

Figure S1. Water column CTD profiles showing Salinity [‰], Fluorescence (0- 5 VDC volts), and Dissolved Oxygen [mg L-1] for all the sampling station. The fluorescence has been magnified 100 times to show on the same x-scale. The top x-axis represents the salinity and fluorescence, and the bottom x-axis represents the dissolved oxygen.

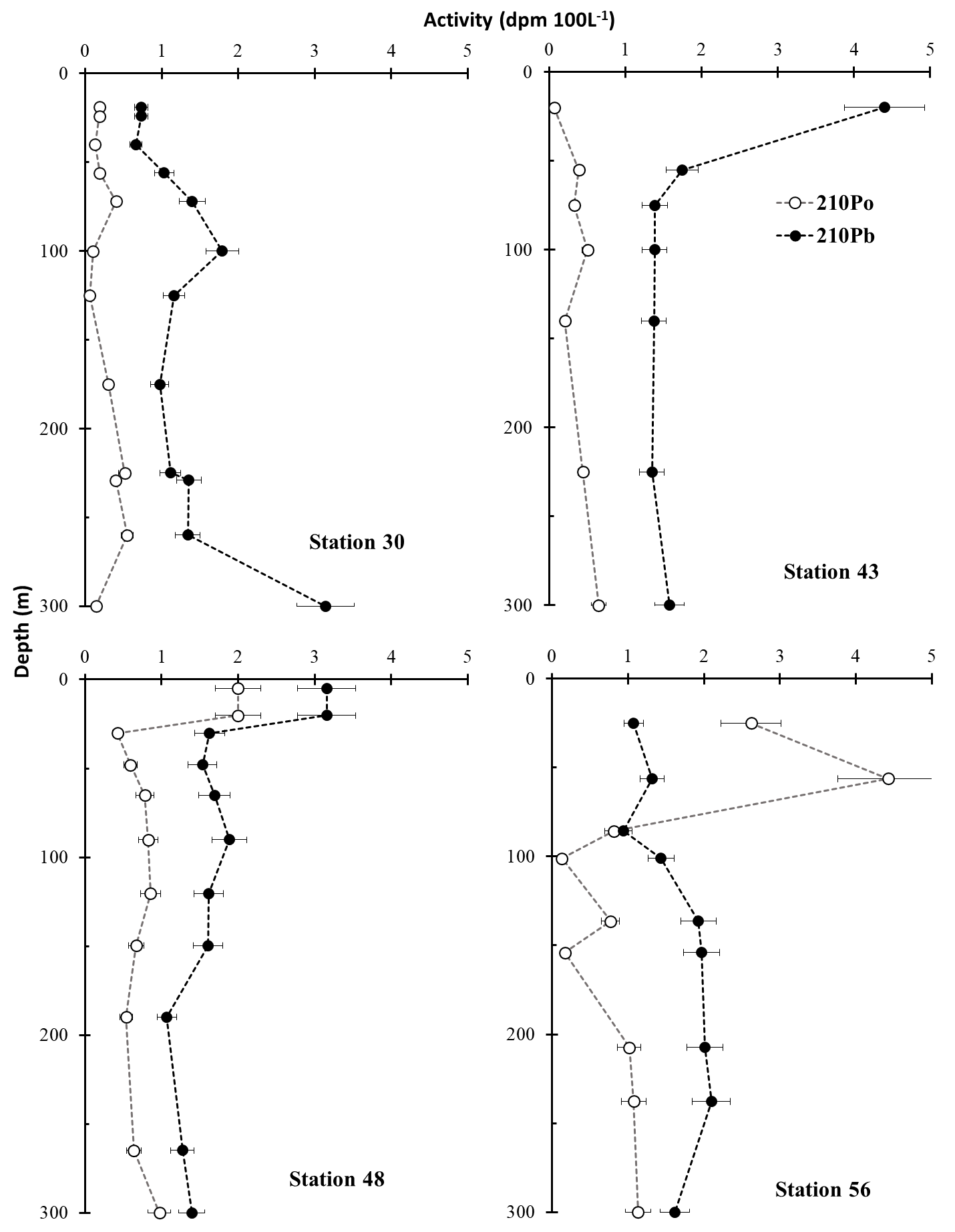


Figure S2. The activity depth profile of particulate (large and small) 210Po (open circle) and 210Pb (filled circle) for the sampling station in the upper 300m.



Figure S3. POC, PIC, PN, and bSi concentration on the large particle samples for upper 300m water column depth.

Table S1. POC fluxes in large and small particle fraction sizes using 210Po flux.

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| --- | --- | --- | --- | --- | --- | --- |
|  | POC Flux (mg C m-2 d-1) Large Particles | | | POC Flux (mg C m-2 d-1) Small Particles | | |
| Station | 100m | 150m | 200m | 100m | 150m | 200m |
| 30 | 2.62 ± 0.26 | 5.43 ± 0.49 | 4.86 ± 0.39 | 6.97 ± 0.69 | 9.77 ± 0.87 | 4.86 ± 0.41 |
| 43 | 7.43 ± 0.42 | 7.23 ± 0.42 | 3.16 ± 0.22 | 9.25 ± 0.52 | 10.82 ± 0.63 | 7.83 ± 0.54 |
| 48 | 2.08 ± 0.11 | 1.88 ± 0.11 | 1.13 ± 0.07 | 5.35 ± 0.29 | 7.77 ± 0.46 | 6.85 ± 0.43 |
| 56 | 1.59 ± 0.16 | 0.75 ± 0.07 | 1.11 ± 0.09 | 3.35 ± 0.04 | 0.28 ± 0.03 | 1.11 ± 0.09 |

Table S2. PN fluxes in large and small particles fraction sizes using 210Po flux.

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| --- | --- | --- | --- | --- | --- | --- |
|  | PN Flux (mg N m-2 d-1) Large Particles | | | PN Flux (mg N m-2 d-1d) Small Particles | | |
| Station | 100m | 150m | 200m | 100m | 150m | 200m |
| 30 | 0.28 ± 0.04 | 0.51 ± 0.04 | 0.48 ± 0.04 | 1.07 ± 0.11 | 1.31 ± 0.87 | 1.05 ± 0.09 |
| 43 | 0.78 ± 0.04 | 0.65 ± 0.04 | 0.35 ± 0.02 | 1.71 ± 0.09 | 1.09 ± 0.06 | 1.18 ± 0.08 |
| 48 | 0.21 ± 0.01 | 0.19 ± 0.01 | 0.12 ± 0.01 | 1.02 ± 0.06 | 1.46 ± 0.09 | 1.09 ± 0.07 |
| 56 | 0.19 ± 0.02 | 0.08 ± 0.01 | 0.13 ± 0.01 | 0.32 ± 0.03 | 0.19 ± 0.01 | 0.15 ± 0.01 |

Table S3. PIC flux estimated based on the 210Pb and 210Po fluxes in large particles.

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| --- | --- | --- | --- | --- | --- | --- |
|  | PIC Flux (mg C m-2 d-1) using Pb fluxes | | | PIC Flux (mg C m-2 d-1) using Po Flux | | |
| Station | 100m | 150m | 200m | 100m | 150m | 200m |
| 30 | 0.018 ± 0.003 | 0.014 ± 0.002 | 0.019 ± 0.003 | 0.08 ± 0.01 | 0.11 ± 0.01 | 0.13 ± 0.01 |
| 43 | 0.042 ± 0.007 | 0.145 ± 0.023 | 0.059 ± 0.009 | 0.41 ± 0.02 | 1.07 ± 0.06 | 0.59 ± 0.04 |
| 48 | 0.017 ± 0.003 | 0.029 ± 0.005 | 0.036 ± 0.005 | 0.08 ± 0.01 | 0.12 ± 0.01 | 0.19 ± 0.01 |
| 56 | -0.021 ± -0.004 | 0.01 ± 0.001 | -0.018 ± 0.001 | -0.11 ± -0.01 | 0.01 ± 0.01 | -0.11 ± -0.01 |

Table S4. bSi flux estimated based on the 210Pb and 210Po fluxes in large particles.

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|  | bSi Flux (mg Si m-2 d-1) using Pb fluxes | | | bSI Flux (mg Si m-2 d-1) using Po Flux | | |
| Station | 100m | 150m | 200m | 100m | 150m | 200m |
| 30 | 1.01 ± 0.17 | 1.23 ± 0.21 | 0.36 ± 0.06 | 4.22 ± 0.46 | 8.69 ± 0.78 | 2.39 ± 0.21 |
| 43 | 1.55 ± 0.27 | 2.88 ± 0.47 | 1.26 ± 0.19 | 14.51 ± 0.82 | 11.72 ± 1.25 | 12.66 ± 0.87 |
| 48 | 0.82 ± 0.11 | 0.33 ± 0.05 | 0.57 ± 0.08 | 3.63 ± 0.21 | 1.36 ± 0.08 | 2.93 ± 0.19 |
| 56 | 0.67 ± 0.12 | 0.14 ± 0.02 | 0.14 ± 0.02 | 3.29 ± 0.33 | 0.77 ± 0.07 | 0.88 ± 0.08 |