Supporting Information for:

Unexpected quasi-independence of colored dissolved organic matter absorption from chlorophyll-*a* concentration in the Southern Ocean

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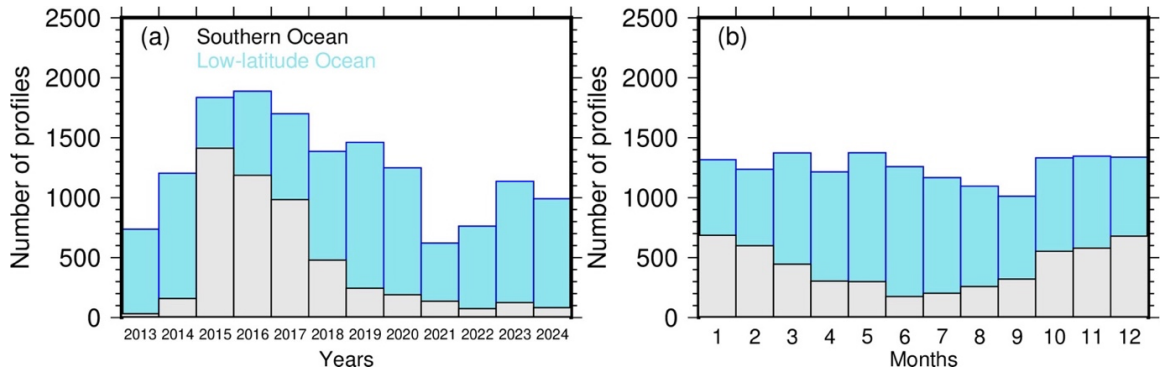
Table S1 Number (N) of BGC-Argo float profiles eliminated based on various criteria and quality controls used in this study. Criteria are successively applied as they appear in this Table, which is why the number of "Bad chlorophyll profile" and "Bad b_b(700 nm) profile" can be different for each spectral band.

	Southern Ocean < 40° S			Lower-latitude Ocean 40° S to 60° N		
N floats	60			211		
N profiles, total	10579			35,591		
N discarded profiles						
Depth < 200 m	30			1396		
Sun elevation < 15°	2472			4997		
	380 nm	412 nm	490 nm	380 nm	412 nm	490 nm
Out-of-range Z_{pd}	2516	2600	2563	12294	12708	12281
$K_d < K_w$	38	95	534	746	1710	4360
Bad chlorophyll profile‡	0	0	0	25	23	23
Bad b_b(700 nm) profile‡	488	482	469	1741	1652	1584
Bad E_d profile‡, per band	2	2	2	4	4	3
Surface average $b_{bp} < 0$	1	2	1	48	48	43
Retrieved a_y values < 0	52	148	766	34	234	2132
Number of profiles used	4980	4748	3743	14306	12821	8788

‡ from any flag other than "A" or "B" following the BGC-Argo nomenclature (Argo data management, 2025). Synthetic BGC Argo netCDF files (extension "Sprof") have been used.



590 **Figure S1: Time distribution of the selected set of BGC-Argo profiles over (a) years and (b) months.**

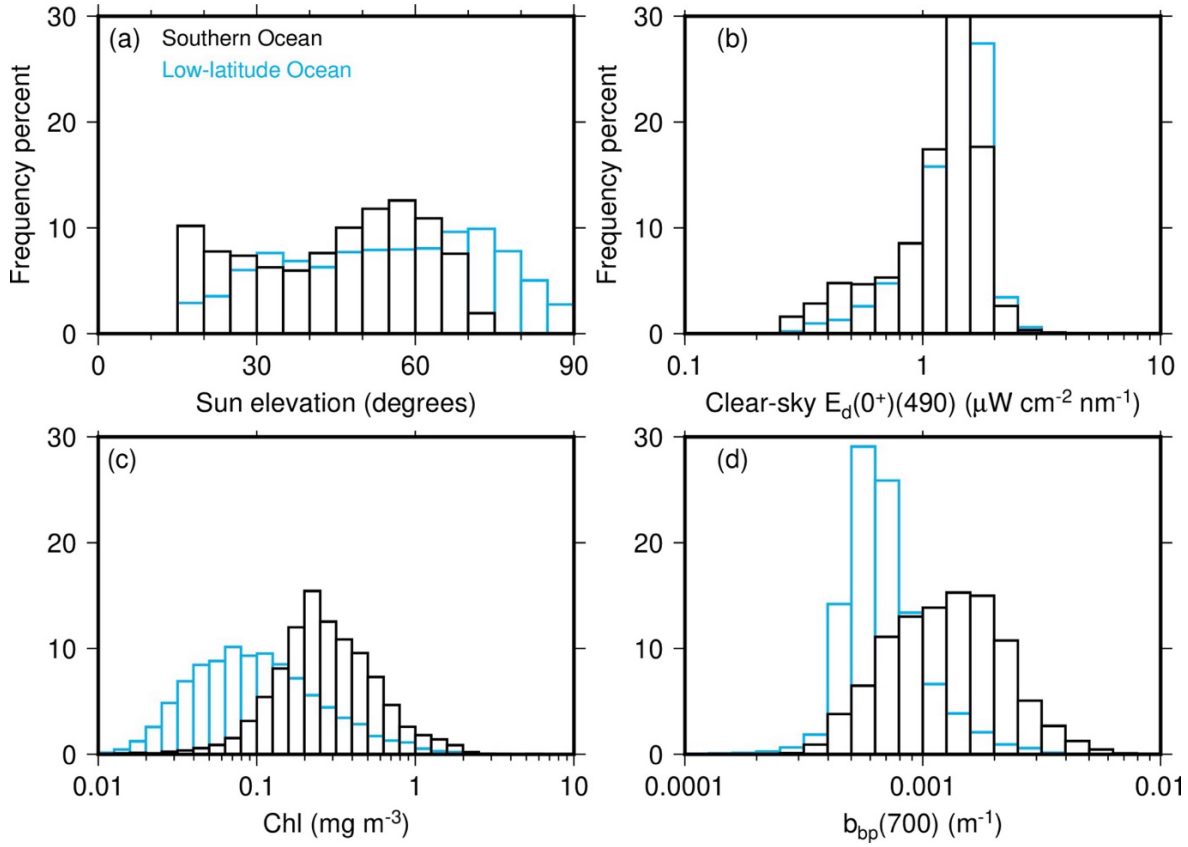


Figure S2: Distribution of (a) sun elevation, (b) measured downward irradiance at 490 nm for values within 20% of the clear-sky value calculated following Gregg and Carder (1990) (data outside of this range are also used, however), (c) Chl
595 **and (d) b_{bp}(700).**

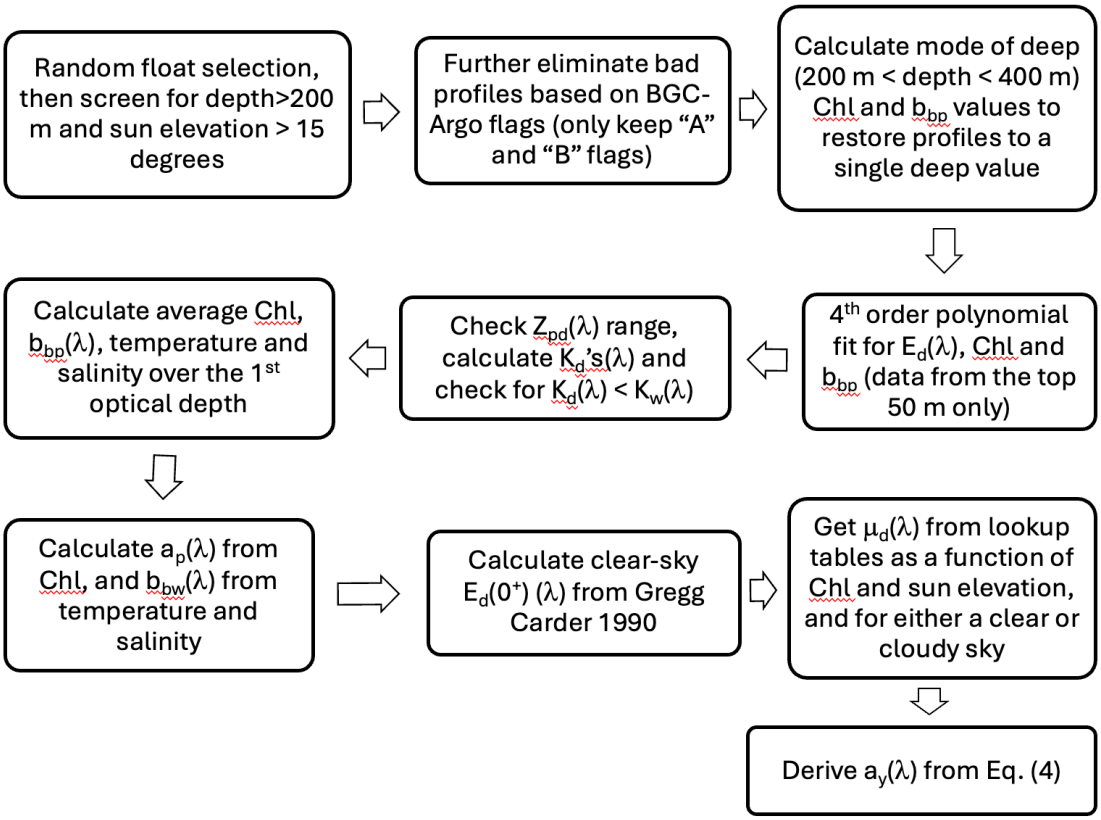


Figure S3: Workflow for the processing of the BGC-Argo data, from profiles of $E_d(\lambda)$, b_{bp} at 700 nm and Chl, down to deriving the CDOM absorption coefficient a_y.

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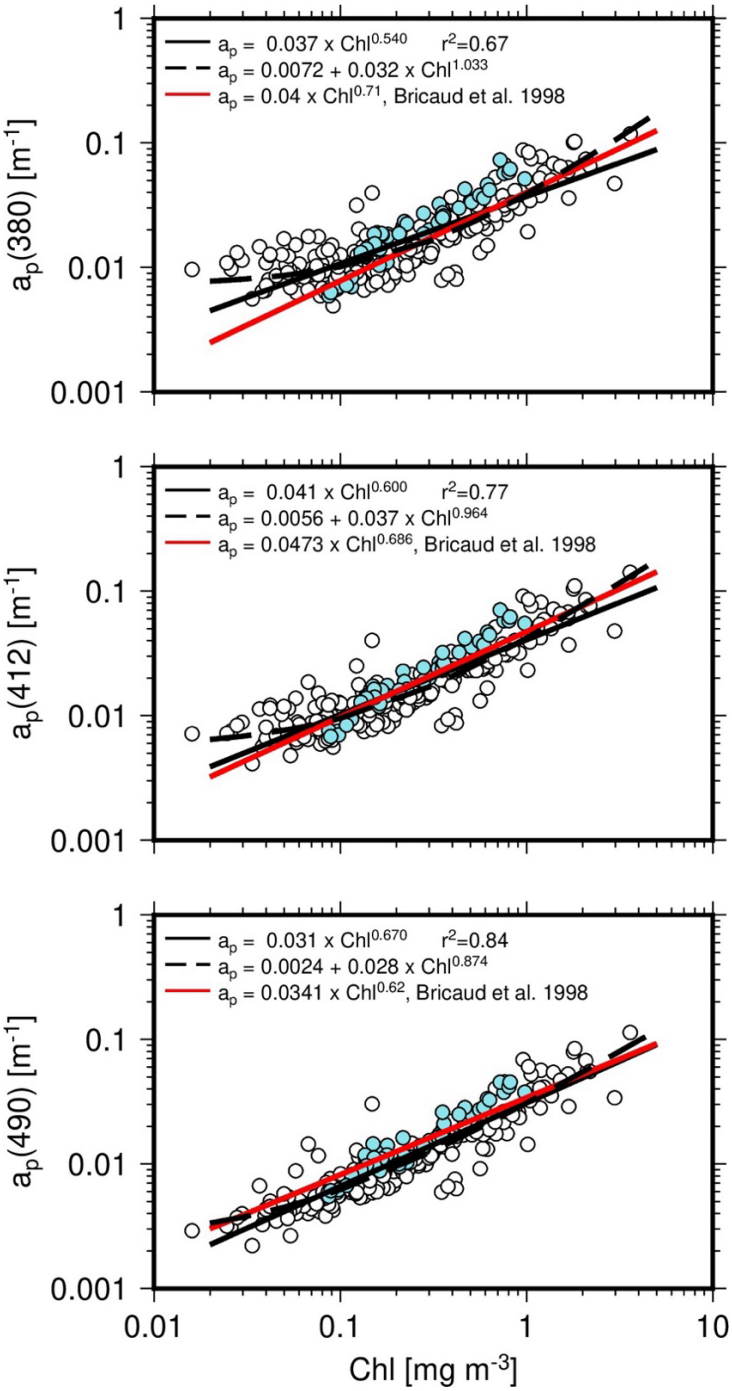

Figure S4: Particulate absorption coefficient at the three wavelengths indicated as a function of Chl. The data are from the ACE (open dots) and SOLACE (turquoise) research voyages. The solid black lines are linear fits on the log-transformed data. The dashed black lines are non-linear fits (Eq. 5) on the same data. The red lines are the parameterization from Bricaud et al. (1998).

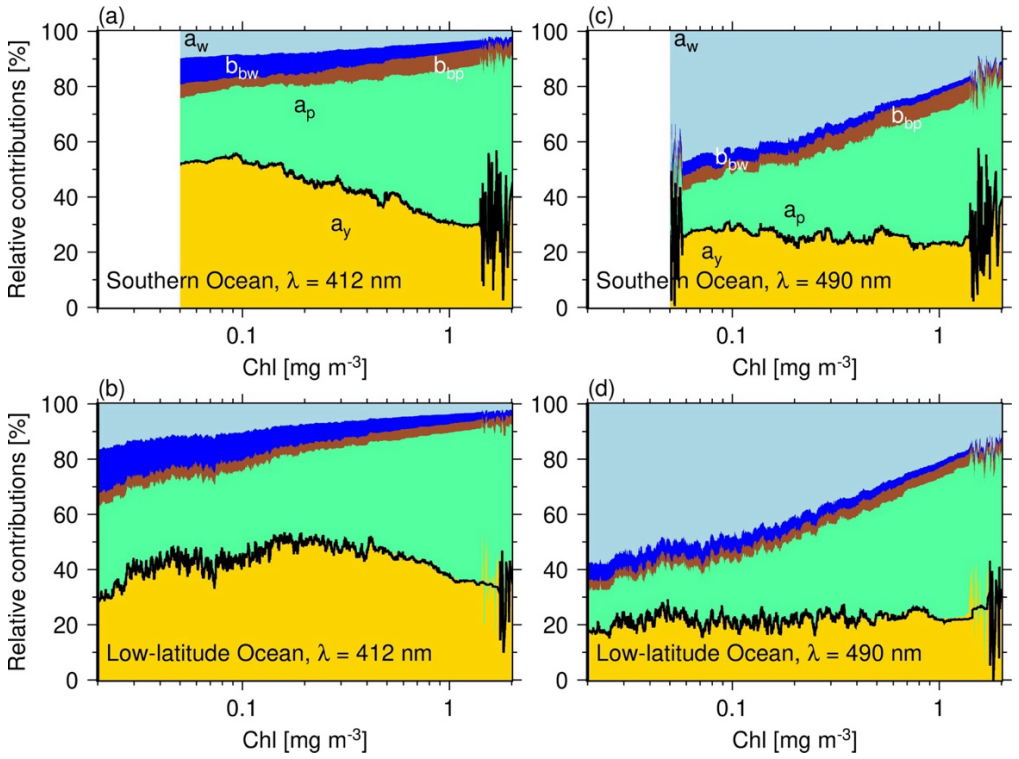

Figure S5: Relative proportions of a_w (light blue), b_{bw} (deep blue), b_{bp} (brown), a_p (green) and a_y (gold) in forming Eq. (4) for 412 nm (left panels) and 490 nm (right panels), plotted as a function of Chl and the SO and low-latitude oceans.