**ESM Table 4**. ANOVA p-values for tests to examine differences in upper 10 cm average variables by stations (one-way ANOVA by Station) and by Depth and Location (two-way ANOVA by Depth, Location, and interaction term Depth x Location Bold values denote p < 0.05.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | One-way ANOVA | Two-way ANOVA | | |
| Variable | Station | Depth | Location | Depth x Location |
| NH4+ | **1.16E-06** | **0.026** | 0.097 | 0.298 |
| DIC | **7.50E-22** | **0.017** | 0.331 | 0.279 |
| Mnaq | **4.42E-14** | 0.250 | 0.334 | 0.991 |
| PO43- | **4.96E-17** | **0.002** | 0.060 | 0.283 |
| SiO2 | **9.73E-22** | **0.002** | 0.183 | 0.184 |
| Alk | **2.59E-13** | **0.008** | 0.171 | 0.087 |
| pw\_Fe2+ | **1.10E-06** | 0.916 | 0.508 | 0.586 |
| FeT(aq) | **2.04E-05** | 0.689 | 0.817 | 0.653 |
| porosity | **5.15E-18** | 0.239 | 0.525 | 0.757 |
| Mn(s) | **1.65E-24** | 0.448 | 0.358 | 0.936 |
| Fe(II)HR | 0.06 | 0.689 | 0.817 | 0.653 |
| Fe(T)HR | **3.02E-29** | 0.430 | 0.157 | 0.912 |
| Fe(III)HR | **1.33E-14** | 0.180 | 0.114 | 0.995 |
| FeTNP | **2.82E-29** | 0.237 | 0.525 | 0.919 |
| %OC | **1.19E-09** | 0.863 | 0.219 | 0.764 |
| %ON | **8.34E-12** | 0.466 | 0.610 | 0.945 |
| SRR | **1.22E-09** | 0.215 | 0.903 | 0.725 |
| CRS | **2.30E-15** | **0.041** | 0.849 | 0.417 |
| Py-Fe | **2.70E-13** | **0.046** | 0.664 | 0.222 |