The following supplement accompanies the article

Benthic foraminiferal community changes and their relationship to environmental dynamics in intertidal muddy sediments (Bay of Cádiz, SW Spain)

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SUPPLEMENT. Taxonomic appendix, electron micrographs and additional correlation analysis information

Table S1. Identified species of benthic foraminifera in alphabetical order. For named species, we give the author and a reference to a representative illustration

Species	Synonym(s) / Comments	Reference(s)	Illustration(s)
Agglutinella agglutinans (d´Orbigny)	*Quinqueloculina agglutinans* d´Orbigny, 1839	Debenay & Luan (2006)	Pl. 1, Fig. 45
Ammonia tepida (Cushman)	*Rotalia beccarii* (Linnaeus) var. *tepida* Cushman, 1926	This work	Fig. S1a,b
Ammoscalaria ruiniana (Heron-Allen and Earland)	*Haplophragmium runianum* Heron-Allen and Earland, 1916	Cimerman & Langer (1991)	Pl. 5, Fig. 7
Arenoparrella mexicana (Kornfeld)	*Trochammina inflata* (Montagu) *var. mexicana* Kornfeld, 1931	Robinson & McBride (2006)	Pl. 1, Fig. 1
Aubignyna hamblensis Murray, Whittaker and Alve, 2000		Alve & Murray (2001)	Pl. 2, Figs. 14 & 15
Brizalina cf. *seminuda* (Cushman)	*Bolivina seminuda* Cushman, 1911	Cushman (1937)	Pl. 18, Figs. 13 to 15 as *B. seminuda*
Brizalina dilatata (Reuss)	*Bolivina dilatata* Reuss, 1850	Diz & Francés (2008)	Pl. 2, Figs. 11 & 12
Brizalina spathulata (Williamson)	*Textularia variabilis* var. *spathulata* Williamson, 1858	Diz & Francés (2008)	Pl. 2, Figs. 8 to 10
Brizalina striatula (Cushman)	*Bolivina striatula* Cushman, 1922	Cushman (1937)	Pl. 18, Figs. 30 & 31
Brizalina variabilis (Williamson)	*Textularia variabilis* Williamson, 1858	Cushman (1937)	Pl. 16, Figs. 12 to 14
Bucella granulata (di Napoli)	*Eponides frigidus* Cushman var. *granulata* di Napoli, 1952	Rasmussen et al. (2006)	Pl. 18, Figs. 1 & 2
Bulimina gibba Fornasini, 1901		Jones (1994)	Pl. 50, Figs. 1 & 2
Buliminella elegantissima (d´Orbigny)	*Bulimina elegantissima* d´Orbigny, 1839	Diz & Francés (2008)	Pl. 1, Fig. 15
Cornuspira involvens	*Operculina involvens* Reuss, 1950	Rasmussen et al.	Pl. 3, Fig. 4

(Reuss)		(2006)	
		This work	Fig. S7
Cribroelphidium articulatum (d´Orbigny)	*Polystomella articulata* d´Orbigny, 1839	Levy et al. (1995)	Pl. 12, Fig. 3
Cribroelphidium excavatum (Terquem)	*Polystomella excavata* Terquem, 1875. Within this species two morphotypes have been distinguished: *Cribroelphidium excavatum* (Terquem) forma *lidoensis* Cushman, 1936 (see Feyling-Hansen 1972, Pl. 6, Figs. 3 & 7 as *Elphidium excavatum* forma *lidoensis*) and *Cribroelphidium excavatum* (Terquem) forma *selseyensis* Heron-Allen and Earland, 1911.	Feyling-Hansen (1972)	Pl. 4, Figs. 3 to 6; Pl. 5, Fig. 2; as *Elphidium excavatum* forma *selseyensis*
		This work	Fig. S4
Cribroelphidium oceanensis (d'Orbigny)	*Polystomella oceanensis* d'Orbigny, 1826	Alve & Murray (2001)	Pl. 1, Fig. 8
Cribroelphidium translucens (Natland)	*Elphidium translucens* Natland, 1938	Cimerman & Langer (1991)	Pl. 92, Figs. 7 to 11
Cribroelphidium williamsoni (Haynes)	*Elphidium williamsoni* Haynes, 1973	Horton & Edwards (2006)	Pl. IV, Fig. 20 as *E. williamsoni*
Eggerelloides scaber (Williamson)	*Bulimina scabra* Williamson, 1858	Diz & Francés (2008)	Pl. 1, Figs. 1 to 3
Elphidium macellum (Fichtel and Moll)	*Nautilus macellus* Fichtel and Moll, 1798	Rasmussen et al. (2006)	Pl. 19, Figs. 9 & 10
Elphidium pulvereum Todd, 1958		Sgarella & Moncharmont (1993)	Pl. 21, Fig. 6
Epistominella vitrea Parker, 1953		Diz & Francés (2008)	Pl. 2, Fig. 4
Fissurina lucida (Williamson)	*Entosolenia marginata* (Montagu) var. *lucida* Williamson, 1848	Alve & Murray (2001)	Pl. 1, Figs. 6 & 7
		This work	Fig. S2
Haynesina germanica	*Nonium germanicum* Ehrenberg, 1840	Diz & Francés	Pl. 2, Fig. 5

(Ehrenberg)		(2008)	
		This work	Fig. S3
Jadammina macrescens (Brady)	*Trochammina inflata* (Montagu) var. *macrescens* Brady 1970	Horton & Edwards (2006)	Pl. I, Fig. 4
Massilina secans (d´Orbigny)	*Quinqueloculina secans* d´Orbigny, 1926	Cimerman & Langer (1991)	Pl. 30, Fig. 9
Miliammina fusca (Brady)	*Quinqueloculina fusca* Brady, 1870	Cimerman & Langer (1991)	Pl. 3, Fig. 11
Miliolinella subrotunda (Montagu)	*Vermiculum subrotundum* Montagu, 1803	Leorri & Cearreta (2004)	Pl. 1, Fig. 14
Pseudotriloculina sp.	Our specimens resemble *Pseudotriloculina laevigata* (d'Orbigny) = *Triloculina laevigata* d'Orbigny, 1826, however, we are not certain of the species asignation and prefer to maintain the genus asignation.	This work	Figs. S5 & S6
		Cimerman & Langer (1991)	Pl. 39, Figs. 8 to 10 as *P. laevigata*
		Debenay et al. (2005)	Pl. 2, Figs.1 & 6 as *P. laevigata*
Quinqueloculina carinatastriata (Wiesner)	*Adelosina milletti* var. *carinatastriata* Wiesner, 1923	Bouchet et al. (2007)	Pl. 1
		This work	Fig. S8
Quinqueloculina jugosa Cushman, 1944		Cimerman & Langer (1991)	Pl. 33, Figs. 12 & 13
Quinqueloculina lata Terquem, 1876		Sgarella & Moncharmont (1993)	Pl. 5, Fig. 15
Quinqueloculina seminula (Linnaeus)	*Serpula seminulum* Linnaeus, 1758	Cimerman & Langer (1991)	Pl. 34, Figs. 9 & 10
Quinqueloculina spp. 1	Includes juvenile forms of *Quinqueloculina* which probably belong to *Q. seminula*.		

Quinqueloculina spp. 2	Includes forms of *Quinqueloculina* with clear stained protoplasm and chambers partially dissolved		
Reophax moniliformis (sic) Siddall	*Reophax moniliforme* Siddall, 1886	Murray & Alve (1999)	Pl. 1, Figs. 6 to 8
Reophax nanus (sic) Rhumbler	*Reophax nana* Rhumbler, 1911	Sgarella & Moncharmont (1993)	Pl. 2, Fig. 1
Rosalina globularis d´Orbigny, 1826		Hansen & Revets (1992)	Pl. 6, Figs. 7 & 8
Spiroplectammina earlandi (Parker)	*Textularia earlandi* 1952	Wollenburg & Mackensen (1998)	Pl. II, Figs. 17 & 18
Spirosigmoilina distorta (Phleger and Parker)	*Sigmoilina distorta* Phleger and Parker, 1951	Sgarella & Moncharmont (1993)	Pl. 9, Fig. 5, as *S. distorta*
Stainforthia fusiformis (Williamson)	*Bulimina pupoides* d'Orbigny var. *fusiformis* Williamson, 1858	Diz & Frances (2008)	Pl. II, Figs. 11 & 12
Tiphotrocha comprimata (Cushman and Brönnimann)	*Trochammina comprimata* Cushman and Brönnimann, 1948	Horton & Edwards (2006)	Pl. 2, Fig. 7
Trochammina inflata (Montagu)	*Nautilus inflatus* Montagu, 1808	Horton & Edwards (2006)	Pl. 2, Fig. 8

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Figs. S1 to S8. Scanning electron micrographs of typical foraminifera found in the Bay of Cádiz. Fig. S1. *Ammonia tepida* (Cushman) (a) umbilical view and (b) spiral view, scale bar = 100 µm. Fig. S2. *Fissurina lucida* (Williamson), scale bar = 100 µm. Fig. S3. *Haynesina germanica* (Ehrenberg), scale bar = 100 µm. Fig. S4. *Cribroelphidium excavatum* (Terquem), scale bar = 100 µm. Fig. S5. *Pseudotriloculina* sp. scale bar = 50 µm, Fig. S6. *Pseudotriloculina* sp., scale bar = 100 µm. Fig. S7. *Cornuspira involvens*, (Reuss), scale bar = 100 µm. Fig. S8. *Quinqueloculina canariatastriata* (Wiesner), scale bar = 100 µm

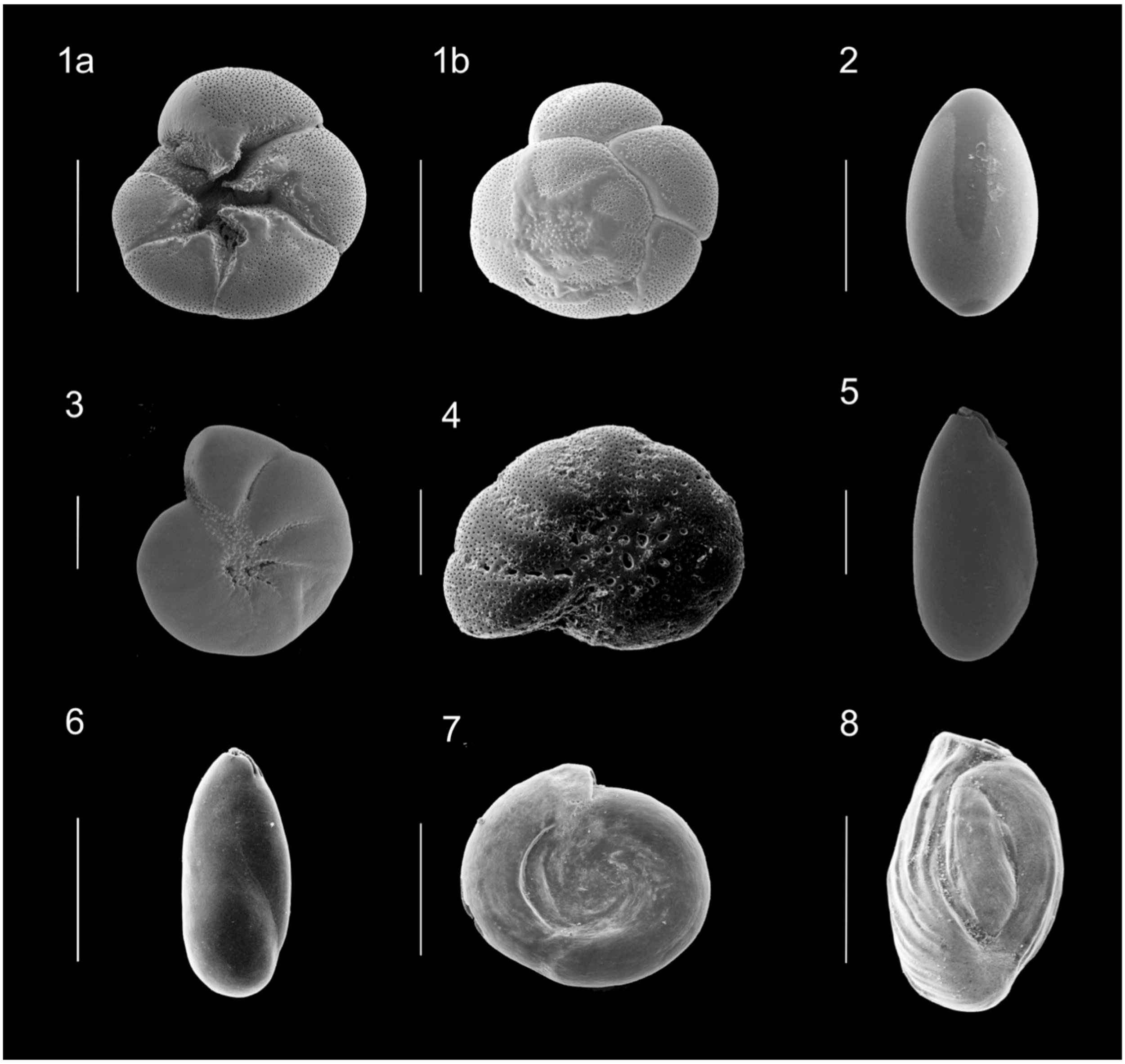

Table S2. Pearson correlation coefficients, r, among the environmental variables (n = 10). Porewater nutrients, water column nutrients, pigments and oxygen variables were ln(x + 1)-transformed. All correlations >|0.5| are shown. Only the surface layer (0–2 mm) was used for sediment variables. *p < 0.050; **p < 0.010; ***p < 0.001. pw: porewater; wc: water column

	Org.Carbon	Tot. Nitr	N:N	Temper.	Salinity	Precip.	pwNH_4^+	pwNO_x^-	pwPO_4^{3-}	pw$Si(OH)_4$
Org. Carbon										
Total Nitrogen	0.951***									
C:N	–0.565	–0.781**								
Temperature										
Salinity				0.773**						
Precipitation										
pwNH_4^+	0.609	0.721*	–0.616	–0.606	–0.512					
pwNO_x^-	0.526	0.642*	–0.590		–0.592	0.639*	0.883***			
pwPO_4^{3-}					–0.560	0.913***		0.572		
pw$Si(OH)_4$					–0.589	0.684*		0.501	0.866***	
OxygenL			–0.540		–0.600			0.638		
OxygenD										
z_{ox}L				–0.657*	–0.723*					
z_{ox}D										
Chlorophyll *a*	0.611	0.677*	–0.607	–0.799**	–0.579		0.701*			
Chlorophyll *c*	0.544	0.628	–0.673*		–0.597					
wcNH_4^+										
wcNO_x^-				–0.729*	–0.545				0.607	0.720*
wcPO_4^{3-}						0.526			0.605	
wc$Si(OH)_4$									0.631	0.638*

	OxygenL	OxygenD	z_{ox}L	z_{ox}D	Chl *a*	Chl *c*	$wcNH_4^+$	$wcNO_x^-$	$wcPO_4^{3-}$	$wcSi(OH)_4$
Org. Carbon										
Total Nitrogen										
C:N										
Temperature										
Salinity										
Precip.										
$pwNH_4^+$										
$pwNO_x^-$										
$pwPO_4^{3-}$										
$pwSi(OH)_4$										
OxygenL										
OxygenD										
z_{ox}L	0.690*									
z_{ox}D			0.750*							
Chlorophyll *a*	0.540									
Chlorophyll *c*	0.839**		0.653*		0.608					
$wcNH_4^+$				–0.569						
$wcNO_x^-$										
$wcPO_4^{3-}$				–0.569						
$wcSi(OH)_4$	0.558	–0.532							0.624*	

Table S3. PERMANOVA table for number of species (*S*), abundance (N), diversity (*H'*) (based on Euclidean distance resemblance matrix) and total community (based on Bray-Curtis distance resemblance matrix) at different depths (factor Depth, De) over time (factor Month, Mo). Significantly different pairs from post hoc analysis are shown at a p < 0.05 level. Two depths, 2–4 and 4–10 cm are missing for July 2008. Month abbreviations correspond to month of sampling from July 2008 to June 2009. Depth layers: (1) 0–2 mm, (3) 2–4 mm, (7) 4–10 mm, (20) 10–30 mm

	Source	df	MSres	Pseudo-*F*	p	Perms	Post hoc tests
N	Mo	9	6106.7	2.851	0.0281	9943	**1:** Jul^{a}, Sep^{b}, Oct^{bc}, Nov^{cd}, Dec^{abcd}, Jan^{ad}, Feb^{abcd}, Mar^{bcd}, May^{abcd}, Jun^{d}
	De	3	1.35E+05	82.098	0.0001	9965	**Jul**: 1^{a}, 3^{ab}, 7^{ab}, 20^{b}
							Sep: 1^{a}, 3^{b}, 7^{c}, 20^{c}
							Oct: 1^{a}, 3^{b}, 7^{b}, 20^{b}
							Nov: 1^{a}, 3^{ab}, 7^{b}, 20^{b}
							May: 1^{ab}, 3^{a}, 7^{ab}, 20^{b}
							Jun: 1^{a}, 3^{bc}, 7^{b}, 20^{c}
	Core(Mo)	20	2144.9	1.3018	0.2131	9918	
	Mo × De	25	4700.9	2.8532	0.0007	9921	
	Res	56	1647.6				
S	Mo	9	39.333	2.4472	0.0524	9940	
	De	3	237.44	55.135	0.0001	9951	1^{a}, 3^{bc}, 7^{b}, 20^{c}
	Core(Mo)	20	16.142	3.7482	0.0001	9923	
	Mo × De	25	5.7004	1.3237	0.1842	9912	
	Res	56	4.3065				
H'	Mo	9	0.7536	3.7123	0.0087	9946	Jul^{acd}, Sep^{ab}, Oct^{c}, Nov^{abcde}, Dec^{abc}, Jan^{de}, Feb^{abcde}, Mar^{e}, May^{e}, Jun^{be}
	De	3	0.50933	6.1601	0.0011	9941	1^{a}, 3^{a}, 7^{b}, 20^{b}
	Core(Mo)	20	0.20371	2.4637	0.0038	9923	
	Mo × De	25	0.106	1.2819	0.2093	9919	
	Res	56	8.27E-02				
Community	Mo	9	4532.7	2.3801	0.0001	9859	**1:** Jul^{ae}, Sep^{ab}, Oct^{c}, Nov^{bcd}, Dec^{d}, Jan^{def}, Feb^{adfgh}, Mar^{fg}, May^{gh}, Jun^{h}
							3: Jul^{ab}, Sep^{a}, Oct^{a}, Nov^{ab}, Dec^{ab}, Jan^{ab}, Feb^{ab}, Mar^{ab}, May^{b}, Jun^{ab}
	De	3	29449	23.362	0.0001	9916	**Jul**: 1^{a}, 3^{ab}, 7^{ab}, 20^{b}
							Sep: 1^{a}, 3^{b}, 7^{ab}, 20^{b}
							Oct: 1^{a}, 3^{ab}, 7^{ab}, 20^{b}
							Mar: 1^{a}, 3^{ab}, 7^{b}, 20^{ab}
							Jun: 1^{a}, 3^{ab}, 7^{b}, 20^{b}
	Re(Mo)	20	1908.2	1.5138	0.0001	9726	
	Mo × De	25	1797.8	1.4262	0.0003	9737	
	Res	56	1260.6				