Table S1

Carbon and oxygen-isotope values (‰) and the contents of elements (%) and TOC (%) in samples from the Shenglihe section

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample nos. | Sample positions | lithology | SiO2 | Al2O3 | Fe2O3 | FeO | MgO | CaO | Na2O | K2O | MnO | TiO | P2O5 | δ13C | δ18O | TOC |
| 15NO4-1 | Middle part of the Bailong Binghe Formation (upper Lower Barremian- Upper Barremian) | Micritic limestone | 6.22 | 1.48 | 0.46 | 0.39 | 0.76 | 50.11 | 0.089 | 0.347 | 0.029 | 0.089 | 0.034 | 2.4 | -7.69 | 0.19 |
| 15NO4-2 | Micritic limestone | 7.13 | 1.62 | 0.49 | 0.36 | 0.74 | 49.54 | 0.089 | 0.385 | 0.030 | 0.097 | 0.031 | 2.1 | -7.33 | 0.16 |
| 15NO4-3 | Micritic limestone | 7.24 | 1.66 | 0.49 | 0.42 | 0.75 | 49.39 | 0.094 | 0.397 | 0.031 | 0.096 | 0.030 | 2.1 | -7.48 | 0.19 |
| 15NO4-4 | Micritic limestone | 6.80 | 1.55 | 0.46 | 0.40 | 0.74 | 49.81 | 0.078 | 0.374 | 0.029 | 0.097 | 0.033 | 2.1 | -7.58 | 0.15 |
| 15NO4-5 | Micritic limestone | 7.64 | 1.74 | 0.56 | 0.36 | 0.77 | 49.06 | 0.096 | 0.426 | 0.031 | 0.104 | 0.029 | 0.3 | -7.22 | 0.19 |
| 15NO4-6 | Micritic limestone | 8.26 | 1.96 | 0.65 | 0.31 | 0.76 | 48.39 | 0.092 | 0.459 | 0.032 | 0.114 | 0.03 | 0.1 | -7.41 | 0.17 |
| 15NO4-7 | Micritic limestone | 9.06 | 2.18 | 0.75 | 0.36 | 0.75 | 47.72 | 0.079 | 0.53 | 0.034 | 0.120 | 0.028 | -2.5 | -7.45 | 0.18 |
| 15NO4-8 | Bioclastic limestone | 1.26 | 0.35 | 0.21 | 0.18 | 0.55 | 54.43 | 0.067 | 0.073 | 0.029 | 0.018 | 0.055 | 1.1 | -6.52 | 0.17 |
| 15NO4-9 | Bioclastic limestone | 0.82 | 0.27 | 0.33 | 0.29 | 1.11 | 53.98 | 0.067 | 0.049 | 0.027 | 0.017 | 0.094 | 1.6 | -5.46 | 0.14 |
| 15NO4-10 | Bioclastic limestone | 0.46 | 0.15 | 0.70 | 0.42 | 0.71 | 54.50 | 0.065 | 0.032 | 0.034 | 0.009 | 0.076 | 2.2 | -5.49 | 0.23 |
| 15NO4-11 | shale | 2.97 | 0.92 | 1.44 | 1.13 | 1.61 | 49.05 | 0.118 | 0.222 | 0.015 | 0.053 | 0.294 | 1.7 | -5.48 | 4.24 |
| 15NO4-12 | shale | 2.31 | 0.69 | 1.64 | 0.96 | 2.57 | 48.42 | 0.16 | 0.163 | 0.019 | 0.036 | 0.279 | 2.1 | -5.21 | 4.31 |
| 15NO4-13 | shale | 2.80 | 0.79 | 2.79 | 1.11 | 2.55 | 46.56 | 0.167 | 0.191 | 0.017 | 0.046 | 0.452 | 1.4 | -6.23 | 3.61 |
| 15NO4-14 | shale | 3.11 | 0.81 | 3.31 | 1.55 | 3.41 | 45.17 | 0.175 | 0.205 | 0.025 | 0.048 | 0.501 | 2.5 | -5.78 | 4.69 |
| 15NO4-15 | shale | 2.77 | 0.73 | 2.34 | 1.13 | 6.31 | 43.53 | 0.193 | 0.154 | 0.035 | 0.036 | 0.296 | 2.2 | -5.59 | 2.78 |
| 15NO4-16 | shale | 2.36 | 0.59 | 1.47 | 0.79 | 6.74 | 44.42 | 0.139 | 0.127 | 0.043 | 0.033 | 0.216 | 1.0 | -5.68 | 4.10 |
| 15NO4-17 | shale | 4.88 | 1.16 | 1.78 | 1.11 | 7.26 | 39.65 | 0.161 | 0.277 | 0.038 | 0.070 | 0.444 | 1.9 | -5.55 | 6.47 |
| 15NO4-18 | shale | 6.74 | 1.61 | 1.78 | 1.39 | 5.28 | 39.68 | 0.125 | 0.401 | 0.037 | 0.103 | 0.574 | -1.3 | -5.28 | 2.29 |
| 15NO4-19 | shale | 4.57 | 1.05 | 1.90 | 1.16 | 6.09 | 41.30 | 0.171 | 0.247 | 0.041 | 0.069 | 0.473 | -0.5 | -6.55 | 6.98 |
| 15NO4-20 | shale | 6.07 | 1.50 | 2.19 | 0.99 | 5.61 | 40.32 | 0.150 | 0.357 | 0.046 | 0.095 | 0.498 | -3.6 | -6.65 | 4.34 |
| 15NO4-21 | shale | 12.63 | 2.90 | 2.35 | 1.19 | 1.90 | 36.78 | 0.164 | 0.676 | 0.039 | 0.184 | 0.749 | 2.1 | -5.29 | 7.62 |
| 15NO4-22 | Marl | 9.28 | 2.34 | 1.00 | 0.30 | 1.20 | 46.76 | 0.093 | 0.532 | 0.059 | 0.138 | 0.035 | 1.9 | -5.25 | 0.17 |
| 15NO4-23 | Marl | 8.04 | 1.88 | 0.83 | 0.38 | 0.99 | 46.70 | 0.082 | 0.449 | 0.053 | 0.117 | 0.032 | 2.2 | -5.43 | 0.16 |
| 15NO4-24 | Marl | 8.23 | 1.98 | 0.93 | 0.51 | 0.86 | 48.11 | 0.070 | 0.472 | 0.057 | 0.130 | 0.031 | 2.1 | -5.34 | 0.23 |
| 15NO4-25 | Marl | 10.99 | 2.83 | 1.28 | 0.56 | 0.86 | 45.79 | 0.101 | 0.712 | 0.052 | 0.162 | 0.034 | 2.0 | -5.88 | 0.20 |
| 15NO4-26 | Marl | 12.36 | 3.43 | 0.79 | 0.26 | 0.85 | 44.74 | 0.124 | 0.874 | 0.055 | 0.195 | 0.036 | 2.0 | -5.48 | 0.15 |
| 15NO4-27 | Marl | 4.40 | 1.07 | 0.52 | 0.43 | 0.73 | 51.35 | 0.067 | 0.277 | 0.043 | 0.063 | 0.038 | 2.1 | -5.97 | 0.24 |
| 15NO4-28 | Marl | 8.16 | 2.20 | 0.77 | 0.28 | 0.72 | 48.25 | 0.069 | 0.513 | 0.038 | 0.119 | 0.040 | 2.6 | -5.88 | 0.18 |
| 15NO4-29 | Marl | 9.07 | 2.56 | 0.97 | 0.32 | 0.75 | 47.38 | 0.082 | 0.612 | 0.040 | 0.135 | 0.035 | 2.2 | -5.69 | 0.17 |
| 15NO4-30 | Marl | 5.07 | 1.44 | 0.60 | 0.35 | 0.61 | 50.86 | 0.062 | 0.362 | 0.031 | 0.080 | 0.025 | 0.5 | -7.18 | 0.25 |
| 15NO4-31 | Marl | 5.19 | 1.50 | 0.56 | 0.33 | 0.65 | 50.82 | 0.075 | 0.364 | 0.034 | 0.074 | 0.022 | 0.3 | -7.15 | 0.20 |
| 15NO4-32 | Marl | 6.12 | 1.78 | 0. 60 | 0.38 | 0.62 | 49.92 | 0.068 | 0.440 | 0.036 | 0.086 | 0.023 | 0.1 | -7.08 | 0.17 |
| 15NO4-33 | Micritic limestone | 1.70 | 0.56 | 0.34 | 0.29 | 0.63 | 53.61 | 0.054 | 0.133 | 0.025 | 0.030 | 0.016 | 0.2 | -7.13 | 0.19 |
| 15NO4-34 | Micritic limestone | 3.37 | 0.72 | 0.41 | 0.35 | 0.56 | 52.48 | 0.058 | 0.169 | 0.022 | 0.044 | 0.016 | 0.2 | -7.12 | 0.29 |
| 15NO4-35 | Micritic limestone | 2.07 | 0.56 | 0.39 | 0.34 | 0.52 | 54.63 | 0.067 | 0.128 | 0.031 | 0.035 | 0.021 | 0.7 | -7.35 | 0.15 |
| 15NO4-36 | Micritic limestone | 2.12 | 0.43 | 0.44 | 0.36 | 0.49 | 53.64 | 0.073 | 0.101 | 0.03 | 0.026 | 0.015 | -0.5 | -6.48 | 0.14 |
| 15NO4-37 | Micritic limestone | 1.63 | 0.39 | 0.34 | 0.29 | 0.27 | 54.17 | 0.045 | 0.077 | 0.032 | 0.023 | 0.014 | -0.6 | -6.84 | 0.26 |
| 15NO4-38 | Micritic limestone | 1.01 | 0.28 | 0.15 | 0.11 | 0.43 | 54.88 | 0.05 | 0.068 | 0.021 | 0.014 | 0.013 | 0.8 | -7.74 | 0.22 |
| 15NO4-39 | Micritic limestone | 3.04 | 0.74 | 0.09 | 0.10 | 0.30 | 53.52 | 0.047 | 0.169 | 0.020 | 0.043 | 0.020 | -0.6 | -6.25 | 0.18 |
| 15NO4-40 | Micritic limestone | 3.10 | 0.78 | 0.10 | 0.10 | 0.31 | 53.46 | 0.038 | 0.173 | 0.016 | 0.044 | 0.021 | 0.3 | -7.14 | 0.18 |
| 15NO4-41 | Micritic limestone | 4.20 | 1.17 | 0.52 | 0.39 | 0.80 | 51.31 | 0.063 | 0.323 | 0.029 | 0.058 | 0.02 | 2.5 | -5.58 | 0.25 |
| 15NO4-42 | Micritic limestone | 5.75 | 1.59 | 0.59 | 0.41 | 0.69 | 50.20 | 0.073 | 0.405 | 0.032 | 0.086 | 0.023 | 0.6 | -7.33 | 0.24 |
| 15NO4-43 | Micritic limestone | 8.20 | 2.49 | 0.73 | 0.58 | 0.90 | 47.50 | 0.094 | 0.633 | 0.028 | 0.129 | 0.025 | 1.1 | -7.74 | 0.48 |
| 15NO4-44 | Micritic limestone | 2.14 | 0.66 | 0.51 | 0.31 | 0.32 | 53.87 | 0.037 | 0.162 | 0.063 | 0.033 | 0.042 | -2.9 | -8.28 | 0.15 |
| 15NO4-45 | Micritic limestone | 2.07 | 0.71 | 0.45 | 0.28 | 0.52 | 53.58 | 0.059 | 0.171 | 0.030 | 0.041 | 0.037 | -1.4 | -6.28 | 0.13 |
| 15NO4-46 | Micritic limestone | 1.51 | 0.50 | 0.40 | 0.24 | 0.57 | 54.07 | 0.055 | 0.117 | 0.021 | 0.025 | 0.017 | 0.8 | -7.32 | 0.16 |
| 15NO4-47 | Micritic limestone | 2.23 | 0.68 | 0.43 | 0.29 | 0.73 | 52.96 | 0.054 | 0.171 | 0.029 | 0.036 | 0.017 | 1.2 | -4.58 | 0.47 |
| 15NO4-48 | Micritic limestone | 2.23 | 0.67 | 0.53 | 0.26 | 0.53 | 53.23 | 0.063 | 0.164 | 0.019 | 0.035 | 0.016 | 1.1 | -7.74 | 0.26 |
| 15NO4-49 | Micritic limestone | 3.09 | 0.84 | 0.39 | 0.31 | 0.75 | 52.74 | 0.086 | 0.175 | 0.026 | 0.038 | 0.019 | 1.0 | -7.72 | 0.57 |
| 15NO4-50 | Micritic limestone | 3.12 | 0.82 | 0.50 | 0.37 | 0.82 | 52.18 | 0.062 | 0.204 | 0.024 | 0.056 | 0.019 | 1.4 | -7.7 | 0.95 |

Table S2. Concentrations of trace elements in the samples from the Shenglihe section in the Qiangtang Basin (unit in ppm)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample nos. | Li | B | Be | Sc | V | Cr | Co | Ni | Cu | Zn | Ga | Rb | Sr | Y | Zr | Nb | Mo | Cd | In | Sb | Cs | Ba | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | W | Re | Tl | Pb | Bi | Th | U |
| 15NO4-1 | 5.18 | 31.8 | 0.46 | 1.74 | 21.0 | 9.54 | 3.00 | 13.4 | 5.13 | 39.4 | 1.87 | 13.6 | 274 | 4.45 | 17 | 1.63 | 0.81 | 0.65 | 0.009 | 0.14 | 1.02 | 44.8 | 4.82 | 9.33 | 1.21 | 4.84 | 1.02 | 0.213 | 0.87 | 0.16 | 0.84 | 0.16 | 0.44 | 0.07 | 0.41 | 0.06 | 0.49 | 0.12 | 0.22 | 0.01 | 0.08 | 13.0 | 0.04 | 1.48 | 1.72 |
| 15NO4-2 | 5.55 | 31.9 | 0.46 | 2.05 | 25.8 | 15.9 | 3.52 | 15.7 | 5.68 | 39.5 | 2.10 | 15.4 | 266 | 5.36 | 20.4 | 1.87 | 0.98 | 0.63 | 0.009 | 0.18 | 1.09 | 43.2 | 5.81 | 11.0 | 1.42 | 5.62 | 1.12 | 0.267 | 0.10 | 0.19 | 0.98 | 0.18 | 0.50 | 0.08 | 0.47 | 0.07 | 0.57 | 0.14 | 0.24 | 0.01 | 0.08 | 14.2 | 0.05 | 1.66 | 1.91 |
| 15NO4-3 | 6.34 | 30.1 | 0.49 | 2.13 | 27.5 | 15.6 | 3.92 | 17.5 | 5.79 | 42.8 | 2.34 | 16.6 | 286 | 5.40 | 21.3 | 2.06 | 1.53 | 0.63 | 0.011 | 0.19 | 1.19 | 47.3 | 5.91 | 11.2 | 1.57 | 5.85 | 1.26 | 0.264 | 1.08 | 0.19 | 0.99 | 0.19 | 0.53 | 0.08 | 0.49 | 0.07 | 0.60 | 0.16 | 0.26 | 0.01 | 0.09 | 14.6 | 0.04 | 1.77 | 1.91 |
| 15NO4-4 | 4.71 | 32.7 | 0.36 | 1.73 | 21.0 | 9.80 | 3.03 | 15.1 | 4.83 | 38.5 | 1.95 | 13.8 | 240 | 4.68 | 19.9 | 1.73 | 1.00 | 0.73 | 0.007 | 0.13 | 1.05 | 38.9 | 4.90 | 9.67 | 1.25 | 4.98 | 1.04 | 0.241 | 0.85 | 0.17 | 0.86 | 0.16 | 0.45 | 0.07 | 0.40 | 0.06 | 0.59 | 0.13 | 0.23 | 0.00 | 0.07 | 12.6 | 0.04 | 1.53 | 1.35 |
| 15NO4-5 | 6.48 | 33.0 | 0.50 | 2.02 | 21.8 | 8.51 | 3.30 | 13.7 | 5.12 | 43.9 | 2.33 | 16.7 | 265 | 5.35 | 21.4 | 1.99 | 0.54 | 0.75 | 0.006 | 0.17 | 1.27 | 47.5 | 5.70 | 11.1 | 1.42 | 5.66 | 1.17 | 0.247 | 1.03 | 0.20 | 0.99 | 0.19 | 0.49 | 0.08 | 0.47 | 0.07 | 0.60 | 0.15 | 0.25 | 0.01 | 0.09 | 16.4 | 0.06 | 1.72 | 1.52 |
| 15NO4-6 | 5.62 | 37.8 | 0.48 | 2.50 | 22.5 | 8.49 | 3.82 | 13.8 | 5.24 | 38.7 | 2.34 | 17.3 | 260 | 6.31 | 21.5 | 2.03 | 0.55 | 0.77 | 0.013 | 0.16 | 1.08 | 42.0 | 6.22 | 12.7 | 1.64 | 6.55 | 1.44 | 0.315 | 1.18 | 0.22 | 1.20 | 0.23 | 0.59 | 0.09 | 0.59 | 0.09 | 0.63 | 0.15 | 0.26 | 0.01 | 0.10 | 20.9 | 0.05 | 1.99 | 1.50 |
| 15NO4-7 | 6.52 | 39.1 | 0.53 | 2.63 | 24.9 | 10.4 | 4.93 | 14.8 | 6.41 | 10.5 | 2.86 | 20.6 | 261 | 7.14 | 23.5 | 2.28 | 0.51 | 0.39 | 0.017 | 0.17 | 1.31 | 44.6 | 6.87 | 14.0 | 1.77 | 7.46 | 1.60 | 0.348 | 1.33 | 0.25 | 1.43 | 0.26 | 0.70 | 0.11 | 0.64 | 0.10 | 0.68 | 0.18 | 0.31 | 0.01 | 0.12 | 26.2 | 0.06 | 2.15 | 0.94 |
| 15NO4-8 | 1.29 | 9.91 | 0.16 | 0.63 | 23.0 | 3.92 | 2.16 | 11.3 | 10.6 | 11.9 | 0.55 | 3.19 | 342 | 1.40 | 4.01 | 0.39 | 0.95 | 0.16 | 0.004 | 0.08 | 0.30 | 11.2 | 1.63 | 2.3 | 0.33 | 1.07 | 0.21 | 0.049 | 0.23 | 0.04 | 0.22 | 0.05 | 0.12 | 0.02 | 0.10 | 0.02 | 0.11 | 0.03 | 0.08 | 0.05 | 0.09 | 5.07 | 0.03 | 0.30 | 2.17 |
| 15NO4-9 | 1.04 | 9.44 | 0.12 | 0.43 | 23.3 | 3.01 | 1.99 | 11.1 | 5.69 | 31.9 | 0.32 | 1.86 | 422 | 0.77 | 2.57 | 0.25 | 1.55 | 0.25 | 0.002 | 0.12 | 0.19 | 15.0 | 0.96 | 1.15 | 0.26 | 0.56 | 0.15 | 0.034 | 0.12 | 0.02 | 0.12 | 0.02 | 0.07 | 0.01 | 0.06 | 0.01 | 0.05 | 0.02 | 0.04 | 0.33 | 0.16 | 13.2 | 0.02 | 0.18 | 2.86 |
| 15NO4-10 | 0.803 | 8.51 | 0.07 | 0.33 | 23.7 | 3.35 | 2.34 | 12.2 | 5.37 | 33.4 | 0.27 | 1.15 | 384 | 0.804 | 1.77 | 0.19 | 3.00 | 0.24 | 0.004 | 0.13 | 0.11 | 9.61 | 1.03 | 1.27 | 0.31 | 0.64 | 0.14 | 0.031 | 0.12 | 0.03 | 0.13 | 0.03 | 0.06 | 0.01 | 0.06 | 0.01 | 0.05 | 0.02 | 0.05 | 0.19 | 0.15 | 11.2 | 0.02 | 0.13 | 2.66 |
| 15NO4-11 | 3.73 | 18.3 | 0.22 | 1.08 | 36.2 | 6.13 | 4.01 | 26.4 | 19.3 | 123 | 1.18 | 9.43 | 1220 | 1.71 | 8.92 | 0.92 | 9.81 | 0.94 | 0.002 | 0.13 | 0.86 | 24.6 | 2.53 | 4.28 | 0.60 | 2.03 | 0.38 | 0.083 | 0.34 | 0.065 | 0.29 | 0.06 | 0.15 | 0.03 | 0.16 | 0.02 | 0.25 | 0.06 | 0.16 | 0.35 | 0.67 | 24.2 | 0.04 | 0.89 | 7.42 |
| 15NO4-12 | 2.89 | 15.3 | 0.20 | 0.84 | 31.7 | 5.18 | 3.93 | 24.8 | 16.7 | 339 | 0.86 | 6.39 | 1340 | 1.40 | 6.63 | 0.65 | 8.31 | 3.24 | 0.002 | 0.17 | 0.59 | 19.7 | 1.97 | 3.15 | 0.43 | 1.54 | 0.30 | 0.068 | 0.27 | 0.05 | 0.25 | 0.05 | 0.14 | 0.02 | 0.14 | 0.02 | 0.17 | 0.04 | 0.14 | 0.29 | 0.80 | 31.2 | 0.03 | 0.53 | 5.90 |
| 15NO4-13 | 3.56 | 19.6 | 0.26 | 1.21 | 27.5 | 10.0 | 4.36 | 28.5 | 25.2 | 337 | 0.95 | 7.33 | 1313 | 1.83 | 10.8 | 0.75 | 11.2 | 2.41 | 0.003 | 0.16 | 0.65 | 23.9 | 2.27 | 3.70 | 0.47 | 1.73 | 0.37 | 0.075 | 0.33 | 0.06 | 0.31 | 0.06 | 0.18 | 0.03 | 0.18 | 0.02 | 0.29 | 0.06 | 0.16 | 0.42 | 0.96 | 29.8 | 0.06 | 0.67 | 9.25 |
| 15NO4-14 | 3.59 | 17.4 | 0.17 | 0.97 | 32.3 | 8.19 | 4.87 | 30.6 | 26.4 | 586 | 1.06 | 8.00 | 915 | 1.93 | 10.5 | 0.78 | 13.6 | 3.63 | 0.003 | 0.17 | 0.68 | 23.8 | 2.45 | 3.85 | 0.53 | 1.81 | 0.36 | 0.082 | 0.34 | 0.06 | 0.34 | 0.06 | 0.18 | 0.03 | 0.16 | 0.03 | 0.26 | 0.06 | 0.16 | 0.86 | 1.16 | 31.3 | 0.04 | 0.71 | 10.2 |
| 15NO4-15 | 2.69 | 13.6 | 0.21 | 0.70 | 24.1 | 5.10 | 4.26 | 23.5 | 19.0 | 1040 | 0.83 | 5.91 | 592 | 1.44 | 7.99 | 0.62 | 9.01 | 5.18 | 0.002 | 0.12 | 0.48 | 18.1 | 1.99 | 2.94 | 0.41 | 1.38 | 0.28 | 0.059 | 0.26 | 0.05 | 0.25 | 0.05 | 0.14 | 0.02 | 0.12 | 0.02 | 0.20 | 0.04 | 0.14 | 0.61 | 0.95 | 36.9 | 0.04 | 0.56 | 11.2 |
| 15NO4-16 | 2.24 | 13.2 | 0.17 | 0.65 | 19.3 | 5.20 | 3.3 | 18.5 | 11.8 | 438 | 0.702 | 4.82 | 342 | 1.31 | 9.45 | 0.50 | 5.61 | 2.62 | 0.002 | 0.10 | 0.37 | 15.2 | 1.80 | 2.71 | 0.34 | 1.23 | 0.25 | 0.052 | 0.22 | 0.04 | 0.23 | 0.04 | 0.13 | 0.02 | 0.12 | 0.02 | 0.25 | 0.04 | 0.10 | 0.25 | 0.46 | 16.3 | 0.03 | 0.45 | 8.71 |
| 15NO4-17 | 4.41 | 20.4 | 0.28 | 1.17 | 23.4 | 6.64 | 3.98 | 24.3 | 25.3 | 384 | 1.35 | 10.6 | 361 | 2.23 | 16.7 | 1.11 | 8.65 | 2.99 | 0.005 | 0.10 | 0.89 | 26.8 | 3.28 | 5.45 | 0.68 | 2.55 | 0.49 | 0.099 | 0.44 | 0.07 | 0.40 | 0.08 | 0.23 | 0.03 | 0.20 | 0.03 | 0.47 | 0.08 | 0.19 | 0.32 | 0.72 | 22.0 | 0.06 | 1.05 | 9.81 |
| 15NO4-18 | 6.37 | 19.0 | 0.32 | 1.69 | 29.0 | 8.59 | 5.01 | 30.1 | 34.8 | 427 | 1.97 | 15.6 | 420 | 3.04 | 25.2 | 1.68 | 12.1 | 2.24 | 0.002 | 0.12 | 1.35 | 36.6 | 4.62 | 7.90 | 1.00 | 3.63 | 0.67 | 0.149 | 0.59 | 0.11 | 0.55 | 0.10 | 0.28 | 0.04 | 0.30 | 0.04 | 0.69 | 0.12 | 0.27 | 0.41 | 0.81 | 23.7 | 0.07 | 1.48 | 13.7 |
| 15NO4-19 | 4.69 | 22.6 | 0.31 | 1.35 | 33.6 | 7.52 | 4.3 | 28.8 | 29.7 | 698 | 1.45 | 10.3 | 465 | 3.01 | 20.2 | 1.25 | 11.0 | 3.99 | 0.005 | 0.09 | 0.87 | 35.6 | 3.93 | 6.49 | 0.83 | 2.99 | 0.59 | 0.133 | 0.51 | 0.10 | 0.49 | 0.09 | 0.28 | 0.04 | 0.28 | 0.04 | 0.56 | 0.09 | 0.21 | 0.45 | 0.85 | 14.5 | 0.06 | 1.12 | 11.9 |
| 15NO4-20 | 6.05 | 26.4 | 0.32 | 1.60 | 39.6 | 9.31 | 5.5 | 33.2 | 33.3 | 477 | 1.87 | 14.4 | 432 | 3.40 | 21.9 | 1.57 | 12.1 | 2.34 | 0.007 | 0.13 | 1.25 | 42.1 | 4.72 | 8.12 | 0.105 | 3.74 | 0.72 | 0.157 | 0.64 | 0.12 | 0.58 | 0.12 | 0.32 | 0.05 | 0.33 | 0.05 | 0.61 | 0.12 | 0.26 | 0.29 | 0.82 | 13.9 | 0.07 | 1.41 | 12.9 |
| 15NO4-21 | 11.3 | 41.4 | 0.65 | 3.08 | 52.1 | 20.7 | 6.74 | 47.2 | 57.1 | 63.6 | 3.74 | 28.8 | 393 | 6.85 | 56 | 3.29 | 16.4 | 0.34 | 0.011 | 0.20 | 2.47 | 122 | 9.56 | 17.7 | 2.18 | 8.24 | 1.54 | 0.32 | 1.34 | 0.24 | 1.23 | 0.23 | 0.64 | 0.09 | 0.59 | 0.09 | 1.52 | 0.24 | 0.49 | 0.77 | 1.63 | 13.8 | 0.14 | 2.98 | 8.00 |
| 15NO4-22 | 4.95 | 36.4 | 0.37 | 1.92 | 22.1 | 10.4 | 4.95 | 12.7 | 6.63 | 40.2 | 2.19 | 16.2 | 223 | 5.25 | 18.4 | 1.90 | 0.64 | 0.24 | 0.010 | 0.16 | 1.16 | 41.2 | 5.45 | 10.9 | 1.45 | 5.58 | 1.17 | 0.259 | 1.02 | 0.19 | 1.03 | 0.18 | 0.53 | 0.08 | 0.46 | 0.07 | 0.52 | 0.14 | 0.25 | 0.01 | 0.09 | 14.9 | 0.05 | 1.66 | 2.10 |
| 15NO4-23 | 6.49 | 30.7 | 0.51 | 2.57 | 28.5 | 14.5 | 5.74 | 18.0 | 7.66 | 37.3 | 2.78 | 20.3 | 343 | 7.14 | 23.8 | 2.48 | 1.03 | 0.14 | 0.010 | 0.26 | 1.45 | 48.6 | 6.88 | 14.0 | 1.85 | 7.19 | 1.56 | 0.331 | 1.30 | 0.24 | 1.35 | 0.25 | 0.69 | 0.10 | 0.62 | 0.09 | 0.67 | 0.18 | 0.29 | 0.01 | 0.12 | 17.8 | 0.07 | 2.02 | 3.00 |
| 15NO4-24 | 6.42 | 30.3 | 0.43 | 2.67 | 30.6 | 13.6 | 6.04 | 17.1 | 7.35 | 33.9 | 2.74 | 19.6 | 332 | 7.03 | 24 | 2.49 | 0.71 | 0.22 | 0.013 | 0.23 | 1.38 | 42.4 | 6.98 | 14.2 | 1.84 | 7.44 | 1.51 | 0.339 | 1.34 | 0.25 | 1.37 | 0.259 | 0.67 | 0.10 | 0.63 | 0.09 | 0.70 | 0.19 | 0.30 | 0.01 | 0.13 | 19.0 | 0.08 | 2.12 | 3.55 |
| 15NO4-25 | 7.68 | 38.0 | 0.52 | 3.18 | 35.5 | 13.0 | 7.77 | 18.9 | 8.61 | 22.3 | 3.6 | 26.6 | 261 | 7.35 | 28 | 2.90 | 0.57 | 0.19 | 0.020 | 0.26 | 1.72 | 53.9 | 7.97 | 15.6 | 1.91 | 7.58 | 1.57 | 0.344 | 1.39 | 0.25 | 1.35 | 0.25 | 0.68 | 0.11 | 0.62 | 0.09 | 0.79 | 0.22 | 0.37 | 0.01 | 0.14 | 23.2 | 0.09 | 2.50 | 2.31 |
| 15NO4-26 | 8.87 | 50.5 | 0.55 | 3.57 | 41.8 | 14.2 | 3.35 | 13.5 | 8.79 | 14.9 | 4.41 | 32.5 | 237 | 7.49 | 32 | 3.29 | 0.58 | 0.03 | 0.027 | 0.18 | 3.24 | 79.0 | 8.98 | 17.3 | 2.14 | 8.47 | 1.72 | 0.36 | 1.47 | 0.26 | 1.39 | 0.27 | 0.73 | 0.11 | 0.71 | 0.10 | 0.89 | 0.26 | 0.42 | 0.05 | 0.17 | 10.2 | 0.13 | 2.92 | 1.81 |
| 15NO4-27 | 3.20 | 18.3 | 0.26 | 1.46 | 19.0 | 8.59 | 2.74 | 15.8 | 3.76 | 86.2 | 1.40 | 11.2 | 304 | 3.70 | 13.7 | 1.14 | 1.34 | 0.58 | 0.010 | 0.10 | 0.80 | 28.4 | 4.11 | 7.50 | 1.00 | 3.70 | 0.73 | 0.154 | 0.69 | 0.12 | 0.65 | 0.12 | 0.33 | 0.05 | 0.29 | 0.04 | 0.34 | 0.08 | 0.21 | 0.01 | 0.08 | 9.63 | 0.08 | 1.04 | 2.57 |
| 15NO4-28 | 6.41 | 36.6 | 0.49 | 2.52 | 26.1 | 8.56 | 3.3 | 14.6 | 5.71 | 9.87 | 2.50 | 18.6 | 275 | 6.37 | 23.4 | 2.11 | 0.53 | 0.08 | 0.018 | 0.17 | 1.28 | 50.3 | 6.84 | 13.6 | 1.78 | 7.10 | 1.48 | 0.308 | 1.26 | 0.24 | 1.20 | 0.23 | 0.62 | 0.09 | 0.58 | 0.09 | 0.73 | 0.16 | 0.30 | 0.02 | 0.12 | 4.80 | 0.06 | 1.95 | 1.50 |
| 15NO4-29 | 6.68 | 38.8 | 0.67 | 3.13 | 29.7 | 9.50 | 3.03 | 14.1 | 6.30 | 26.7 | 2.98 | 20.2 | 283 | 7.39 | 26.6 | 2.22 | 0.77 | 0.11 | 0.013 | 0.16 | 1.37 | 87.3 | 8.51 | 16.9 | 2.14 | 8.24 | 1.78 | 0.351 | 1.42 | 0.28 | 1.44 | 0.27 | 0.72 | 0.11 | 0.71 | 0.10 | 0.77 | 0.17 | 0.31 | 0.02 | 0.14 | 5.22 | 0.07 | 2.36 | 2.32 |
| 15NO4-30 | 3.38 | 25.2 | 0.37 | 1.38 | 17.1 | 5.59 | 1.81 | 11.2 | 3.43 | 19.6 | 1.56 | 11.4 | 157 | 3.69 | 12.9 | 1.19 | 0.88 | 0.10 | 0.011 | 0.08 | 0.87 | 29.0 | 4.56 | 8.82 | 1.16 | 4.44 | 0.89 | 0.192 | 0.71 | 0.15 | 0.71 | 0.13 | 0.36 | 0.05 | 0.32 | 0.05 | 0.37 | 0.09 | 0.17 | 0.02 | 0.08 | 2.69 | 0.04 | 1.09 | 1.75 |
| 15NO4-31 | 3.66 | 28.1 | 0.36 | 1.51 | 16.2 | 6.62 | 1.83 | 11.9 | 4.20 | 16.7 | 1.68 | 11.9 | 176 | 3.69 | 13.9 | 1.33 | 0.87 | 0.07 | 0.012 | 0.11 | 0.89 | 44.6 | 4.96 | 9.45 | 1.22 | 4.72 | 0.96 | 0.198 | 0.81 | 0.15 | 0.71 | 0.13 | 0.36 | 0.06 | 0.34 | 0.05 | 0.42 | 0.10 | 0.18 | 0.02 | 0.08 | 2.88 | 0.04 | 1.21 | 2.36 |
| 15NO4-32 | 4.49 | 32.2 | 0.46 | 1.88 | 20.5 | 12.4 | 2.28 | 14.8 | 7.11 | 17.2 | 2.18 | 15.5 | 172 | 3.88 | 15.6 | 1.59 | 1.15 | 0.09 | 0.016 | 0.12 | 1.13 | 37.1 | 5.45 | 10.2 | 1.35 | 4.89 | 0.94 | 0.195 | 0.82 | 0.15 | 0.74 | 0.14 | 0.38 | 0.06 | 0.39 | 0.06 | 0.50 | 0.12 | 0.21 | 0.02 | 0.11 | 3.20 | 0.05 | 1.45 | 2.00 |
| 15NO4-33 | 2.09 | 16.2 | 0.28 | 0.77 | 30.1 | 8.17 | 1.93 | 14.4 | 3.73 | 17.3 | 0.731 | 5.64 | 201 | 1.50 | 5.12 | 0.52 | 1.02 | 0.19 | 0.010 | 0.19 | 0.53 | 16.7 | 2.11 | 3.46 | 0.51 | 1.66 | 0.36 | 0.083 | 0.30 | 0.06 | 0.30 | 0.06 | 0.15 | 0.03 | 0.16 | 0.03 | 0.37 | 0.05 | 0.11 | 0.04 | 0.10 | 6.10 | 0.05 | 0.49 | 6.59 |
| 15NO4-34 | 2.66 | 16.3 | 0.25 | 0.91 | 21.4 | 7.37 | 1.5 | 12.9 | 6.87 | 8.33 | 0.886 | 7.14 | 181 | 2.82 | 7.73 | 0.80 | 0.74 | 0.05 | 0.012 | 0.12 | 0.63 | 18.8 | 3.35 | 6.59 | 0.89 | 3.49 | 0.75 | 0.177 | 0.63 | 0.11 | 0.57 | 0.10 | 0.25 | 0.04 | 0.22 | 0.03 | 0.23 | 0.07 | 0.14 | 0.03 | 0.10 | 3.51 | 0.03 | 0.64 | 1.56 |
| 15NO4-35 | 1.94 | 14.8 | 0.26 | 0.83 | 21.8 | 5.65 | 1.35 | 10.8 | 3.85 | 5.44 | 0.746 | 5.32 | 179 | 2.94 | 4.87 | 0.61 | 0.43 | 0.06 | 0.013 | 0.14 | 0.54 | 31.6 | 3.25 | 6.06 | 0.90 | 3.29 | 0.74 | 0.168 | 0.63 | 0.11 | 0.57 | 0.10 | 0.27 | 0.04 | 0.24 | 0.03 | 0.17 | 0.04 | 0.11 | 0.02 | 0.06 | 2.36 | 0.03 | 0.52 | 3.20 |
| 15NO4-36 | 1.70 | 14.2 | 0.23 | 0.77 | 15.9 | 5.19 | 1.29 | 12.7 | 2.87 | 5.51 | 0.594 | 3.68 | 159 | 3.49 | 5.05 | 0.48 | 0.63 | 0.06 | 0.013 | 0.12 | 0.38 | 14.9 | 3.24 | 6.73 | 0.10 | 3.64 | 0.82 | 0.193 | 0.73 | 0.13 | 0.69 | 0.12 | 0.32 | 0.05 | 0.26 | 0.04 | 0.17 | 0.05 | 0.11 | 0.02 | 0.13 | 3.59 | 0.03 | 0.47 | 5.91 |
| 15NO4-37 | 1.60 | 13.6 | 0.17 | 0.68 | 13.5 | 1.75 | 1.69 | 12.9 | 2.21 | 5.76 | 0.457 | 2.66 | 107 | 1.34 | 4.44 | 0.39 | 1.70 | 0.07 | 0.007 | 0.11 | 0.25 | 12 | 1.61 | 2.70 | 0.38 | 1.39 | 0.30 | 0.069 | 0.25 | 0.05 | 0.27 | 0.05 | 0.14 | 0.03 | 0.12 | 0.02 | 0.16 | 0.04 | 0.09 | 0.09 | 0.17 | 2.30 | 0.02 | 0.32 | 1.91 |
| 15NO4-38 | 1.67 | 12.7 | 0.16 | 0.78 | 16.6 | 4.74 | 2.1 | 15.5 | 3.00 | 20.1 | 0.435 | 3.12 | 186 | 1.45 | 2.96 | 0.32 | 1.56 | 0.10 | 0.009 | 0.09 | 0.29 | 19.7 | 1.77 | 3.23 | 0.49 | 1.72 | 0.38 | 0.082 | 0.30 | 0.06 | 0.28 | 0.06 | 0.15 | 0.03 | 0.15 | 0.03 | 0.11 | 0.03 | 0.08 | 0.03 | 0.10 | 3.08 | 0.03 | 0.33 | 4.64 |
| 15NO4-39 | 3.31 | 15.9 | 0.31 | 1.11 | 19.0 | 4.05 | 1.25 | 9.91 | 2.80 | 24.9 | 0.98 | 7.04 | 139 | 1.66 | 9.87 | 0.92 | 0.48 | 0.23 | 0.007 | 0.14 | 0.808 | 19.8 | 2.62 | 4.15 | 0.58 | 2.04 | 0.46 | 0.088 | 0.35 | 0.07 | 0.33 | 0.06 | 0.16 | 0.03 | 0.18 | 0.03 | 0.31 | 0.07 | 0.14 | 0.02 | 0.11 | 2.54 | 0.04 | 0.80 | 2.38 |
| 15NO4-40 | 3.52 | 14.1 | 0.26 | 1.30 | 23.6 | 8.23 | 1.46 | 13.1 | 3.07 | 31.8 | 0.967 | 7.46 | 146 | 1.87 | 11.7 | 1.06 | 0.73 | 0.23 | 0.004 | 0.10 | 0.83 | 20.5 | 3.05 | 4.97 | 0.70 | 2.38 | 0.46 | 0.109 | 0.39 | 0.08 | 0.35 | 0.07 | 0.19 | 0.03 | 0.21 | 0.03 | 0.35 | 0.08 | 0.15 | 0.02 | 0.09 | 1.97 | 0.04 | 0.90 | 2.34 |
| 15NO4-41 | 4.22 | 20.9 | 0.34 | 1.9 | 18.3 | 7.34 | 2.11 | 14.2 | 3.66 | 49.6 | 1.59 | 12.5 | 289 | 3.62 | 10.5 | 1.18 | 0.85 | 0.16 | 0.010 | 0.09 | 0.91 | 42.4 | 4.38 | 8.67 | 1.15 | 4.31 | 0.84 | 0.204 | 0.72 | 0.13 | 0.70 | 0.12 | 0.34 | 0.05 | 0.33 | 0.05 | 0.33 | 0.09 | 0.34 | 0.02 | 0.09 | 6.71 | 0.04 | 1.19 | 1.26 |
| 15NO4-42 | 4.81 | 29.2 | 0.45 | 2.29 | 20.4 | 12.8 | 2.94 | 13.9 | 3.94 | 8.61 | 2.15 | 15.4 | 231 | 4.24 | 18.4 | 1.59 | 0.96 | 0.08 | 0.015 | 0.14 | 1.21 | 42.4 | 5.55 | 11.3 | 1.50 | 5.40 | 1.08 | 0.245 | 0.94 | 0.17 | 0.89 | 0.16 | 0.43 | 0.07 | 0.42 | 0.06 | 0.54 | 0.12 | 0.24 | 0.03 | 0.12 | 3.07 | 0.06 | 1.56 | 1.18 |
| 15NO4-43 | 36.9 | 43.7 | 0.49 | 2.54 | 25.2 | 14.9 | 3.24 | 18.1 | 4.89 | 12.8 | 3.16 | 23.4 | 236 | 5.19 | 22.2 | 2.13 | 1.52 | 0.09 | 0.022 | 0.17 | 1.77 | 49.6 | 6.99 | 12.9 | 1.65 | 5.96 | 1.17 | 0.239 | 0.98 | 0.18 | 1.00 | 0.19 | 0.47 | 0.07 | 0.47 | 0.06 | 0.69 | 0.17 | 0.26 | 0.02 | 0.12 | 3.56 | 0.002 | 1.96 | 1.60 |
| 15NO4-44 | 2.34 | 14.6 | 0.35 | 1.63 | 26.7 | 8.19 | 1.79 | 15.6 | 7.29 | 21.5 | 1.33 | 8.38 | 186 | 4.30 | 6.9 | 0.85 | 0.86 | 0.47 | 0.011 | 0.20 | 0.92 | 18.7 | 4.08 | 7.26 | 1.06 | 4.04 | 0.88 | 0.213 | 0.79 | 0.15 | 0.72 | 0.14 | 0.38 | 0.06 | 0.33 | 0.05 | 0.22 | 0.07 | 0.18 | 0.02 | 0.06 | 4.69 | 0.05 | 0.81 | 1.41 |
| 15NO4-45 | 2.25 | 15.9 | 0.44 | 1.45 | 30.8 | 5.52 | 1.54 | 11.8 | 4.52 | 18.7 | 1.04 | 8.21 | 217 | 3.60 | 7.08 | 0.82 | 0.65 | 0.25 | 0.017 | 0.15 | 0.76 | 17.5 | 4.03 | 8.51 | 1.11 | 4.38 | 0.91 | 0.21 | 0.773 | 0.14 | 0.70 | 0.12 | 0.31 | 0.05 | 0.30 | 0.04 | 0.23 | 0.06 | 0.18 | 0.02 | 0.07 | 3.46 | 0.04 | 0.77 | 3.24 |
| 15NO4-46 | 2.01 | 13.1 | 0.24 | 1.26 | 25.9 | 7.12 | 1.66 | 12.0 | 4.59 | 9.09 | 0.669 | 5.11 | 203 | 1.49 | 4.54 | 0.55 | 0.82 | 0.09 | 0.008 | 0.12 | 0.54 | 21.7 | 2.09 | 3.34 | 0.56 | 1.67 | 0.37 | 0.08 | 0.291 | 0.05 | 0.31 | 0.05 | 0.16 | 0.03 | 0.16 | 0.03 | 0.15 | 0.04 | 0.13 | 0.02 | 0.07 | 2.78 | 0.04 | 1.36 | 3.42 |
| 15NO4-47 | 2.75 | 16.1 | 0.37 | 1.49 | 26.0 | 4.34 | 1.75 | 13.2 | 5.38 | 28.0 | 1.03 | 7.40 | 242 | 1.67 | 7.09 | 0.67 | 0.53 | 0.33 | 0.013 | 0.11 | 0.68 | 24.3 | 2.32 | 4.06 | 0.59 | 1.89 | 0.44 | 0.10 | 0.35 | 0.06 | 0.32 | 0.07 | 0.19 | 0.03 | 0.19 | 0.03 | 0.22 | 0.06 | 0.18 | 0.03 | 0.12 | 2.69 | 0.05 | 0.69 | 7.58 |
| 15NO4-48 | 2.43 | 18.5 | 0.27 | 1.59 | 21.5 | 3.75 | 1.85 | 15.1 | 4.03 | 202 | 1.15 | 6.64 | 196 | 1.63 | 15.7 | 0.71 | 1.28 | 1.71 | 0.015 | 0.23 | 0.56 | 30.2 | 2.28 | 4.25 | 0.56 | 2.02 | 0.42 | 0.10 | 0.364 | 0.07 | 0.33 | 0.06 | 0.16 | 0.03 | 0.18 | 0.03 | 0.48 | 0.05 | 0.15 | 0.03 | 0.19 | 3.31 | 0.04 | 0.66 | 2.79 |
| 15NO4-49 | 2.56 | 17.7 | 0.23 | 1.54 | 17.7 | 6.36 | 1.96 | 15.6 | 3.71 | 24.5 | 1.03 | 6.83 | 220 | 2.36 | 8.31 | 0.71 | 0.96 | 0.11 | 0.010 | 0.10 | 0.60 | 19.5 | 2.96 | 5.98 | 0.75 | 2.94 | 0.58 | 0.13 | 0.515 | 0.09 | 0.48 | 0.08 | 0.23 | 0.04 | 0.21 | 0.03 | 0.26 | 0.06 | 0.16 | 0.02 | 0.13 | 3.37 | 0.05 | 0.72 | 2.40 |
| 15NO4-50 | 3.29 | 21.3 | 0.32 | 1.95 | 18.0 | 5.29 | 2.05 | 14.5 | 4.07 | 29.6 | 1.12 | 8.8 | 250 | 2.91 | 10.8 | 1.14 | 1.75 | 0.10 | 0.013 | 0.17 | 0.70 | 22.3 | 3.78 | 7.20 | 0.93 | 3.39 | 0.73 | 0.16 | 0.623 | 0.11 | 0.54 | 0.10 | 0.26 | 0.04 | 0.26 | 0.04 | 0.32 | 0.10 | 0.16 | 0.02 | 0.23 | 4.01 | 0.06 | 1.01 | 3.31 |
| EFB | 0.95 |  | 0.05 | 1.51 | 2.51 | 1.14 | 2.06 | 4.69 | 3.00 | 21.4 | 1.21 | 1.10 | 25.6 | 2.00 | 1.06 | 1.03 | 46.49 |  |  |  | 0.94 | 0.79 | 1.67 | 1.49 | 1.77 | 1.86 | 2.19 | 2.43 | 2.24 | 2.51 | 2.30 | 1.88 | 1.77 | 2.01 | 1.74 | 1.67 | 1.29 |  | 1.12 |  |  | 8.68 | 3.00 | 1.23 | 20.2 |
| EFS | 1.02 |  | 0.05 | 1.33 | 3.45 | 1.25 | 3.24 | 8.51 | 8.85 | 85.7 | 1.18 | 1.13 | 57.8 | 1.55 | 1.37 | 1.02 | 175 |  |  |  | 1.03 | 0.89 | 1.53 | 1.23 | 1.41 | 1.43 | 1.58 | 1.72 | 1.66 | 1.81 | 1.66 | 1.39 | 1.36 | 1.50 | 1.36 | 1.32 | 1.56 |  | 1.25 |  |  | 19.1 | 3.68 | 1.20 | 52.1 |

EFelement X = (X/Al)sample/(X/Al) PAAS

EFB, EC in bulk rocks; ECS, EC in shales