Supplementary Table 1: Elemental data from pXRF, ICP-OES data for P, results from PCA and molar ratio of Ca/Al, Ca/Sr and Fe/Al.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **g kg-1** | | | | | | | | | |  | **PCA** | | |  | **Molar ratio** | | |
|  | **Samples** | **Al** | **Si** | **K** | **Ca** | **Cr** | **Mn** | **Fe** | **Zn** | **Sr** | **P** |  | **PC1** | **PC2** | **PC3** |  | **Ca/Al** | **Ca/Sr** | **Fe/Al** |
| **Section 4** | **4015\_U** | 73.685 | 169.987 | 13.605 | 22.936 | 0.066 | 1.806 | 91.482 | 0.128 | 0.861 | 1.600 |  | -0.268 | 0.696 | 0.423 |  | 0.210 | 58.356 | 0.600 |
| **4015\_M** | 77.462 | 180.981 | 12.668 | 21.378 | 0.087 | 1.673 | 85.818 | 0.123 | 0.800 | 1.500 |  | -0.410 | 0.143 | 0.180 |  | 0.186 | 58.528 | 0.535 |
| **4015\_L** | 71.299 | 147.701 | 11.018 | 17.327 | 0.059 | 1.809 | 90.100 | 0.126 | 0.769 | 1.400 |  | -0.270 | -0.049 | -1.487 |  | 0.164 | 49.360 | 0.610 |
| **4025\_U** | 82.238 | 190.228 | 13.350 | 25.210 | 0.079 | 1.677 | 87.120 | 0.108 | 0.822 | 1.700 |  | -0.439 | 0.174 | 0.851 |  | 0.207 | 67.202 | 0.512 |
| **4025\_L** | 79.986 | 183.797 | 13.147 | 24.941 | 0.079 | 1.645 | 89.135 | 0.110 | 0.830 | 1.600 |  | -0.526 | 0.367 | 0.644 |  | 0.210 | 65.799 | 0.538 |
| **4027** | 74.251 | 174.997 | 12.261 | 51.102 | 0.000 | 1.572 | 82.943 | 0.100 | 0.817 | 1.600 |  | -1.518 | 1.267 | -0.448 |  | 0.465 | 136.966 | 0.540 |
| **4026** | 63.706 | 152.760 | 11.604 | 39.421 | 0.000 | 1.376 | 74.291 | 0.092 | 0.739 | 1.700 |  | -2.122 | 0.394 | -1.335 |  | 0.418 | 116.889 | 0.563 |
| **4028** | 78.668 | 189.999 | 11.934 | 61.269 | 0.138 | 1.944 | 111.115 | 0.137 | 1.000 | 1.500 |  | 0.874 | 2.769 | -0.148 |  | 0.526 | 134.146 | 0.682 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Section 11** | **4048** | 78.540 | 190.018 | 13.680 | 40.137 | 0.127 | 2.166 | 113.265 | 0.152 | 0.891 | 2.000 |  | 1.724 | 1.060 | 0.255 |  | 0.345 | 98.598 | 0.697 |
| **4041** | 74.988 | 188.257 | 13.899 | 22.000 | 0.080 | 1.918 | 90.663 | 0.148 | 0.877 | 2.000 |  | 0.563 | 0.237 | 0.479 |  | 0.198 | 54.919 | 0.584 |
| **4042** | 87.050 | 178.198 | 14.228 | 27.132 | 0.095 | 1.836 | 96.129 | 0.127 | 0.853 | 2.400 |  | 0.915 | -0.385 | 1.221 |  | 0.210 | 69.621 | 0.533 |
| **4043** | 78.834 | 175.323 | 10.719 | 24.467 | 0.086 | 1.792 | 96.714 | 0.130 | 0.720 | 1.900 |  | 0.666 | -0.868 | -1.618 |  | 0.209 | 74.453 | 0.593 |
| **4046** | 75.891 | 179.514 | 11.724 | 22.551 | 0.091 | 1.806 | 97.717 | 0.134 | 0.722 | 2.000 |  | 0.697 | -0.839 | -1.171 |  | 0.201 | 68.443 | 0.622 |
| **4044** | 88.534 | 178.391 | 13.656 | 20.693 | 0.083 | 1.789 | 93.839 | 0.146 | 0.758 | 2.100 |  | 0.912 | -0.973 | 0.699 |  | 0.158 | 59.788 | 0.512 |
| **4045** | 81.254 | 203.258 | 11.419 | 21.949 | 0.075 | 1.857 | 97.648 | 0.128 | 0.760 | 2.200 |  | 0.913 | -1.042 | -1.138 |  | 0.182 | 63.251 | 0.580 |
| **4047** | 84.850 | 201.088 | 11.386 | 24.096 | 0.093 | 1.807 | 100.092 | 0.125 | 0.798 | 1.800 |  | 0.705 | -0.363 | -0.657 |  | 0.192 | 66.149 | 0.570 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Controls** | **C2** | 81.188 | 181.883 | 14.523 | 12.151 | 0.103 | 1.591 | 79.253 | 0.109 | 0.635 | 1.700 |  | -0.655 | -1.226 | 1.366 |  | 0.101 | 41.900 | 0.471 |
| **C4** | 81.002 | 182.519 | 14.985 | 18.286 | 0.074 | 1.704 | 88.181 | 0.120 | 0.762 | 1.700 |  | -0.402 | -0.173 | 1.574 |  | 0.152 | 52.545 | 0.526 |
| **C6** | 75.803 | 160.436 | 13.176 | 13.254 | 0.064 | 1.436 | 74.425 | 0.096 | 0.646 | 1.700 |  | -1.358 | -1.190 | 0.312 |  | 0.118 | 44.944 | 0.474 |