



Supplement of

The primacy of dissolved organic matter to aquatic light variability

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Figure S1.

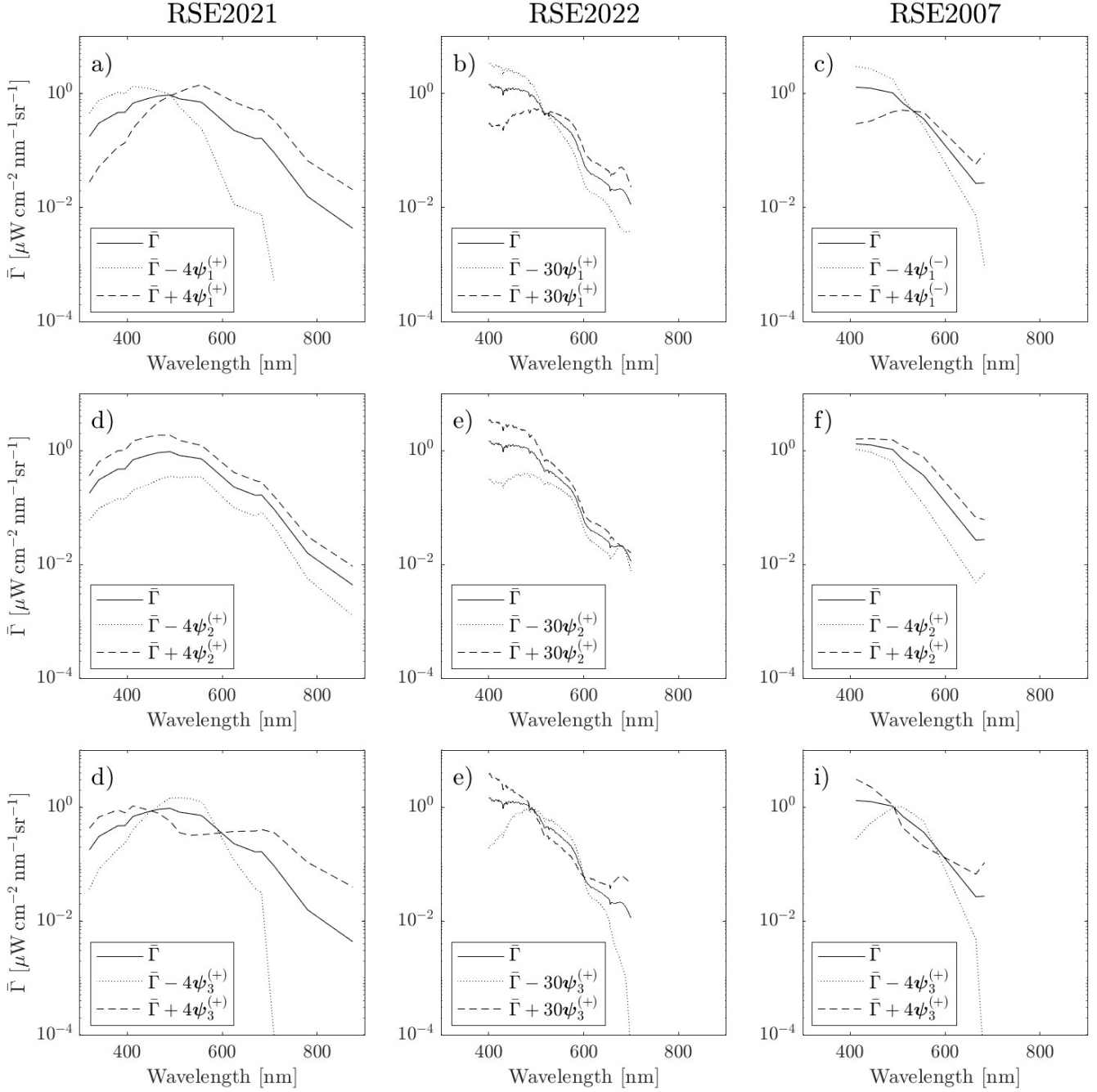


Figure S1. Mean $[L_W(\lambda)]_N$ spectra—represented as $\bar{\Gamma}$ for brevity following Hooker et al. 2021—are shown for each dataset as solid black lines. Reconstructed spectra are shown in dashed plus dotted lines and represent spectral modifications associated with adding or subtracting, respectively, scalar quantities derived from the eigenfunctions. Modifications associated with ψ_1 , ψ_2 , and ψ_3 are shown in the top, middle, and bottom rows, respectively.

Figure S2.

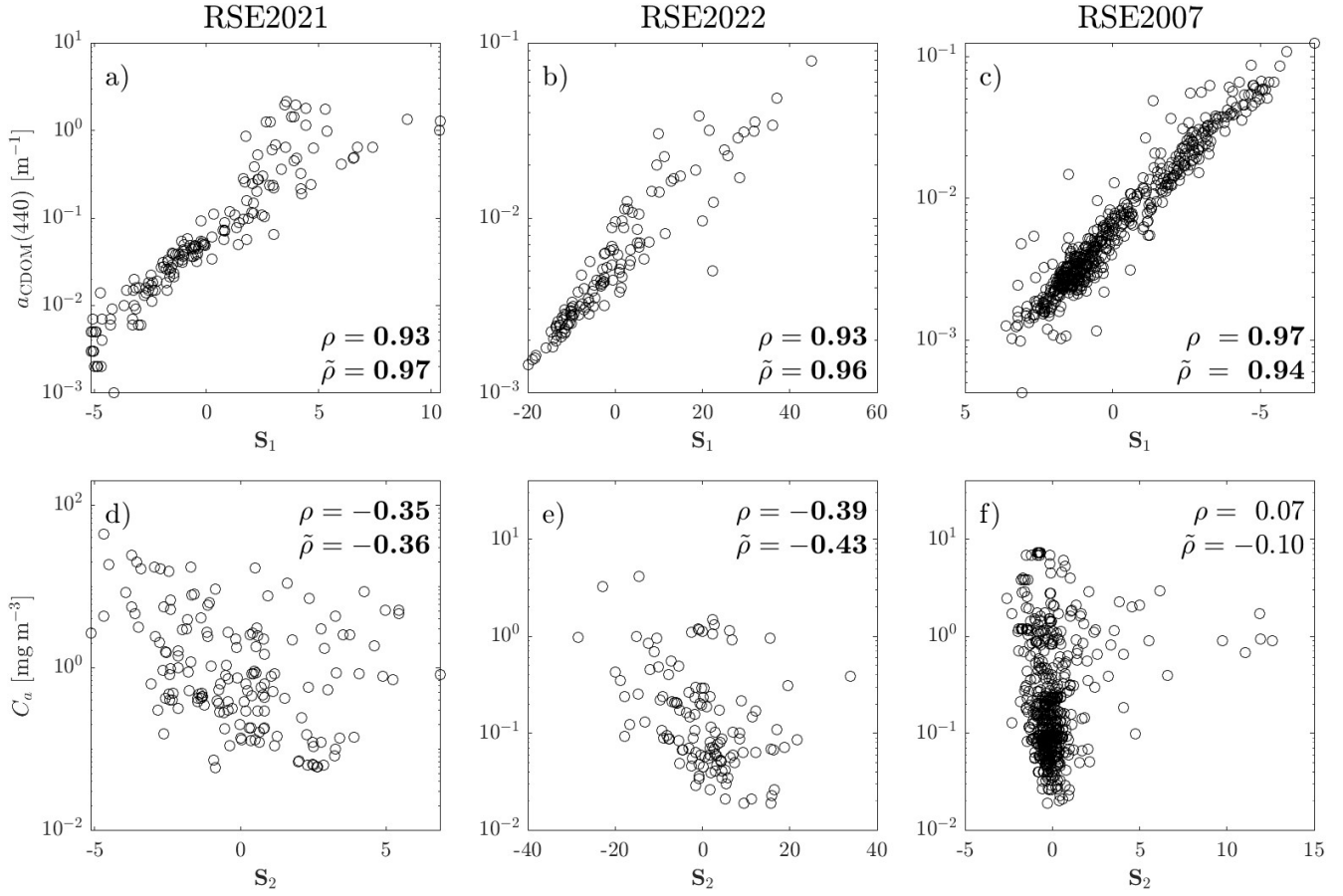


Figure S2. Relationships between the S_1 (top row) and S_2 (bottom row) matrix predictors to CDOM absorption (top row) and C_a values (bottom row). Pearson's (ρ) and Spearman's ($\tilde{\rho}$) correlation coefficients are overlaid, with bold type indicating significance at $P < 0.01$.

Table S1.

Table. S1. The quartile summary of biogeochemical quantities from the RSE2021, RSE2022, and RSE2007 dataset field observations, plus estimated values for $b_{bp}(443)$ derived following Matsuoka et al. (2013) and Hooker et al. (2021). Out-of-bound values are indicated as limit of detection (LOD).

Dataset	Parameter	Min	Lower Quartile	Median	Upper Quartile	Max
$a_{CDOM}(440)$ [m^{-1}]	RSE2021	0.0010	0.0175	0.4550	0.2185	2.1460
	RSE2022	0.0015	0.0028	0.0044	0.0088	0.0795
	RSE2007	0.0004	0.0027	0.0040	0.0124	0.1242
C_a [$mg\ m^{-3}$]	RSE2021	0.0590	0.2925	0.7440	2.6900	44.1960
	RSE2022	0.0190	0.0580	0.1015	0.2520	4.1510
	RSE2007	0.0190	0.0780	0.1450	0.4815	7.3180
$b_{bp}(443)$ [m^{-1}]	RSE2021	LOD	0.0010	0.0050	0.0290	0.3290

References

Hooker, S.B., Houskeeper, H.F., Kudela, R.M., Matsuoka, A., Suzuki, K., and Isada, T.: Spectral modes of radiometric measurements in optically complex waters. *Continental Shelf Research* 219, 104357, 2021.

Matsuoka, A., Babin, M., Doxaran, D., Hooker, S.B., Mitchell, B.G., Bélanger, S., and Bricaud, A.: A synthesis of light absorption properties of the Pan-Arctic Ocean: Application to semi-analytical estimates of dissolved organic carbon concentrations from space. *Biogeosciences Discussions* 10, no. 11, 2013.