Supplementary information for

Meta-analytical insights into organic matter enrichment in the surface microlayer

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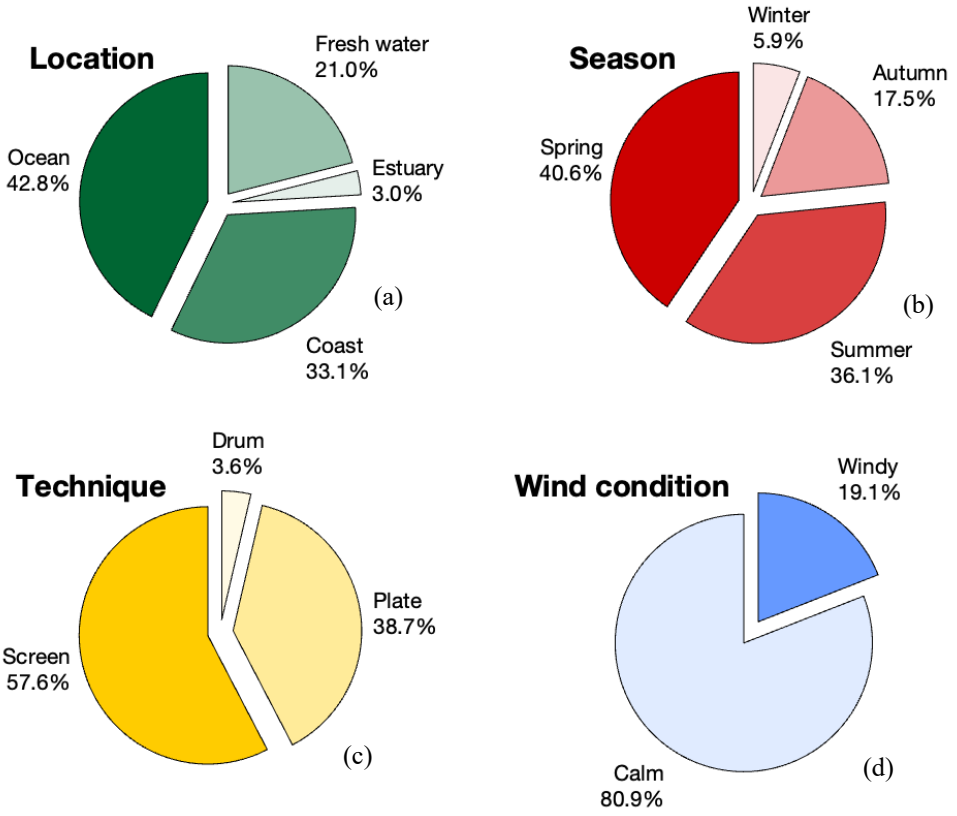
Contents of this file

Supplementary Figures 2

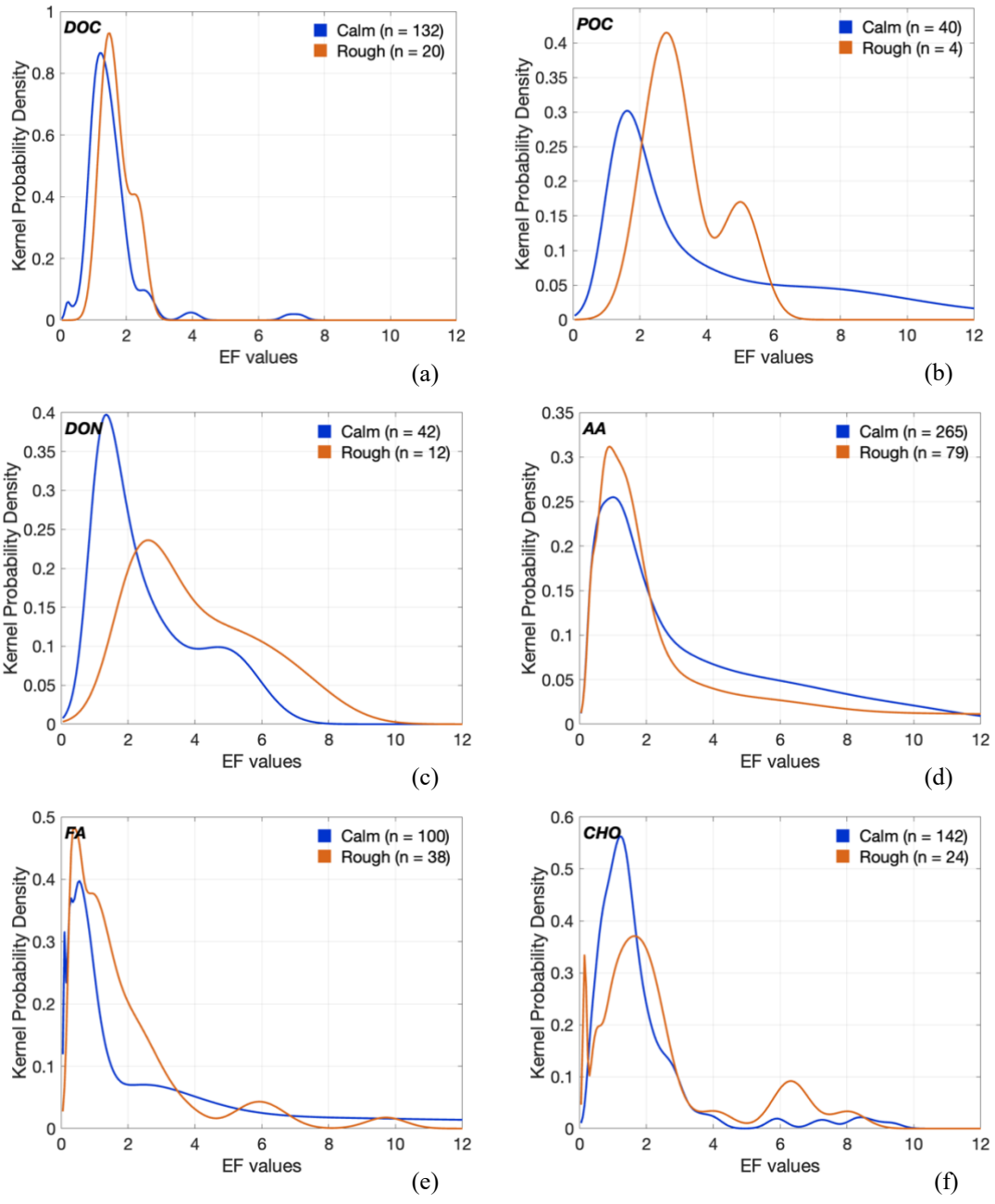
Supplementary Table 1

Introduction

The supplementary information includes 2 figures and 1 table presenting additional analyses supporting the main text.



Supplementary Figure S1: A graphical summary presenting the distribution of the reference studies across four main research attributes. Percentage of data across (a) sampling location, (b) sampling seasons, (c) sampling techniques and (4) wind conditions. Seasons were defined following de Boyer Montégut *et al.* (2004) (i.e. Boreal winter spans from January to March and Austral winter spans from July to September, with the other seasons defined accordingly). Wind condition is considered to be 'calm' when the wind speed is < 6.6 ms^{-1} (Reinthaler *et al.*, 2008) and vice versa.



Supplementary Figure S2: Enrichment variability in the SML under calm vs. rough wind regimes. PDFs illustrating varying enrichment patterns for (a) DOC, (b) POC, (c) DON, (d) AA, (e) FA and (f) CHO between calm (< 6 ms^{-1}) and rough (> 6 ms^{-1}) wind conditions. 'n' gives the respective sample sizes.

Supplementary Table S1: Summary of the reference studies contributing to the SMD dataset. The citations are accompanied with primary and secondary data extracted from each study. The labels 'Ca', 'Wi', 'O', 'C', 'E', 'F', 'Sp', 'Su', 'A', 'W', 'S', 'P' and 'D' represent the following: 'Calm', 'Windy', 'Ocean', 'Estuary', 'Freshwater', 'Spring', 'Summer', 'Autumn', 'Winter', 'Screen', 'Plate' and 'Drum', respectively. The sampling depth of the ULW of each study is also given.

Reference studies	ULW depth (m)	Primary data												Secondary data			
		TOC	POC	DOC	TON	PON	DON	AA	FA	TEP	CHO	Proteins	Lipids	Wind speed	Location	Period	Method
Williams, (1967)	15 – 20 cm		√			√								Ca	O	Sp, A, W	S
Dietz *et al.*, (1976)	1 – 1.5 m		√	√		√									O, C, Fw		P
Sieburth *et al.* (1976)	8 m			√										Ca	O	SU	S
Meyers (1980)	30 cm			√											C	Sp	
Carlson (1983)	2 m		√	√											O, C, E	Sp, Su	S, P
Carlucci *et al.* (1985)	10 cm							√						Ca, Wi	O	Su, A	S
Henrichs and Williams (1985)	5 – 15 cm							√			√				C	Su	S
Williams *et al.* (1986)	1 – 15 cm		√	√		√	√				√	√	√	Ca	O, C	Su, A, W	S
Marty *et al.* (1988)	20 cm		√						√					Wi	O	Su, A	S
Kuznetsova and Lee (2002)	15 cm							√						Ca	C	Sp, Su, A, W	S
Kuznetsova *et al.* (2004)	15 cm							√						Ca, Wi	O	Sp	S, D
Hillbricht-Ilkowska and Kostrzewska-Szlakowska (2004)	0.5 cm				√	√								Ca	Fw	Su	P
Kuznetsova *et al.* (2005)	15 cm							√							C	Sp, Su	S
Gašparović *et al.* (2007)	10 cm		√	√		√			√					Ca	C	Su	S
Obernosterer *et al.* (2008)	5 m		√	√		√								Ca	O	A	S
Reinthaler *et al.* (2008)	30 cm			√			√	√						Ca, Wi	O	Su, A	P
Wurl and Holmes (2008)	1 m			√						√				Ca	O, E	Sp, W	P

Baastrup-Spohr and Staehr (2009)	epilimnion	√			√									Wi	Fw	Sp, Su	S
Cunliffe *et al.* (2009)	0.75 m			√						√				Mesocosm experiment			
Wurl *et al.* (2009)	1 m									√	√			Ca, Wi	C	Su	P
Hörtnagl *et al.* (2010)	0.2 – 0.5 m			√										Ca	Fw	Su	S
Wurl *et al.* (2011)	1 m									√	√			Wi	O, C	Sp, Su	P
Gao *et al.* (2012)	0.5 m	√												Ca	O	Su	P
Van Pinxteren *et al.* (2012)	1 m			√				√			√			Ca	O	Sp, Su, A, W	D
Huang *et al.* (2015)	0.5 m			√											C, Fw	Sp, Su, A, W	P, D
Astrahan *et al.* (2016)	1 m										√			Microcosm experiment			D
Chen *et al.* (2016)8/19/2025 9:29:00 AM	20 cm			√				√			√			Ca, Wi	O, C	Sp	S
Barthelmeß *et al.* (2021)	2 m			√				√			√			Wi	O	W	S
Barthelmeß and Engel (2022)	20 cm			√				√			√			Wi	C	Sp. Su	P
Milinković *et al.* (2022)	1 m		√	√						√	√			Ca, Wi	C	Sp, Su, W	D

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