Supplementary Data: Tables

Table S1: Chlorophyll *a* concentration measured between the 16/08/10 and the 15/12/11 in µg/L.

Date	c Chlorophyll *a* [µg/L]	Date	c Chlorophyll *a* [µg/L]
16/08/10	7.1	06/06/11	5.1
30/08/10	6.7	09/06/11	4.4
15/09/10	7.7	17/06/11	2.9
28/09/10	4.6	23/06/11	4.5
22/10/10	4.0	30/06/11	6.3
01/11/10	4.1	04/07/11	6.7
15/11/10	1.9	15/07/11	5.7
26/11/10	3.6	21/07/11	3.3
17/12/10	4.5	27/07/11	5.7
24/01/11	3.7	01/08/11	3.2
10/02/11	1.2	08/08/11	5.6
23/02/11	0.5	22/08/11	6.6
08/03/11	5.2	29/08/11	4.4
23/03/11	12.9	12/09/11	4.6
05/04/11	22.2	21/09/11	1.8
11/04/11	8.6	29/09/11	3.4
19/04/11	10.7	14/10/11	1.8
26/04/11	14.0	20/10/11	3.0
03/05/11	5.0	31/10/11	2.7
11/05/11	5.5	15/11/11	2.6
18/05/11	2.0	28/11/11	2.0
24/05/11	10.8	15/12/11	1.6
01/06/11	1.8		

Table S2: Phytoplankton diversity and abundance. Abundance measured in cells/L.

Dates	cells/L [x10^6]															
	cyanobacteria					Cryptophyta		Chlorophyta		Diatoms					Haptophyta	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Total
08/09/10	6	3														9
15/09/10			3													3
23/09/10						2										2
28/09/10		1						1								2
08/10/10								1								1
14/10/10			42													42
22/10/10								1		2						3
01/11/10		1														1
15/11/10								2								2
26/11/10								2	2							4
17/12/10			9						2							11
24/01/11			3	13					2							18
10/02/11								2								2
23/02/11			1													1
08/03/11										2						2
15/03/11										2						2
23/03/11								1			1					2
28/03/11										2	1					3
05/04/11											3					3
11/04/11						0.5										0.5
19/04/11						1				2					7	10
26/04/11												9			21	30
03/05/11												3			26	29
11/05/11													2		13	15
18/05/11														0.5		0.5
24/05/11										2	3					5
06/06/11								1		1						2
09/06/11							0.5	1								1.5
17/06/11															1	1
23/06/11															1	1
30/06/11															3	3
04/07/11		0.5														0.5
15/07/11		1														1
21/07/11											1					1
27/07/11	6															6
01/08/11	9									2						11
08/08/11										1					1	2
15/08/11															1	1
22/08/11															2	2
29/08/11						0.5										0.5
12/09/11					1											1
15/09/11	8															8.2
21/09/11							0.2									2
29/09/11						1				1						2
14/10/11						1		1								2
20/10/11															2	2
31/10/11								1								1
15/11/11		3														3
28/11/11								2								2
15/12/11								2		1						3

Cyanobacteria: A *Chroococcaceae*, B *Chlorococcales*, C *Cyanophyta*, D *Snowella*, E *Microcystis*; Cryptohyta: F *Hemiselmis*, G *Plagioselmis*; Chlorophyta: H *Prasinophyceae*, I Chlorophyta; Diatoms: J *Bacillariales*, K *Thalassiosiraceae*, L *Chaetoceros*, M *Pseudo-nitzschia delicatissima*, N *Cylindrotheca closterium*; Haptophyta: O *Phaeocystis globosa*

Table S3: Order-level bacterial diversity and abundance in North Sea SPM based on the 16S rRNA gene amplicon sequencing. Percentage based on total bacteria reads excluding Chloroplast reads.

bacterial groups	% of total bacteria reads															
	28/09/2010	26/11	10/01/2011	08/03	23/03	05/04	19/04	03/05	18/05	17/06	30/06	15/07	22/08	06/09	21/09	28/10/2011
Acidimicrobiales	1.7	3.4	1.1	1.1	0.8	0.2	0.3	0.5	1.2	3.3	2.4	1.4	4.7	4.6	10.8	6.7
Micrococcales	3.2	1.7	1.1	0.2	0.1	0.6	0.8	1.1	6.1	2.6	2.4	2.0	5.8	1.2	0.3	0.2
Flavobacteriales	16.2	13.2	10.6	16.8	14.7	27.9	29.7	30.8	28.6	25.3	27.8	22.1	21.0	17.3	14.2	13.4
Sphingobacteriales	3.4	2.7	4.6	4.6	4.5	3.9	3.6	3.3	3.2	4.1	3.8	3.1	3.5	2.7	2.7	2.9
Pirellulales	8.1	2.9	2.9	3.1	2.6	0.6	0.1	0.3	0.1	0.3	0.4	1.0	1.8	2.1	3.4	2.7
Rhodobacterales	8.2	12.4	9.7	9.2	8.4	5.6	6.5	5.9	9.1	11.2	9.1	5.8	9.1	10.0	11.6	6.4
Rickettsiales	8.4	12.2	12.0	6.1	8.7	16.8	15.5	7.0	5.5	2.6	3.2	6.0	7.6	5.6	7.5	9.9
Methylophiales	0.9	1.8	2.5	1.9	1.0	1.0	1.2	0.7	1.7	1.0	2.3	2.4	2.0	1.7	1.6	4.0
Rhodocyclales	0.9	2.1	6.5	5.1	3.7	2.1	3.9	2.5	1.3	0.4	0.7	1.4	1.1	0.5	0.1	0.9
Alteromonadales	10.7	9.3	13.2	11.8	12.7	8.8	11.6	17.0	9.7	17.3	13.1	14.1	10.0	12.0	8.9	11.1
Oceanospirillales	3.0	7.9	4.3	5.1	7.3	7.4	12.0	7.8	10.5	7.1	8.1	6.5	6.6	7.2	8.7	8.4
Thiotrichales	3.1	1.6	2.9	1.6	2.4	1.2	0.4	3.8	1.6	1.7	3.2	2.6	3.1	3.4	1.4	2.5
Puniceicoccales	0.6	1.0	0.3	1.9	5.4	8.5	3.4	1.3	0.9	0.4	5.6	2.6	3.5	1.4	0.9	0.7
Verrucomicrobiales	5.1	1.0	1.1	2.9	4.5	2.3	0.7	1.7	2.3	3.2	2.8	3.7	3.3	1.3	0.8	1.0

Actinobacteria: *Acidimicrobiales*, *Micrococcales*; *Bacteroidetes*: *Flavobacteriales*, *Sphingobacteriales*; *Planctomycetes*: *Pirellulales*; *α-Proteobacteria*: *Rhodobacterales*, *Rickettsiales*; *β-Proteobacteria*: *Methylophiales*, *Rhodocyclales*; *γ-Proteobacteria*: *Alteromonadales*, *Oceanospirillales*, *Thiotrichales*; *Verrucomicrobia*: *Puniceicoccales*, *Verrucomicrobiales*

Table S4: Fatty acid abundance in North Sea water samples.

Date	Fatty acid abundance [%]					
	C14:0	C16:1*	C16:0	C18:x	C18:0	C20:5 PUFA
16/08/10	14	23	36	16	6	5
30/08/10	17	26	29	15	6	7
15/09/10	19	27	32	14	5	4
28/09/10	14	24	29	18	9	7
15/11/10	13	17	32	23	13	3
26/11/10	13	20	31	21	13	2
10/12/10	12	13	35	28	11	1
17/12/10	11	30	28	26	4	0
10/01/11	9	27	32	23	8	0
24/01/11	7	23	29	30	7	4
17/02/11	8	27	31	24	9	0
08/03/11	11	35	24	16	3	11
23/03/11	13	33	21	17	5	12
05/04/11	10	34	26	13	4	13
19/04/11	13	35	25	11	2	14
03/05/11	17	23	23	22	2	12
18/05/11	17	28	29	12	6	9
17/06/11	21	21	35	9	10	4
30/06/11	27	20	26	14	5	8
15/07/11	21	25	28	9	7	10
27/07/11	16	25	33	11	10	5
08/08/11	14	25	26	10	7	18
22/08/11	21	15	31	17	8	7
06/09/11	14	20	32	10	18	6
21/09/11	13	16	38	20	10	3
11/10/11	16	22	37	13	11	0
28/10/11	12	21	32	22	9	5
15/11/11	12	25	31	17	8	6
28/11/11	15	26	32	15	7	5
16/12/11	8	27	30	19	9	6

*n*C16:1*: double bond at the ω7 position

Table S5: δD values of fatty acids.

Date	$\delta D_{fatty\ acid}$ [‰]				
	C14:0	C16:1*	C16:0	C18:0	C20:5 PUFA
16/08/10	-219	-201	-201	-185	-191
30/08/10	-222	-202	-189	-186	-199
15/09/10	-216	-206	-197	-186	-180
28/09/10	-219	-198	-192	-197	-207
15/11/10	-213	-203	-182	-200	N.D.
26/11/10	-226	-202	-188	-203	N.D.
10/12/10	-225	-188	-191	-202	N.D.
17/12/10	-232	-193	-194	-188	N.D.
10/01/11	-221	-200	-186	-204	N.D.
24/01/11	-212	-191	-195	-192	-209
17/02/11	-223	-208	-195	-206	N.D.
08/03/11	-226	-214	-205	-182	-235
23/03/11	-241	-216	-205	-190	-241
05/04/11	-223	-210	-209	-212	-223
19/04/11	-235	-224	-221	N.D.	-240
03/05/11	-238	-225	-214	-212	-236
18/05/11	-219	-205	-198	-178	-214
17/06/11	-225	-211	-196	-190	N.D.
30/06/11	-225	-210	-202	-175	-213
15/07/11	-204	-195	-188	-181	-217
27/07/11	-220	-200	-203	-180	-201
08/08/11	-222	-202	-201	-180	-234
22/08/11	-231	-202	-189	-190	-202
06/09/11	-224	-217	-221	-216	-218
21/09/11	-218	-204	-185	-194	N.D.
11/10/11	-213	-191	-183	-188	-226
28/10/11	-217	-187	-181	-184	-207
15/11/11	-212	-198	-191	-184	-221
28/11/11	-217	-193	-190	-180	-197
16/12/11	-198	-179	-174	-188	N.D.

*n*C16:1*: double bond at the ω7 position

Table S6: Fatty acid profiles of the bacterio- and phytoplankton observed via 16S rRNA gene amplicon sequencing and microscopy.

Organism	Fatty acid profile	Literature
Acidimicrobiales	OCS155: uncultured *Microthrixaceae*: fatty acid profile not determined	
Micrococcales	*Microbacteriaceae*: mainly *ai*C15:0, *i*C16:0, *a*C17:0	(Evtushenko and Takeuchi, 2006)
Flavobacteriales	*Flavobacteriaceae*: mainly *i*C15:0, *ai*C15:0, C15:0; only traces of C16:0, C18:0, C14:0 *Cryomorphaceae*: mainly *i*C15:0, *i*C15:1ω10, C15:0; only traces of C16:0, C18:0, C14:0	(Van Trappen et al., 2004b; Khan et al., 2006; Heindl et al., 2008) (Bowman et al., 2003; O'Sullivan et al., 2005)
Sphingobacteriales	*Sphingobacteriaceae*: mainly *i*C15:0, iC17:0 3-OH, *i*C17:1ω9 and potentially C16:1ω7; minor amounts of C16:0 and C14:0 NS11-12: uncultured	(Gallego et al., 2006)
Pirellulales	*Pirellulaceae*: mainly C16:0, C18:1ω9; minor amounts of C14:0, C16:1ω7 and C18:0	(Kerger et al., 1988; Schlesner et al., 2004)
Rhodobacterales	*Rhodobacteraceae*: mainly C18:1ω7, C16:0, C16:1ω7, C18:0	(Yoon et al., 2007a; Venkata Ramana et al., 2009; Jung et al., 2010; Park and Yoon, 2014)
Rickettsiales	SAR11 cluster: fatty acid profile not determined	
Methylophiales	*Methylophilaceae*: mainly C16:0 and C16:1ω7; traces of C18:0	(Kalyuzhnaya et al., 2006; Kalyuzhnaya et al., 2012)
Rhodocyclales	*Rhodocyclaceae*: mainly C16:0, C16:1*cis*-9, C18:1; only traces of C14:0 and C18:0	(Reinhold-Hurek et al., 1993; Anders et al., 1995)

Alteromonadales	*Alteromonadaceae*: mainly C18:1ω7, C16:0, C16:1ω7; only traces of C14:0 and C18:0	(Bowman et al., 1998; Van Trappen et al., 2004a; Tang et al., 2008; Lee et al., 2012; Teramoto and Nishijima, 2014)
	SAR92 clade: fatty acid profile not determined	
	OM60 clade: mainly C16:0, C16:1ω7, C16:1ω6, C18:1ω7; only traces of C14:0 and C18:0	(Spring et al., 2009; Spring et al., 2013)
Oceanospirillales	*Halomonadaceae*: mainly C16:0, C18:1ω7; minor amounts of C14:0, C16:1ω7; traces of C18:0	(Sánchez-Porro et al., 2009; Long et al., 2013)
Thiotrichales	*Piscirickettsiaceae*: mainly C16:0, C16:1ω7; minor amounts of C14:0; traces of C18:0	(Doronina et al., 2003; Kim et al., 2007; Antony et al., 2012)
	Thiotrichaceae: mainly C18:1ω7, C16:1ω7, C16:0; minor amounts of C14:0, C18:0	(Aruga et al., 2002)
Puniceicoccales	*Coraliomargarita*: mainly C14:0, C18:1ω9, C18:0	(Yoon et al., 2007b)
Verrucomicrobiales	*Verrucomicrobiaceae*: mainly C16:0, some also C14:0 and C16:1ω7	(Yoon et al., 2008)
Chlorophyta	*Mamiellales*: mainly C16:0, C16:1ω7, C18:1ω7, C18:1ω9; only traces of C14:0 and C18:0	(Martínez-Fernández et al., 2006; Vaezi et al., 2013)
Stramenopiles (diatoms)	*Thalassiosira*: mainly C14:0, C16:0, C16:1ω7; only minor amounts of C18:0	(Viso and Marty, 1993)
	Chaetoceros: mainly C14:0, C16:0, C16:1ω7, C20:5; only minor amounts of C18:0	(Viso and Marty, 1993; Zhukova and Aizdaicher, 1995)

Haptophyta	*Phaeocystis*: mainly C14:0, C16:0, C18:1ω9; minor amounts of C16:1ω7, C18:0 and C20:5 PUFA	(Al-Hasan et al., 1990; Nichols et al., 1991; Hamm and Rousseau, 2003)
Cryptophyta	*Chroomonas*: mainly C16:0, C18:1ω9, C20:5 PUFA; only minor amount of C14:0, C16:1ω7 and C18:0	(Viso and Marty, 1993; Zhukova and Aizdaicher, 1995)

Al-Hasan, R. H., Ali, A. M., and Radwan, S. S.: Lipids, and their constituent fatty acids, of *Phaeocystis* sp. from the Arabian Gulf, Mar Biol, 105, 9-14, 10.1007/bf01344265, 1990.

Anders, H.-J., Kaetzke, A., Kämpfer, P., Ludwig, W., and Fuchs, G.: Taxonomic position of aromatic-degrading denitrifying Pseudomonad strains K 172 and KB 740 and their description as new members of the genera *Thauera*, as *Thauera aromatica* sp. nov., and *Azoarcus*, as *Azoarcus evansii* sp. nov., respectively, members of the Beta subclass of the *Proteobacteria*, Int J Syst Bacteriol, 45, 327-333, 10.1099/00207713-45-2-327, 1995.

Antony, C. P., Doronina, N. V., Boden, R., Trotsenko, Y. A., Shouche, Y. S., and Murrell, J. C.: *Methylophaga lonarensis* sp. nov., a moderately haloalkaliphilic methylotroph isolated from the soda lake sediments of a meteorite impact crater, Int J Syst Evol Microbiol, 62, 1613-1618, 10.1099/ijs.0.035089-0, 2012.

Aruga, S., Kamagata, Y., Kohno, T., Hanada, S., Nakamura, K., and Kanagawa, T.: Characterization of filamentous Eikelboom type 021N bacteria and description of *Thiothrix disciformis* sp. nov. and *Thiothrix flexilis* sp. nov, Int J Syst Evol Microbiol, 52, 1309-1316, 10.1099/ijs.0.02177-0, 2002.

Bowman, J. P., McCammon, S. A., Brown, J. L., and McMeekin, T. A.: *Glaciecola punicea* gen. nov., sp. nov. and *Glaciecola pallidula* gen. nov., sp. nov.: psychrophilic bacteria from Antarctic sea-ice habitats, Int J Syst Bacteriol, 48, 1213-1222, 10.1099/00207713-48-4-1213, 1998.

Bowman, J. P., Nichols, C. M., and Gibson, J. A. E.: *Algoriphagus ratkowskyi* gen. nov., sp. nov., *Brumimicrobium glaciale* gen. nov., sp. nov., *Cryomorpha ignava* gen. nov., sp. nov. and *Crocinitomix catalasitica* gen. nov., sp. nov., novel flavobacteria isolated from various polar habitats, Int J Syst Evol Microbiol, 53, 1343-1355, 10.1099/ijs.0.02553-0, 2003.

Doronina, N., Darmaeva, T., and Trotsenko, Y.: *Methylophaga natronica* sp. nov., a new alkaliphilic and moderately halophilic, restricted-facultatively methylotrophic bacterium from soda lake of the Southern Transbaikal Region, Syst Appl Microbiol, 26, 382-389, 10.1078/072320203322497419, 2003.

Evtushenko, L., and Takeuchi, M.: The Family *Microbacteriaceae*, in: The Prokaryotes, edited by: Dworkin, M., Falkow, S., Rosenberg, E., Schleifer, K.-H., and Stackebrandt, E., Springer New York, 1020-1098, 2006.

Gallego, V., García, M. T., and Ventosa, A.: *Pedobacter aquatilis* sp. nov., isolated from drinking water, and emended description of the genus *Pedobacter*, Int J Syst Evol Microbiol, 56, 1853-1858, 10.1099/ijs.0.64176-0, 2006.

Hamm, C. E., and Rousseau, V.: Composition, assimilation and degradation of Phaeocystis globosa-derived fatty acids in the North Sea, J Sea Res, 50, 271-283, 10.1016/s1385-1101(03)00044-3, 2003.

Heindl, H., Wiese, J., and Imhoff, J. F.: *Tenacibaculum adriaticum* sp. nov., from a bryozoan in the Adriatic Sea, Int J Syst Evol Microbiol, 58, 542-547, 10.1099/ijs.0.65383-0, 2008.

Jung, Y.-T., Kim, B.-H., Oh, T.-K., and Yoon, J.-H.: *Pseudoruegeria lutimaris* sp. nov., isolated from a tidal flat sediment, and emended description of the genus *Pseudoruegeria*, Int J Syst Evol Microbiol, 60, 1177-1181, 10.1099/ijs.0.015073-0, 2010.

Kalyuzhnaya, M. G., Bowerman, S., Lara, J. C., Lidstrom, M. E., and Chistoserdova, L.: *Methylotenera mobilis* gen. nov., sp. nov., an obligately methylamine-utilizing bacterium within the family *Methylophilaceae*, Int J Syst Evol Microbiol, 56, 2819-2823, 10.1099/ijs.0.64191-0, 2006.

Kalyuzhnaya, M. G., Beck, D. A. C., Vorobev, A., Smalley, N., Kunkel, D. D., Lidstrom, M. E., and Chistoserdova, L.: Novel methylotrophic isolates from lake sediment, description of *Methylotenera versatilis* sp. nov. and emended description of the genus *Methylotenera*, Int J Syst Evol Microbiol, 62, 106-111, 10.1099/ijs.0.029165-0, 2012.

Kerger, B. D., Mancuso, C. A., Nichols, P. D., White, D. C., Langworthy, T., Sittig, M., Schlesner, H., and Hirsch, P.: The budding bacteria, *Pirellula* and *Planctomyces*, with atypical 16S rRNA and absence of peptidoglycan, show eubacterial phospholipids and uniquely high proportions of long chain beta-hydroxy fatty acids in the lipopolysaccharide lipid A, Arch Microbiol, 149, 255-260, 10.1007/bf00422014, 1988.

Khan, S. T., Nakagawa, Y., and Harayama, S.: *Sediminicola luteus* gen. nov., sp. nov., a novel member of the family *Flavobacteriaceae*, Int J Syst Evol Microbiol, 56, 841-845, 10.1099/ijs.0.64047-0, 2006.

Kim, H. G., Doronina, N. V., Trotsenko, Y. A., and Kim, S. W.: *Methylophaga aminisulfidivorans* sp. nov., a restricted facultatively methylotrophic marine bacterium, Int J Syst Evol Microbiol, 57, 2096-2101, 10.1099/ijs.0.65139-0, 2007.

Lee, O. O., Lai, P. Y., Wu, H.-x., Zhou, X.-j., Miao, L., Wang, H., and Qian, P.-Y.: *Marinobacter xestospongiae* sp. nov., isolated from the marine sponge *Xestospongia testudinaria* collected from the Red Sea, Int J Syst Evol Microbiol, 62, 1980-1985, 10.1099/ijs.0.028811-0, 2012.

Long, M.-R., Zhang, D.-F., Yang, X.-Y., Zhang, X.-M., Zhang, Y.-G., Zhang, Y.-M., Zhu, H., and Li, W.-J.: *Halomonas nanhaiensis* sp. nov., a halophilic bacterium isolated from a sediment sample from the South China Sea, Antonie van Leeuwenhoek, 103, 997-1005, 10.1007/s10482-013-9879-3, 2013.

sequence data, Nucleic Acids Res, 32, 1363-1371, 10.1093/nar/gkh293, 2004.

Martínez-Fernández, E., Acosta-Salmón, H., and Southgate, P. C.: The nutritional value of seven species of tropical microalgae for black-lip pearl oyster (*Pinctada margaritifera*, L.) larvae, Aquaculture, 257, 491-503, 10.1016/j.aquaculture.2006.03.022, 2006.

Nichols, P. D., Skerratt, J. H., Davidson, A., Burton, H., and McMeekin, T. A.: Lipids of cultured *Phaeocystis pouchetii*: Signatures for food-web, biogeochemical and environmental studies in Antarctica and the Southern ocean, Phytochemistry, 30, 3209-3214, 10.1016/0031-9422(91)83177-M, 1991.

O'Sullivan, L. A., Rinna, J., Humphreys, G., Weightman, A. J., and Fry, J. C.: *Fluviicola taffensis* gen. nov., sp. nov., a novel freshwater bacterium of the family *Cryomorphaceae* in the phylum '*Bacteroidetes*', Int J Syst Evol Microbiol, 55, 2189-2194, 10.1099/ijs.0.63736-0, 2005.

Park, S., and Yoon, J. H.: *Octadecabacter jejudonensis* sp nov., isolated from the junction between the ocean and a freshwater spring and emended description of the genus *Octadecabacter*, Int J Syst Evol Microbiol, 64, 719-724, 10.1099/ijs.0.057513-0, 2014.

Reinhold-Hurek, B., Hurek, T., Gillis, M., Hoste, B., Vancanneyt, M., Kersters, K., and De Ley, J.: *Azoarcus* gen. nov., nitrogen-fixing *Proteobacteria* associated with roots of Kallar grass (*Leptochloa fusca* (L.) Kunth), and description of two species, *Azoarcus indigens* sp. nov. and *Azoarcus communis* sp. nov, Int J Syst Bacteriol, 43, 574-584, 10.1099/00207713-43-3-574, 1993.

Sánchez-Porro, C., de la Haba, R. R., Soto-Ramírez, N., Márquez, M. C., Montalvo-Rodríguez, R., and Ventosa, A.: Description of *Kushneria aurantia* gen. nov., sp. nov., a novel member of the family *Halomonadaceae*, and a proposal for reclassification of *Halomonas marisflavi* as *Kushneria marisflavi* comb. nov., of *Halomonas indalinina* as *Kushneria indalinina* comb. nov. and of *Halomonas avicenniae* as *Kushneria avicenniae* comb. nov, Int J Syst Evol Microbiol, 59, 397-405, 10.1099/ijs.0.001461-0, 2009.

Schlesner, H., Rensmann, C., Tindall, B. J., Gade, D., Rabus, R., Pfeiffer, S., and Hirsch, P.: Taxonomic heterogeneity within the *Planctomycetales* as derived by DNA–DNA hybridization, description of *Rhodopirellula baltica* gen. nov., sp. nov., transfer of *Pirellula marina* to the genus

Blastopirellula gen. nov. as *Blastopirellula marina* comb. nov. and emended description of the genus *Pirellula*, Int J Syst Evol Microbiol, 54, 1567-1580, 10.1099/ijs.0.63113-0, 2004.

Tang, S.-K., Wang, Y., Cai, M., Lou, K., Mao, P.-H., Jin, X., Jiang, C.-L., Xu, L.-H., and Li, W.-J.: *Microbulbifer halophilus* sp. nov., a moderately halophilic bacterium from north-west China, Int J Syst Evol Microbiol, 58, 2036-2040, 10.1099/ijs.0.65519-0, 2008.

Teramoto, M., and Nishijima, M.: *Agaribacter marinus* gen. nov., sp. nov., an agar-degrading bacterium from surface seawater, Int J Syst Evol Microbiol, 64, 2416-2423, 10.1099/ijs.0.061150-0, 2014.

Van Trappen, S., Tan, T.-L., Yang, J., Mergaert, J., and Swings, J.: *Alteromonas stellipolaris* sp. nov., a novel, budding, prosthecate bacterium from Antarctic seas, and emended description of the genus *Alteromonas*, Int J Syst Evol Microbiol, 54, 1157-1163, 10.1099/ijs.0.02862-0, 2004a.

Van Trappen, S., Vandecandelaere, I., Mergaert, J., and Swings, J.: *Flavobacterium degerlachei* sp. nov., *Flavobacterium frigoris* sp. nov. and *Flavobacterium micromati* sp. nov., novel psychrophilic bacteria isolated from microbial mats in Antarctic lakes, Int J Syst Evol Microbiol, 54, 85-92, 10.1099/ijs.0.02857-0, 2004b.

Venkata Ramana, V., Anil Kumar, P., Srinivas, T. N. R., Sasikala, C., and Ramana, C. V.: *Rhodobacter aestuarii* sp. nov., a phototrophic alphaproteobacterium isolated from an estuarine environment, Int J Syst Evol Microbiol, 59, 1133-1136, 10.1099/ijs.0.004507-0, 2009.

Viso, A.-C., and Marty, J.-C.: Fatty acids from 28 marine microalgae, Phytochemistry, 34, 1521-1533, 10.1016/S0031-9422(00)90839-2, 1993.

Yoon, J.-H., Lee, S.-Y., Kang, S.-J., Lee, C.-H., and Oh, T.-K.: *Pseudoruegeria aquimaris* gen. nov., sp. nov., isolated from seawater of the East Sea in Korea, Int J Syst Evol Microbiol, 57, 542-547, 10.1099/ijs.0.64594-0, 2007a.

Yoon, J., Yasumoto-Hirose, M., Katsuta, A., Sekiguchi, H., Matsuda, S., Kasai, H., and Yokota, A.: *Coraliomargarita akajimensis* gen. nov., sp. nov., a novel member of the phylum '*Verrucomicrobia*' isolated from seawater in Japan, Int J Syst Evol Microbiol, 57, 959-963, 10.1099/ijs.0.64755-0, 2007b.

Yoon, J., Matsuo, Y., Katsuta, A., Jang, J.-H., Matsuda, S., Adachi, K., Kasai, H., and Yokota, A.: *Haloferula rosea* gen. nov., sp. nov., *Haloferula harenae* sp. nov., *Haloferula phyci* sp. nov., *Haloferula helveola* sp. nov. and *Haloferula sargassicola* sp. nov., five marine representatives of the family *Verrucomicrobiaceae* within the phylum '*Verrucomicrobia*', Int J Syst Evol Microbiol, 58, 2491-2500, 10.1099/ijs.0.2008/000711-0, 2008.

Zhukova, N. V., and Aizdaicher, N. A.: Fatty acid composition of 15 species of marine microalgae, Phytochemistry, 39, 351-356, 10.1016/0031-9422(94)00913-E, 1995.

Figure legends Supplementary

Figure S1

Phylogenetic tree of 16S rRNA gene sequence reads assigned to *Bacteroidetes*. Scale bar indicates 0.10 % estimated sequence divergence. Groups containing sequences are highlighted.

Figure S2

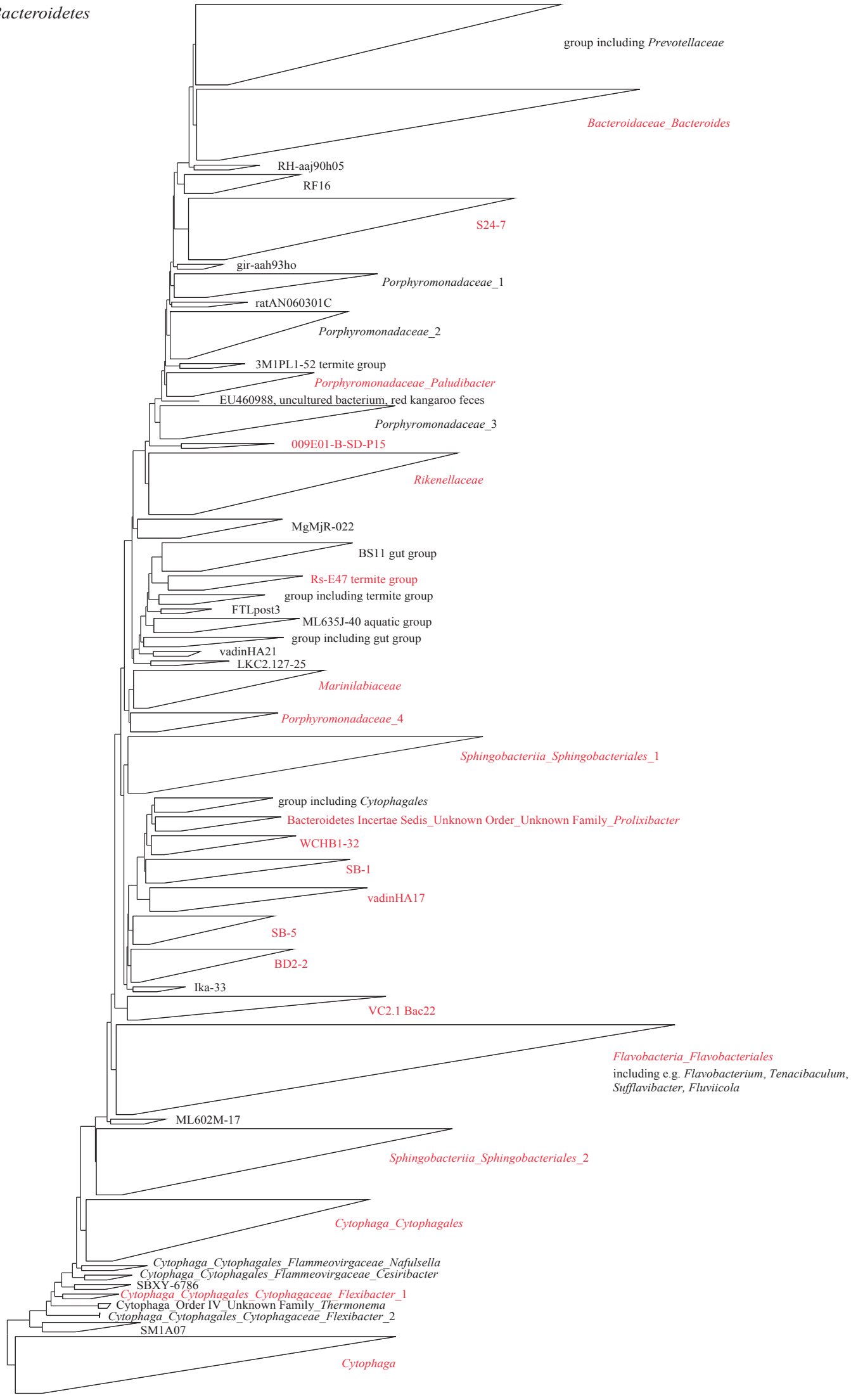
Phylogenetic tree of 16S rRNA gene sequence reads assigned to *Alphaproteobacteria*. Scale bar indicates 0.10 % estimated sequence divergence. Groups containing sequences are highlighted.

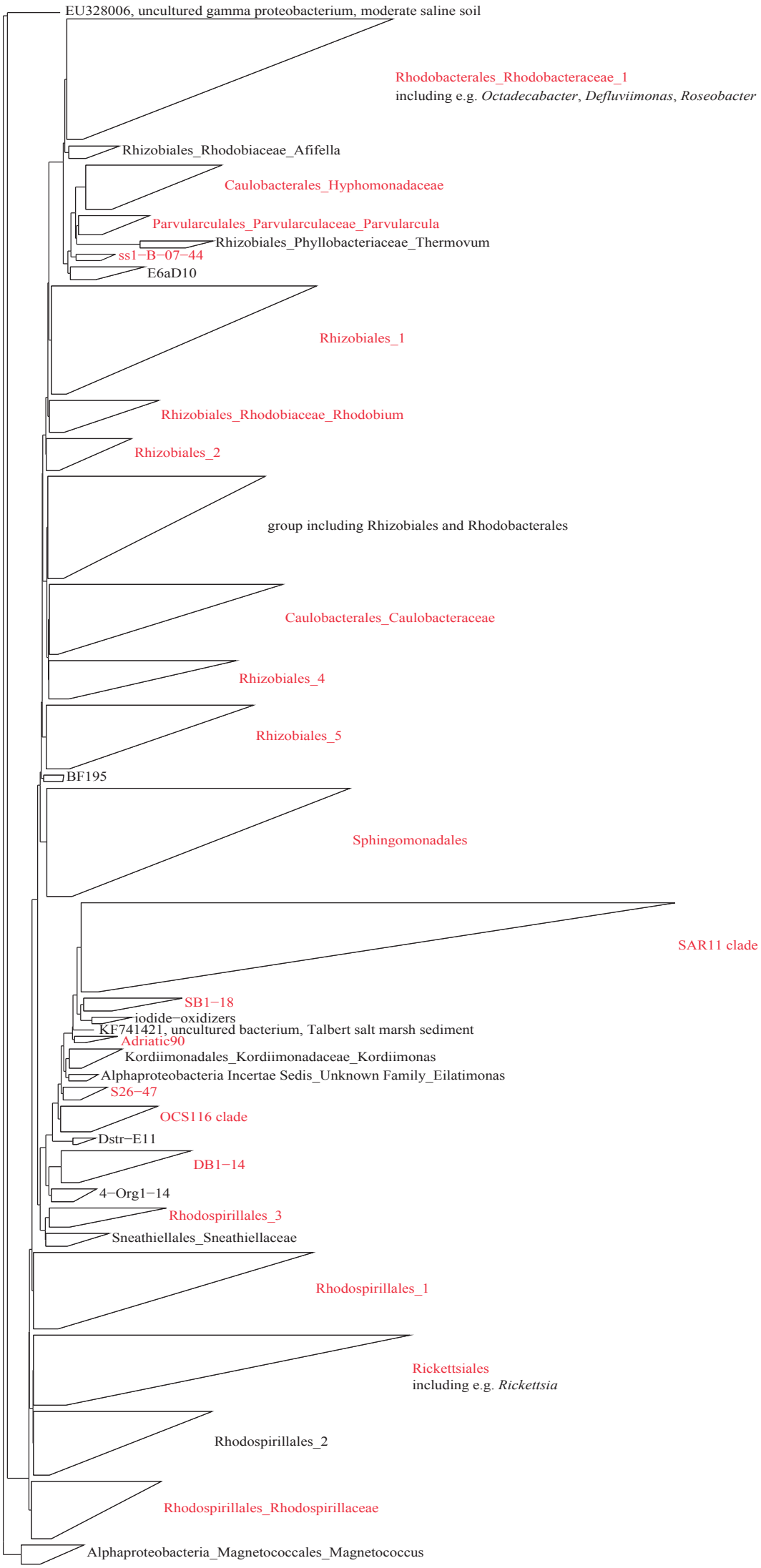
Figure S3

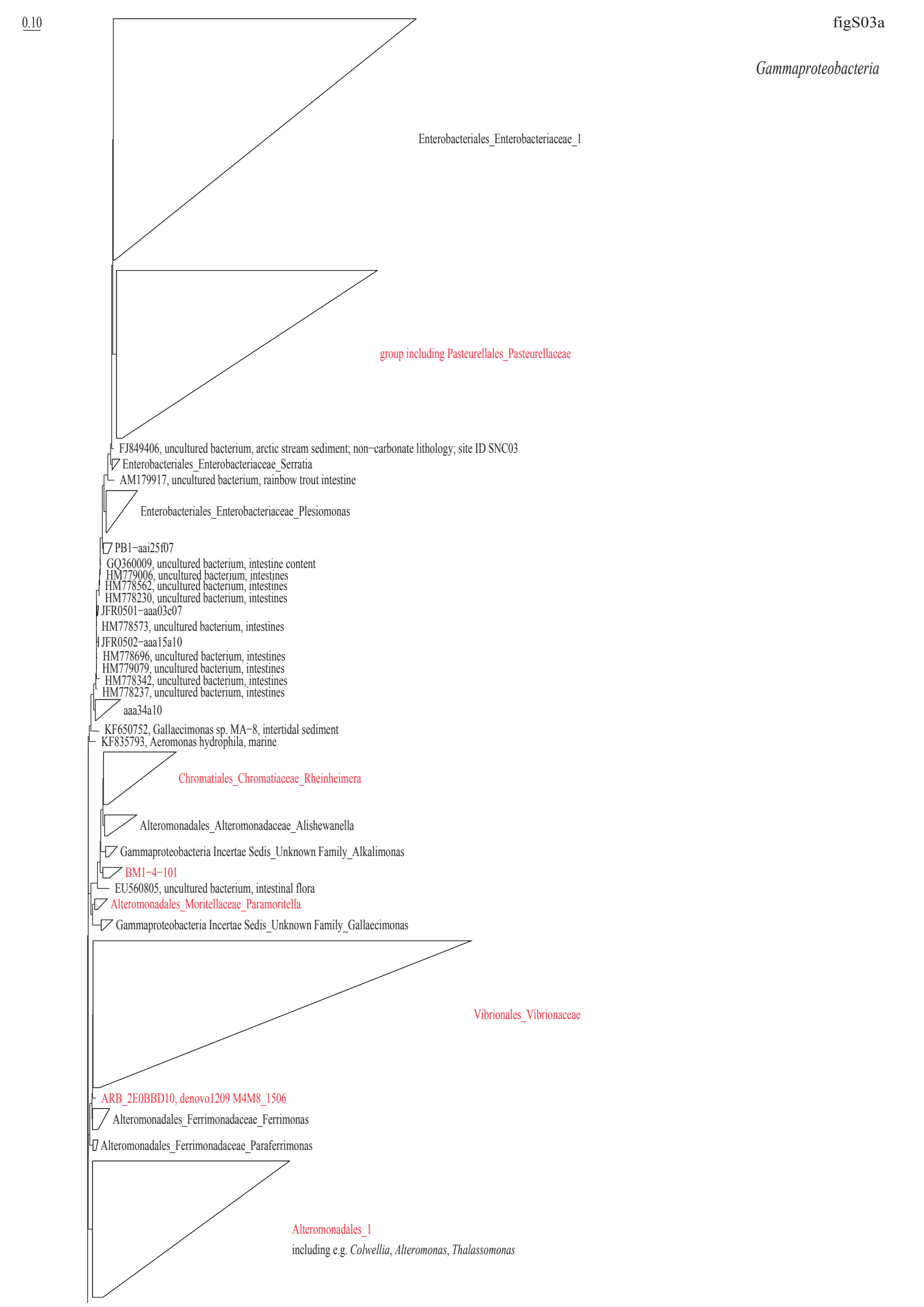
Phylogenetic tree of 16S rRNA gene sequence reads assigned to *Gammaproteobacteria*. Scale bar indicates 0.10 % estimated sequence divergence. Groups containing sequences are highlighted.

Figure S4

δD_{water} versus salinity of North Sea SPM sampled in 2013.

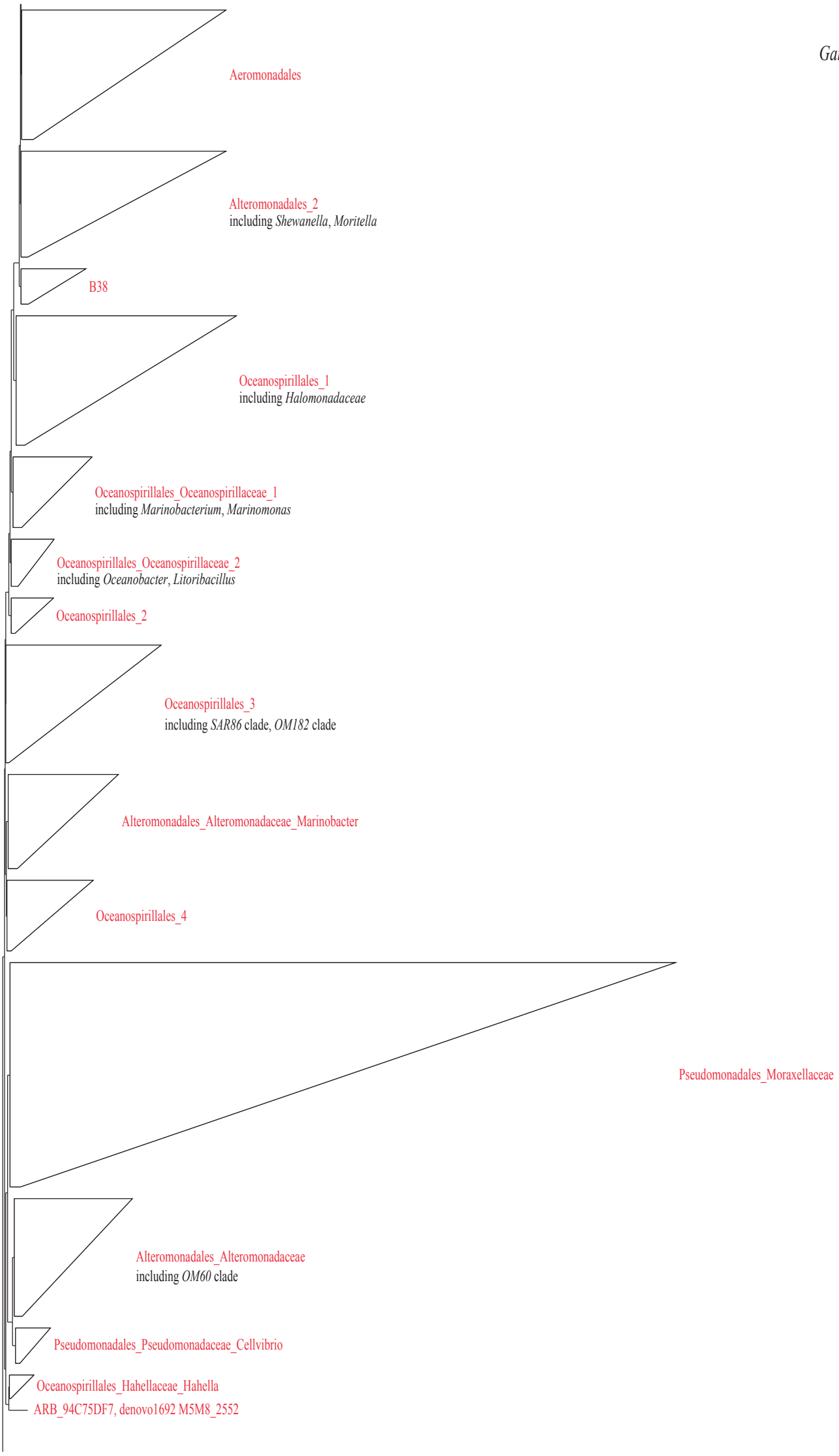

group including *Prevotellaceae*
Bacteroidaceae_Bacteroides
RH-aaj90h05
RF16
S24-7
gir-aah93ho
*Porphyromonadaceae*_1
ratAN060301C
*Porphyromonadaceae*_2
3M1PL1-52 termite group
Porphyromonadaceae_Paludibacter
EU460988, uncultured bacterium, red kangaroo feces
*Porphyromonadaceae*_3
009E01-B-SD-P15
Rikenellaceae
MgMjR-022
BS11 gut group
Rs-E47 termite group
group including termite group
FTLpost3
ML635J-40 aquatic group
group including gut group
vadinHA21
LKC2.127-25
Marinilabiaceae
*Porphyromonadaceae*_4
*Sphingobacteriia_Sphingobacteriales*_1
group including *Cytophagales*
Bacteroidetes Incertae Sedis_Unknown Order_Unknown Family_*Prolixibacter*
WCHB1-32
SB-1
vadinHA17
SB-5
BD2-2
Ika-33
VC2.1 Bac22
Flavobacteria_Flavobacteriales
including e.g. *Flavobacterium*, *Tenacibaculum*, *Sufflavibacter*, *Fluviicola*
ML602M-17
*Sphingobacteriia_Sphingobacteriales*_2
Cytophaga_Cytophagales
Cytophaga_Cytophagales_Flammeovirgaceae_Nafulsella
Cytophaga_Cytophagales_Flammeovirgaceae_Cesiribacter
SBXY-6786
*Cytophaga_Cytophagales_Cytophagaceae_Flexibacter*_1
Cytophaga_Order IV_Unknown Family_*Thermonema*
*Cytophaga_Cytophagales_Cytophagaceae_Flexibacter*_2
SM1A07
Cytophaga
0.10

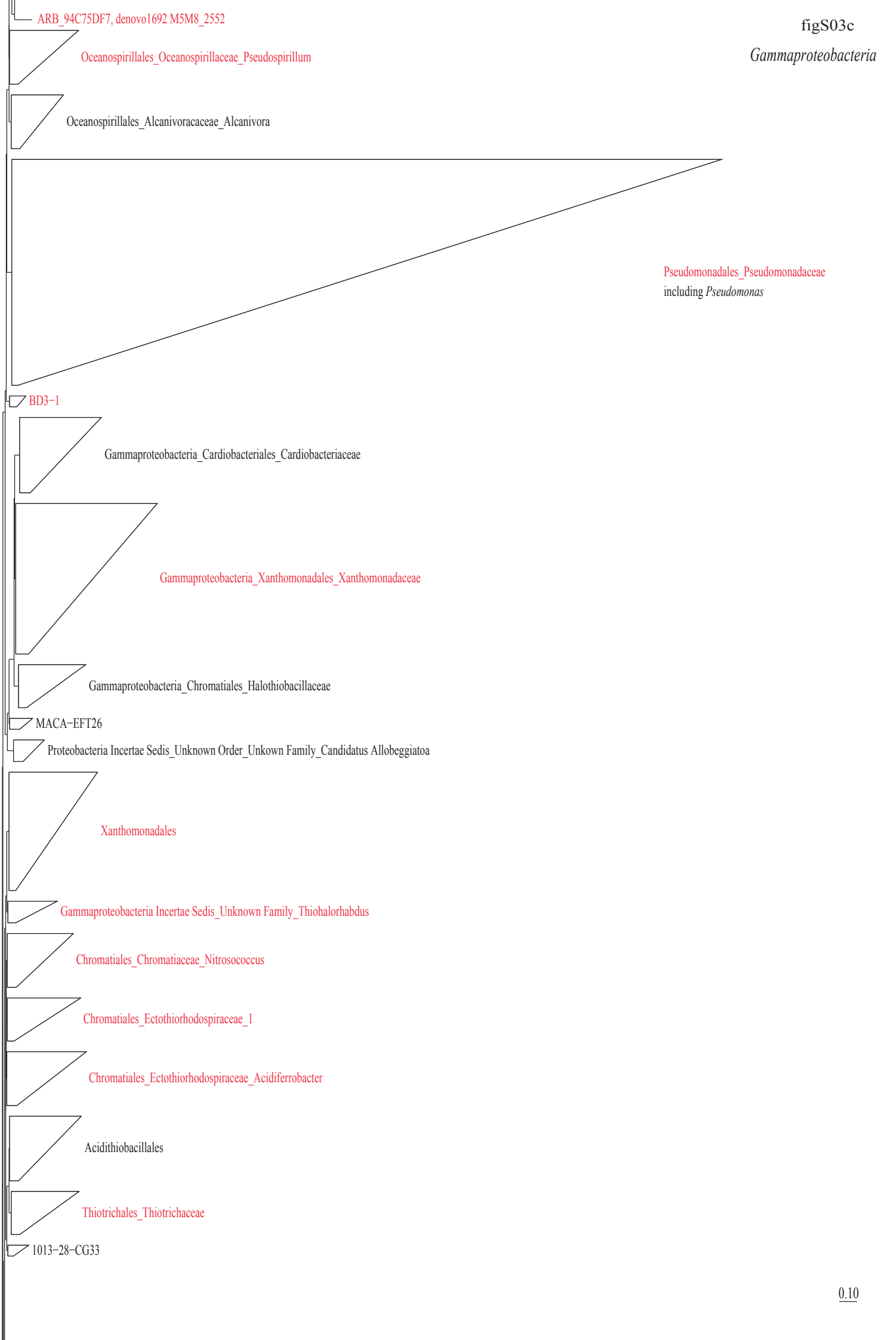

EU328006, uncultured gamma proteobacterium, moderate saline soil
Alphaproteobacteria
Rhodobacterales_Rhodobacteraceae_1
including e.g. Octadecabacter, Defluviimonas, Roseobacter
Rhizobiales_Rhodobiaceae_Afifella
Caulobacterales_Hyphomonadaceae
Parvularculales_Parvularculaceae_Parvularcula
Rhizobiales_Phyllobacteriaceae_Thermovum
ss1−B−07−44
E6aD10
Rhizobiales_1
Rhizobiales_Rhodobiaceae_Rhodobium
Rhizobiales_2
group including Rhizobiales and Rhodobacterales
Caulobacterales_Caulobacteraceae
Rhizobiales_4
Rhizobiales_5
BF195
Sphingomonadales
SAR11 clade
SB1−18
iodide−oxidizers
KF741421, uncultured bacterium, Talbert salt marsh sediment
Adriatic90
Kordiimonadales_Kordiimonadaceae_Kordiimonas
Alphaproteobacteria Incertae Sedis_Unknown Family_Eilatimonas
S26−47
OCS116 clade
Dstr−E11
DB1−14
4−Org1−14
Rhodospirillales_3
Sneathiellales_Sneathiellaceae
Rhodospirillales_1
Rickettsiales
including e.g. Rickettsia
Rhodospirillales_2
Rhodospirillales_Rhodospirillaceae
Alphaproteobacteria_Magnetococcales_Magnetococcus
0.10


0.10
Gammaproteobacteria
Enterobacteriales_Enterobacteriaceae_1
group including Pasteurellales_Pasteurellaceae
FJ849406, uncultured bacterium, arctic stream sediment; non−carbonate lithology; site ID SNC03
Enterobacteriales_Enterobacteriaceae_Serratia
AM179917, uncultured bacterium, rainbow trout intestine
Enterobacteriales_Enterobacteriaceae_Plesiomonas
PB1−aai25f07
GQ360009, uncultured bacterium, intestine content
HM779006, uncultured bacterium, intestines
HM778562, uncultured bacterium, intestines
HM778230, uncultured bacterium, intestines
JFR0501−aaa03c07
HM778573, uncultured bacterium, intestines
JFR0502−aaa15a10
HM778696, uncultured bacterium, intestines
HM779079, uncultured bacterium, intestines
HM778342, uncultured bacterium, intestines
HM778237, uncultured bacterium, intestines
aaa34a10
KF650752, Gallaecimonas sp. MA−8, intertidal sediment
KF835793, Aeromonas hydrophila, marine
Chromatiales_Chromatiaceae_Rheinheimera
Alteromonadales_Alteromonadaceae_Alishewanella
Gammaproteobacteria Incertae Sedis_Unknown Family_Alkalimonas
BM1−4−101
EU560805, uncultured bacterium, intestinal flora
Alteromonadales_Moritellaceae_Paramoritella
Gammaproteobacteria Incertae Sedis_Unknown Family_Gallaecimonas
Vibrionales_Vibrionaceae
ARB_2E0BBD10, denovo1209 M4M8_1506
Alteromonadales_Ferrimonadaceae_Ferrimonas
Alteromonadales_Ferrimonadaceae_Paraferrimonas
Alteromonadales_1
including e.g. Colwellia, Alteromonas, Thalassomonas

figS03b

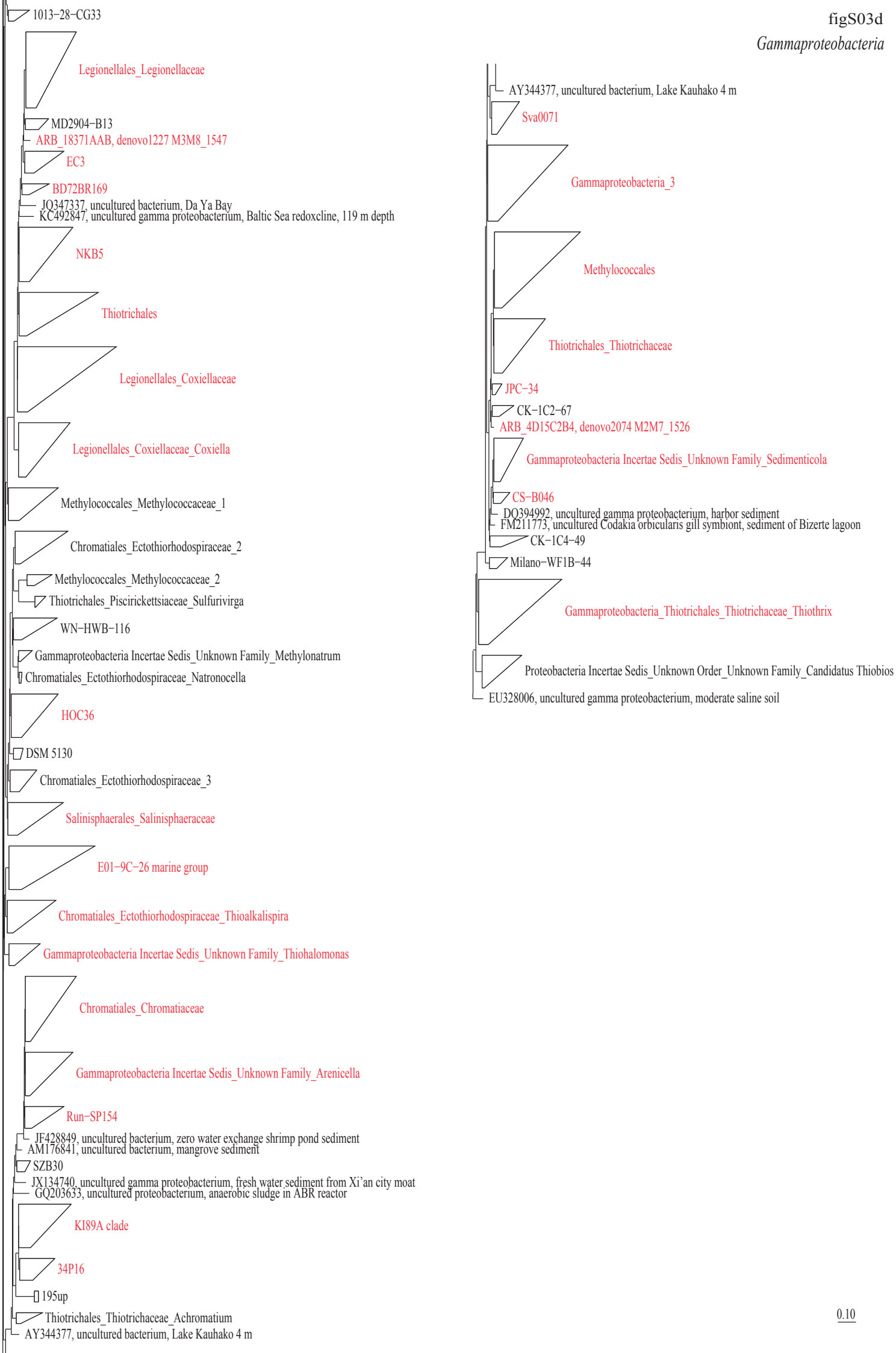
Gammaproteobacteria



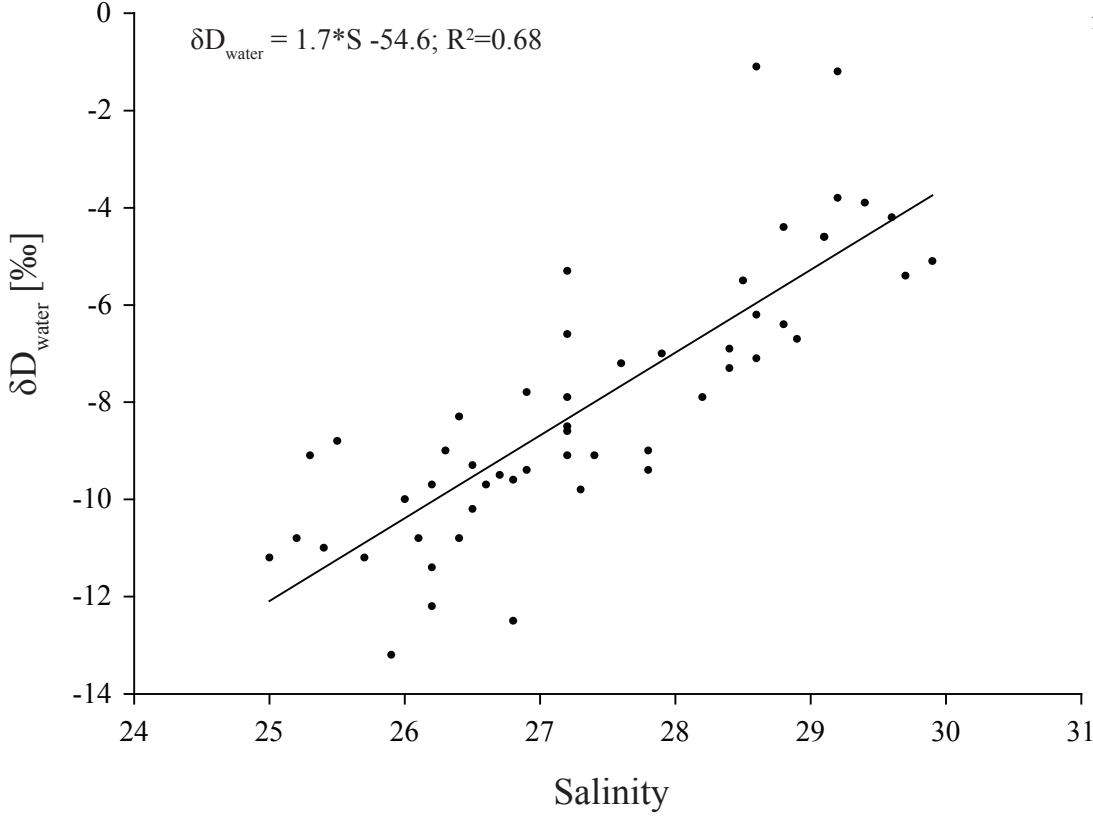

figS03c
Gammaproteobacteria
ARB_94C75DF7, denovo1692 M5M8_2552
Oceanospirillales_Oceanospirillaceae_Pseudospirillum
Oceanospirillales_Alcanivoracaceae_Alcanivora
Pseudomonadales_Pseudomonadaceae
including Pseudomonas
BD3−1
Gammaproteobacteria_Cardiobacteriales_Cardiobacteriaceae
Gammaproteobacteria_Xanthomonadales_Xanthomonadaceae
Gammaproteobacteria_Chromatiales_Halothiobacillaceae
MACA−EFT26
Proteobacteria Incertae Sedis_Unknown Order_Unkown Family_Candidatus Allobeggiatoa
Xanthomonadales
Gammaproteobacteria Incertae Sedis_Unknown Family_Thiohalorhabdus
Chromatiales_Chromatiaceae_Nitrosococcus
Chromatiales_Ectothiorhodospiraceae_1
Chromatiales_Ectothiorhodospiraceae_Acidiferrobacter
Acidithiobacillales
Thiotrichales_Thiotrichaceae
1013−28−CG33
0.10

figS03d

Gammaproteobacteria



figS04


δD_water = 1.7*S -54.6; R²=0.68
δD_water [‰]
0
-2
-4
-6
-8
-10
-12
-14
24
25
26
27
28
29
30
31
Salinity