## Supplementary information

Table 1: Isotopic signatures (δ13C‰, δ15N‰) of potential sources ± standard deviation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | δ15N‰ | SD | δ13C‰ | SD |
| Saltmarsh AGB (n = 13) | 2.31 | 1.67 | -24.57 | 4.32 |
| Saltmarsh BGB (n = 9) | 1.44 | 0.40 | -26.86 | 1.30 |
| Mangrove AGB (n = 13) | 4.25 | 1.11 | -26.29 | 0.89 |
| Mangrove BGB (n = 9) | 2.77 | 1.13 | -25.63 | 0.25 |
| Seagrass AGB (n = 10) | 4.77 | 0.80 | -9.39 | 0.99 |
| Seagrass BGB (n = 6) | 3.35 | 0.78 | -10.60 | 2.06 |
| Microphytobenthos (MPB) (n = 4) | 5.83 | 1.16 | -13.58 | 1.67 |
| SPOM Upper (n = 5) | 5.93 | 1.14 | -27.89 | 0.68 |
| SPOM Middle (n = 3) | 6.10 | 1.55 | -27.12 | 2.65 |
| SPOM Entrance (n = 5) | 6.94 | 1.79 | -19.86 | 4.70 |

Table 2: Above and belowground organic carbon stocks (mean ± SE) across habitats and transects

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Transect | Habitat | Aboveground organic C (t ha-1) | Belowground organic C (t ha-1) | Above and belowground organic C stocks (t C ha-1) |
| Tairua Upper | Saltmarsh | 3.07 ± 0.29 | 77.03 ± 1.42 | 80.10 ± 1.55 |
|  | Mangrove | 5.16 ± 2.57 | 49.99 ± 4.99 | 55.15 ± 5.61 |
|  | Unvegetated | 0.00 ± 0.00 | 25.62 ± 2.27 | 25.62 ± 2.27 |
| Paunui | Saltmarsh | 2.32 ± 0.13 | 80.40 ± 4.79 | 82.72 ± 4.85 |
|  | Mangrove | 5.50 ± 4.10 | 38.49 ± 4.51 | 43.99 ± 0.55 |
|  | Seagrass | 0.03 ± 0.03 | 19.83 ± 2.74 | 19.86 ± 2.73 |
|  | Unvegetated | 0.00 ± 0.00 | 30.66 ± 5.51 | 30.66 ± 5.51 |
| Tairua Mid | Saltmarsh | 1.58 ± 0.10 | 105.63 ± 2.64 | 107.22 ± 2.74 |
|  | Mangrove | 2.51 ± 0.49 | 37.34 ± 7.35 | 39.86 ± 7.47 |
|  | Unvegetated | 0.00 ± 0.00 | 31.37 ± 2.30 | 31.37 ± 2.30 |
| Tairua Entrance | Seagrass | 0.14 ± 0.03 | 33.80 ± 5.98 | 33.94 ± 6.01 |
|  | Unvegetated | 0.00 ± 0.00 | 20.14 ± 3.03 | 20.14 ± 3.03 |
| All transects pooled | Saltmarsh | 2.33 ± 0.24 | 87.69 ± 4.80 | 90.01 ± 4.63 |
|  | Mangrove | 4.39 ± 1.48 | 41.94 ± 3.51 | 46.33 ± 3.54 |
|  | Seagrass | 0.09 ± 0.03 | 26.82 ± 4.29 | 26.90 ± 4.32 |
|  | Unvegetated | 0.00 ± 0.00 | 25.58 ± 2.04 | 25.58 ± 2.04 |

Table 3: PERMANOVA analysis of sediment characteristics and carbon stocks between habitats and sites. Bold: Pairwise post hoc tests were used to isolate differences between habitats, sites, and depth (p < 0.05). S = Saltmarsh, M = mangrove, SG = Seagrass, U = Unvegetated.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Source | df |  SS |  MS | Pseudo-F | P(perm) |  perms |  |
| Sediment chlorophyll a | SITE |  3 | 15.064 | 5.0215 | 0.095783 |  0.963 |  998 |  |
|  | HABITAT |  3 | 976.79 |  325.6 |  6.2107 |  0.004 |  999 | MxUMxSM |
|  | SITExHABITAT\*\* |  5 | 957.78 | 191.56 |  3.6539 |  0.016 |  998 |  |
|  | Res | 27 | 1415.5 | 52.425 |   |   |   |  |
|  | Total | 38 | 3496.9 |   |   |   |   |  |
| Sediment silt and clay content | SITE |  3 | 275.54 | 91.847 |  0.70365 |  0.561 |  999 |  |
|  | HABITAT |  3 |  11919 |  3973 |  30.438 |  0.001 |  998 | MxUMxSGUxSMSMxSG |
|  | SITExHABITAT\*\* |  5 | 587.12 | 117.42 |  0.8996 |  0.531 |  999 |  |
|  | Res | 27 | 3524.3 | 130.53 |   |   |   |  |
|  | Total | 38 |  21937 |   |   |   |   |  |
| Sediment bulk density | SITE |  3 | 0.090316 | 0.030105 |  1.5526 |  0.215 |  998 |  |
|  | HABITAT |  3 |  3.4364 |  1.1455 |  59.075 |  0.001 |  999 | MxUMxSMMxSGUxSMUxSGSMxSG |
|  | SITExHABITAT\*\* |  5 |  0.16901 | 0.033803 |  1.7433 |  0.145 |  999 |  |
|  | Res | 27 |  0.52353 |  0.01939 |   |   |   |  |
|  | Total | 38 |  4.8117 |   |   |   |   |  |
| Above Ground OC | SITE |  3 | 10.232 | 3.4108 |  0.64716 |  0.59 |  999 |  |
|  | HABITAT |  3 | 101.65 | 33.883 |  6.4289 |  0.001 |  998 | MxUUxSMUxSGSMxSG |
|  | SITExHABITAT\*\* |  5 | 9.1947 | 1.8389 |  0.34892 |  0.909 |  999 |  |
|  | Res | 27 |  142.3 | 5.2704 |   |   |   |  |
|  | Total | 38 | 288.61 |   |   |  |  |  |
| Sediment OC | SITE |  3 | 510.52 | 170.17 |  2.9316 |  0.064 |  999 |  |
|  | HABITAT |  3 |  18995 | 6331.8 |  109.08 |  0.001 |  997 | MxUMxSMMxSGUxSMSMxSG |
|  | SITExHABITAT\*\* |  5 | 1844.5 | 368.89 |  6.355 |  0.002 |  999 |  |
|  | Res | 27 | 1567.3 | 58.048 |   |   |   |  |
|  | Total | 38 |  28050 |   |   |   |   |  |
| Total OC | SITE |  3 | 388.17 | 129.39 |  2.3185 |  0.091 |  999 |  |
|  | HABITAT |  3 |  20019 | 6673.1 |  119.57 |  0.001 |  997 | MxUMxSMMxSGUxSMSMxSG |
|  | SITExHABITAT\*\* |  5 | 1931.7 | 386.34 |  6.9228 |  0.001 |  998 |  |
|  | Res | 27 | 1506.8 | 55.807 |   |   |   |  |
|  | Total | 38 |  29743 |   |   |   |   |  |
| OC with depth | Source |  df |  SS |  MS | Pseudo-F | P(perm) |  perms |  |
|  | SITE |  3 | 0.00010351 | 3.4503E-05 |  1.0569 |  0.388 |  999 |  |
|  | Habitat |  3 |  0.0042323 |  0.0014108 |  43.215 |  0.001 |  998 |  |
|  | Depth |  6 |  0.0038996 | 0.00064994 |  19.909 |  0.001 |  999 |  |
|  | SITExHabitat\*\* |  5 | 0.00038282 | 7.6565E-05 |  2.3454 |  0.037 |  997 |  |
|  | SITExDepth |  18 | 0.00021401 |  1.189E-05 |  0.36421 |  0.99 |  997 |  |
|  | HabitatxDepth |  18 |  0.0033784 | 0.00018769 |  5.7495 |  0.001 |  996 |  |
|  | SITExHabitatxDepth\*\* |  30 | 0.00090856 | 3.0285E-05 |  0.92772 |  0.628 |  999 |  |
|  | Res | 189 |  0.0061699 | 3.2645E-05 |   |   |   |  |
|  | Total | 272 |  0.020771 |   |   |   |   |  |