

Supporting information for: **Winter biogeochemical cycling of dissolved and particulate cadmium in the Indian sector of the Southern Ocean (GEOTRACES G1pr07 transect)**

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Includes:

- Supplemental tables: Table S1-S2
- Supplemental figures: Figure S1-S5

Table S1. Results for dZn and dMn from the ICP-MS analysis of GEOTRACES SAFE D2, GSC and GSP seawater reference materials (<https://www.geotraces.org/standards-and-reference-materials/>), NASS-7 certified seawater reference material and our own WISOS internal reference seawater are compared with respective consensus values. Consensus values for SAFe D2 as of 2013 and GSC and GSP as of 2019. Calibrated mean values for WISOS calculated by repeat analysis ( $n > 10$ ) of a large volume surface seawater sample collected from 55°S; 28°E. Instrument and method blanks as well as ICP-MS limit of detection are also shown.

	<b>dZn</b> <i>nmol kg<sup>-1</sup></i>	<b>dMn</b> <i>nmol kg<sup>-1</sup></i>
<b><i>SAFe D2</i></b>		
Consensus	7.43 ± 0.25	0.35 ± 0.05
Measured (n=5)	7.23 ± 0.25	0.40 ± 0.035
<b><i>GSC</i></b>		
consensus	1.40 ± 0.10	2.18 ± 0.08
Measured (n=5)	1.41 ± 0.10	1.96 ± 0.18
<b><i>GSP</i></b>		
consensus	0.03 ± 0.05	0.78 ± 0.03
Measured (n=5)	0.10 ± 0.02	0.73 ± 0.06
<b><i>NASS-7</i></b>		
Certified	6.27 ± 1.22	13.47 ± 1.09
Measured (n=5)	6.59 ± 0.07	13.43 ± 0.78
<b><i>WISOS reference material</i></b>		
TracEx Calibration (n=10)	9.67 ± 0.23	0.39 ± 0.01
Measured (n=5)	9.63 ± 0.24	0.43 ± 0.03
<b><i>Blanks</i></b>		
Method (n=9)	0.09 ± 0.01	0.001 ± 0.001
<b><i>Limit of Detection</i></b>	0.02	0.001

Table S2. Results for dFe from the ICP-MS analysis of GEOTRACES SAFe S, SAFe D1, GSC and GSP seawater reference materials (<https://www.geotraces.org/standards-and-reference-materials/>), Consensus values for SAFe S and SAFe D1 as of 2013 and GSC and GSP as of 2019. Method blanks as well as ICP-MS limit of detection are also shown.

	<b>dFe</b> <i>nmol kg<sup>-1</sup></i>
<b><i>SAFe S</i></b>	
Consensus	0.091 ± 0.008
Measured (n=2)	0.101 ± 0.004
<b><i>SAFe D1</i></b>	
consensus	0.910 ± 0.022
Measured (n=9)	0.951 ± 0.117
<b><i>GSP</i></b>	
consensus	0.151 ± 0.044
Measured (n=9)	0.158 ± 0.032
<b><i>GSC</i></b>	
Certified	1.498 ± 0.112
Measured (n=7)	1.835 ± 0.232
<b><i>Blanks</i></b>	
Method	0.109 ± 0.014
<b><i>Limit of Detection</i></b>	0.041

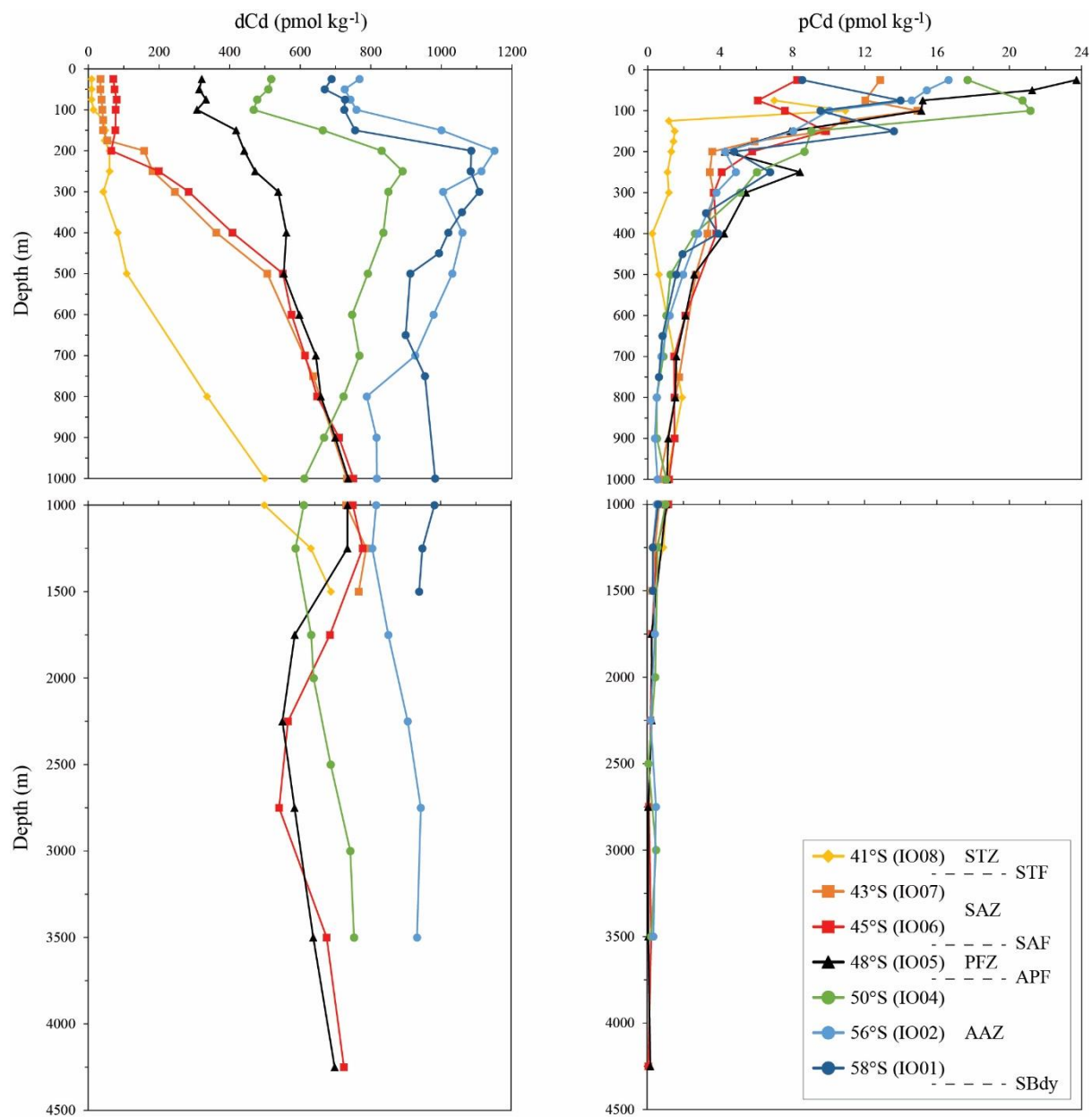


Figure S1. Vertical profiles of dCd (left panels) and pCd (right panels) at all stations.

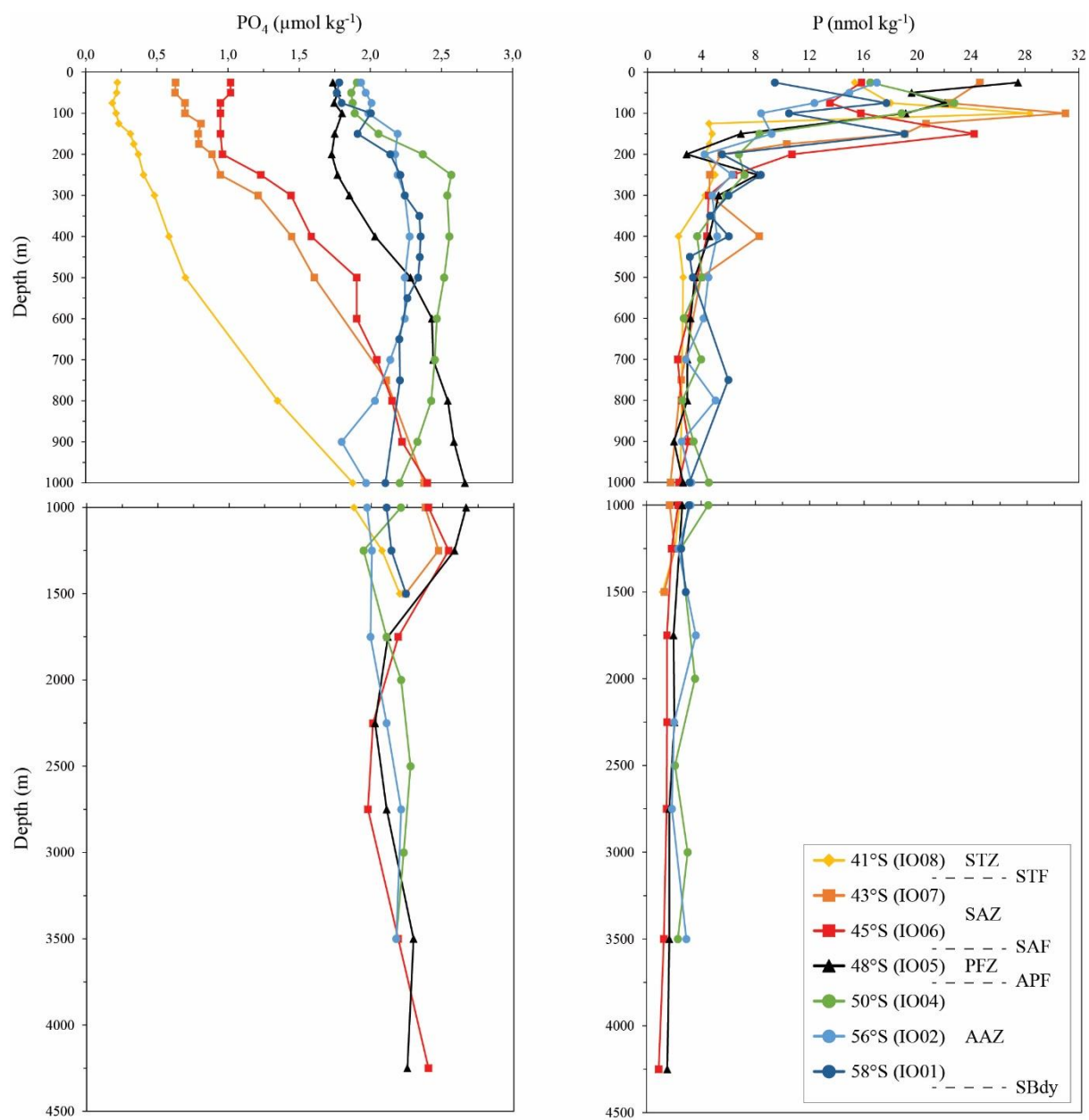


Figure S2. Vertical profiles of  $\text{PO}_4$  (left panels) and  $\text{P}$  (right panels) at all stations.

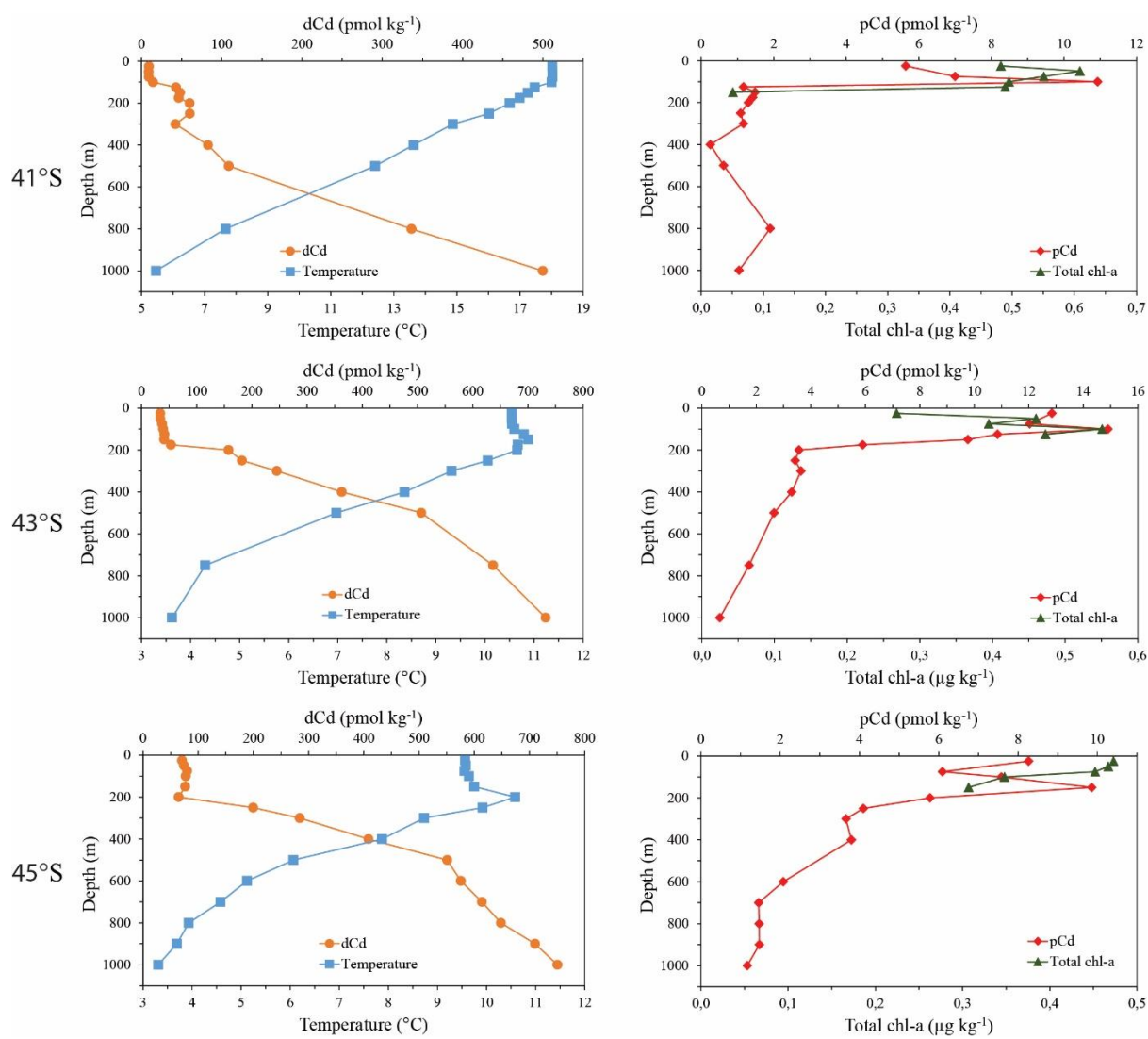


Figure S3. Vertical profiles of dCd vs temperature (left panels) and pCd vs total Chl-a (right panels) for the upper 1000 m at all stations.

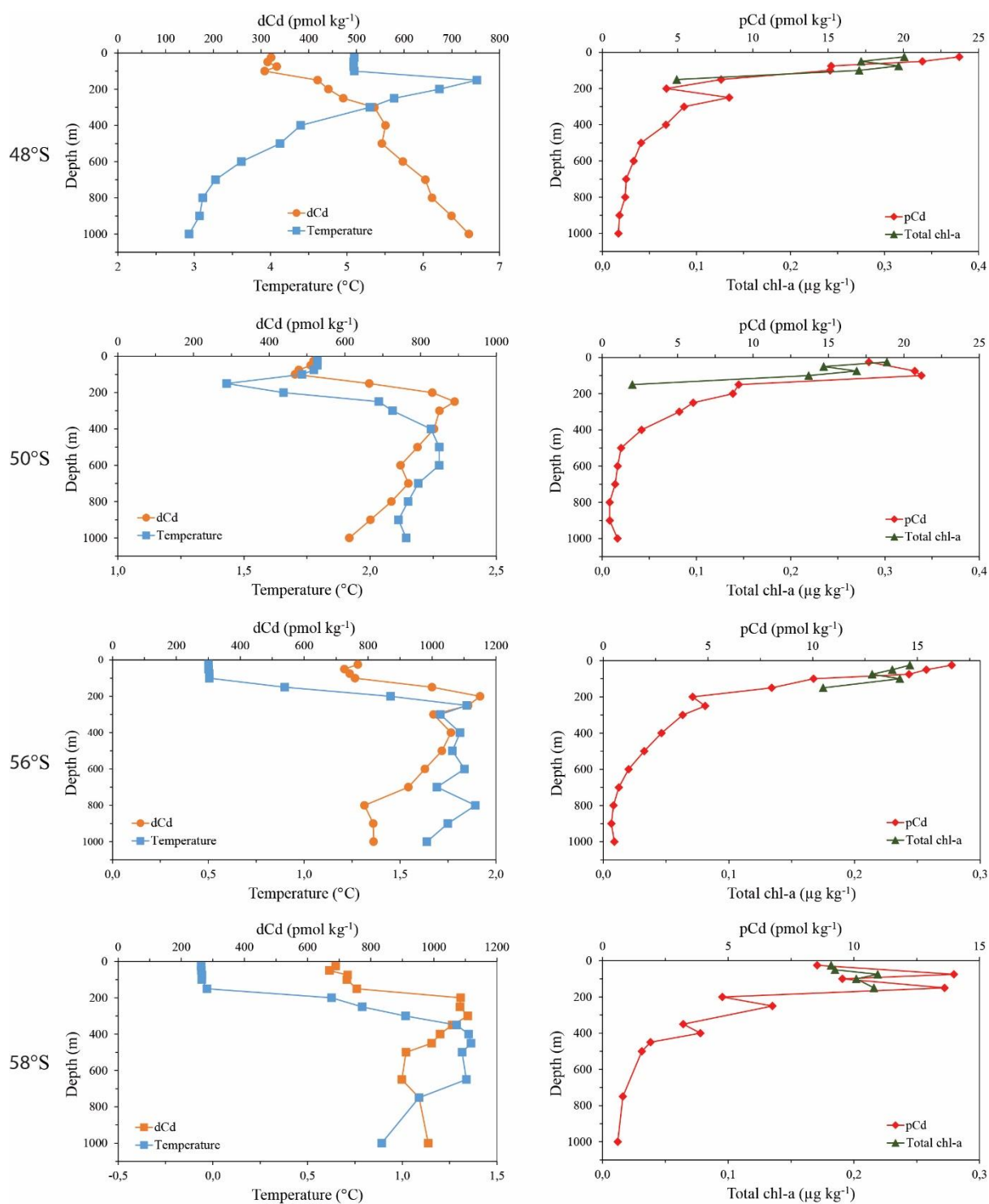


Figure S3 continued. Vertical profiles of dCd vs temperature (left panels) and pCd vs total Chl-a (right panels) for the upper 1000 m at all stations.

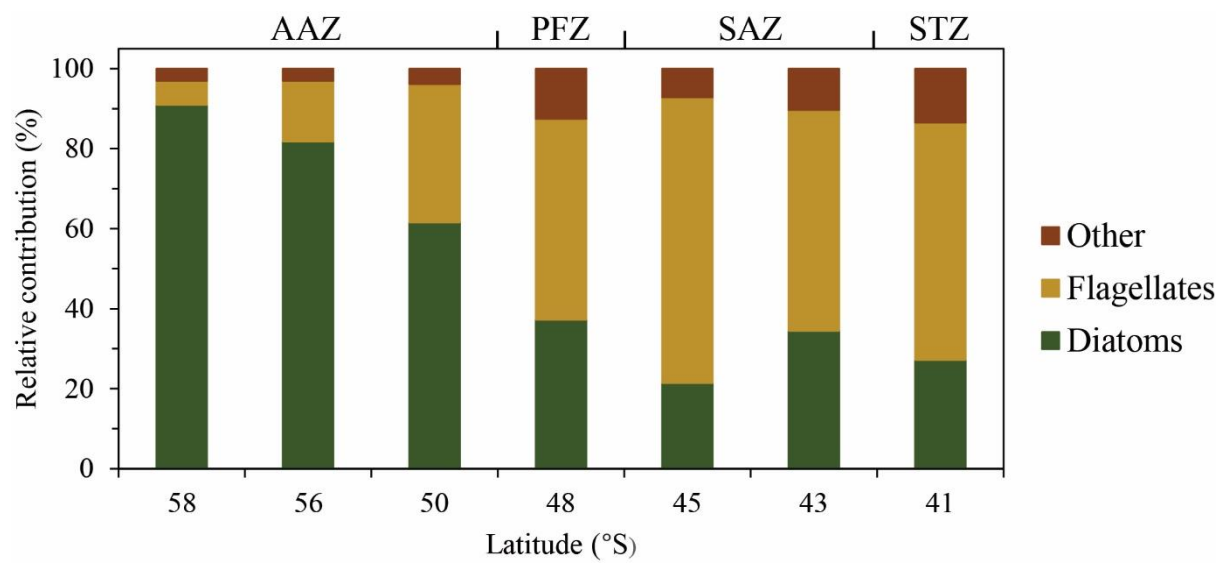


Figure S4. Relative contributions of diatoms, flagellates and other (mainly coccolithophores and ciliates) to the phytoplankton community at each station.



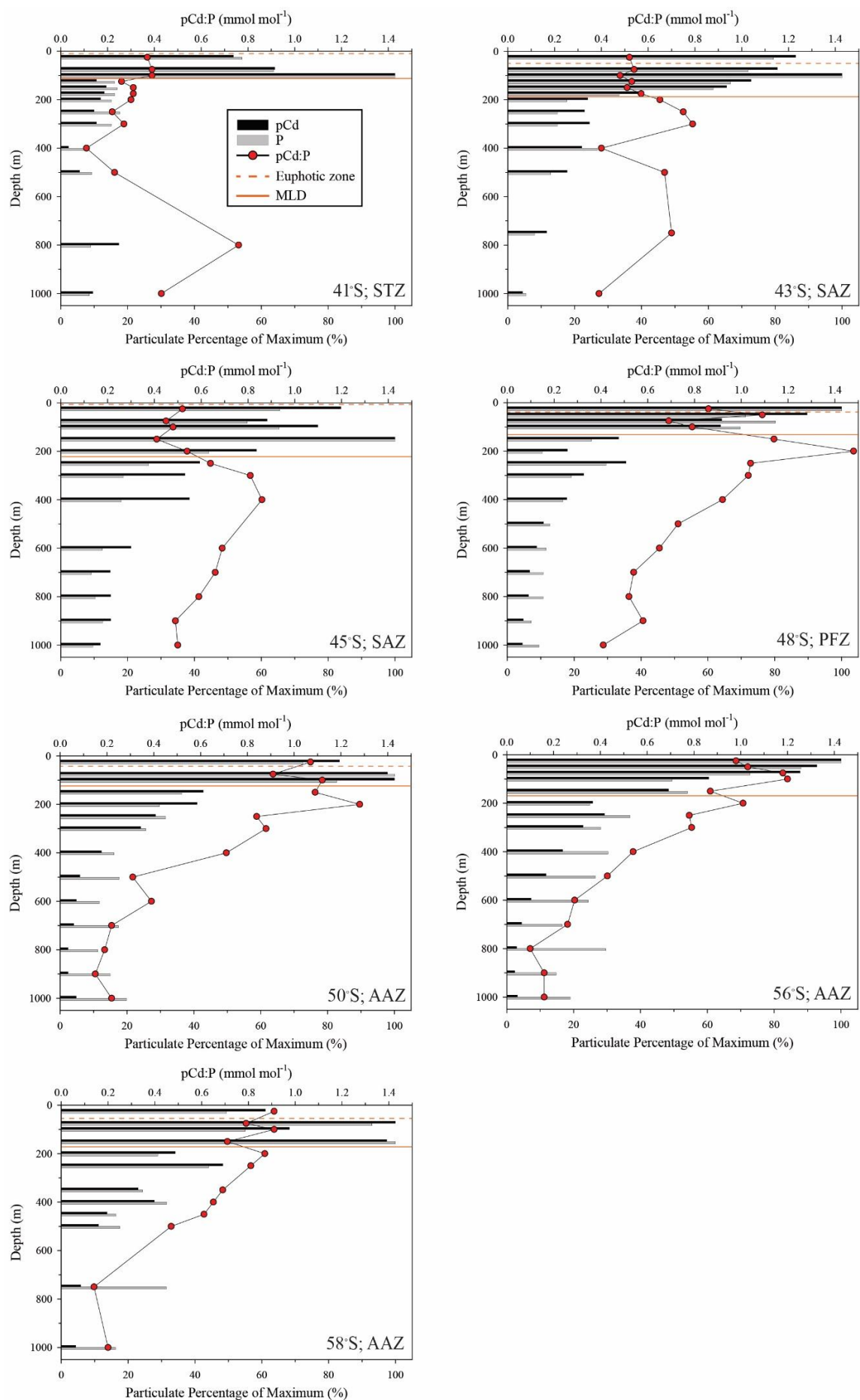


Figure S5. Particulate cadmium (black bars) and P (grey bars) normalised to profile maximum values

(bottom axis) for the upper 1000 m at all stations. The red dots are the absolute pCd:P ratios at each depth (top axis). Dashed horizontal lines represents the bottom of the euphotic zone at each station. Solid horizontal line represents the bottom of the MLD at each station. No euphotic zone data for 56°S (AAZ) due to PAR sensor failure.

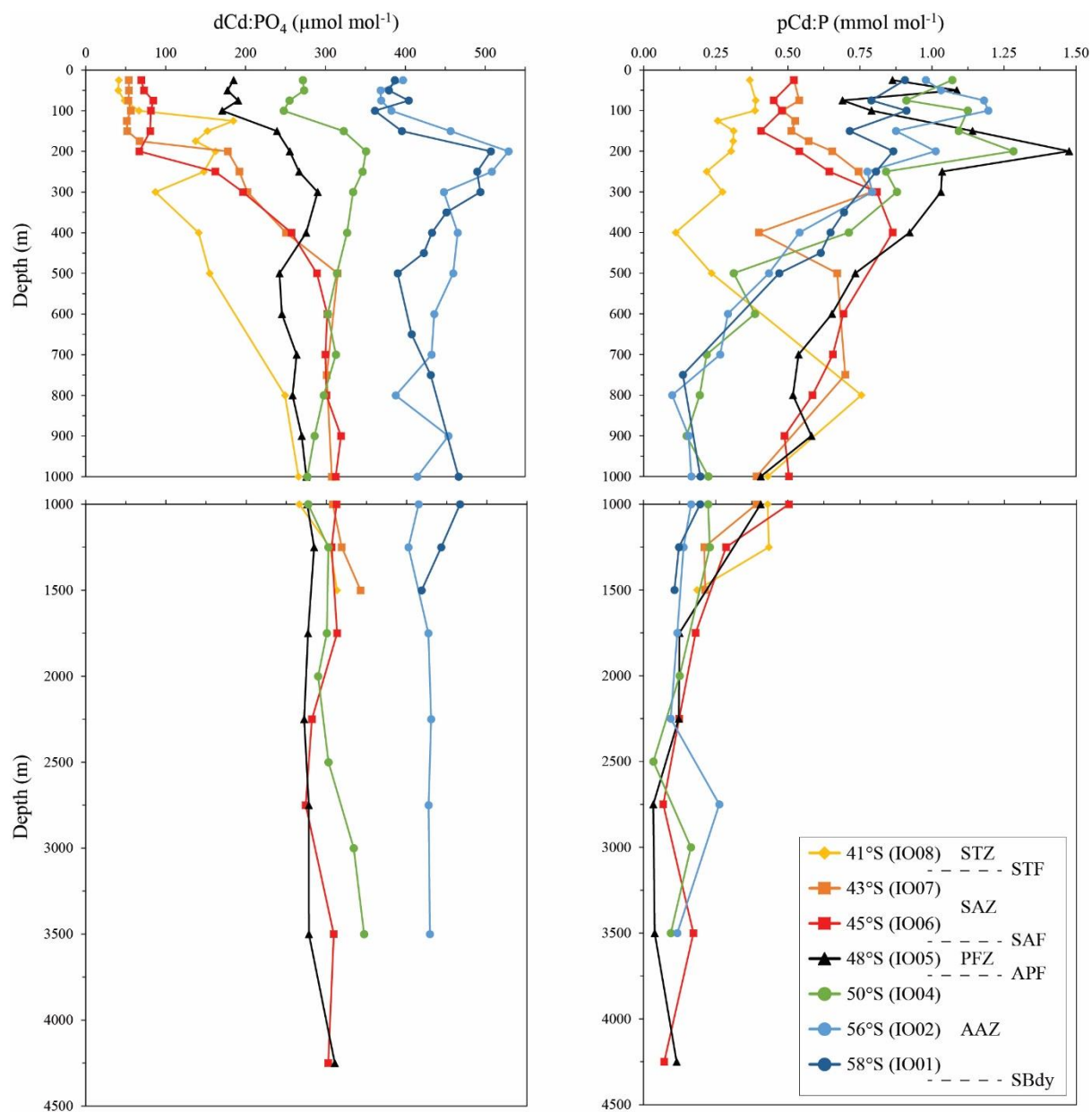


Figure S6. Vertical profiles of dCd:PO<sub>4</sub> (left panels) and pCd:P (right panels) at all stations.