 | 0.00 | 0.09 | 0.00 | bdl |  | bdl |  | 3.91 | 0.18 | 80.37 | 0.23 |
| SC-14 | Tweed | 0.04 | 0.00 | 0.10 | 0.00 | bdl |  | bdl |  | 6.84 | 0.19 | 68.14 | 0.23 |
| SC-15 | Tweed | 0.27 | 0.01 | 0.11 | 0.00 | bdl |  | bdl |  | 5.24 | 0.18 | 77.13 | 0.24 |
| MUR-01 | Tweed | 0.18 | 0.00 | 0.05 | 0.00 | bdl |  | 0.33 | 0.01 | 7.01 | 0.20 | 69.80 | 0.23 |
| MUR-02 | Tweed | 0.33 | 0.01 | 0.16 | 0.00 | bdl |  | 0.04 | 0.00 | 7.59 | 0.21 | 64.75 | 0.24 |
| MUR-03 | Tweed | 0.19 | 0.00 | 0.10 | 0.00 | bdl |  | 0.30 | 0.01 | 4.15 | 0.18 | 73.15 | 0.24 |
| MUR-04 | Tweed | 0.18 | 0.00 | 0.10 | 0.00 | bdl |  | 0.25 | 0.01 | 5.12 | 0.18 | 74.28 | 0.24 |
| MUR-05 | Tweed | 0.14 | 0.00 | 0.13 | 0.00 | bdl |  | 0.25 | 0.01 | 4.65 | 0.19 | 74.24 | 0.24 |
| MUR-06 | Tweed | 0.07 | 0.00 | 0.18 | 0.00 | bdl |  | bdl |  | 5.61 | 0.20 | 72.65 | 0.25 |
| MUR-07 | Tweed | 0.42 | 0.01 | 0.09 | 0.00 | bdl |  | bdl |  | 7.14 | 0.20 | 67.73 | 0.24 |
| MUR-08 | Tweed | 1.14 | 0.01 | 0.21 | 0.00 | 0.03 | 0.00 | 0.50 | 0.01 | 6.27 | 0.20 | 68.75 | 0.24 |
| MUR-09 | Tweed | 0.16 | 0.00 | 0.15 | 0.00 | bdl |  | 0.34 | 0.01 | 4.19 | 0.18 | 74.27 | 0.25 |
| MUR-10 | Tweed | 0.29 | 0.00 | 0.08 | 0.00 | bdl |  | 0.09 | 0.02 | 4.39 | 0.22 | 70.22 | 0.24 |
| MUR-11 | Tweed | 0.19 | 0.01 | 0.16 | 0.00 | bdl |  | 0.12 | 0.02 | 3.24 | 0.21 | 69.34 | 0.24 |
| MUR-12 | Tweed | 0.55 | 0.01 | 0.08 | 0.00 | bdl |  | 0.94 | 0.00 | 9.46 | 0.18 | 61.57 | 0.24 |
| DR-01 | Northumberland | 0.17 | 0.00 | 0.16 | 0.00 | bdl |  | 1.55 | 0.00 | 7.16 | 0.20 | 70.73 | 0.24 |
| DR-02 | Northumberland | 0.62 | 0.01 | 0.21 | 0.00 | bdl |  | 1.26 | 0.01 | 5.88 | 0.23 | 59.34 | 0.23 |
| DR-03 | Northumberland | 0.04 | 0.00 | 0.13 | 0.00 | bdl |  | 0.37 | 0.01 | 7.56 | 0.21 | 71.39 | 0.25 |
| DR-04 | Northumberland | 0.50 | 0.01 | 0.15 | 0.00 | bdl |  | 0.62 | 0.01 | 4.04 | 0.21 | 56.97 | 0.25 |
| DR-05 | Northumberland | 0.46 | 0.01 | 0.06 | 0.00 | bdl |  | 0.92 | 0.01 | 7.15 | 0.23 | 61.18 | 0.24 |
| DR-06 | Northumberland | 0.08 | 0.00 | 0.12 | 0.00 | bdl |  | 0.91 | 0.01 | 6.19 | 0.20 | 71.38 | 0.24 |
| DR-07 | Northumberland | 0.53 | 0.01 | 0.15 | 0.00 | bdl |  | 0.46 | 0.01 | 5.00 | 0.19 | 69.29 | 0.24 |
| ST-1309 | Northumberland | 0.60 | 0.01 | 0.04 | 0.00 | 3.13 | 0.03 | bdl |  | 2.73 | 0.23 | 93.54 | 0.24 |
| ST-1380 | Northumberland | 0.56 | 0.01 | 0.08 | 0.00 | 3.48 | 0.04 | bdl |  | 2.71 | 0.24 | 90.46 | 0.25 |
| ST-1406 | Northumberland | 0.29 | 0.01 | 0.05 | 0.00 | 0.44 | 0.01 | bdl |  | 2.47 | 0.23 | 99.77 | 0.24 |
| ST-1412 | Northumberland | 0.30 | 0.01 | 0.11 | 0.00 | 0.29 | 0.01 | bdl |  | 4.50 | 0.19 | 95.92 | 0.24 |
| ST-1420 | Northumberland | 0.28 | 0.01 | 0.02 | 0.00 | 0.73 | 0.02 | bdl |  | 3.70 | 0.20 | 90.67 | 0.24 |
| ST-1434 | Northumberland | 0.44 | 0.01 | 0.06 | 0.00 | 0.19 | 0.01 | bdl |  | 4.86 | 0.19 | 92.26 | 0.24 |
| ST-1436 | Northumberland | 0.40 | 0.01 | 0.08 | 0.00 | 0.56 | 0.01 | bdl |  | 3.36 | 0.19 | 88.19 | 0.25 |
| ST-1447 | Northumberland | 0.20 | 0.00 | 0.03 | 0.00 | 0.25 | 0.01 | bdl |  | 3.57 | 0.19 | 89.56 | 0.24 |
| ST-1454 | Northumberland | 0.95 | 0.01 | 0.05 | 0.00 | 2.64 | 0.03 | bdl |  | 2.80 | 0.23 | 91.19 | 0.24 |
| ST-1461 | Northumberland | 1.39 | 0.01 | 0.19 | 0.00 | 0.99 | 0.02 | 0.23 | 0.01 | 5.41 | 0.21 | 87.75 | 0.25 |
| ST-1466 | Northumberland | 0.45 | 0.01 | 0.03 | 0.00 | 0.93 | 0.02 | bdl |  | 3.69 | 0.20 | 97.69 | 0.24 |
| ST-1525 | Northumberland | 0.69 | 0.01 | 0.19 | 0.00 | 1.15 | 0.02 | 0.56 | 0.01 | 5.63 | 0.20 | 85.98 | 0.25 |
| ST-1545 | Northumberland | 0.22 | 0.01 | 0.03 | 0.00 | 0.39 | 0.01 | bdl |  | 3.60 | 0.19 | 93.10 | 0.24 |
| ST-1553 | Northumberland | 0.27 | 0.01 | 0.03 | 0.00 | 0.58 | 0.01 | 0.02 | 0.00 | 5.53 | 0.20 | 91.91 | 0.24 |
| ST-1579 | Northumberland | 0.49 | 0.01 | 0.13 | 0.00 | 0.39 | 0.01 | bdl |  | 2.85 | 0.21 | 95.57 | 0.24 |
| ST-1719 | Northumberland | 0.43 | 0.01 | 0.06 | 0.00 | 0.84 | 0.02 | bdl |  | 3.99 | 0.20 | 92.27 | 0.24 |
| ST-1924 | Northumberland | 0.96 | 0.01 | 0.07 | 0.01 | 2.36 | 0.03 | bdl |  | 2.47 | 0.25 | 96.94 | 0.24 |
| HA-4922 | Alston | 0.69 | 0.01 | 0.02 | 0.00 | 0.16 | 0.01 | 0.48 | 0.01 | 3.78 | 0.20 | 94.35 | 0.24 |
| HA-5651 | Alston | 0.39 | 0.01 | 0.04 | 0.00 | 9.14 | 0.06 | 0.24 | 0.01 | 3.19 | 0.24 | 66.98 | 0.24 |
| HA-5658 | Alston | 0.29 | 0.01 | 0.06 | 0.00 | 0.38 | 0.01 | 0.71 | 0.01 | 4.62 | 0.20 | 74.31 | 0.25 |
| HA-5697 | Alston | 0.16 | 0.00 | 0.03 | 0.00 | 0.40 | 0.01 | 0.79 | 0.01 | 4.00 | 0.20 | 87.00 | 0.24 |
| HA-5703 | Alston | 0.25 | 0.01 | 0.01 | 0.00 | 0.05 | 0.01 | 1.03 | 0.01 | 4.17 | 0.20 | 96.41 | 0.25 |
| HA-5719 | Alston | 1.04 | 0.01 | 0.03 | 0.00 | 5.52 | 0.05 | 0.56 | 0.01 | 4.05 | 0.23 | 72.21 | 0.24 |
| HA-5752 | Alston | 0.47 | 0.01 | 0.06 | 0.00 | 1.32 | 0.02 | 0.36 | 0.01 | 3.51 | 0.21 | 85.63 | 0.24 |
| HA-5764 | Alston | 0.55 | 0.01 | 0.03 | 0.00 | 0.43 | 0.02 | 1.88 | 0.02 | 5.10 | 0.21 | 76.43 | 0.24 |
| HA-5774 | Alston | 0.33 | 0.01 | 0.02 | 0.00 | 3.19 | 0.03 | 0.31 | 0.01 | 3.32 | 0.22 | 94.43 | 0.24 |
| HA-5783 | Alston | 0.49 | 0.01 | 0.03 | 0.00 | 2.00 | 0.03 | 0.88 | 0.01 | 4.55 | 0.22 | 80.44 | 0.24 |
| HA-5793 | Alston | 0.27 | 0.01 | 0.09 | 0.00 | 0.76 | 0.02 | 0.39 | 0.01 | 3.74 | 0.21 | 81.79 | 0.24 |
| HA-5798 | Alston | 0.51 | 0.01 | 0.09 | 0.00 | 2.23 | 0.03 | 0.24 | 0.01 | 3.27 | 0.21 | 93.56 | 0.24 |

Supplementary data table 3: Concentrations of selected element oxides in weight per cent (wt. %) for sandstone samples belonging to the Fell Sandstone Formation across the northern Pennine Basin. Bdl = below limit of detection.