ELSEVIER

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Relative abundances of benthic foraminifera in response to total organic carbon in sediments: Data from European intertidal areas and transitional waters



Vincent M.P. Bouchet^{a,*}, Fabrizio Frontalini^b, Fabio Francescangeli^c, Pierre-Guy Sauriau^d, Emmanuelle Geslin^e,

Maria Virginia Alves Martins^{f,g}, Ahuva Almogi-Labin^h, Simona Avnaim-Katavⁱ, Letizia Di Bella^j, Alejandro Cearreta^k, Rodolfo Coccioni^b, Ashleigh Costelloe¹, Margarita D. Dimiza^m, Luciana Ferraroⁿ, Kristin Haynert^o, Michael Martínez-Colón^{p,q}, Romana Melis^r, Magali Schweizer^e, Maria V. Triantaphyllou^m, Akira Tsujimoto^s, Brent Wilson^t, Eric Armynot du Châtelet^u

^b University Urbino Dipartimento di Scienze Pure e Applicate (DiSPeA), Università degli Studi di Urbino "Carlo Bo", Campus Scientifico Enrico Mattei, Località Crocicchia, 61029, Urbino, Italy

- ^c University of Hamburg, Institute for Geology, Centre for Earth System Research and Sustainability, Bundesstraße, 5520146 Hamburg, Germany
- ^d La Rochelle Université, CNRS, Littoral Environnement et Sociétés, UMR 7266 LIENSs, 2 rue Olympe de Gouges, 17000 La Rochelle, France
- ^e UMR CNRS 6112 LPG-BIAF, University of Angers, 2 Bd Lavoisier, Angers Cedex 1, 49045, France

^fRio de Janeiro State University (UERJ), R. São Francisco Xavier, 524 - Lab 1006 - Maracanã, Rio de Janeiro 20550-900, Brazil

- ^g Aveiro University, Department of Geosciences, GeoBioTec, Campus de Santiago, 3810-197 Aveiro, Portugal
- ^h Geological Survey of Israel, Yesha'yahu Leibowitz 32, Jerusalem 9692100, Israel
- ⁱ Israel Oceanographic and Limnological Research, Haifa, 3108001, Israel
- ^jDipartimento di Scienze Della Terra, Sapienza Università di Roma, Italy

^k Departamento de Geología, Universidad del País Vasco UPV/EHU, Apartado 644, 48080 Bilbao, Spain

¹BioStratigraphic Associates (Trinidad) Limited, 113 Frederick Settlement, Old Southern Main Rd., Caroni, Trinidad and Tobago

^mNational and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Panepistimioupolis, 15784, Athens, Greece

ⁿ CNR, Institute of Marine Sciences, National Research Council of Italy, Calata Porta di Massa, Naples, Italy

DOI of original article: 10.1016/j.marpolbul.2021.112071

* Corresponding author.

E-mail address: vincent.bouchet@univ-lille.fr (V.M.P. Bouchet).

https://doi.org/10.1016/j.dib.2021.106920

^a University Lille, CNRS, Univ. Littoral Côte d'Opale, UMR 8187, LOG, Laboratoire d'Océanologie et de Géosciences, Station Marine de Wimereux, F 59000, Lille, France

^{2352-3409/© 2021} The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)

^o University of Göttingen, J.F. Blumenbach Institute of Zoology and Anthropology, Göttingen

^p Florida A&M University, School of the Environment, FL, USA

⁹FSH Science Research Center, RM306B, 1515 South MLK Blvd, Tallahassee, FL 32307, USA

^r Department of Mathematics and Geosciences, 34127 Trieste, Italy

^s Faculty of Education, Shimane University, 1060 Nishikawatsucho, Matsue, Shimane 690-8504, Japan

^tCedar Lodge, Maenygroes, Cei Newydd, Ceredigion, Wales SA45 9RL, UK

^u University Lille, CNRS, University Littoral Côte d'Opale, UMR 8187, LOG, Laboratoire d'Océanologie et de Géosciences, F 59000, Lille, France

ARTICLE INFO

Article history: Received 21 January 2021 Revised 24 February 2021 Accepted 25 February 2021 Available online 27 February 2021

Keywords:

Living Benthic foraminifera Relative abundances Total organic carbon Intertidal areas Transitional waters English channel European atlantic coast Mediterranean sea

ABSTRACT

We gathered total organic carbon (%) and relative abundances of benthic foraminifera in intertidal areas and transitional waters from the English Channel/European Atlantic Coast (587 samples) and the Mediterranean Sea (301 samples) regions from published and unpublished datasets. This database allowed to calculate total organic carbon optimum and tolerance range of benthic foraminifera in order to assign them to ecological groups of sensitivity. Optima and tolerance range were obtained by mean of the weightedaveraging method. The data are related to the research article titled "Indicative value of benthic foraminifera for biomonitoring: assignment to ecological groups of sensitivity to total organic carbon of species from European intertidal areas and transitional waters" [1].

© 2021 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)

Specifications Table

Subject	Ecology
Specific subject area	Environmental Monitoring
Type of data	Tables and Figures
How data were acquired	Data available with peer-reviewed journal articles and unpublished data.
	The weighted-averaging (WA) optimum and tolerance approach was used [2,3]
	using the optimos.prime R package [4]; as well as the AMBI formula [5].
	Statistics were done with the statistical language R version 3.6.3 [6].
Data format	Primary data
	Secondary data
Parameters for data collection	The aim was to collect data on total organic carbon (TOC) and benthic
	foraminifera in order to classify benthic foraminifera in ecological groups of
	sensitivity to TOC [5]. Studies had to fulfill the following criteria: 1) coming
	from the English Channel, the French, Spanish and Portuguese Atlantic coasts
	and the Mediterranean Sea, 2) sampled from intertidal areas and transitional
	waters (TWs), 3) based on living foraminifera, 4) TOC sample must come from
	the same site at the same date as foraminiferal sample, 5) only samples
	containing >50 living stained specimens were considered.
	If only organic matter content (%) was provided, it was converted to TOC using
	the following formula: LOI (loss-on-ignition) = ~ 2 TOC [7,8].
	When foraminiferal raw counts or abundances were available, there were
	transformed to relative abundances.
Description of data collection	Primary data - Data from unpublished studies (studies 1, 3, 6, 7, 8, 9, 10) were
-	provided by their authors. When the raw data were not published with the
	peer-reviewed publication (studies 13, 33 and 41), the authors were contacted
	to provide us with the raw data.
	-

	Secondary data – When available, relative abundances data were downloaded from online sources where the study was published. When only raw counts or abundances were published, foraminiferal data were transformed to relative abundances.
	We standardized species names according to the World Registry of Marine Species (WoRMS). All data processing and analysis was done in the
Data accuracy location	open-source sortware R.
Data source location	Secondary data sources: The full list of data sources is available at
Data accossibility	The database is available on Mondeley, Poushet Vincenty Frontalini, Fabrizie
Data accessibility	Francoscangeli Fabio: Sauriau Bierro Cuu: Coslin Emmanuello: Martins
	Virginia: Almogi Labin, Abuya: Aunaim Katay, Gestili, Elilindiluelle, Martilis,
	Vilginia, Alinogi-Labin, Anuva, Avnanii-Kalav, Siniona, Di Dena, Lenzia,
	Centrela, Alejandro, Coccioni, Rodono, Costenoe, Asineign, Diniza, Malgania,
	Felialo, Lucialia, Haynell, Klistili, Maltinez-Cololi, Michael, Melis, Kollialia,
	Armunot du Châtalat Eric (2021) "Living foraminifora relative abundances and
	Annyhot du Chalelet, Elic (2021), "Living foranininera relative abundances and
	Mondalay Data V1 http://dv.doi.org/10.17622/stifr0yuyg1
	http://dx.doi.org/10.17622/stjff9XVXg.1
Polated recearch article	IIII.p://dx.doi.org/10.17632/StJII9XVXg.1
Related research article	V.M.P. DOUCHEL, F. FIOHIAIHH, F. FIANCESCHIGEH, PG. Sauliau, E. Geshin, M.V.A.
	Mattinis, A. Alliogi-Labili, S. Avilaini-Kaldy, L. Di Della, A. Cedifeld, K. Coccolin,
	A. Costelloe, M.D. Dilliza, L. Fellalo, K. Hayliett, M. Maltillez-Cololi, K. Melis,
	W. Schweizer, W.V. manaphynou, A. Isujiniolo, B. Wilson, E. Annyhol uu
	Chatelet, indicative value of benchic foranithiera for biomonitoring:
	from European intertidal areas and transitional waters. Mar. Dell. Bull. 164
	(2021) 112071 https://doi.org/10.1016/j.marpolbul.2021.112071
	(2021) 1120/1. https://doi.org/10.1010/1.11dfD01D01.2021.1120/1

Value of the Data

- The data of relative abundances of living benthic foraminifera in European intertidal areas and transitional waters allows assessing the response of the species to total organic carbon contained in the sediment over a large geographical scale.
- The assignment of benthic foraminiferal species to ecological groups of sensitivity to total organic carbon have further implication for environmental monitoring.
- In the present study database, foraminiferal species names and data format were standardised to species concept from the World Register of Marine Species and to relative abundances, respectively.
- These data might be re-used to further assess and improve our understanding of the biogeographical distribution patterns of benthic foraminifera in European intertidal areas and transitional waters over a large latitudinal range.

1. Data Description

The present study database (available in Mendeley: http://dx.doi.org/10.17632/stjfr9xvxg.1), composed of primary and secondary data, summarizes the total organic carbon content in sediment (%) and the relative abundances (%) of benthic foraminiferal species in European intertidal areas and transitional waters (French coast of the English Channel, European Atlantic Coast and the Mediterranean Sea) extracted from 35 primary peer-reviewed articles and seven unpublished grey literature that met the inclusion criteria for the related meta-analysis [1] (see meta-data in Table 1). In the English Channel/European Atlantic Coast, selected study sites included eight classical estuaries, four coastal freshwater/brackish water plumes, two artificial water bodies and two Rias (Fig. 1; see definition of each body type in Table 1 in [1] according to [9,10]). In the Mediterranean Sea, one delta, six lentic non-tidal lagoons, four lentic tidal lagoons, one artificial water body, seven semi-enclosed bays and one classical estuary were considered (Fig. 1).

This database was built to assign benthic foraminiferal species to ecological groups of sensitivity to total organic carbon (see [1] for more details). Because of the particular characteristics of foraminiferal habitats and communities, we decided to present the database split in two: one for the English Channel/European Atlantic and one for the Mediterranean region. The overall aim of this paper is to provide foraminiferal ecologists with a ready-to-use database detailing foraminiferal species relative abundances and total organic content (%) in the studied sampling sites to be used for ecological, biogeographical and environmental monitoring purposes.

Table 1

Meta-data of the different selected studies. Full details of primary and secondary data sources are available at https: //data.mendeley.com/datasets/stjfr9xvxg/1.

					Related	Related Total							Data available		
				Local study	foraminiferal	Organic	Sample code	Tidal	Year of	Time of the	Foram size		with original	Sediment	Sampling
	Dataset	Region	Country	area	study	Carbon study	description	condition	sampling	year	fraction	TOC method	publication	layer	device
_	1	English Channel	France	Grand-Fort	Francescangeli	same	A+J-O+F: April, June,	Intertidal	2014-2015	4 seasons	> 63 µm	CHN	Unpublished	0-1 cm	Corer
				Philippe	(2017)-PhD thesis		October, February; FP: Fort-Philippe; 1-2-3: replicates					Elemental analyser			(diameter: 85 μm)
	2	English Channel	France	Liane estuary	Armynot du Châtelet et al.	same	BL: Boulogne sur Mer; a-b-c:	Intertidal and subtidal	2008	April	$> 63 \ \mu m$	CHN Elemental	Yes, relative abundances	0-1 cm	Van Veen grab
					(2011)		replicates					analyser			
	3	English Channel	France	Boulogne sur Mer Harbor	Francescangeli (2017)-PhD thesis	same	A-J-O-F: April, June, October, February; RI -	Intertidal	2014-2015	4 seasons	> 63 µm	CHN Elemental analyser	Unpublished	0-1 cm	Corer (diameter: 85 um)
							Boulogne-sur-Mer; 1-2-3: replicates								,
	4	English Channel	France	Canche estuary	Francescangeli et al. (2017)	same	T: transect; P: sampling point;	Intertidal	2012-2013- 2014	September	> 63 µm	CHN Elemental	Yes, Raw counts	0-1 cm	Corer (diameter:
	5	English Channel	France	Canche	Armynot du	same	A,B,C: replicates CE: Canche estuary	Intertidal	2007 (CE)	April	> 63 µm	analyser CHN	Yes, relative	0-1 cm (CE)	85 µm) Van Veen
				estuary	Châtelet et al. (2018)		transept cross shore; D: samples in a		and 2017 (D)			Elemental analyser	abundances	and 0-2 cm (D)	grab (CE), scraping (D)
	6	English Channel	France	Canche	Francescangeli	esmo	square meter	Intertidal	2014-2015	A seasons	~ 63 um	CHN	Unnublished	0-1 cm	Corer
		Lightin Channel	THINC	estuary	(2017)-PhD thesis	Jan C	October, February; CA: Canche Estuaryr;	mertida	2014-2015	4 10000	» өз µш	Elemental analyser	onpublished	0-1 cm	(diameter: 85 μm)
	7	English Channel	France	Authie	Francescangeli	same	1-2-3: replicates A-I-O-F: April June	Intertidal	2014-2015	4 seasons	> 63 um	CHN	Unpublished	0-1 cm	Corer
				estuary	(2017)-PhD thesis		October, February; AU: Authie Esturie;					Elemental analyser			(diameter: 85 μm)
	8	English Channel	France	Somme	Francescanzeli	same	1–2–3: replicates A-I–O–F: April. June.	Intertidal	2014-2015	4 seasons	> 63 um	CHN	Unpublished	0-1 cm	Corer
				estuary	(2017)-PhD thesis		October, February; SO: Somme Estuary;					Elemental analyser			(diameter: 85 μm)
	9	English Channel	France	Bay of Veys	Bouchet	same	1-2-3: replicates Ref: reference station	Intertidal	2006	October	> 63 um	CHN	Unpublished	0-1 cm	Spoon (pseu-
					(unpublished)		outside the influence of the oyster farming					Elemental analyser			doreplication method)
							area; Transect from oyster farming area (0 m) to 50, 100,								
							200 and 400 m away								
	10	Atlantic	France	Crouesty harbor	Armynot du Châtelet (2003)-PhD	same	Numbers: stations	Subtidal	2002	July	> 63 µm	LOI	Unpublished	0-1 cm	Van Veen grab
	11	Atlantic	France	Loire estuary	Mojtahid et al. (2016)	same	A-B-L: outer estuary-lower inner	Intertidal and Subtidal	2012	September	$>$ 150 μm	LECO-CS200 [®] analyser	Yes, abundances	0-1 cm	Subtidal: Van Veen grab;
							estuary; according to station number								scraping off
	12	Atlantic	France	Aiguillon bay	Armynot du Châtelet et al. (2009)	same	According to station number	Intertidal	2001	October	> 63 µm	LOI	Partly, relative abundances	0-1 cm	Van Veen grab
	13	Atlantic	France	Aiguillon	Bouchet et al.	same	C: control station	Intertidal	2004	October, 29	$> 63 \ \mu m$	LOI	No	0-1 cm	Corer
				Bay/Ré Island	(2009)		outside oyster farm; OZ: in the oyster zone; OFZ: oyster free zone under the								(diameter: 95 μm)
							influence of the oyster farming area								
	14	Atlantic	France	Ronce Perquis	Bouchet et al. (2007)	same	According to station number	Intertidal	2004	April 22, May 25, June 9 and 22,	> 63 µm	LOI	Partly, abundances	0-1 cm	Spoon (pseu- doreplication method)
	15	Atlantic	Spain	Plentzia estuary	Cearreta et al. (2002)	same	According to sampling station	Intertidal	1997	August 4 Sping and Autumn	> 63 µm	Walkey method	Partly, relative	0-1 cm	Corer (diameter:
	16	Atlantic	Spain	Ria de Vigo	Diz et al. (2006)	same	name According to station number and month	Subtidal	1998	January and September	> 63 µm	LECO-CS200 ¹⁰ analyser	abundances Yes, raw counts	0-1 cm	not specified) Box corer
	17	Atlantic	Portugal	Ria de Aveiro	Martins et al. (2015)	same	of sampling According to station number	Subtidal	2011	Summer	> 63 µm	LOI	Yes, relative abundances	0-1/2 cm	Adapted Petit Ponnar
	18	Atlantic	Portugal	Ria de Aveiro	Martins et al.	same	According to station	Subtidal	2006-2007	Spring/	> 63 µm	LOI	Yes, relative	0-2 cm	sampler (with two openings Adapted Petit
					(2013)		number			Summer			abundances		Ponnar sampler (with
	19	Atlantic	Portugal	Ria de Aveiro	Martins et al. (2010)	same	According to station number	Subtidal	2006	March and April	> 63 µm	LOI	Yes, relative abundances	0-5 cm	Adapted Petit Ponnar sampler (with

(continued on next page)

|--|

base control control decima main						Related	Related Total							Data available		
base base <t< th=""><th></th><th></th><th></th><th></th><th>Local study</th><th>foraminiferal</th><th>Organic</th><th>Sample code</th><th>Tidal</th><th>Year of</th><th>Time of the</th><th>Foram size</th><th></th><th>with original</th><th>Sediment</th><th>Sampling</th></t<>					Local study	foraminiferal	Organic	Sample code	Tidal	Year of	Time of the	Foram size		with original	Sediment	Sampling
D Marker Name Image Diam Marker with being waters Marker with beind waters Marker with beind wate	_	Dataset	Region	Country	area	study	Carbon study	description	condition	sampling	year	Iraction	TOC method	publication	layer	device
1 1		20	Atlantic	Portugal	Ria de Aveiro	Martins et al.	same	C1-C8: stations	Subtidal	2009 to 2011	Autumn, early	> 63 µm	LOI	Yes, relative	0-1 cm	Box-corer
1 1						(2016)		number; 1-4:			winter, early			abundances		
1 1								Sampling season (1:			spring, late					
1 100 100 200								Autumn, 2: eany			winte					
Image Processes P								spring A: late								
1 1 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>winter)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								winter)								
Image Image <t< td=""><td></td><td>21</td><td>Atlantic</td><td>Portugal</td><td>Guadiana</td><td>Camacho et al</td><td>same</td><td>According to station</td><td>Intertidal</td><td>2010</td><td>Winter and</td><td>> 63 um</td><td>CHN</td><td>Ves relative</td><td>0-1 cm</td><td>Corer</td></t<>		21	Atlantic	Portugal	Guadiana	Camacho et al	same	According to station	Intertidal	2010	Winter and	> 63 um	CHN	Ves relative	0-1 cm	Corer
Andres					estuary	(2014)		name and season of			Summer		Elemental	abundances		(diameter:
1 National National <td></td> <td></td> <td></td> <td></td> <td>,</td> <td> ,</td> <td></td> <td>sampling</td> <td></td> <td></td> <td></td> <td></td> <td>analyser</td> <td></td> <td></td> <td>50 um)</td>					,	,		sampling					analyser			50 um)
1 1		22	Mediterranean	Spain	Ebro delta	Benito et al.	same	According to station	Intertidal	2012-2013	November.	> 63 um	LOI	Yes, relative	0-1 cm	Corer
Amount			Sea			(2016)		number and date of			April and			abundances		(diameter:
1 Matemate Name Name Matemate Name								sampling			August					57 μm)
9 9 </td <td></td> <td>23</td> <td>Mediterranean</td> <td>France</td> <td>Bagès-Sigean</td> <td>Foster et al.</td> <td>same</td> <td>According to station</td> <td>Subtidal</td> <td>2010</td> <td>September</td> <td>> 125 um</td> <td>CHN</td> <td>Yes, relative</td> <td>0-1 cm</td> <td>Shallow-</td>		23	Mediterranean	France	Bagès-Sigean	Foster et al.	same	According to station	Subtidal	2010	September	> 125 um	CHN	Yes, relative	0-1 cm	Shallow-
1 1			Sea		lagoon	(2012)		number					Elemental	abundances		water surface
Amound Participant Amound					0								analyser			sediment
1 Matement Matement <td></td> <td>sampler</td>																sampler
Image Sat Made Cat Made Cat Made Made <thm< td=""><td></td><td>24</td><td>Mediterranean</td><td>Italy</td><td>Sardinia</td><td>Schintu et al.</td><td>same</td><td>According to</td><td>Subtidal</td><td>2010 (PT and</td><td>May (PT and</td><td>> 63 µm</td><td>LOI</td><td>Yes, relative</td><td>0-3 cm</td><td>Van Veen</td></thm<>		24	Mediterranean	Italy	Sardinia	Schintu et al.	same	According to	Subtidal	2010 (PT and	May (PT and	> 63 µm	LOI	Yes, relative	0-3 cm	Van Veen
Image: state			Sea		island	(2015)		sampling zone (PT:		PS) and 2011	PS) and June			abundances		grab
1 5								Porto Torres, PS:		(LM)	(LM)					
1 1								Portoscuso, LM: La								
1 Normal								Maddalena								
1 5 5 6								Archipelago) and								
1 Mademian Martial (000) Martial (0000) Martial (000								station number								
jok jok </td <td></td> <td>25</td> <td>Mediterranean</td> <td>Italy</td> <td>Santa Gilla</td> <td>Frontalini et al.</td> <td>Aztori</td> <td>According to station</td> <td>Subtidal</td> <td>2006</td> <td>October</td> <td>> 63 µm</td> <td>CHN</td> <td>Yes, relative</td> <td>0-2 cm</td> <td>Van Veen</td>		25	Mediterranean	Italy	Santa Gilla	Frontalini et al.	Aztori	According to station	Subtidal	2006	October	> 63 µm	CHN	Yes, relative	0-2 cm	Van Veen
1 Mathemate Market Parte Market Parte Market Parte			Sea			(2009)	(2013)-PhD	number					Elemental	abundances		grab
A Name Na		20	M	ter be	0.1	Provide the task of	thesis Grouphically	A	Coloridat	2002	0	63	anaiyser	Mar and shares		Mar Mara
xa		20	Mediterranean	italy	Orbetello	(2010)	specchium	According to station	Subtidai	2003	October	> 63 µm	CHIN	res, relative	0-2 cm	van veen
1 Mader and a set in the set i			564			(2010)	et al. (2010)	number					Elementai	abundances		grab
J. Generation Participant Partipant Paripant Paripant		77	Maditamanaan	Italu	Naples hashes	Exercises of al	c2000	According to	Subtidal	ND	ND	175	CUN	Most collations	0.30.000	Undeanlie
Arr Balayer B		27	Sea	italy	Naples failed	(2006)	same	sampling zone (DI -	Subtidat	N.D.	N.D.	> 125 µm	Elemental	abundances	0=20 Cm	vibro-corer
Image: Participant service of the service			Jea			(2000)		Levante dock DC:					analwar	abundances		(diameter:
Interaction Interaction <thinteraction< th=""> <thinteraction< th=""></thinteraction<></thinteraction<>								Granili dock) and					unaryser			(uninecci)
1 Median with with with with with with with with								station number								,,
is join join <		28	Mediterranean	Italy	Varano lake	Frontalini et al.	same	According to station	Subtidal	2012	March	> 125 um	CHN	Yes, relative	0-2 cm	Van Veen
And and any and any and any			Sea	,		(2013)		number					Elemental	abundances		grab
1 Median Mus Mus<													analyser			0
Image: second secon		29	Mediterranean	Italy	Lesina lagoon	Frontalini et al.	Borja et al.	According to station	Subtidal	2004	March	> 63 µm	CHN	Yes, relative	0-2 cm	Van Veen
Partner Barrner Barrner <t< td=""><td></td><td></td><td>Sea</td><td></td><td></td><td>(2010)</td><td>(2011)</td><td>number</td><td></td><td></td><td></td><td></td><td>Elemental</td><td>abundances</td><td></td><td>grab</td></t<>			Sea			(2010)	(2011)	number					Elemental	abundances		grab
10 Mediermane 10 Vicia Lagio Occomit p and participant set of the set of													analyser			
ind ind ind main <		30	Mediterranean	Italy	Venice lagoon	Coccioni et al.	Secco et al.	According to station	Subtidal	2002	June	> 63 µm	CHN	Yes, relative	0-2 cm	Van Veen
Addit ranze Matra and bala Mar. and			Sea			(2009)	(2005)	number					Elemental	abundances		grab
11 Mediatranam kala Mana ad Melia and We Vale Register Intribut 205 May ad July 6 July 6 July 100 Uppelshed 0 - cm Correct (amaterial addition of addition													analyser			
Sol Galo is get <		31	Mediterranean	Italy	Marano and	Melis	same	VN: Valle Noghere,	Intertidal	2015	May and July	> 63 µm	CHN	Unpublished	0-2 cm	Corer
 International control of the state of the st			Sea		Grado lagoon	(unpublished		according to station					Elemental			(diameter:
12 Medierrane method Genere method Sample method So diales from he So field So						data)		number					analyser			56 µm)
 Jachi and a serie and a serie		32	Mediterranean	Greece	Saronikos gulf	Portela	same	S: distance from the	Subtidal	2016	February	> 125 µm	CHN	Unpublished	0-1 cm	Stainless steel
3 Mediatranes Sevent Saves			Jea			(2017)-wise mesis		effluents					analwar			bux-corer
Sa Torong Caliby Same and second secon		33	Mediterranean	Greece	Saronikos gulf	Dimiza et al.	same	S: distance from the	Subtidal	2012	February	> 125 um	CHN	No	0-1 cm	Stainless steel
14 Kedierrance Sa Creep (2013)-MC Folding all (2013)-MC Creep (2013)-MC Folding all (2013)-MC Satistice (2013)-MC Satistice (2014)-MC Satistice (201			Sea			(2016)		point source of the			,		Elemental			box-corer
1 Mediatrance Genes								effluents					analyser			
36a		34	Mediterranean	Greece	Evoikos gulf	Goreija	same	N: According to	Subtidal	2011	November	$> 125 \ \mu m$	CHN	Unpublished	1 to 2 cm	Van Veen
35. Rediterance scale Rediterance scal			Sea			(2013)-MSc		station number					Elemental			grab
35 Medilemane forece know (2013)-Mac integrated into a coording to the solution of the solution into a coording to thin solution into a coording to the solution into a coording to thin solutin into a coording to thin s						thesis							analyser			
Sea Defails analyset equipational states analyset analyset analyset 36 Mediletranzen Turkey Gaf of larmin lengin et al. same According to station Subtil all 202 November > 25 g m Nationes Neise relative managet 37 Mediletranzen Ivarel Turkey Off of larmin Palas-Zarithy same According to date ground 202 and November > 5 3 m Emental 0-4 cm Corder Gamerer 38 Mediletranzen Ivarel Rezer, Anality same According to date Palas-Zarithy Same Netroiter 203 and Netroiter > 5 3 m Emental O-4 cm Corder Gamerer 38 Mediletranzen Ivarel Nazawa, state Netroiter Samerer Netroiter 30, pm 6. > 5 3 m Emental Netroiter 5 4 m Samerer Samerer </td <td></td> <td>35</td> <td>Mediterranean</td> <td>Greece</td> <td>Kavala bay</td> <td>Delliou</td> <td>same</td> <td>according to the</td> <td>Subtidal</td> <td>2012</td> <td>November</td> <td>> 125 µm</td> <td>CHN</td> <td>Unpublished</td> <td>1 to 2 cm</td> <td>Bowser-corer</td>		35	Mediterranean	Greece	Kavala bay	Delliou	same	according to the	Subtidal	2012	November	> 125 µm	CHN	Unpublished	1 to 2 cm	Bowser-corer
Intersection Turkey Sea Call of Lemin (2006) Same (2007) Same (2007) Same (2007) Same (2007) November (2007) Same (2007) November (2007) Same (2007) Same (2007) Same (2007) November (2007) Same (2007) November (2007)<			Sea			(2013)-MSc		sampled					Elemental			
So So Initial case Regr		36	Mediterranean	Turkey	Culf of Izmir	Berrin et al	eame	According to station	Subtidal	2002	November	~ 750 um	analyser Hach method	Vec relative	0-1 cm	Van Veen
37 Mediterranean Sea Israel Timush pend et al. (2011) Rab- zaritsky et al. (2011) same et al. (2011) gend pend et al. (2011) gend pend et al. (2011) 202 and pend pend pend pend pend pend pend pe			Sea			(2006)		number				p		abundances		grab
Sea e al. (2011) ampline (mercentrol) water-winter, inter, actions 203 and February benefinal counts fidumeter: (analyser) 38 Mediterranen (staret Bratel Berzet, (analyser) main-Katav same Three regitates. Inter(1a) 2012-2013 3 seasons: (analyser) > 63 µm Elemental counts - 1 cm (dumeter: (analyser) 58 Mediterranen (analyser) Namuar, Pole, Lehchh same Three regitates. Inter(1a) 2012-2013 3 seasons: (analyser) > 63 µm Elemental (analyser) - 1 cm (dumeter: (analyser) 59 Mediterranen (analyser) Namuar, Pole, Lehchh same Three regitates. Inter(1a) 2012-2013 3 seasons: (analyser) - 53 µm Elemental (analyser) - 1 cm (dumeter: (analyser) 61 Mediterranen (Gumeter: Nome - 1 cm Same Same - 1 cm Same - 1 cm -		37	Mediterranean	Israel	Timsah pond	Flako-Zaritsky	same	According to date of	ground	2002 and	November	> 63 µm	CHN	Yes, raw	0-4 cm	Corer
 Martin and State State			Sea			et al. (2011)		sampling	water-surface	2003	and February		Elemental	counts		(diameter:
1 Parking the series of the									water		-		analyser			35 μm)
Participant Retret, Name Main-Kau (a) name Main-Kau (a) Same Maine (a) Main-Kau (a) Main-Kau (a) Main-Kau (a) Main-Kau (a) Maine (a) Maine (a) </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>interaction</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									interaction							
38 Medilerranen Iszel Rizel Medilerranen Intree replicates Intree replicates Intree replicates Intree replicates Solamon									pond							
Sea Name, Poles, Labis, ettaaries Sample names are ettaaries Sample names are e		38	Mediterranean	Israel	Betzet,	Avnaim-Katav	same	Three replicates.	Intertidal	2012-2013	3 seasons:	> 63 µm	CHN	Yes, raw	0-1 cm	Corer
Piece, Leichik Hammer, Aussie Hamm			Sea		Naaman,	et al. (2016)		Sample names at			summer: May		Elemental	counts		(diameter:
$ \begin than the strain of t$					Poleg, Lachish			each estuary include			30, June 6,		analyser			54 µm)
1 + 4 there exists a set is a set is a set is set is is a set is					estuaries			a capital letter			June 27, July					
$\begin to the the the the the the the the the the$								representing			il; autumn:					
19 Mediteranean Sea Egyet Initial Barket al, 2018) Bishawany and annexistic Portuging to station Subtidal Su								sampling season			October					
								(S -summer; A -			25;winter:					
10 Mediterranen Sea Tunisia Bierte lagon E kank et al. 2018) Same Assee Satistica sumber 101 Satistica sumber 63 µm LECO - C5200 [®] Yes, relative abundances 9-1 cm Gats 10 Mediterranen Tunisia Bigeta beta of abundances Satistica sumber 2014 June >63 µm LECO - C5200 [®] Yes, relative abundances 0-1 cm Gats 10 Sea Tunisia Bigeta beta of abundances Satistica subtidat 2014 June >63 µm LECO - C5200 [®] Yes, relative abundances 0-1 cm Gats 11 Mediterranen Sea Tunisia Bierte lagon El katob et al. (2018) same According to station member Satistica 2014 June >63 µm LECO - 5200 [®] Yes, relative abundances 0-1 cm Gats 12 Mediterranen Sea Tunisia Monastir by mark et al. same According to station member Satistica 2015 Agaust >125 µm Meller - 100 0-1 cm Scaping 14 Mediterranen Sea Tunisia Bizerte Joo Same Satistica 2015								autumn;W- winter;			January 1/ (chosthy after-					
4 angle angle E-V gradiet away 5-V event, March event, March F-V gradiet away income event, March event, March 1 Mediteranean Tanisa Barbay Barbay angle 2 Mediteranean Tanisa March Barbay Barbay angle 3 Mediteranean Tanisa Barbay Barbay Saa According to station Sabital 2015 May and >63 µm LECO-CS200° Yes, estative 0-1 cm Grab 3 Mediteranean Tanisa Marbay Barbay Barbay Saa According to station Sabital 2015 May and >63 µm LECO-CS200° Yes, estative 0-1 cm Grab 40 Mediteranean Tunisia Marbay Barbay Barbay According to station Sabital 2015 May >63 µm LECO-CS200° Yes, estative 0-1 cm Grab 50 Mediteranean Tunisia Marbay Barbay According to station Sabital 2015 Asgust >53 µm Mandances -1 cm Grab 50 Mediteranean Tunisia Marbay Marbay Asmande								vv) and numerals			(snoruy arter					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $								E-W gradient www			a inajor winter storm					
100 Mar Allerianesan Egypt Abs-Qir kay Eskanawary et al. (2011) Same According to station Subtidal 2005 May and >63 µm LECO-CS200° Yes, relative 0-1 cm Gab 20 Mediterranesan Egypt Abs-Qir kay Eskanawary et al. (2011) same According to station Subtidal 2015 May and >63 µm LECO-CS200° Yes, relative 0-1 cm Gab 30 Mediterranesan Tunisia Opena lagon E Kateb et al. Same Same According to station Subtidal 2014 July >63 µm LECO-CS200° Yes, relative 0-1 cm Gab 40 Mediterranesan Tunisia Opena lagon E Kateb et al. Same Same According to station Subtidal 2015 July >63 µm LECO-CS200° Yes, relative 0-1 cm Gab 41 Mediterranesan Tunisia Monstir bay Damak et al. Same Same According to station Subtidal 2015 August >53 µm Multimarian No 0-1 cm Scaping 42 Mediterranesan Tunisia Bizerte lagon Medit Marini Same According to station Subtidal 2015 March >63 µm <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>from the stream</td><td></td><td></td><td>event) March</td><td></td><td></td><td></td><td></td><td></td></td<>								from the stream			event) March					
39 Mediterranean Sea Egypt Abu-Qir bay Eikhanwany et al. (2011) same According to station Sabidal 2014 May and November > 63 µm LECO-CS20° Yes, relative abundances 0-1 cm Crab 40 Mediterranean Sea Tunisia Djeba lagon (2018) H Katho et al. (2018) same According to station Sabidal 2014 July > 63 µm LECO-CS20° Yes, relative abundances 0-1 cm Crab 41 Mediterranean Sea Tunisia Monsatir bay (2018) same According to station number Sabidal 2015 Angust > 125 µm MIN Yes, relative abundances 0-1 cm Crab 42 Mediterranean Sea Tunisia Bizerte lagon et al. (2015) same Satidios number Sabidal 2015 Angust > 125 µm Multer and Mediterranean No 0-1 cm Scapping 42 Mediterranean Sea Tunisia Bizerte lagon et al. (2015) same Satidios number Sabidal 2013 Angust > 53 µm Multer and Mediterranean No 0-1 cm Scapping 42 Keinternean Sea Tunisia Bizerte lagon et al. (2015) Satidios number Sabidal 2013 March > 63 µm Perl								mouth: 1 heing the			19					
 Medilerranean Lunisia Super Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Monastir bay Damak et al. (2015) Medilerranean Tunisia Monastir bay Damak et al. (2016) Medilerranean Tunisia Monastir bay Damak et al. (2016) Medilerranean Tunisia Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2016) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al. (2015) Medilerranean Tunisia Bizere Lagon Monastir bay Damak et al.								closet to the river								
39 Mediterranes Fays Abu-Gree Eddamanase roots inlaind out: monter instantion monter inlaind out: abu-Gree May and > 63 µm LEOD-CS20 ⁶ May and out: abu-Gree								mouth and 3 the								
39 Mediterranean Sea Egypt Abu-Qit kyy et al. (2011) Edihanawan et al. (2011) sene et al. (2011) According to station sampling 2005 May and November > 63 µm LGO-CS00 ⁶ Monember Ver, relative abundances 0-1 cm Gala 40 Mediterranean Sea Tunisia Dieba kyon Dieba kyon Bi Kateb et al. Dieba kyon Same According to station Subtidal 2015 Juby > 63 µm CIN Yes, relative abundances 0-1 cm Gala 40 Mediterranean Sea Tunisia Monastir by O2019 Danak et al. (2019) same According to station number Subtidal 2015 August 2015 > 63 µm CIN Yes, relative 2010 0-1 cm Scaping 42 Mediterranean Sea Tunisia Bizerte kyon et al. (2015) New Martins 2015 Subtidal 2015 March > 63 µm Mola Cint No 0-1 cm Scaping 43 Mediterranean Sea Tunisia Bizerte kyon et al. (2015) Nome Subtidal 2015 March > 63 µm No Nome No 0-1 cm Scaping 40 No Nore Narrins Sea <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>most inland one.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>								most inland one.								
		39	Mediterranean	Egypt	Abu-Qir bay	Elshanawany	same	According to station	Subtidal	2005	May and	> 63 µm	LECO-CS200®	Yes, relative	0-1 cm	Grab
40 Mediterranean Tunisia Dijerla lagon El Kateb et al. same According to station Subtidal 2014 July > 63 µm CHN Vex, relative 0-1 cm Gala 40 Mediterranean Tunisia Dijerla lagon El Kateb et al. same According to station Subtidal 2014 July > 63 µm CHN Vex, relative 0-1 cm Gala 41 Mediterranean Tunisia Monastir bay Damak et al. same According to station Subtidal 2015 August > 125 µm Walker and No 0-1 cm Scaping 50a			Sea			et al. (2011)		number and date of			November		analyser	abundances		
40 Mediterranen Tunisia Tunisia Direha lagon E Kateb et al. same According to station Subital 2014 July > 63 µm OII Ver, relative 0-1 cm Grab Sa 2018 number same According to station Subital 2015 Acgust > 212 µm Multer and No 0-1 cm Scraping 42 Mediterranen Tunisia Bizerte lagon Arew Martins same Stations number Subital 2013 March > 63 µm OII No 0-1 cm Scraping 42 Mediterranen Tunisia Bizerte lagon Arew Martins same Stations number Subital 2013 March > 63 µm Perkin Himer No 0-1 cm Scraping 42 Mediterranen Tunisia Bizerte lagon Arew Martins same Stations number Subital 2013 March > 63 µm Perkin Himer 0-2 cm Bis-corer 5a et al. (2015) et al. (2015) Enternal MA MA MA USA JF 2400 cTN 2400 cTN 2400 c								sampling								
Sea C208) number Elemental analyzer 41 Mediterranean Sea Tunisia Monastir bay (2019) Samet (2019) According to station Subtidal 2015 August > 215 µm Walter and Black method No 0-1 cm Scraping 42 Mediterranean Tunisia Bizerte lagon (2019) Samet Subtidal 2013 March > 63 µm Perkin filmer Ye 0-2 cm Box-corer (Waltam, 5a et al. (2015) et al. (2015) et al. (2015) Her Lagon (2010) March > 63 µm MA(Liss) F Her Lagon (2010)		40	Mediterranean	Tunisia	Djerba lagoon	El Kateb et al.	same	According to station	Subtidal	2014	July	> 63 µm	CHN	Yes, relative	0-1 cm	Grab
41 Mediterranean Tunisia Monastir bay Damak et al. same According to station Subtidal 2015 August > > 25 µm Walker and No 0-1 cm Scraping 5ca (2019) number BLck.method BLck.method 42 Mediterranean Tunisia Bizerle Jagon Aves Martins same Sabtidal 2013 March > 63 µm Perkin Elmer Sacorer 5ca et al. (2015) et al. (2015) et al. (2015) (Widtham, 2400 CIN 5ca et al. (2015) HAL USA) F 2400 CIN 2400 CIN 2400 CIN			Sea			(2018)		number					Elemental	abundances		
*1 mrouneruneen i uunsus voj duffak et al. same According to station Sutotical 2010 August > 1/2 juin valiter and No 0-1 Ch Scripting Sea (2019) number Black method 42 Mediterranean Tunisia Bizerte lagoon Avest Martins same Stations number Subtidal 2013 March > 63 juin Prevint Effort Yes 0-2 cm Box-cover Sea et al. (2015) March 2013 March > 63 juin Prevint Effort Yes 0-2 cm Box-cover MA, USA) YE 2400 CIN System		41	Maditarranear	Tunicia	Monastie h	Damak at al	c	According to stat'	Subtidal	2015	August	. 175 um	analyser Mallor and	No	0.1.cm	Economica
42 Meditetranean Tunisia Bizerte lagon Aves Martins same Stations number Subtidal 2013 March > 63 µm Perkin Himer Yes 0-2 cm Box-corer Sea et al. (2015) (Waltham, 2400 CIN 2400 CIN 9 system			Sea	ruffisia	wonastir bay	(2019)	saine	number	subtidat	2013	nugust	> 125 µm	watter and Black mothor	140	o-1 cm	acidping
Sea et al. (2015) General Annual		47	Mediterranean	Tunisia	Rizerte Jagoon	Alves Martins	same	Stations number	Subtidal	2013	March	> 63 um	Perkin Elmer	Ves	0-2 cm	Box-corer
AA, USA) PE 2400 CIN System		-	Sea			et al. (2015)						,	(Waltham.			
2400 CHN system													MA, USA) PE			
system													2400 CHN			
	_												system			



Fig. 1. Map showing the geographical distribution of the 42 studies according to the water body type (see definition of each body type in Table 1 in [1] according to [9] and [10]) used to assign the species from the English Channel/European Atlantic coast and the Mediterranean Sea intertidal and TWs. Numbers are the same as in Table 1.



Fig. 2. Caterpillar plot showing the optimum (green dots) and tolerance range (bars) to TOC of benthic foraminiferal species in the English Channel/European Atlantic intertidal areas and transitional waters.



Fig. 3. Caterpillar plot showing the optimum (green dots) and tolerance range (bars) to TOC of benthic foraminiferal species in the Mediterranean Sea intertidal areas and transitional waters.

2. Experimental Design, Materials and Methods

Data acquisition: Data of benthic foraminifera relative abundances and related TOC contents (%) in the sediment are mainly from published literature, obtained from data tables in the publication or provided by the authors if not published (database available in Mendeley: http://dx.doi.org/10.17632/stjfr9xvxg.1). To select the relevant studies, the following criteria scheme was followed: only studies on living foraminifera (not dead neither total assemblages), only samples with >50 living specimens and contemporaneous TOC and foraminifera sampling. In total, it was possible to include in the data 587 samples from the English Channel/European Atlantic Coast and 301 from the Mediterranean Sea.

Data computation: When raw counts or abundances were provided, we standardised it to relative abundances. The optimos.prime R package [4] was used to calculate the weighted averaging optimum and tolerance level [2,3] of each species to TOC (Figs. 2 and 3).

In order to illustrate the typical response of species from each ecological group along the TOC gradient, a locally weighted scatterplot smooth line (LOESS) was fitted through each scatter plot (see Fig. 5–6 in [1]). Marginal plots were added to each scatter plot to show the frequency of distribution of occurrences along the TOC gradient. The median of the distribution of the occurrences was also computed. The R code (supplementary materials) includes the following packages: ggpubr, ggExtra, cowplot, mgcv.

CRediT Author Statement

Vincent M.P. Bouchet: Conceptualization, Supervision, Investigation, Data curation, Formal analysis, Visualization, Writing – original draft; Fabrizio Frontalini: Investigation, Writing – Review & Editing; Fabio Francescangeli: Visualization - Writing – Review & Editing; Pierre-Guy Sauriau: Formal analysis, Writing – Review & Editing; Emmanuelle Geslin: Supervision, Writing – Review & Editing; Virginia Martins: Investigation, Writing – Review & Editing; Ahuva Almogi-Labin: Writing – Review & Editing; Simona Avnaim-Katav: Investigation, Writing – Review & Editing; Letizia Di Bella: Writing – Review & Editing; Alejandro Cearreta: Investigation, Writing – Review & Editing; Rodolfo Coccioni: Writing – Review & Editing; Ashleigh Costelloe: Writing – Review & Editing; Margarita D. Dimiza: Writing – Review & Editing; Luciana Ferraro: Investigation, Writing – Review & Editing; Kristin Haynaert: Writing – Review & Editing; Michael Martínez-Colón: Writing – Review & Editing; Romana Melis: Investigation, Writing – Review & Editing; Magali Schweizer: Writing – Review & Editing; Maria V. Triantaphyllou: Investigation, Writing – Review & Editing; Akira Tsujimoto: Writing – Review & Editing; Brent Wilson: Writing – Review & Editing; Eric Armynot du Châtelet: Supervision, Investigation, Writing – Review & Editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

Acknowledgments

Maria-Belen Sathicq helped V.M.P.B. in handling the optimos.prime R package. The authors are grateful to the Swiss National Science Foundation, the Agence de l'Eau Artois-Picardie, the Communauté d'Agglomération du Boulonnais, the Université de Lille, the Université du Littoral Côte d'Opale, the Laboratoire d'Océanologie et de Géosciences for their financial support to FOBIMO workshops in Fribourg (Switzerland), Wimereux (France) and Texel (The Netherlands);

and to Silvia Spezzaferri and Henko de Stigter for organizing and hosting the workshops in Fribourg and Texel. Additional funding was provided by Spanish MINECO (RTI2018-095678-B-C21, MCIU/AEI/FEDER, UE). The authors would like to thank the scientific editor and the anonymous reviewer for their comments that contributed to improve the manuscript.

Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.dib.2021.106920.

References

- [1] V.M.P. Bouchet, F. Frontalini, F. Francescangeli, P.-.G. Sauriau, E. Geslin, M.V.A. Martins, A. Almogi-Labin, S. Avnaim-Katav, L. Di Bella, A. Cearreta, R. Coccioni, A. Costelloe, M.D. Dimiza, L. Ferraro, K. Haynert, M. Martínez-Colón, R. Melis, M. Schweizer, M.V. Triantaphyllou, A. Tsujimoto, B. Wilson, E. Armynot du Châtelet, Indicative value of benthic foraminifera for biomonitoring: assignment to ecological groups of sensitivity to total organic carbon of species from European intertidal areas and transitional waters, Mar. Poll. Bull. 164 (2021) 112071, doi:10.1016/j.marpolbul.2021.112071.
- [2] H.J.B. Birks, J.M. Line, S. Juggins, A.C. Stevenson, C.J.F. Ter Braak, Diatoms and pH reconstruction, Phil. Trans. R. Soc. Lond. B 327 (1990) 263–278, doi:10.1098/rstb.1990.0062.
- [3] C.J.F.Ter Braak, Unimodal models to relate species to environment (Doctoral thesis), University of Wageningen, 1987.
- [4] M.B. Sathicq, M.M. Nicolosi Gelis, J. Cochero, Calculating autoecological data (optima and tolerance range) for multiple species with the 'optimos.prime' R package, Austral Ecol 45 (2020) 845–850, doi:10.1111/aec.12868.
- [5] A. Borja, J. Franco, V. Pérez, A marine biotic index to establish the ecological quality of soft-bottom benthos within European estuarine and coastal environments, Mar. Pollut. Bull. 40 (2000) 1100–1114, doi:10.1016/S0025-326X(00) 00061-8.
- [6] R. Core Team, R: A Language and Environment for Statistical Computing, 2020 https://www.R-project.org/.
- [7] A.-.L. Barillé-Boyer, L. Barillé, H. Massé, D. Razet, M. Héral, Correction for particulate organic matter as estimated by loss on ignition in estuarine ecosystems, Estuar. Coast. Shelf Sci. 58 (2003) 147–153, doi:10.1016/S0272-7714(03) 00069-6.
- [8] G. Frangipane, M. Pistolato, E. Molinarolli, S. Guerzoni, D. Tagliapietra, Comparison of loss on ignition and thermal analysis stepwise method for determination of sedimentary organic matter, Aquatic Conserv: Mar. Fresh. Ecosyst. 19 (2009) 24–33.
- [9] D.S. McLusky, M. Elliott, Transitional waters: a new approach, semantics or just muddying the waters? Estuar. Coast. Shelf Sci. 71 (2007) 359–363, doi:10.1016/j.ecss.2006.08.025.
- [10] European Communities, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, Off. J. Eur. Commun. 43 (L327) (2000) 75.