



Supplement of

Quantification and characterization of primary biological aerosol particles and microbes aerosolized from Baltic seawater

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S1 Summary and overview of all experiments

Date & Time (LT) (UTC+2)	Location	Sample name	Type of sample	Sample volume (mL seawater or L air)	Analysed with		
					FM	IC	DNA
18.05.21 18:13- 19.05.21 18:40		SSC1	Chamber air	7350 L	(X)	X	(X)
19.05.21 09:00	57° 4,362'N 18° 42,726'E	SW1	bulk seawater (SW)*	50 mL for FM 500 mL for DNA 10 mL for IC	(X)	X	X
19.05.21 18:55- 20.05.21 18:15		SSC2	Chamber air	7000 L	(X)	X	
19.05.21 19:30	57° 23,448'N 19° 02,05'E	SW3	SW	500 mL for DNA 10 mL for IC		X	X
20.05.21 12:00	57° 25,3'N 19° 00,8'E	SW4	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	(X)	X	X
20.05.21 15:00	57° 25,3'N 19° 00,8'E	SW5	SML	FM: 100 mL	(X)		
20.05.21 18:30- 21.05.21 18:00		SSC3	Chamber air	7050 L	(X)	X	
21.05.21 09:30	57° 23,448'N 19° 02,05'E	SW7	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	(X)	X	X
21.05.21 11:00			Filter blank	0 L	(X)	X	X
21.05.21 18:15- 22.05.21 18:45		SSC4	Chamber air	7350 L	(X)	X	X
22.05.21 00:15	57° 24,552'N 19° 03,618'E	SW8	SW	DNA: 500 mL			X
22.05.21 08:30	58° 29,9'N 20° 00,0'E	SW9	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	(X)	X	X
22.05.21 08:30	58° 29,9'N 20° 00,0'E	SW10	SML	FM: 80 mL DNA: 500 mL IC: 5 mL	(X)	X	X
22.05.21 18:50 - 23.05.21 18:00		SSC5	Chamber air	6950 L	(X)	X	X
22.05.21 19:00			MiliQ blank	10 mL		X	
22.05.21 19:00			Filter blank	0 L			X
23.05.21 08:45	57° 23,4'N 19° 02,07'E	SW11	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	(X)	X	X
23.05.21 09:00			Filter blank	0 L			X
23.05.21 18:30- 24.05.21 18:15		SSC6	SSC	7125 L	(X)		X
24.05.21 12:00	56° 38,7'N 18° 54,6'E	SW12	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	(X)	X	X
24.05.21 12:00	56° 38,7'N 18° 54,6'E	SW13	SML	FM: 100 mL DNA: 300 mL IC: 5 mL	(X)	X	(X)
24.05.21 18:15- 25.05.21 18:00		SSC7	Chamber air	5550 L	(X)	X	X
25.05.21 09:00	56° 37,97'N 18° 36,4'E	SW14	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	(X)	X	X
25.05.21 09:00	56° 37,97'N 18° 36,4'E	SW15	SML	FM: 75 mL DNA: 500 mL IC: 5 mL	(X)		X
25.05.21 18:15- 26.05.21 18:00		SSC8	Chamber air	7125 L	(X)	X	X
25.05.21 18:15			Filter blank	0 L	(X)		
26.05.21 09:15	54° 34,77'N 18° 47,5'E	SW16	SW	FM: 75 mL DNA: 500 mL IC: 5 mL	(X)	X	X
26.05.21 09:15	54° 34,77'N 18° 47,5'E	SW17	SML	FM: 75 mL DNA: 250 mL IC: 5 mL	(X)	X	X
26.05.21 18:15- 27.05.21 17:50		SSC9	Chamber air	7075 L	(X)	X	X
27.05.21 08:00	54° 52,98'N 18° 22,2'E	SW18	SW	FM: 75 mL DNA: 500 mL IC: 5 mL	(X)	X	X
27.05.21 12:30	55° 17,4672' 17° 59,784'	SW19	SML	FM: 75 mL DNA: 400 mL IC: 5 mL	(X)	X	X
27.05.21 18:00- 28.05.21 18:00		SSC10	Chamber air	7200 L	(X)	X	(X)
28.05.21 08:00	55° 07,97'N 17° 45,03'E	SW20	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	(X)	X	X
28.05.21 18:05- 29.05.21 18:00		SSC11	Chamber air	7125 L	(X)	X	(X)
28.05.21 18:05			Filter blank	0 L	(X)		
29.05.21 08:30	54° 39,06'N 16° 50,06'E	SW22	SW	FM: 100 mL DNA: 400 mL IC: 5 mL	(X)	X	X
29.05.21 08:30	54° 39,06'N 16° 50,06'E	SW23	SML	FM: 75 mL DNA: 300 mL IC: 5 mL	(X)	X	X
29.05.21 09:00			Filter blank	0 L		X	X

*sampled from at 1.5 m depth

Table S1: Overview table of all seawater samples collected during the *Oceania* campaign. SSC denotes sea spray chamber aerosol samples, SW denotes bulk seawater, SML denotes surface microlayer, FM denotes fluorescence microscopy, IC denotes ion chromatography and DNA denotes DNA sequencing. Samples in brackets are excluded from analysis.

Date & Time (LT) (UTC+2)	Location	Sample name	Type of sample	Sample volume (mL SW or L air)	Analysed with			
					FM	IC	DNA	MBS
10.08.21 14:00	57°25,914'N 18°58,764'E	SW1	SW*	FM: 80 mL DNA: 500 mL IC: 5 mL	X	X	X	
10.08.21 14:00- 11.08.21 14:00		SSC1	Chamber air	7200 L	X	X	X	(X)
10.08.21 18:00	57°26,004'N 18°57,756'E	SML1	SML	FM: 100 mL DNA: 500 mL IC: 5 mL	X	X	X	
11.08.21 06:15	57°25,914'N 18°58,764'E	SW3	SW	DNA: 500 mL IC: 5 mL		X	X	
11.08.21 09:30	57°26,004'N 18°57,756'E	SML2	SML	FM: 50 mL DNA: 500 mL IC: 5 mL	X	X	X	
11.08.21 14:00	57°25,914'N 18°58,764'E	SW5	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	X	X	X	
11.08.21 14:30			Filter blank	0 L	X	X	X	
11.08.21 14:15- 12.08.21 14:00		SSC2	Chamber air	7175 mL	X	X	X	(X)
12.08.21 11:00	57°26,004'N 18°57,756'E	SML3	SML	FM: 75 mL DNA: 500 mL IC: 5 mL	X	X	X	
12.08.21 14:00	57°25,914'N 18°58,764'E	SW9	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	X	X	X	
12.08.21 16:30- 13.08.21 13:45		SSC3	Chamber air	6375 L	X	X	X	X
13.08.21 12:30	57°26,004'N 18°57,756'E	SML4	SML	FM: 75 mL DNA: 500 mL IC: 5 mL	X	X	X	
13.08.21 13:30	57°25,914'N 18°58,764'E	SW13	SW	FM: 75 mL DNA: 500 mL IC: 5 mL	X	X	X	
13.08.21 14:45- 14.08.21 14:00		SSC4	Chamber air	6975 L	X	X	X	X
14.08.21 13:30	57°25,914'N 18°58,764'E	SW16	SW	FM: 100 mL DNA: 500 mL IC: 5 mL	X	X	X	
14.08.21 14:00- 15.08.21 14:45		SSC5	Chamber air	7200 L	X	X	X	X
15.08.21 14:00	57°25,914'N 18°58,764'E	SW20	SW	FM: 75 mL DNA: 500 mL IC: 5 mL	X	X	X	
15.08.21 14:00- 17.08.21 12:00		SSC6	Chamber air	13800 L	X	X	X	X
17.08.21 12:00	57°27,618'N 18°56,1'E	SW23	SW	FM: 75 mL DNA: 500 mL IC: 5 mL	X	X	X	
17.08.21 13:00			Filter blank	0 L	X	X	X	
17.08.21 15:30	57°26,004'N 18°57,756'E	SML5	SML	FM: 75 mL DNA: 500 mL IC: 5 mL	X	X	X	
17.08.21 14:00- 18.08.21 08:30		SSC7	Chamber air	5550 L	X	X	X	X
18.08.21 08:30	57°25,824'N 18°58,002'E	SW24	SW	FM: 60 mL DNA: 500 mL IC: 5 mL	X	X	X	
18.08.21 08:50- 19.08.21 08:00		SSC8	Chamber air	6950 L	X	X	X	X
19.08.21 08:00	57°25,824'N 18°58,002'E	SW25	SW	FM: 50 mL DNA: 500 mL IC: 5 mL	X	X	X	
19.08.21 08:20- 20.08.21 08:00		SSC9	Chamber air	7100 L	X	X	X	X
20.08.21 07:45	57°26,004'N 18°57,756'E	SML6	SML	FM: 50 mL DNA: 500 mL IC: 5 mL	X	X	X	
20.08.21 08:00	57°25,824'N 18°58,002'E	SW26	SW	FM: 50 mL DNA: 500 mL IC: 5 mL	X	X	X	
20.08.21 08:15- 21.08.21 08:15		SSC10	Chamber air	7200 L	X	X	X	X
21.08.21 08:00	57°25,824'N 18°58,002'E	SW27	SW	FM: 50 mL DNA: 500 mL IC: 5 mL	X	X	X	
21.08.21 09:00			Filter blank	0 L	X	X	X	
21.08.21 08:30- 22.08.21 08:00		SSC11	Chamber air	7050 L	X	X	X	X
21.08.21 17:45	57°26,004'N 18°57,756'E	SML7	SML	FM: 50 mL DNA: 500 mL IC: 5 mL	X	X	X	
22.08.21 08:00	57°25,824'N 18°58,002'E	SW28	SW	FM: 50 mL DNA: 500 mL IC: 5 mL	X	X	X	

*sampled from ship's inlet at 1.5 m depth

Table S2: Overview table of all samples collected during the *Electra* campaign. SSC denotes sea spray chamber aerosol samples, SW denotes bulk seawater, SML denotes surface microlayer, FM denotes fluorescence microscopy, IC denotes ion chromatography, DNA denotes DNA sequencing and MBS denotes multiparameter aerosol spectrometer. Samples in brackets are excluded from analysis.

S2 Description of triple PCR amplification

The PCR mixture included a template volume of 2.5-10 μL , 12.5 μL 2X KAPA HiFi HotStart polymerase (Kapa Biosystems, Inc., mUS), 0.5 μL forward primer (10 pmol μL), 0.5 μL reverse primer (10 pmol μL), and 0.5 μL BSA (4 g L^{-1}). The first PCR involved an initial denaturation at 95°C for 3 min, followed by 24 cycles of denaturation at 95°C for 30 s, annealing at 55°C for 30 s, elongation at 72°C for 30 s, and a final elongation at 72°C for 5 min. A second PCR with 10–12 cycles was conducted using the same PCR conditions, but this time incorporating the Illumina overhang adapters without BSA. In a third PCR, primers were annealed to the adapter sequence from step two for indexing purposes.

The resulting PCR product was cleaned with 20 μL AMPure XP beads (Beckman Coulter, US) and gel electrophoresis confirmed successful amplification. Prior to sequencing, DNA concentrations were determined using the Quant-iTTM dsDNA high sensitivity Assay Kits (Thermo Fisher Scientific, US) and normalized to a concentration of 4 ng μL^{-1} .

S3 Processing of DNA sequencing data using the nf-core amplifyseq workflow

The nf-core/ampliseq workflow version 2.3.2 (Straub et al., 2020) was used for the analysis of the sequencing data. This involved pre-processing steps such as read quality control (FastQC version 0.11.9, Andrews et al., 2010), and primer trimming with cutadapt (version 3.4 Martin, 2011). Amplicon sequence variants (ASV) were inferred and classified using DADA2 (version 1.22.0, Callahan et al., 2016) with the Silva reference taxonomy database (version 138, Quast et al., 2012). A secondary taxonomic classification was performed using the Quantitative Insights Into Microbial Ecology 2 platform (QIIME2, version 2021.8.0, Bolyen et al., 2019), providing absolute and relative abundances of the different taxa found in each sample.

S4 Overview of contaminant ASVs

Phylum	Class	Order	Family	Genus	Species
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Sphingomonas</i>	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Clade I	<i>Clade Ia</i>	NA
Bacteroidota	Bacteroidia	Sphingobacteriales	NS11-12 marine group	NA	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Sphingomonas</i>	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Clade I	<i>Clade Ia</i>	NA
Firmicutes	Bacilli	Paenibacillales	Paenibacillaceae	<i>Paenibacillus</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	<i>Yoonia-Loktanella</i>	NA
Firmicutes	Bacilli	Paenibacillales	Paenibacillaceae	<i>Paenibacillus</i>	NA
Actinobacteriota	Actinobacteria	Frankiales	Sporichthyaceae	<i>hgcI clade</i>	NA
Verrucomicrobiota	Verrucomicrobiae	Chthoniobacterales	Chthoniobacteraceae	<i>LD29</i>	NA
Cyanobacteria	Cyanobacteriia	Synechococcales	Cyanobiaceae	<i>Cyanobium FCC-6307</i>	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Clade I	<i>Clade Ia</i>	NA
Actinobacteriota	Actinobacteria	Frankiales	Sporichthyaceae	<i>hgcI clade</i>	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Clade I	<i>Clade Ia</i>	NA
Bacteroidota	Bacteroidia	Cytophagales	Spirosomaceae	<i>Taeseokella</i>	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Clade III	NA	NA
Proteobacteria	Gammaaproteobacteria	Burkholderiales	Methylolphilaceae	<i>OM43 clade</i>	NA
Proteobacteria	Gammaaproteobacteria	Burkholderiales	Comamonadaceae	<i>RS62 marine group</i>	NA
Actinobacteriota	Actinobacteria	Frankiales	Sporichthyaceae	<i>Candidatus Planktophila</i>	NA
Proteobacteria	Gammaaproteobacteria	Burkholderiales	Comamonadaceae	<i>RS62 marine group</i>	NA
Proteobacteria	Gammaaproteobacteria	Burkholderiales	Comamonadaceae	<i>Aquabacterium</i>	NA
Firmicutes	Bacilli	Bacillales	Bacillaceae	<i>Bacillus</i>	NA
Firmicutes	Bacilli	Paenibacillales	Paenibacillaceae	<i>Paenibacillus</i>	NA
Actinobacteriota	Acidimicrobiia	Microtrichales	Illumatobacteraceae	<i>CL500-29 marine group</i>	NA
Firmicutes	Bacilli	Paenibacillales	Paenibacillaceae	<i>Paenibacillus</i>	NA
Proteobacteria	Gammaaproteobacteria	Burkholderiales	Methylolphilaceae	<i>OM43 clade</i>	NA
Actinobacteriota	Actinobacteria	Frankiales	Sporichthyaceae	<i>hgcI clade</i>	NA
Proteobacteria	Gammaaproteobacteria	Burkholderiales	Alcaligenaceae	<i>GKS98 freshwater group</i>	NA
Actinobacteriota	Actinobacteria	Frankiales	Sporichthyaceae	<i>hgcI clade</i>	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Clade I	<i>Clade Ia</i>	NA
Proteobacteria	Gammaaproteobacteria	Pseudomonadales	Moraxellaceae	<i>Acinetobacter</i>	<i>A. lwoffii</i>
Actinobacteriota	Actinobacteria	Micrococcales	Microbacteriaceae	<i>Candidatus Aquiluna</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Firmicutes	Bacilli	Paenibacillales	Paenibacillaceae	<i>Paenibacillus</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Bacteroidota	Bacteroidia	Chitinophagales	Saprosiraceae	<i>Levinella</i>	NA
Cyanobacteria	Cyanobacteriia	Synechococcales	Cyanobiaceae	<i>Cyanobium FCC-6307</i>	NA

Table S3: Overview of ASVs that were identified as contamination and removed from further analysis.

Phylum	Class	Order	Family	Genus	Species
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Actinobacteriota	Actinobacteria	Frankiales	Sporichthyaceae	<i>hgcI clade</i>	NA
Actinobacteriota	Actinobacteria	Micrococcales	Microbacteriaceae	<i>Candidatus Limnoluna</i>	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Bacteroidota	Bacteroidia	Flavobacteriales	Flavobacteriaceae	<i>Subsaribacter</i>	NA
Firmicutes	Bacilli	Paenibacillales	Paenibacillaceae	<i>Paenibacillus</i>	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Caulobacterales	Caulobacteraceae	<i>Brevundimonas</i>	NA
Proteobacteria	Gammaproteobacteria	Burkholderiales	Comamonadaceae	<i>Aquabacterium</i>	NA
Bacteroidota	Bacteroidia	Flavobacteriales	NS9 marine group	NA	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Cyanobacteria	Cyanobacteria	Synechococcales	Cyanobiaceae	<i>Cyanobium PCC-6307</i>	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Sphingobium</i>	<i>S. yanoikuyae</i>
Actinobacteriota	Actinobacteria	Micrococcales	Micrococcaceae	<i>Micrococcus</i>	NA
Bacteroidota	Bacteroidia	Flavobacteriales	Flavobacteriaceae	NA	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Erythrobacter</i>	NA
Firmicutes	Bacilli	Bacillales	Bacillaceae	<i>Bacillus</i>	NA
Proteobacteria	Alphaproteobacteria	Caulobacterales	Hyphomonadaceae	<i>Hyphomonas</i>	NA
Bacteroidota	Bacteroidia	Flavobacteriales	Flavobacteriaceae	<i>NS5 marine group</i>	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Firmicutes	Bacilli	Bacillales	Bacillaceae	<i>Bacillus</i>	NA
Cyanobacteria	Cyanobacteria	Pseudanabaenales	Pseudanabaenaceae	<i>Pseudanabaena PCC-7129</i>	NA
Firmicutes	Bacilli	Lactobacillales	Streptococcaceae	<i>Streptococcus</i>	NA
Firmicutes	Bacilli	Staphylococcales	Staphylococcaceae	<i>Staphylococcus</i>	NA
Cyanobacteria	Cyanobacteria	Chloroplast	NA	NA	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	NA
Proteobacteria	Gammaproteobacteria	Enterobacteriales	Enterobacteriaceae	<i>Escherichia-Shigella</i>	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	Sphingobium	NA
Proteobacteria	Alphaproteobacteria	Rhodospirillales	Magnetospiraceae	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodobacteriales	Rhodobacteraceae	<i>Pseudorhodobacter</i>	NA
Proteobacteria	Gammaproteobacteria	Burkholderiales	Nitrosomonadaceae	<i>IS-44</i>	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Fokiniaaceae	<i>MD3-55</i>	NA
Bacteroidota	Bacteroidia	Flavobacteriales	Cryomorphaceae	NA	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Moraxellaceae	<i>Enhydrobacter</i>	<i>E. aerosaccus</i>

Table S3 continued

Phylum	Class	Order	Family	Genus	Species
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Moraxellaceae	<i>Psychrobacter</i>	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Moraxellaceae	<i>Psychrobacter</i>	<i>nambhaensis</i>
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Moraxellaceae	<i>Psychrobacter</i>	NA
Actinobacteriota	Actinobacteria	Propionibacteriales	Propionibacteriaceae	<i>Cutibacterium</i>	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Rickettsiaceae	NA	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Clade III	NA	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Rickettsiaceae	<i>Candidatus Megaira</i>	NA
Proteobacteria	Gammaproteobacteria	Enterobacteriales	Shewanellaceae	<i>Shewanella</i>	NA
Actinobacteriota	Thermoleophilii	Gaiellales	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Erythrobacter</i>	NA
Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	<i>Tabrizicola</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Bacteroidota	Bacteroidia	Cytophagales	Cyclobacteriaceae	<i>Marinoscillum</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	<i>Gemmobacter</i>	<i>G. aquaticus</i>
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	NA	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Novosphingobium</i>	NA
Proteobacteria	Gammaproteobacteria	Xanthomonadales	Xanthomonadaceae	<i>Stenotrophomonas</i>	<i>S. maltophilia</i>
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	<i>Limimarricola</i>	NA
Bacteroidota	Bacteroidia	Flavobacteriales	Flavobacteriaceae	<i>Winogradskyella</i>	NA
Actinobacteriota	Thermoleophilii	Gaiellales	NA	NA	NA
Actinobacteriota	Actinobacteria	PeM15	NA	NA	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodospirillales	Magnetospiraceae	NA	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Pseudohongellaceae	<i>Pseudohongiella</i>	NA
Proteobacteria	Gammaproteobacteria	Xanthomonadales	Xanthomonadaceae	<i>Stenotrophomonas</i>	NA
Bacteroidota	Bacteroidia	Cytophagales	Cyclobacteriaceae	<i>Algoriphagus</i>	<i>A. aquacmariae</i>
Proteobacteria	Alphaproteobacteria	Rickettsiales	Fokiniaceae	NA	NA
Proteobacteria	Gammaproteobacteria	Xanthomonadales	Xanthomonadaceae	<i>Stenotrophomonas</i>	NA
Actinobacteriota	Actinobacteria	PeM15	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Sphingobium</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA

Table S3 continued

Phylum	Class	Order	Family	Genus	Species
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Proteobacteria	Alphaproteobacteria	Paracaedibacterales	Paracaedibacteraceae	<i>Candidatus Captivus</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Actinobacteriota	Actinobacteria	Corynebacteriales	Corynebacteriaceae	<i>Corynebacterium</i>	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Erythrobacter</i>	NA
Bacteroidota	Bacteroidia	Flavobacteriales	Cryomorphaceae	NA	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Proteobacteria	Gammaproteobacteria	Burkholderiales	Comamonadaceae	<i>Limnohabitans</i>	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Glade III	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	<i>Lentibacter</i>	<i>L. algarum</i>
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Porphyrobacter</i>	<i>P. sanguineus</i>
Actinobacteriota	Actinobacteria	Corynebacteriales	Mycobacteriaceae	<i>Mycobacterium</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	<i>Roseobacter</i>	NA
Firmicutes	Bacilli	Bacillales	Bacillaceae	Bacillus	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	<i>Yoonia-Loktanella</i>	NA
Bacteroidota	Bacteroidia	Chitinophagales	Saprosiraceae	NA	NA
Planctomycetota	Planctomycetes	Pirellulales	Pirellulaceae	NA	NA
Actinobacteriota	Actinobacteria	Frankiales	Sporichthyaceae	<i>hgcl clade</i>	NA
Proteobacteria	Gammaproteobacteria	Burkholderiales	Comamonadaceae	<i>Polaromonas</i>	NA
Proteobacteria	Gammaproteobacteria	Burkholderiales	Alcaligenaceae	NA	NA
Actinobacteriota	Actinobacteria	PeM15	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Anaplasmataceae	<i>Wolbachia</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Actinobacteriota	Thermoleophila	Solirubrobacterales	67-14	NA	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Moraxellaceae	<i>Alkanindiges</i>	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Proteobacteria	Alphaproteobacteria	NA	NA	NA	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Pseudomonadaceae	<i>Pseudomonas</i>	NA
Bacteroidota	Bacteroidia	Flavobacteriales	NS9 marine group	NA	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Croceicoccus</i>	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	NA	NA
Proteobacteria	Gammaproteobacteria	Pseudomonadales	Moraxellaceae	<i>Acinetobacter</i>	NA
Firmicutes	Clostridia	Peptostreptococcales-Tissierellales	Family XI	<i>Anaerococcus</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA

Table S3 continued

Phylum	Class	Order	Family	Genus	Species
Firmicutes	Bacilli	Lactobacillales	Streptococcaceae	<i>Streptococcus</i>	NA
Actinobacteriota	Actinobacteria	Frankiales	Sporichthyaceae	<i>hgcI clade</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Bacteroidota	Bacteroidia	Flavobacteriales	Flavobacteriaceae	<i>Gaetbulibacter</i>	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	Mitochondria	NA	NA
Proteobacteria	Alphaproteobacteria	Rickettsiales	NA	NA	NA
Proteobacteria	Alphaproteobacteria	SAR11 clade	Clade IV	NA	NA
Verrucomicrobiota	Verrucomicrobiae	Verrucomicrobiales	Rubritaleaceae	<i>Haloferrula</i>	NA
Cyanobacteria	Cyanobacteriia	Chloroplast	NA	NA	NA
Actinobacteriota	Actinobacteria	Propionibacteriales	Nocardioidaceae	<i>Nocardioides</i>	NA
Bacteroidota	Bacteroidia	Chitinophagales	Saprosiraceae	NA	NA
Proteobacteria	Gammaproteobacteria	Incertae Sedis	Incertae Sedis	<i>Marrnicella</i>	NA
Proteobacteria	Alphaproteobacteria	Kiloniellales	Kiloniellaceae	NA	NA
Actinobacteriota	Actinobacteria	Propionibacteriales	Propionibacteriaceae	NA	NA
Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomonadaceae	<i>Altererythrobacter</i>	NA
Bacteroidota	Bacteroidia	Flavobacteriales	Flavobacteriaceae	<i>Flavobacterium</i>	NA
Bacteroidota	Bacteroidia	Sphingobacteriales	Sphingobacteriaceae	<i>Pedobacter</i>	NA

Table S3 continued

S5 Supplementary figures

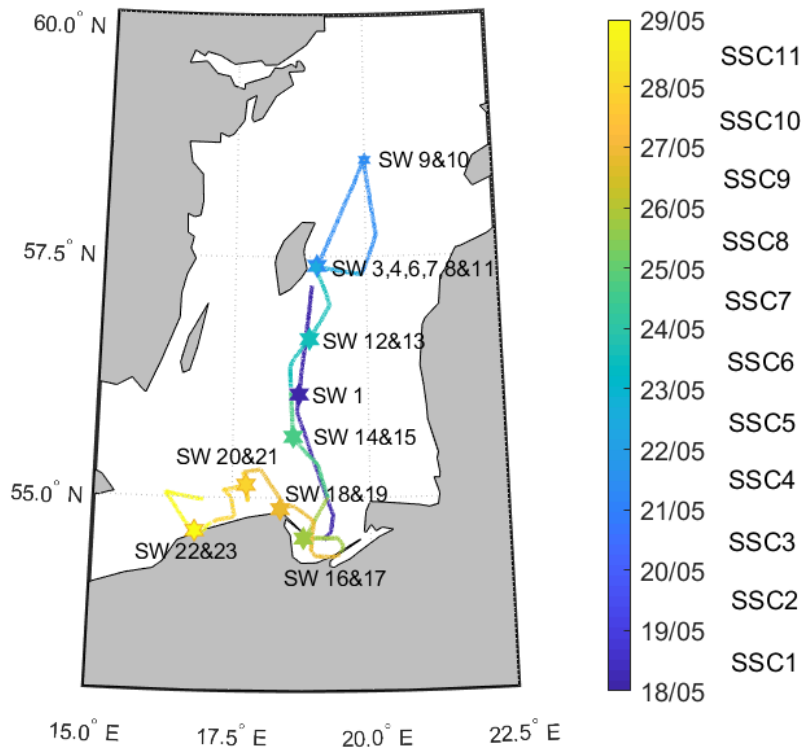


Figure S1: Cruise track during the *Oceania* campaign in May 2021. The color-code indicates where each sea spray chamber (SSC) experiment was conducted, the stars mark location where the seawater samples were collected.

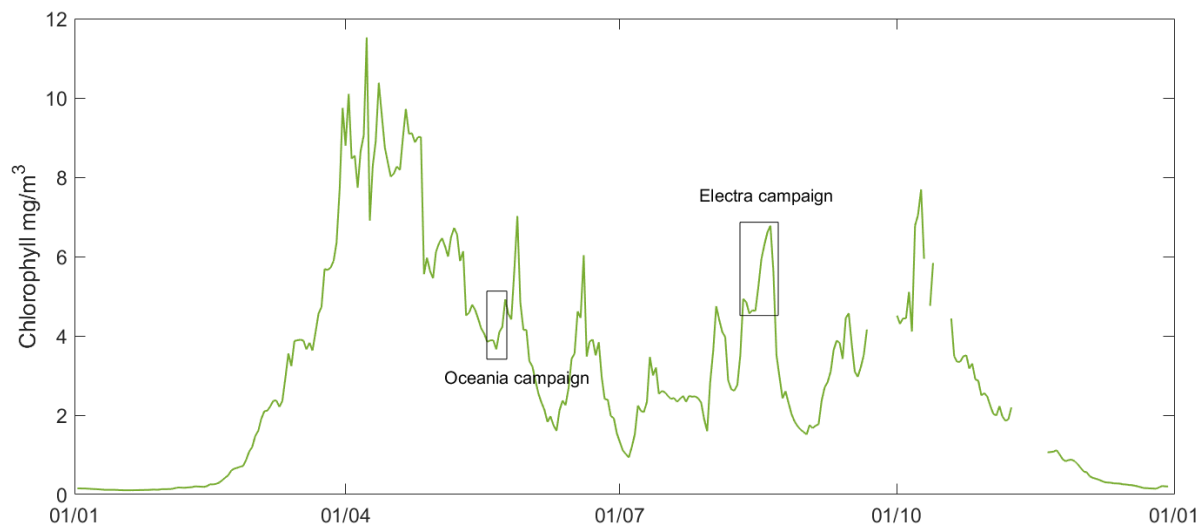


Figure S2: Yearly time series of daily average chlorophyll-*a* concentrations in the surface seawater close to Östergarnsholm island obtained from re-analysis data from 2021.

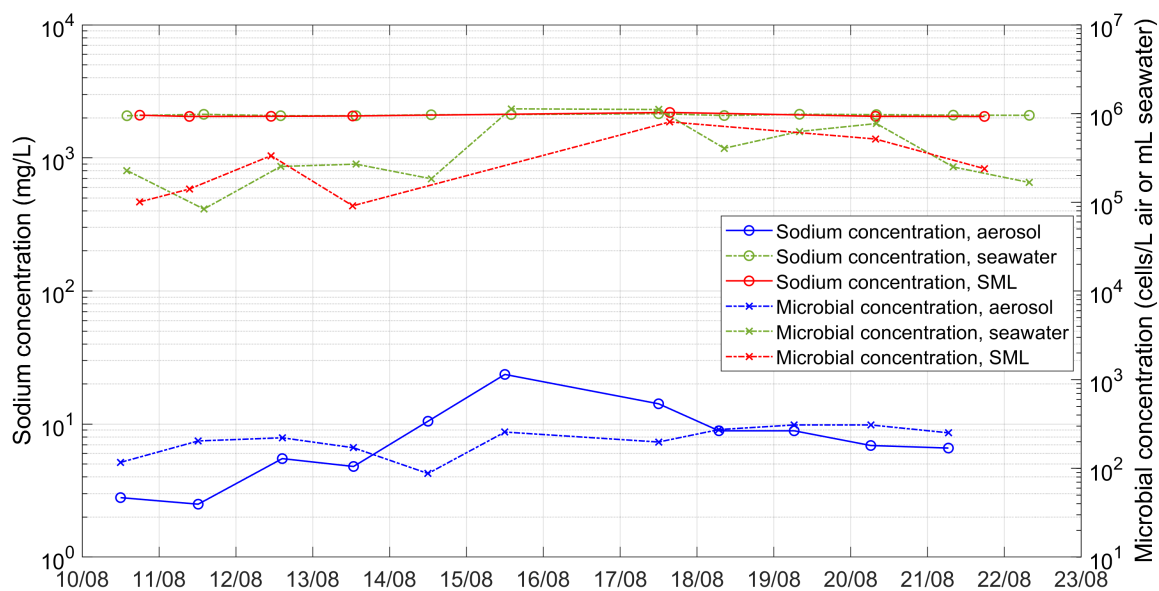


Figure S3: Time series of microbial cell abundance and sodium concentrations in the aerosol and seawater samples during the *Electra* campaign in August 2021.

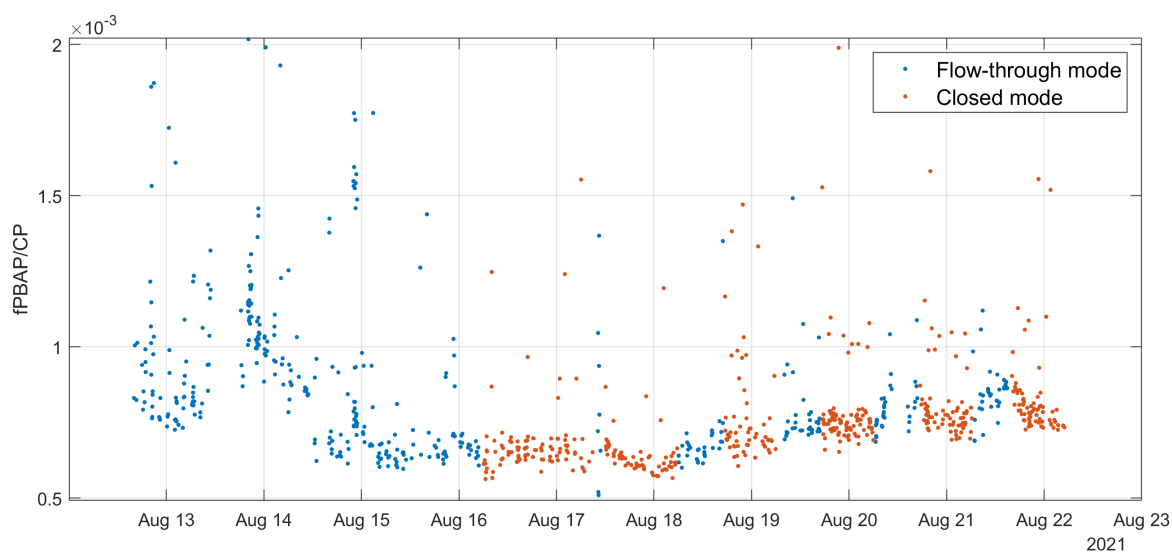


Figure S4: Time series of the ratio of fPBAP to coarse particles (CP) during the *Electra* campaign in August 2021. Times when the chamber was operated in flow-through mode are marked in blue and closed-mode periods are marked in orange.

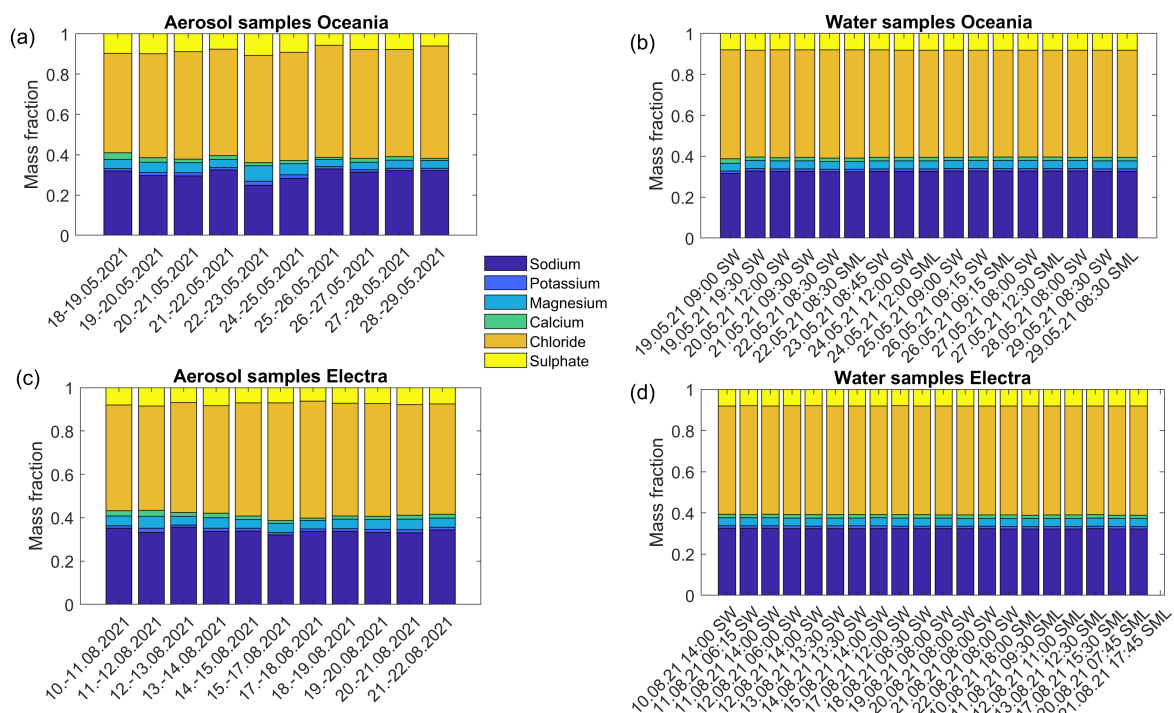


Figure S5: Mass fractions of ionic compounds from IC measurements in (a) aerosol and (b) water samples from the *Oceania* campaign in May 2021 and (c) aerosol and (d) water samples from the *Electra* campaign in August 2021.

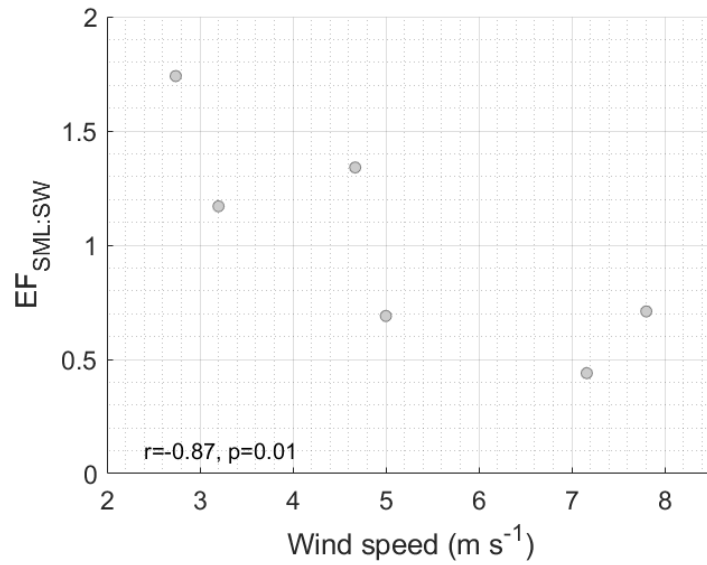


Figure S6: Microbial enrichment factor in the SML compared to underlying SW versus wind speed during the *Electra* campaign in August 2021.

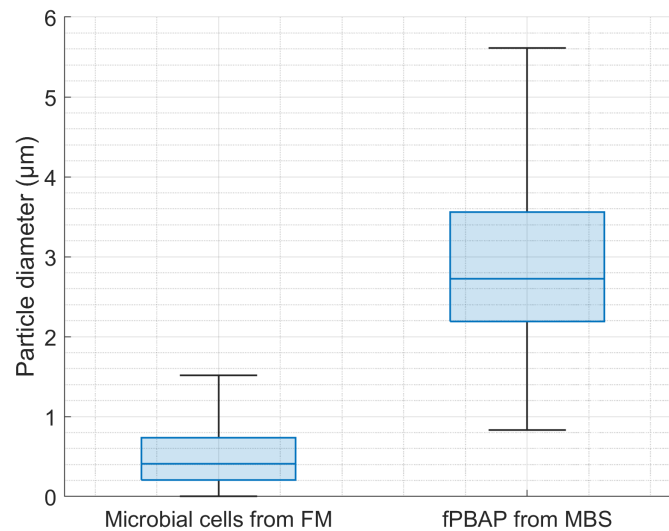


Figure S7: Boxplot of cell diameters obtained from fluorescence microscopy (FM) and optical diameters of fluorescent primary biological aerosol particles (fPBAP) obtained from the multiparameter bioaerosol spectrometer (MBS) measurements in August 2021.

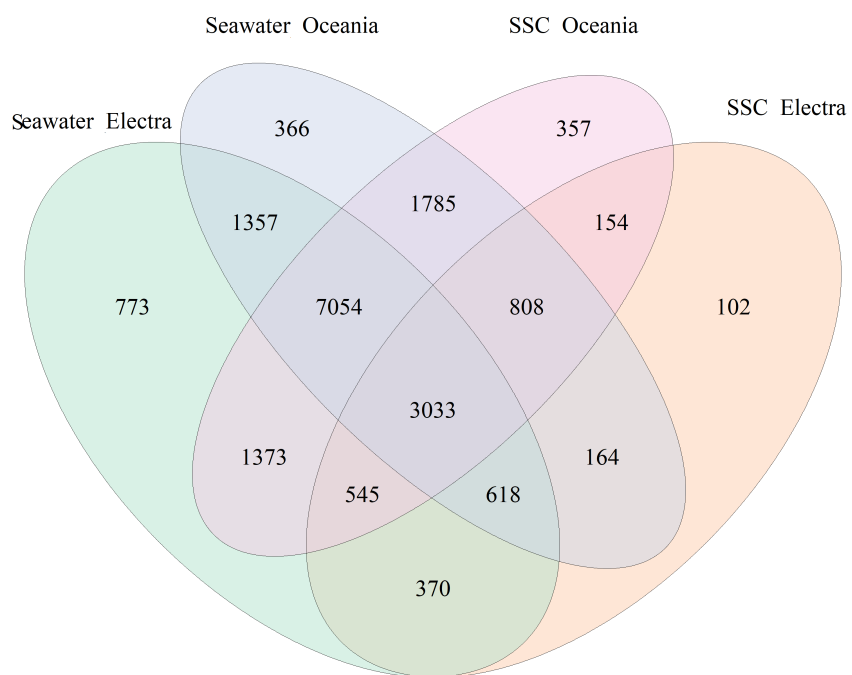


Figure S8: Venn diagram indicating shared taxa (ASVs) between seawater samples and chamber aerosol samples (SSC) between the two campaigns.

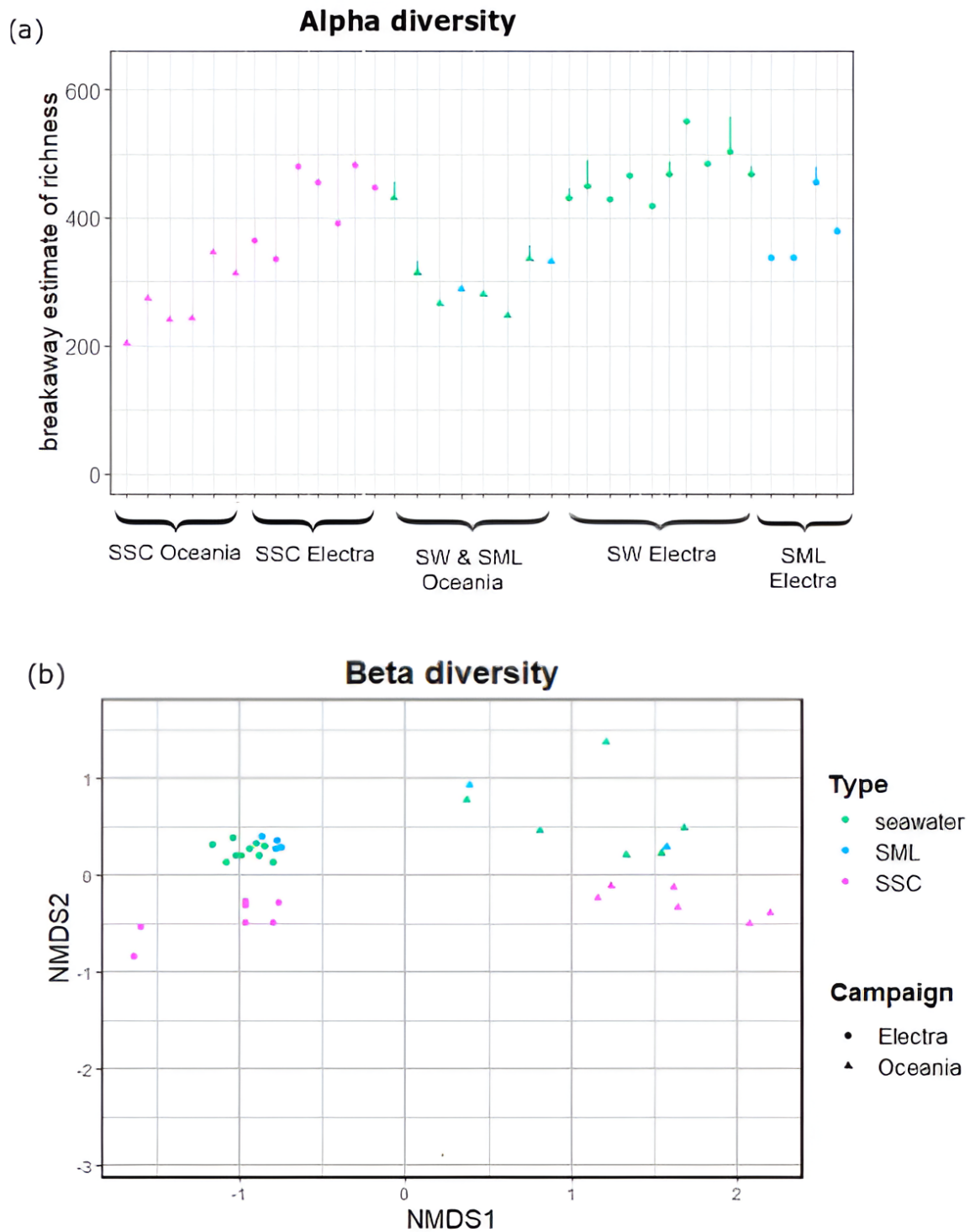


Figure S9: (a) Observed alpha and (b) beta diversity of sea spray chamber aerosol (SSC), bulk seawater (SW) and surface microlayer (SML) for both campaigns with corresponding sampling dates. The beta diversity was estimated based on non-metric multidimensional scaling of Bray-Curtis dissimilarity.

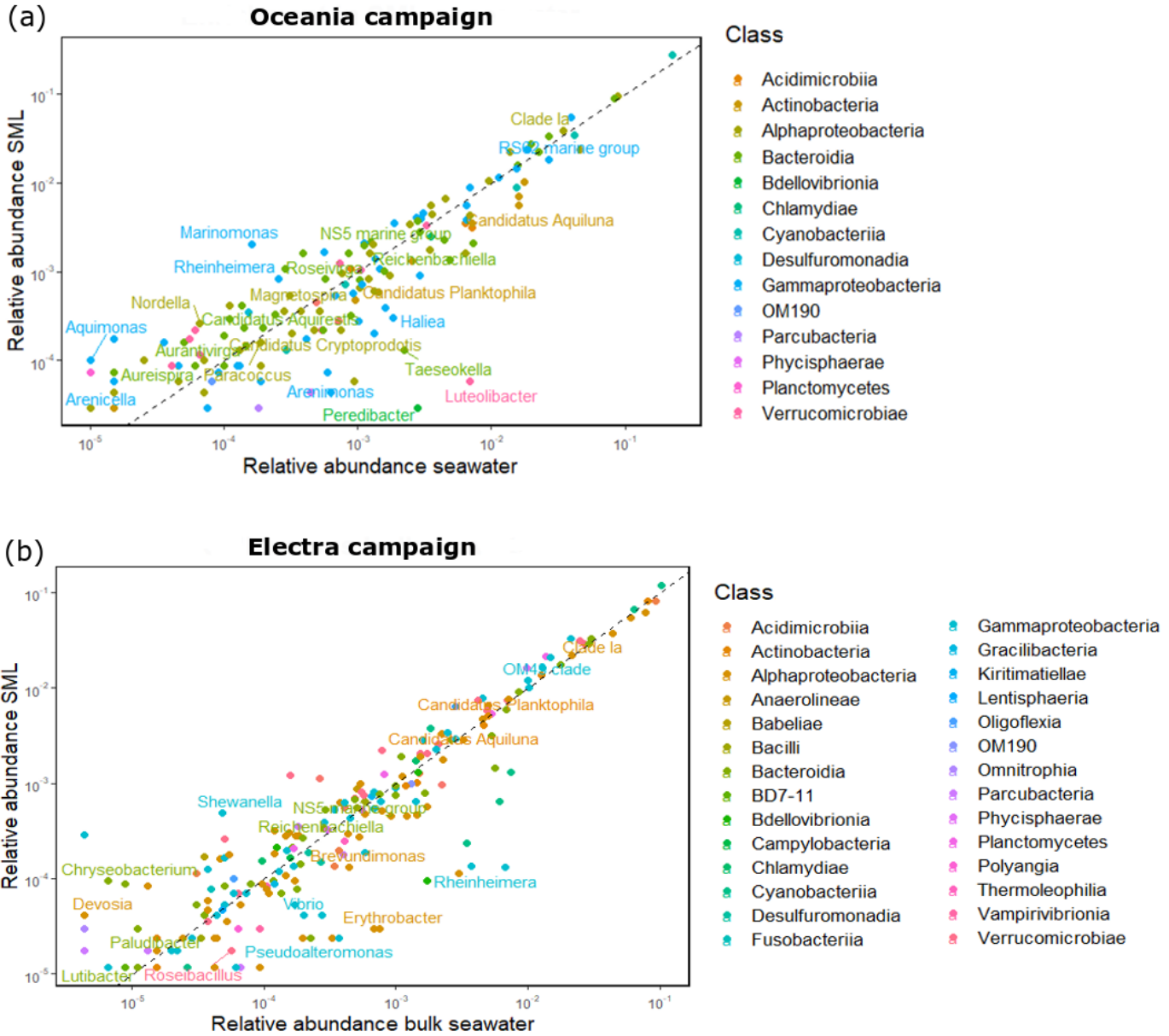


Figure S10: Enrichment of ASVs in the SML compared to the bulk seawater during (a) the *Oceania* campaign and (b) the *Electra* campaign. Colors represent different bacteria classes. The dashed line indicates the 1:1 line. A number of selected genera names is shown in each panel.

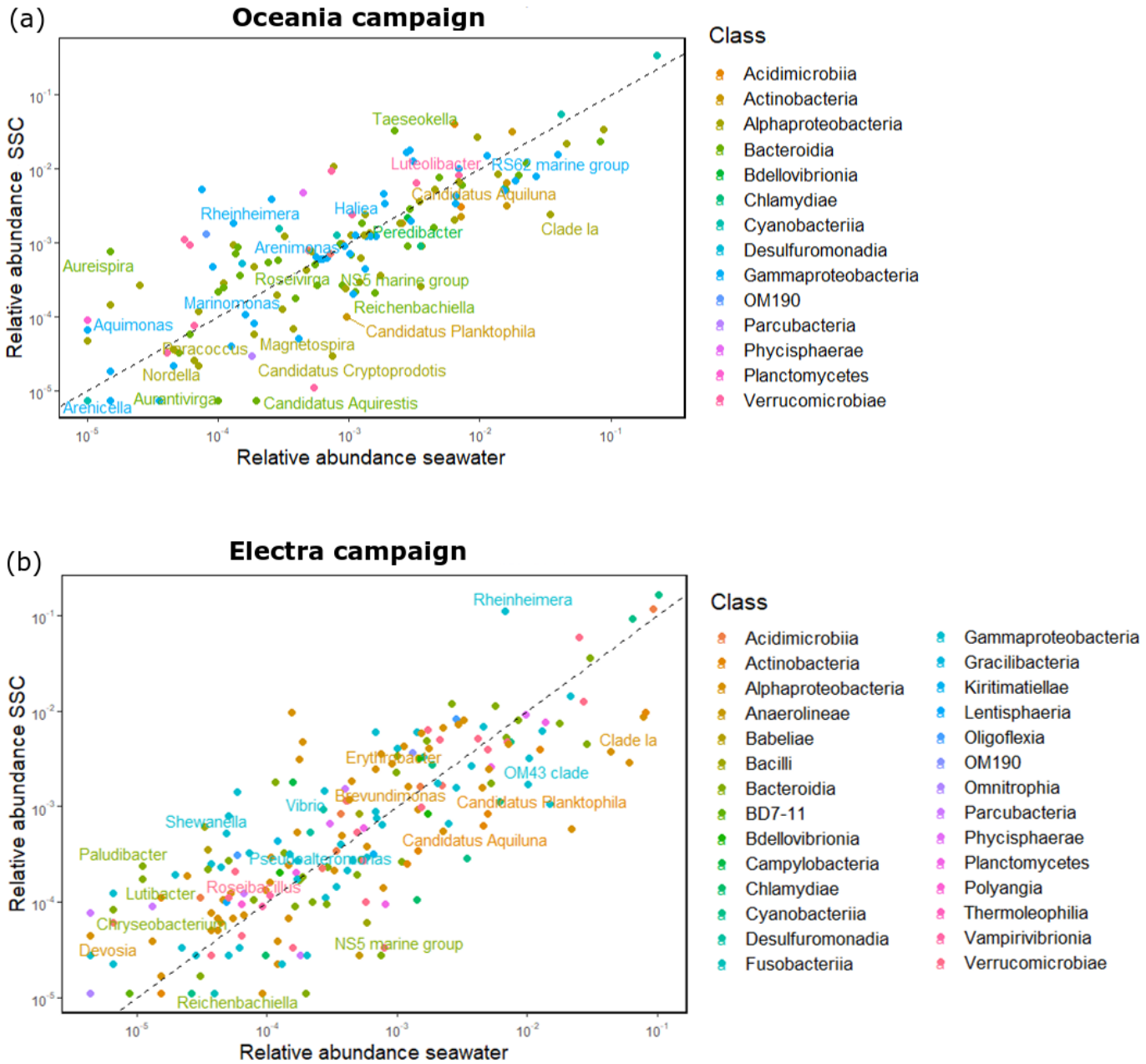


Figure S11: Enrichment of ASVs in the aerosol in the head space of the sea spray chamber compared to the bulk seawater during (a) the *Oceania* campaign and (b) the *Electra* campaign. Colors represent different bacteria classes. The dashed line indicates the 1:1 line. A number of selected genera names is shown in each panel.

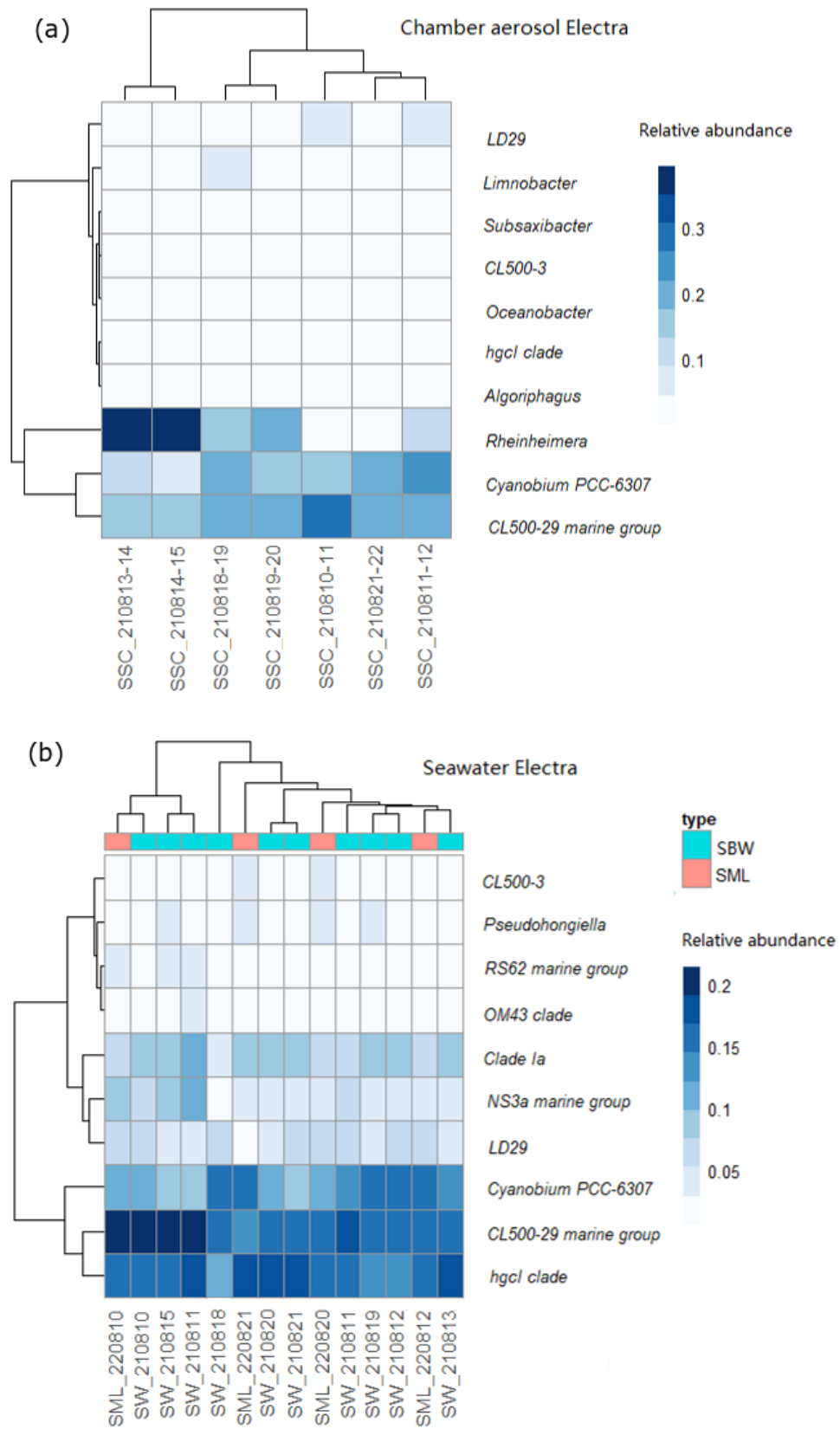


Figure S12: Relative abundance of the 10 most abundant taxa (on genus level) in (a) chamber aerosol samples (SSC), (b) bulk seawater (SW) and surface microlayer (SML) samples collected during the *Electra* campaign.

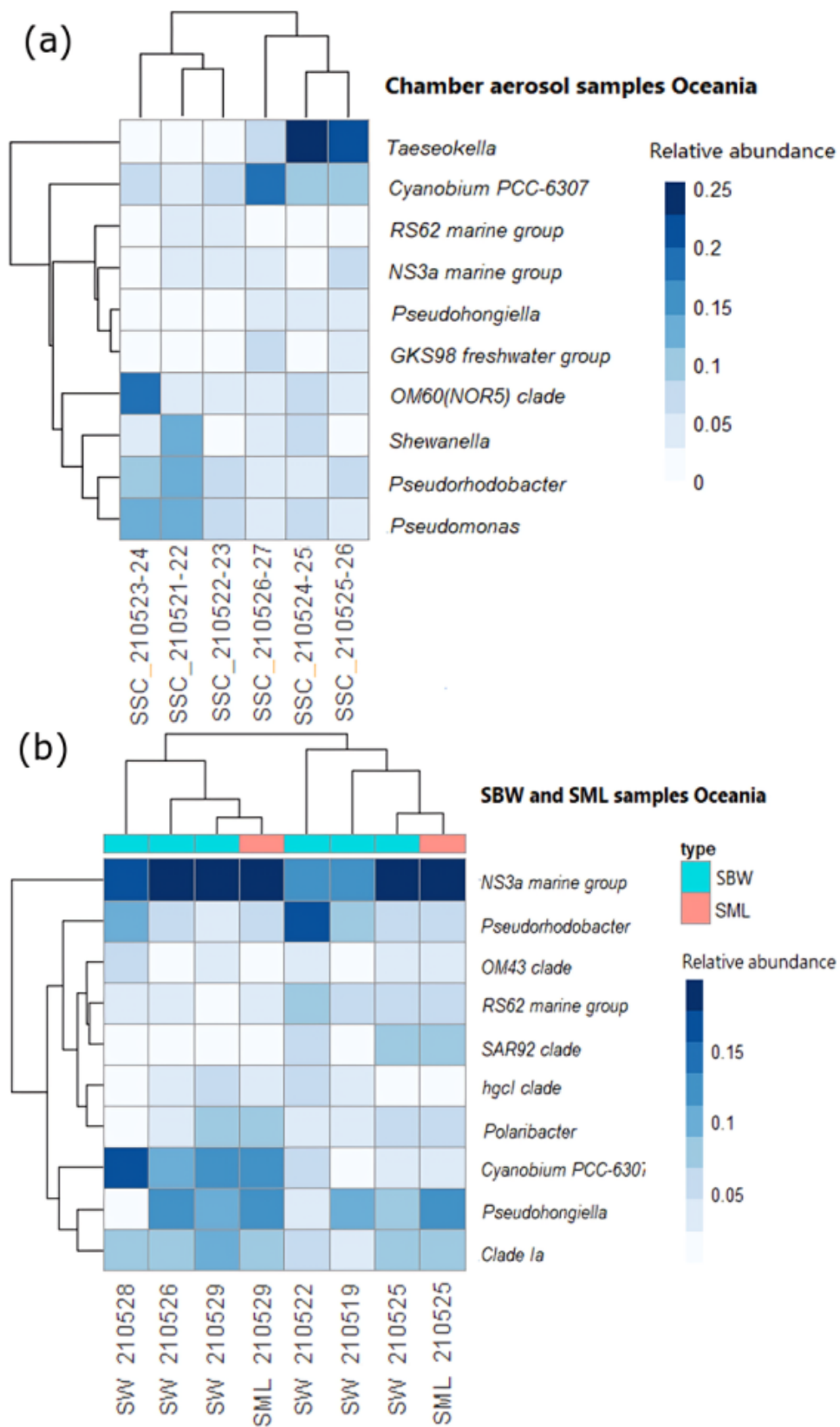


Figure S13: Relative abundance of the 10 most abundant taxa (on genus level) in (a) chamber aerosol samples (SSC) and (b) bulk and surface microlayer seawater samples collected during the *Oceania* campaign.

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