**ESM Table 3**. Concentrations in upper 10 cm of sediment.

Porewater concentrations of DIC (mM), NH4+ (uM), Fe2+(uM)

Solid phase concentrations of highly reactive (HR) FeII and FeIII, non-pyritic iron FeT (NP), Mn, and pyritic iron Py-Fe, (umol g-1 dr wt). Py-Fe is calculated as chromium reducibile sulfur (TRS)/2.

Degree of Pyritization (DOP) is Py-Fe/FeT(NP)+PyFe

C/S is calculated as OC/TRS (wt/wt)

SRR units of µmol L-1 d-1

n, number of fractions between 0-10 cm deep used to obtain average

S.D., standard deviation of averages.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Station | %OC | n | S.D. | DIC | n | S.D. | NH4+ | n | S.D. | Fe2+ | n | S.D. | Mn (aq) | n | S.D. |
| A02b | 1.4 | 21 | 2.61 | 5.9 | 9 | 0.62 | 224.9 | 9 | 9.94 | 45.6 | 10 | 9.85 | 64.7 | 6 | 19.11 |
| A05b | 1.4 | 21 | 0.11 | 5.1 | 20 | 0.49 | 213.2 | 20 | 38.69 | 3.1 | 19 | 3.08 | 191.9 | 13 | 38.69 |
| A07b | 1.3 | 21 | 0.10 | 3.5 | 21 | 0.12 | 88.1 | 21 | 19.99 | 40.0 | 18 | 6.22 | 228.3 | 16 | 49.57 |
| C02b | 0.7 | 20 | 0.47 | 5.9 | 21 | 1.53 | 428.9 | 21 | 131.66 | 83.7 | 21 | 44.16 | 38.3 | 19 | 6.93 |
| C06b | 0.8 | 21 | 0.80 | 4.4 | 15 | 0.68 | 164.3 | 16 | 61.44 | 71.4 | 16 | 49.99 | 46.3 | 12 | 9.15 |
| C11b | 0.6 | 20 | 0.22 | 3.2 | 20 | 0.10 | 27.9 | 20 | 13.52 | 85.9 | 13 | 37.82 | 85.5 | 17 | 13.57 |
| F04b | 1.0 | 21 | 0.40 | 7.7 | 21 | 0.42 | 508.2 | 21 | 79.86 | 70.7 | 20 | 10.66 | 64.4 | 20 | 7.49 |
| F07b | 0.8 | 21 | 0.79 | 3.6 | 18 | 0.27 | 71.2 | 18 | 16.69 | 51.2 | 19 | 16.99 | 121.4 | 17 | 22.97 |
| F08b | 0.8 | 21 | 0.12 | 3.4 | 18 | 0.07 | 33.8 | 18 | 9.10 | 25.7 | 19 | 10.90 | 84.6 | 12 | 10.27 |
| H03b | 0.3 | 20 | 0.18 | 4.0 | 14.0 | 1.18 | 113.4 | 15 | 109.38 | 2.0 | 13 | 2.35 | 12.3 | 11 | 2.58 |
| H04b | 0.6 | 20 | 0.25 | 3.1 | 21.0 | 0.10 | 11.8 | 21 | 6.16 | 19.3 | 21 | 5.54 | 23.7 | 18 | 11.11 |
| H08b | 0.8 | 21 | 0.12 | 3.5 | 21.0 | 0.10 | 33.1 | 21 | 15.10 | 24.0 | 20 | 22.79 | 92.0 | 17 | 30.21 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Station | %OC | n | S.D. | DIC | n | S.D. | NH4+ | n | S.D. | Fe2+ | n | S.D. | Mn (aq) | n | S.D. |
| A02b | 1.4 | 21 | 2.61 | 5.9 | 9 | 0.62 | 224.9 | 9 | 9.94 | 45.6 | 10 | 9.85 | 64.7 | 6 | 19.11 |
| A05b | 1.4 | 21 | 0.11 | 5.1 | 20 | 0.49 | 213.2 | 20 | 38.69 | 3.1 | 19 | 3.08 | 191.9 | 13 | 38.69 |
| A07b | 1.3 | 21 | 0.10 | 3.5 | 21 | 0.12 | 88.1 | 21 | 19.99 | 40.0 | 18 | 6.22 | 228.3 | 16 | 49.57 |
| C02b | 0.7 | 20 | 0.47 | 5.9 | 21 | 1.53 | 428.9 | 21 | 131.66 | 83.7 | 21 | 44.16 | 38.3 | 19 | 6.93 |
| C06b | 0.8 | 21 | 0.80 | 4.4 | 15 | 0.68 | 164.3 | 16 | 61.44 | 71.4 | 16 | 49.99 | 46.3 | 12 | 9.15 |
| C11b | 0.6 | 20 | 0.22 | 3.2 | 20 | 0.10 | 27.9 | 20 | 13.52 | 85.9 | 13 | 37.82 | 85.5 | 17 | 13.57 |
| F04b | 1.0 | 21 | 0.40 | 7.7 | 21 | 0.42 | 508.2 | 21 | 79.86 | 70.7 | 20 | 10.66 | 64.4 | 20 | 7.49 |
| F07b | 0.8 | 21 | 0.79 | 3.6 | 18 | 0.27 | 71.2 | 18 | 16.69 | 51.2 | 19 | 16.99 | 121.4 | 17 | 22.97 |
| F08b | 0.8 | 21 | 0.12 | 3.4 | 18 | 0.07 | 33.8 | 18 | 9.10 | 25.7 | 19 | 10.90 | 84.6 | 12 | 10.27 |
| H03b | 0.3 | 20 | 0.18 | 4.0 | 14.0 | 1.18 | 113.4 | 15 | 109.38 | 2.0 | 13 | 2.35 | 12.3 | 11 | 2.58 |
| H04b | 0.6 | 20 | 0.25 | 3.1 | 21.0 | 0.10 | 11.8 | 21 | 6.16 | 19.3 | 21 | 5.54 | 23.7 | 18 | 11.11 |
| H08b | 0.8 | 21 | 0.12 | 3.5 | 21.0 | 0.10 | 33.1 | 21 | 15.10 | 24.0 | 20 | 22.79 | 92.0 | 17 | 30.21 |

(cont. next page)

ESM Table4 (cont.)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Station | Py-Fe | n | S.D | DOP | n | S.D | C/S (wt/wt) | n | S.D. | SRR | n | S.D. |  |  |  |
| A02b | 11.3 | 18 | 5.0 | 0.04 | 18 | 0.02 | 13.6 | 18 | 8.5 | 14.9 | 18 | 22.4 |  |  |  |
| A05b | 37.2 | 18 | 20.4 | 0.11 | 17 | 0.05 | 8.1 | 17 | 3.6 | 14.4 | 19 | 12.1 |  |  |  |
| A07b | 16.7 | 17 | 6.8 | 0.04 | 20 | 0.02 | 12.8 | 20 | 6.1 | 10.7 | 20 | 10.5 |  |  |  |
| C02b | 23.4 | 21 | 9.4 | 0.14 | 21 | 0.06 | 5.9 | 21 | 3.6 | 46.5 | 20 | 26.4 |  |  |  |
| C06b | 40.8 | 21 | 28.5 | 0.19 | 21 | 0.09 | 4.3 | 21 | 3.3 | 16.6 | 21 | 19.1 |  |  |  |
| C11b | 16.5 | 20 | 2.3 | 0.06 | 20 | 0.01 | 5.3 | 20 | 1.1 | 19.2 | 21 | 28.7 |  |  |  |
| F04b | 26.2 | 21 | 9.3 | 0.11 | 14 | 0.03 | 11.2 | 14 | 8.8 | 130.5 | 21 | 206.4 |  |  |  |
| F07b | 21.4 | 20 | 9.5 | 0.08 | 20 | 0.03 | 8.5 | 20 | 3.0 | 6.2 | 21 | 6.2 |  |  |  |
| F08b | 18.8 | 13 | 5.3 | 0.07 | 13 | 0.02 | 8.5 | 13 | 2.8 | 3.0 | 21 | 2.2 |  |  |  |
| H03b | 25.5 | 20 | 6.6 | 0.14 | 20 | 0.04 | 2.0 | 20 | 2.0 | 36.2 | 21 | 30.7 |  |  |  |
| H04b | 30.5 | 14 | 4.9 | 0.14 | 14 | 0.02 | 3.5 | 14 | 0.7 | 30.4 | 21 | 42.2 |  |  |  |
| H08b | 7.9 | 21 | 2.5 | 0.03 | 21 | 0.01 | 22.2 | 21 | 10.5 | 6.7 | 21 | 3.1 |  |  |  |