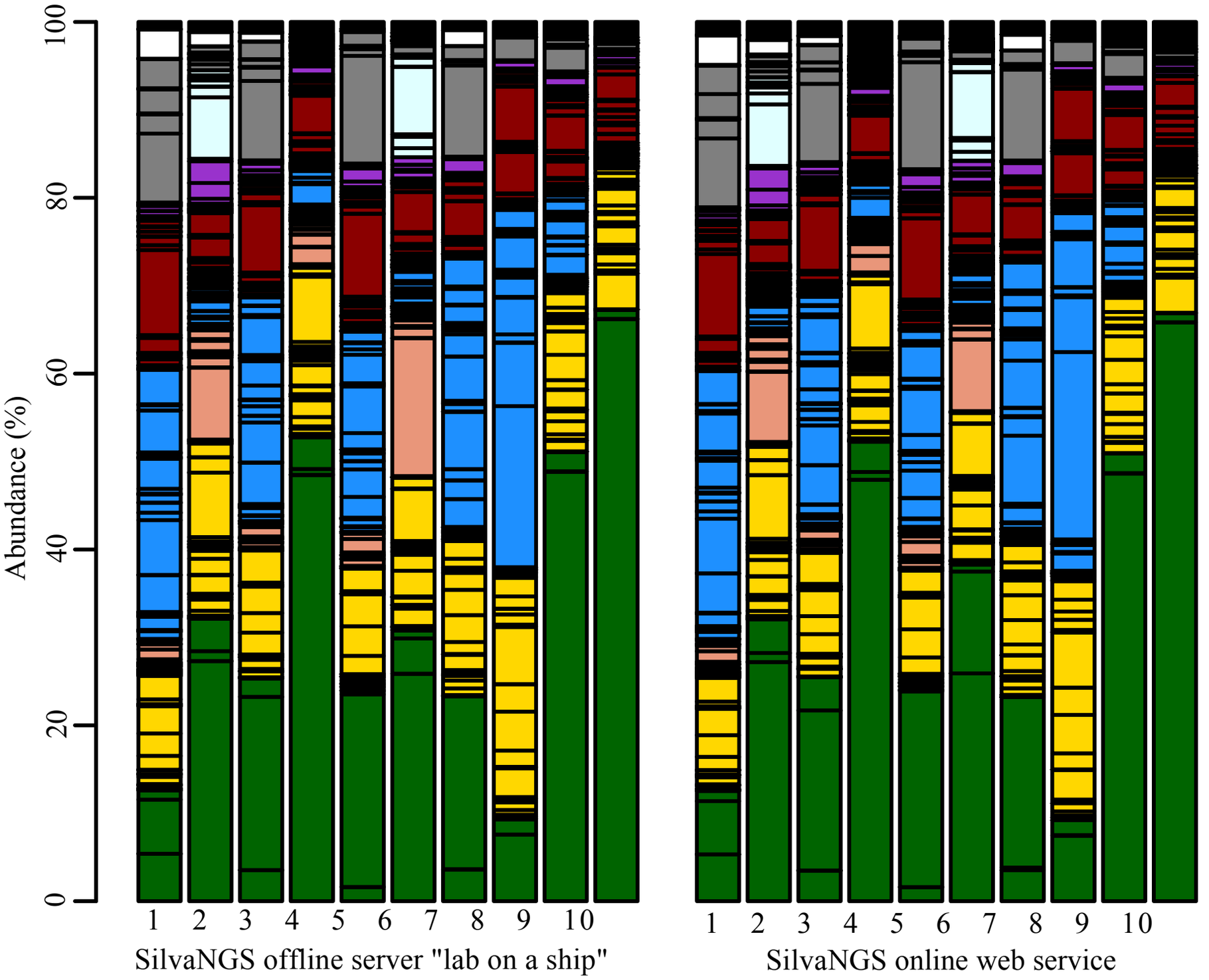
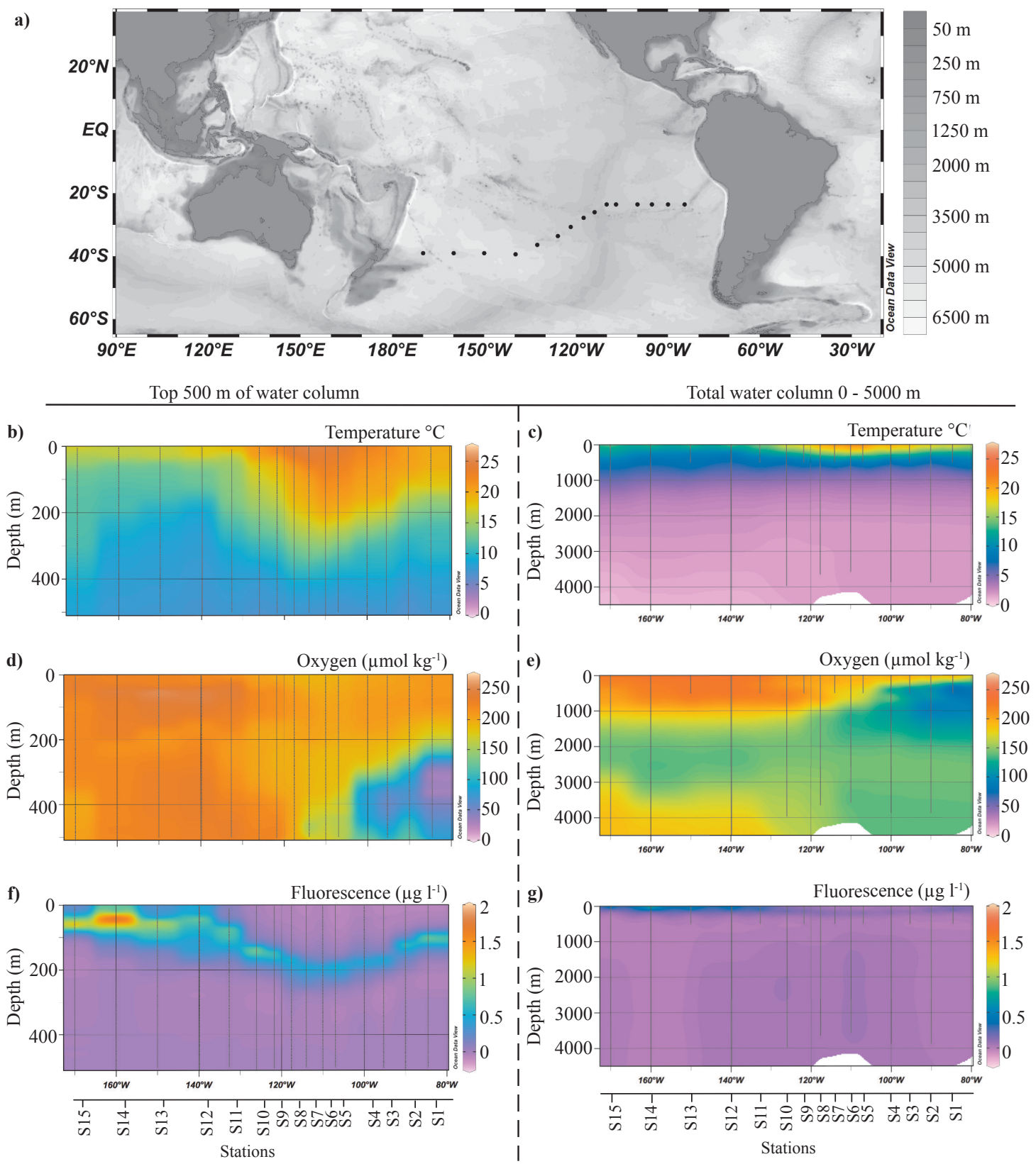
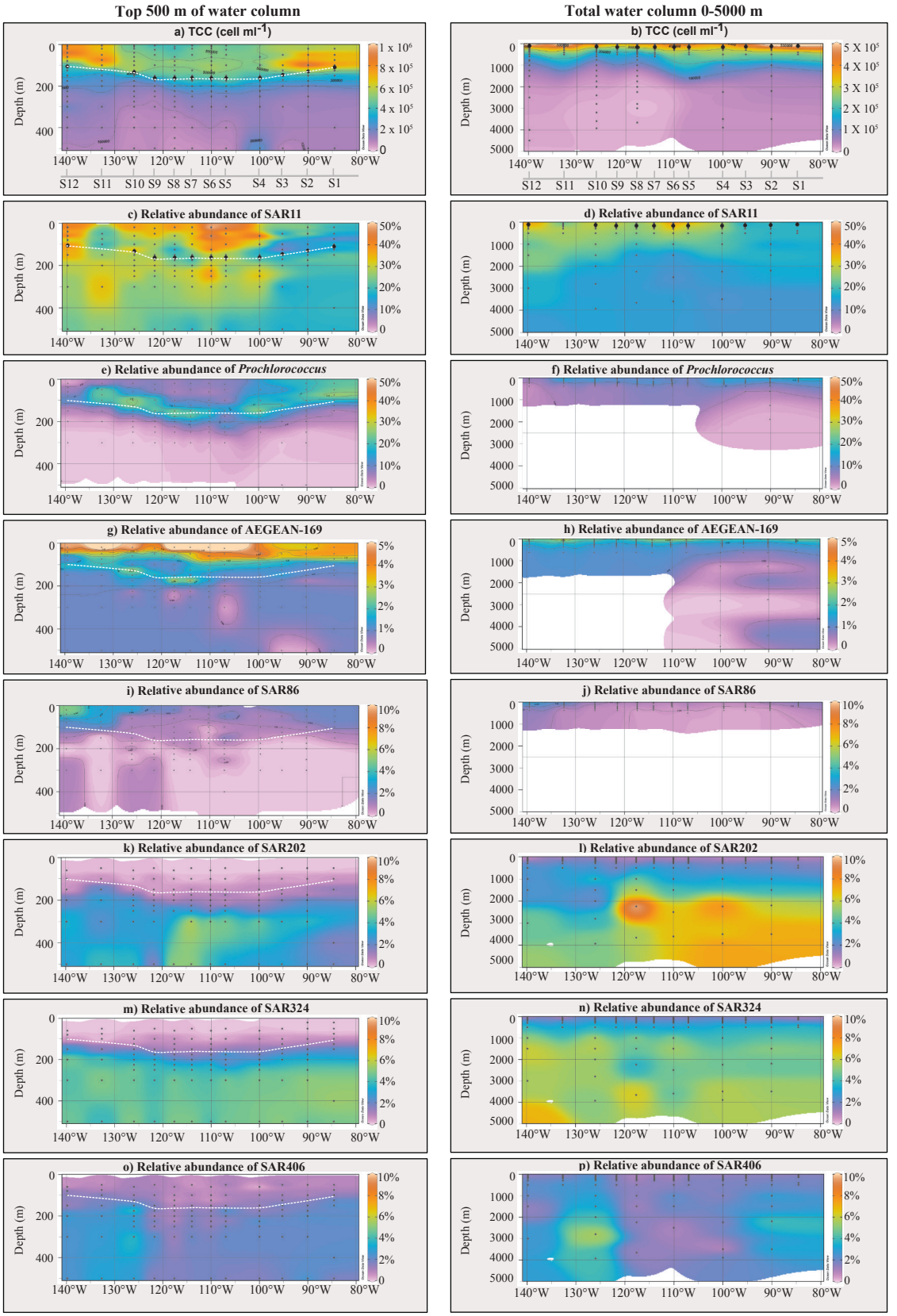


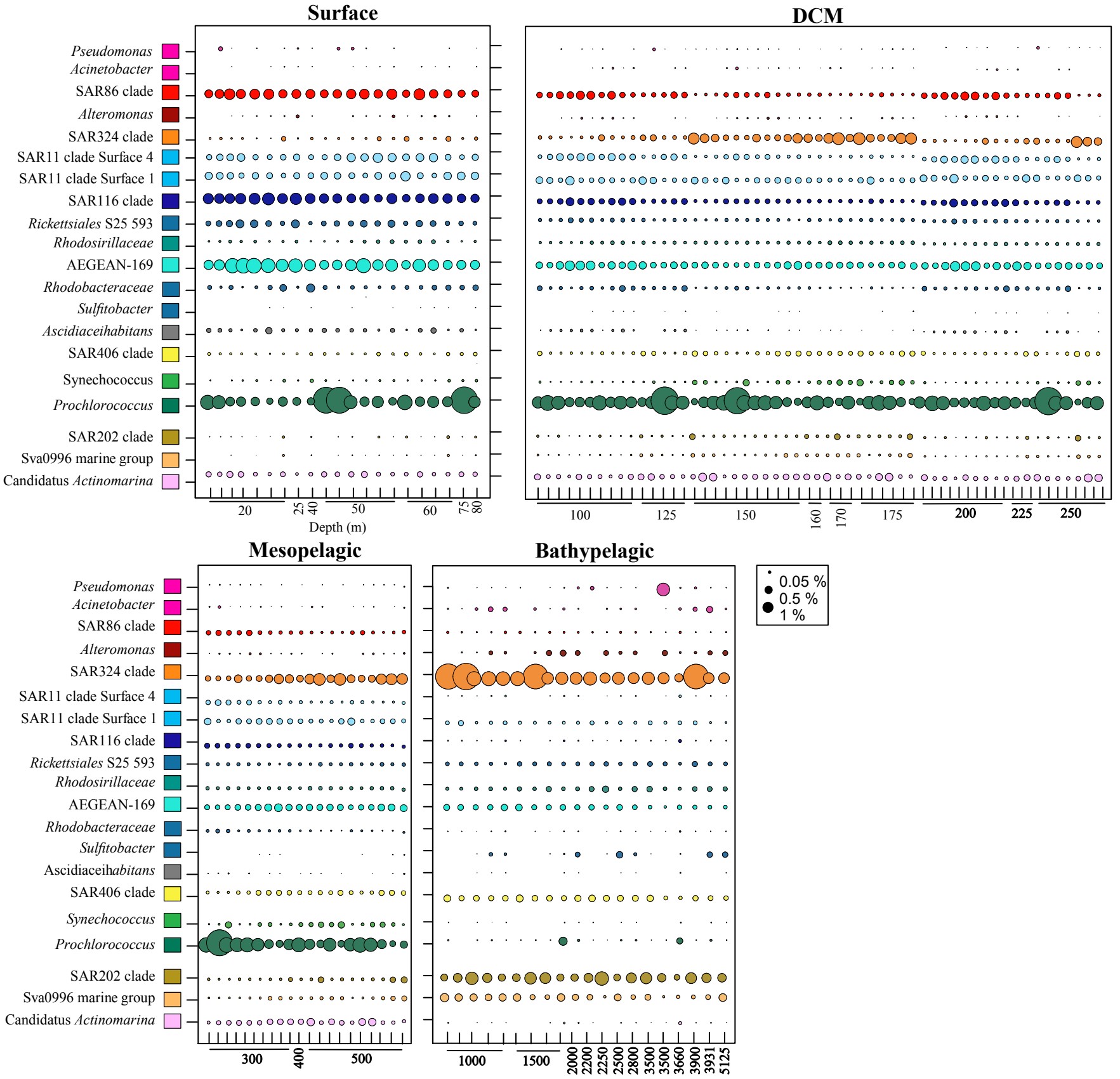
Supplementary Figure S1. Bar chart of the bacterial community composition obtained from the analysis of 10 mock communities (labelled 1 - 10) on two versions of the SILVAngs pipeline (right: online web service at www.arb-silva-de, left: offline server "lab on a ship"). Sequences were classified to genus level and color-coded at the phylum level: green = *Cyanobacteria*, yellow = *Bacteroidetes,* *beige* = Other *Proteobacteria,* blue = *Alphaproteobacteria,* red = *Gammaproteobacteria,* purple = *Verrucromicrobia,* light blue = *Planctomycetes,* grey = other bacteria, white = *Archaea* and black = No relative.



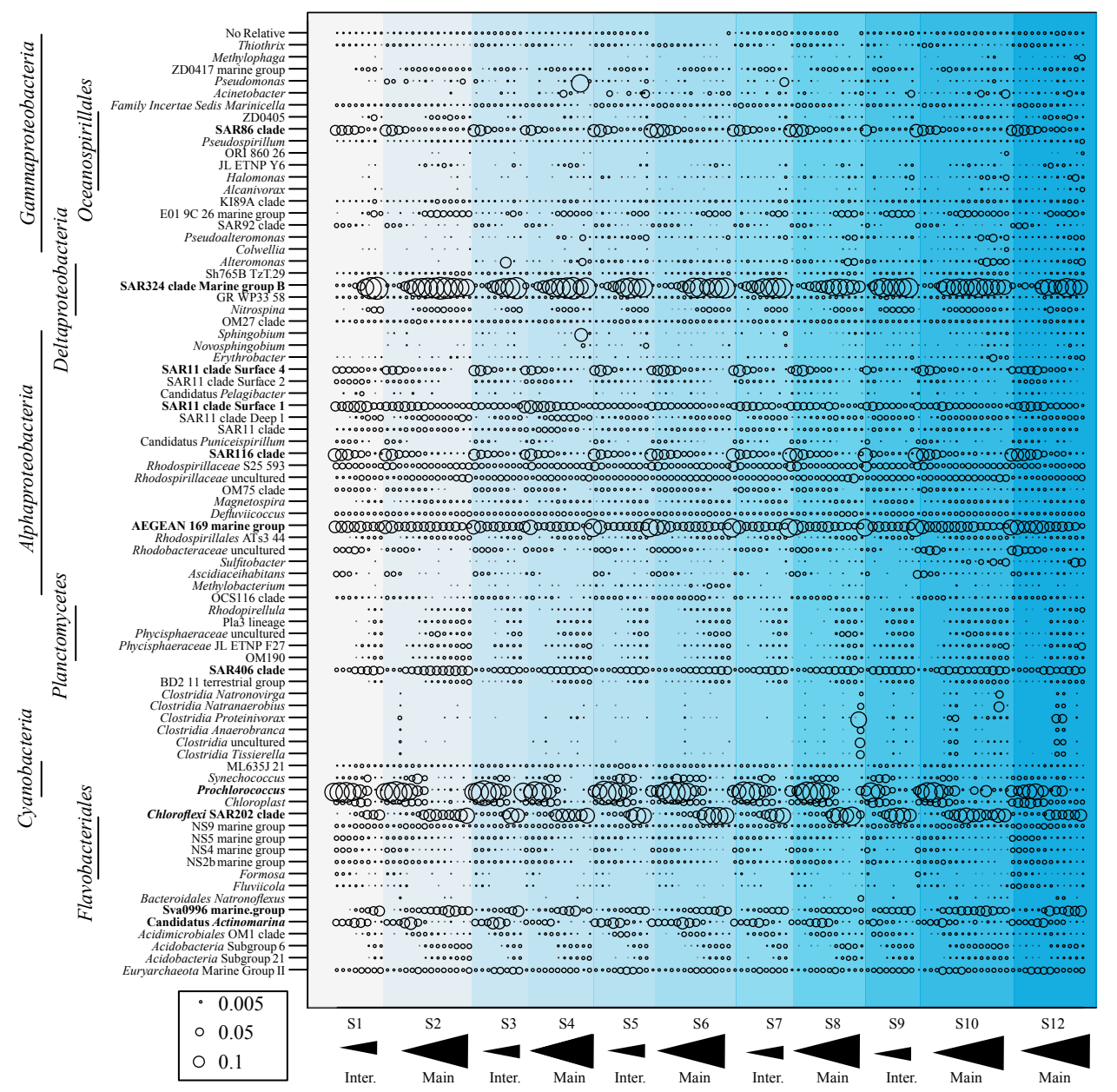
Supplementary Figure S2. a) Map of all 15 stations sampled during the SO245 "Ultrapac" cruise. b - g) Contour plots derived from CTD measurements at all 15 stations during the SO245 cruise. The plots show physico-chemical data from 0 - 500 m (b, d, f) and 0 - 4500 m (c, e, g). b&c) Temperature with depth (°C). d&e) Oxygen concentration with depth (µmol kg^{-1}). f&g) Calculated fluorescence (µg L^{-1}). The stations are indicated on the axis below the plots. All data is publicly available from Pangaea: https://doi.org/10.1594/PANGAEA.870806 (Zielinski et al. 2017).



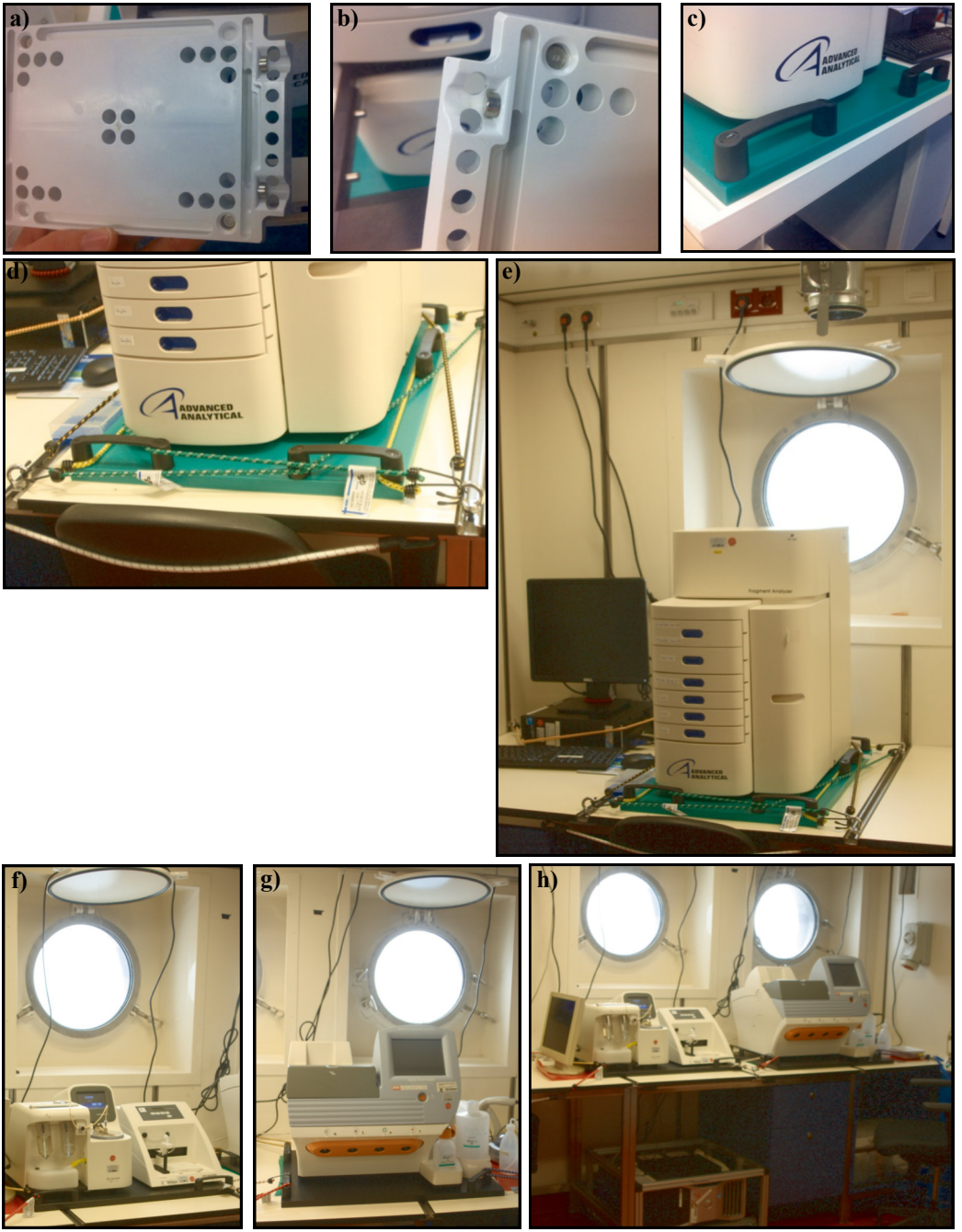
Supplementary Figure S3. Contour plots of a&b) total cell counts (cells ml^{-1}) and d-p) relative abundance (percentage of total cell counts) enumerated by FISH of SAR11, *Prochlorococcus,* AEGEAN-169 marine group, SAR86, SAR202, SAR324 and SAR406. Plots on the left show relative abundance of each bacterial clades from 0 - 500m and plots on the right show the relative abundance of each bacterial clade from 0- 5000 m. Black dots indicate the sample location. The stations and longitude are indicated on the axis below the plots. All data is publicly available from Pangaea: https://doi.pangaea.de/10.1594/PANGAEA.882015 (Reintjes et al. 2017).



Supplementary Figure S4. Bubble plots showing the relative read abundance of the 20 most abundant bacterial clade in all 147 samples sequenced directly onboard the RV Sonne during the SO245 cruise (minimum abundance of 0.5% in at least 2 samples). The size of the bubble indicates the relative read abundance (%) of each genus normalized against the total read abundance in each sample. Each vertical row of bubbles shows the microbial composition of a sample from a specific station at a specific depth. Samples from the same depth at different stations are groups together and displayed sequentially. The samples are displayed by depth zone: surface 20 - 80m, DCM 100 - 250 m, mesopelagic 300 - 500 m, and bathypelagic 1000 - 5125 m. The bacterial clades are color-coded according to the legend.



Supplementary Figure S5. Bubble plot of bacterial and archaeal genera with a minimum relative read abundance of 0.001 in at least one station. The size of the bubbles indicates the average relative read abundance of each genus normalised against the total abundance. Each vertical row of bubbles shows the microbial composition of a sample from a specific station at a specific depth. The station names (S1 – S12) are located under the sections and each station is coloured in a different blue tone. Main (20 – 5000 m) and intermediate (20 – 500 m) stations are indicated by large and small black triangles, respectively. The triangles orientation indicates the increase in depth (shallow to deep).



Supplementary Figure S6. Images showing the alterations of the Fragments Analyser (AATI), Ion Torrent PGM (Thermo Fisher) and Ion Torrent OT2 (Thermo Fisher) to enable onboard use. a & b) Images of the fragment analyser sampling trays with attached magnets to prevent accidental dropping. c) Image of 2 cm thick polyethylene base plate (green) with handles for secure placement and easy transport. d & e) Images of fragment analyser securely attached to ship working surface using bungee cords to prevent accidental movement during ship pitch and roll movements. f –h) Images of secured Ion Torrent PGM, Ion Torrent OT2 and ES with attached 2 cm thick polyethylene base plate (green or black) with handles for secure placement and easy transport.

Supplementary Table S1: List of stations sampled. Samples taken for a) 16s rRNA tag sequencing analysis at different depths during the SO245 cruise and, b) cell enumeration and FISH.

a) Samples taken for 16s rRNA tag sequencing						
Station No.	Station type	Station Cruise ID	Collection date	Latitude [degree north]	Longitude [degree east]	Depth [m]
1	Intermediate	SO245-01-01	25.12.15	-23.503	-84.562	20
1	Intermediate	SO245-01-01	25.12.15	-23.503	-84.562	50
1	Intermediate	SO245-01-01	25.12.15	-23.503	-84.562	75
1	Intermediate	SO245-01-01	25.12.15	-23.503	-84.562	100
1	Intermediate	SO245-01-01	25.12.15	-23.503	-84.562	125
1	Intermediate	SO245-01-01	25.12.15	-23.503	-84.562	150
1	Intermediate	SO245-01-01	25.12.15	-23.503	-84.562	400
1	Intermediate	SO245-01-01	25.12.15	-23.503	-84.562	500
2	Main	SO245-02-12	27.12.15	-23.517	-90.029	20
2	Main	SO245-02-12	27.12.15	-23.517	-90.029	50
2	Main	SO245-02-12	27.12.15	-23.517	-90.029	100
2	Main	SO245-02-10	27.12.15	-23.517	-90.029	125
2	Main	SO245-02-10	27.12.15	-23.517	-90.029	150
2	Main	SO245-02-10	27.12.15	-23.517	-90.029	175
2	Main	SO245-02-10	27.12.15	-23.517	-90.029	200
2	Main	SO245-02-10	27.12.15	-23.517	-90.029	250
2	Main	SO245-02-10	27.12.15	-23.517	-90.029	300
2	Main	SO245-02-05	27.12.15	-23.492	-90.029	500
2	Main	SO245-02-05	27.12.15	-23.492	-90.029	1000
2	Main	SO245-02-02	27.12.15	-23.492	-90.029	1500
2	Main	SO245-02-02	27.12.15	-23.492	-90.029	2200
2	Main	SO245-02-02	27.12.15	-23.492	-90.029	3500
3	Intermediate	SO245-03-01	29.12.15	-23.499	-95.295	50
3	Intermediate	SO245-03-01	29.12.15	-23.499	-95.295	100
3	Intermediate	SO245-03-01	29.12.15	-23.499	-95.295	125
3	Intermediate	SO245-03-01	29.12.15	-23.499	-95.295	150
3	Intermediate	SO245-03-01	29.12.15	-23.499	-95.295	170
3	Intermediate	SO245-03-01	29.12.15	-23.499	-95.295	200
3	Intermediate	SO245-03-01	29.12.15	-23.499	-95.295	300
3	Intermediate	SO245-03-01	29.12.15	-23.499	-95.295	500
4	Main	SO245-04-13	31.12.15	-23.501	-99.992	50
4	Main	SO245-04-13	31.12.15	-23.501	-99.992	100
4	Main	SO245-04-11	31.12.15	-23.501	-99.992	150
4	Main	SO245-04-11	31.12.15	-23.501	-99.992	175
4	Main	SO245-04-11	31.12.15	-23.501	-99.992	200
4	Main	SO245-04-11	31.12.15	-23.501	-99.992	250
4	Main	SO245-04-11	31.12.15	-23.501	-99.992	300
4	Main	SO245-04-07	31.12.15	-23.501	-99.992	500

4	Main	SO245-04-07	31.12.15	-23.5	-100	1000
4	Main	SO245-04-01	30.12.15	-23.5	-100	3500
4	Main	SO245-04-01	30.12.15	-23.5	-100	3900
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	50
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	100
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	150
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	175
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	200
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	225
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	250
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	300
5	Intermediate	SO245-05-01	02.01.16	-23.497	-107.002	500
6	Main	SO245-06-11	04.01.16	-23.5	-110.049	20
6	Main	SO245-06-11	04.01.16	-23.5	-110.049	60
6	Main	SO245-06-11	03.01.16	-23.5	-110.049	100
6	Main	SO245-06-11	03.01.16	-23.5	-110.049	125
6	Main	SO245-06-08	03.01.16	-23.49	-110.039	150
6	Main	SO245-06-08	03.01.16	-23.49	-110.039	175
6	Main	SO245-06-08	03.01.16	-23.49	-110.039	200
6	Main	SO245-06-08	03.01.16	-23.49	-110.039	225
6	Main	SO245-06-08	03.01.16	-23.49	-110.039	250
6	Main	SO245-06-08	03.01.16	-23.49	-110.039	300
6	Main	SO245-06-03	03.01.16	-23.5	-110.049	500
6	Main	SO245-06-03	03.01.16	-23.5	-110.049	1000
6	Main	SO245-06-01	03.01.16	-23.5	-110.049	1500
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	20
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	50
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	100
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	125
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	150
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	175
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	200
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	250
7	Intermediate	SO245-07-01	06.01.16	-25.982	-114.009	300
8	Main	SO245-08-04	08.01.16	-27.741	-117.62	20
8	Main	SO245-08-04	08.01.16	-27.741	-117.62	50
8	Main	SO245-08-04	08.01.16	-27.741	-117.62	100
8	Main	SO245-08-04	08.01.16	-27.741	-117.62	150
8	Main	SO245-08-04	08.01.16	-27.741	-117.62	160
8	Main	SO245-08-04	08.01.16	-27.741	-117.62	170
8	Main	SO245-08-04	08.01.16	-27.742	-117.62	200
8	Main	SO245-08-04	08.01.16	-27.742	-117.62	250
8	Main	SO245-08-04	08.01.16	-27.742	-117.62	300
8	Main	SO245-08-07	08.01.16	-27.742	-117.62	20
8	Main	SO245-08-07	08.01.16	-27.742	-117.62	50
8	Main	SO245-08-07	08.01.16	-27.741	-117.62	100

8	Main	SO245-08-07	08.01.16	-27.742	-117.62	150
8	Main	SO245-08-07	08.01.16	-27.741	-117.62	160
8	Main	SO245-08-07	08.01.16	-27.742	-117.62	170
8	Main	SO245-08-07	08.01.16	-27.742	-117.62	200
8	Main	SO245-08-07	08.01.16	-27.741	-117.62	250
8	Main	SO245-08-07	08.01.16	-27.742	-117.62	300
8	Main	SO245-08-09	08.01.16	-27.741	-117.62	20
8	Main	SO245-08-09	08.01.16	-27.742	-117.62	50
8	Main	SO245-08-09	08.01.16	-27.742	-117.62	100
8	Main	SO245-08-09	08.01.16	-27.741	-117.62	150
8	Main	SO245-08-09	08.01.16	-27.742	-117.62	160
8	Main	SO245-08-09	08.01.16	-27.741	-117.62	170
8	Main	SO245-08-09	08.01.16	-27.742	-117.62	200
8	Main	SO245-08-09	08.01.16	-27.742	-117.62	250
8	Main	SO245-08-09	08.01.16	-27.741	-117.62	300
8	Main	SO245-08-16	08.01.16	-27.742	-117.62	20
8	Main	SO245-08-16	08.01.16	-27.741	-117.62	50
8	Main	SO245-08-16	08.01.16	-27.742	-117.62	100
8	Main	SO245-08-16	08.01.16	-27.742	-117.62	150
8	Main	SO245-08-16	08.01.16	-27.741	-117.62	160
8	Main	SO245-08-16	08.01.16	-27.742	-117.62	170
8	Main	SO245-08-16	08.01.16	-27.741	-117.62	200
8	Main	SO245-08-16	08.01.16	-27.742	-117.62	250
8	Main	SO245-08-16	08.01.16	-27.742	-117.62	300
8	Main	SO245-08-05	08.01.16	-27.741	-117.62	500
8	Main	SO245-08-01	08.01.16	-27.742	-117.62	1500
8	Main	SO245-08-01	08.01.16	-27.741	-117.62	2250
8	Main	SO245-08-01	08.01.16	-27.741	-117.62	3660
9	Intermediate	SO245-09-01	09.01.16	-30.632	-121.763	25
9	Intermediate	SO245-09-01	09.01.16	-30.632	-121.763	150
9	Intermediate	SO245-09-01	09.01.16	-30.632	-121.763	175
9	Intermediate	SO245-09-01	09.01.16	-30.632	-121.763	200
9	Intermediate	SO245-09-01	09.01.16	-30.632	-121.763	225
9	Intermediate	SO245-09-01	09.01.16	-30.632	-121.763	250
9	Intermediate	SO245-09-01	09.01.16	-30.632	-121.763	300
9	Intermediate	SO245-09-01	09.01.16	-30.632	-121.763	500
10	Main	SO245-10-10	10.01.16	-33.503	-126.008	20
10	Main	SO245-10-10	10.01.16	-33.503	-126.008	60
10	Main	SO245-10-10	10.01.16	-33.503	-126.008	100
10	Main	SO245-10-10	10.01.16	-33.503	-126.008	125
10	Main	SO245-10-06	10.01.16	-33.503	-126.008	150
10	Main	SO245-10-06	10.01.16	-33.503	-126.008	175
10	Main	SO245-10-06	10.01.16	-33.503	-126.008	200
10	Main	SO245-10-06	10.01.16	-33.503	-126.008	250
10	Main	SO245-10-06	10.01.16	-33.503	-126.008	300
10	Main	SO245-10-03	10.01.16	-33.503	-126.008	500

10	Main	SO245-10-03	10.01.16	-33.503	-126.008	1000
10	Main	SO245-10-01	10.01.16	-33.503	-126.008	1500
10	Main	SO245-10-01	10.01.16	-33.503	-126.008	2000
10	Main	SO245-10-01	10.01.16	-33.503	-126.008	2800
10	Main	SO245-10-01	10.01.16	-33.503	-126.008	3931
12	Main	SO245-12-14	16.01.16	-39.31	-139.81	20
12	Main	SO245-12-14	16.01.16	-39.31	-139.81	40
12	Main	SO245-12-14	16.01.16	-39.31	-139.81	60
12	Main	SO245-12-14	16.01.16	-39.31	-139.81	80
12	Main	SO245-12-14	16.01.16	-39.31	-139.81	100
12	Main	SO245-12-10	16.01.16	-39.31	-139.81	150
12	Main	SO245-12-10	16.01.16	-39.31	-139.81	200
12	Main	SO245-12-10	16.01.16	-39.31	-139.81	300
12	Main	SO245-12-06	16.01.16	-39.31	-139.81	500
12	Main	SO245-12-06	16.01.16	-39.31	-139.81	1000
12	Main	SO245-12-01	15.01.16	-39.31	-139.81	2500
12	Main	SO245-12-01	15.01.16	-39.31	-139.81	5125

b) Samples taken for cell enumeration and FISH

Station No.	Station type	Station Cruise ID	Pangaea Event	Collection date	Latitude [degree north]	Longitude [degree east]	Depth [m]
1	Intermediate	SO245-01-01	SO245_01-01	2015.12.25	-23.503	-84.562	20
1	Intermediate	SO245-01-01	SO245_01-01	2015.12.25	-23.503	-84.562	50
1	Intermediate	SO245-01-01	SO245_01-01	2015.12.25	-23.503	-84.562	75
1	Intermediate	SO245-01-01	SO245_01-01	2015.12.25	-23.503	-84.562	100
1	Intermediate	SO245-01-01	SO245_01-01	2015.12.25	-23.503	-84.562	125
1	Intermediate	SO245-01-01	SO245_01-01	2015.12.25	-23.503	-84.562	150
1	Intermediate	SO245-01-01	SO245_01-01	2015.12.25	-23.503	-84.562	400
1	Intermediate	SO245-01-01	SO245_01-01	2015.12.25	-23.503	-84.562	500
2	Main	SO245-02-12	SO245_02-02	2015.12.27	-23.517	-90.029	20
2	Main	SO245-02-12	SO245_02-02	2015.12.27	-23.517	-90.029	50
2	Main	SO245-02-12	SO245_02-02	2015.12.27	-23.517	-90.029	100
2	Main	SO245-02-10	SO245_02-02	2015.12.27	-23.517	-90.029	125
2	Main	SO245-02-10	SO245_02-02	2015.12.27	-23.517	-90.029	150
2	Main	SO245-02-10	SO245_02-02	2015.12.27	-23.517	-90.029	175
2	Main	SO245-02-10	SO245_02-02	2015.12.27	-23.517	-90.029	200
2	Main	SO245-02-10	SO245_02-02	2015.12.27	-23.517	-90.029	250
2	Main	SO245-02-10	SO245_02-02	2015.12.27	-23.517	-90.029	300
2	Main	SO245-02-05	SO245_02-02	2015.12.27	-23.492	-90.029	500
2	Main	SO245-02-05	SO245_02-02	2015.12.27	-23.492	-90.029	1000
2	Main	SO245-02-02	SO245_02-02	2015.12.27	-23.492	-90.029	1500
2	Main	SO245-02-02	SO245_02-02	2015.12.27	-23.492	-90.029	2200
2	Main	SO245-02-02	SO245_02-02	2015.12.27	-23.492	-90.029	3500
3	Intermediate	SO245-03-01	SO245_03-01	2015.12.27	-23.499	-95.295	50
3	Intermediate	SO245-03-01	SO245_03-01	2015.12.27	-23.499	-95.295	100

3	Intermediate	SO245-03-01	SO245_03-01	2015.12.27	-23.499	-95.295	125
3	Intermediate	SO245-03-01	SO245_03-01	2015.12.27	-23.499	-95.295	150
3	Intermediate	SO245-03-01	SO245_03-01	2015.12.27	-23.499	-95.295	170
3	Intermediate	SO245-03-01	SO245_03-01	2015.12.27	-23.499	-95.295	200
3	Intermediate	SO245-03-01	SO245_03-01	2015.12.27	-23.499	-95.295	300
3	Intermediate	SO245-03-01	SO245_03-01	2015.12.27	-23.499	-95.295	500
4	Main	SO245-04-13	SO245_04-01	2015.12.31	-23.501	-99.992	60
4	Main	SO245-04-13	SO245_04-01	2015.12.31	-23.501	-99.992	100
4	Main	SO245-04-11	SO245_04-01	2015.12.31	-23.501	-99.992	150
4	Main	SO245-04-11	SO245_04-01	2015.12.31	-23.501	-99.992	175
4	Main	SO245-04-11	SO245_04-01	2015.12.31	-23.501	-99.992	200
4	Main	SO245-04-11	SO245_04-01	2015.12.31	-23.501	-99.992	225
4	Main	SO245-04-11	SO245_04-01	2015.12.31	-23.501	-99.992	250
4	Main	SO245-04-11	SO245_04-01	2015.12.31	-23.501	-99.992	300
4	Main	SO245-04-07	SO245_04-01	2015.12.31	-23.5	-100	500
4	Main	SO245-04-07	SO245_04-01	2015.12.31	-23.5	-100	1000
4	Main	SO245-04-01	SO245_04-01	2015.12.30	-23.5	-100	2250
4	Main	SO245-04-01	SO245_04-01	2015.12.30	-23.5	-100	3500
4	Main	SO245-04-01	SO245_04-01	2015.12.30	-23.5	-100	3900
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	5
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	25
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	50
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	100
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	150
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	175
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	200
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	225
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	250
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	300
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	400
5	Intermediate	SO245-05-01	SO245_05-01	2016.1.2	-23.497	-107.002	500
6	Main	SO245-06-11	SO245_06-01	2016.1.4	-23.5	-110.049	5
6	Main	SO245-06-11	SO245_06-01	2016.1.4	-23.5	-110.049	10
6	Main	SO245-06-11	SO245_06-01	2016.1.4	-23.5	-110.049	20
6	Main	SO245-06-11	SO245_06-01	2016.1.4	-23.5	-110.049	40
6	Main	SO245-06-11	SO245_06-01	2016.1.4	-23.5	-110.049	60
6	Main	SO245-06-11	SO245_06-01	2016.1.4	-23.5	-110.049	80
6	Main	SO245-06-11	SO245_06-01	2016.1.4	-23.5	-110.049	100
6	Main	SO245-06-11	SO245_06-01	2016.1.4	-23.5	-110.049	125
6	Main	SO245-06-08	SO245_06-01	2016.1.3	-23.49	-110.039	150
6	Main	SO245-06-08	SO245_06-01	2016.1.3	-23.49	-110.039	175
6	Main	SO245-06-08	SO245_06-01	2016.1.3	-23.49	-110.039	200
6	Main	SO245-06-08	SO245_06-01	2016.1.3	-23.49	-110.039	225
6	Main	SO245-06-08	SO245_06-01	2016.1.3	-23.49	-110.039	250
6	Main	SO245-06-08	SO245_06-01	2016.1.3	-23.49	-110.039	275
6	Main	SO245-06-08	SO245_06-01	2016.1.3	-23.49	-110.039	300

6	Main	SO245-06-03	SO245_06-01	2016.1.3	-23.5	-110.049	500
6	Main	SO245-06-03	SO245_06-01	2016.1.3	-23.5	-110.049	1000
6	Main	SO245-06-01	SO245_06-01	2016.1.3	-23.5	-110.049	1500
6	Main	SO245-06-01	SO245_06-01	2016.1.3	-23.5	-110.049	2500
6	Main	SO245-06-01	SO245_06-01	2016.1.3	-23.5	-110.049	3600
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	5
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	20
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	50
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	100
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	125
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	150
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	175
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	200
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	225
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	250
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	300
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	400
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	500
7	Intermediate	SO245-07-04	SO245_07-04	2016.1.6	-25.982	-114.009	600
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	10
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	20
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	60
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	80
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	100
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	125
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	150
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	175
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	200
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	225
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	250
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	275
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	300
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	350
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	400
8	Main	SO245-08-10	SO245_08-01	2016.1.7	-27.741	-117.62	450
8	Main	SO245-08-05	SO245_08-01	2016.1.7	-27.741	-117.62	500
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	600
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	750
8	Main	SO245-08-05	SO245_08-01	2016.1.7	-27.741	-117.62	1000
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	1250
8	Main	SO245-08-01	SO245_08-01	2016.1.6	-27.741	-117.62	1500
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	1750
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	2000
8	Main	SO245-08-01	SO245_08-01	2016.1.6	-27.741	-117.62	2250
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	2800
8	Main	SO245-08-19	SO245_08-01	2016.1.8	-27.742	-117.62	3000

8	Main	SO245-08-01	SO245_08-01	2016.1.6	-27.741	-117.62	3660
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	5
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	25
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	50
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	100
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	150
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	175
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	200
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	225
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	250
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	300
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	400
9	Intermediate	SO245-09-01	SO245_09-01	2016.1.9	-30.632	-121.763	500
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.503	-126.008	5
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.503	-126.008	10
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.503	-126.008	20
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.503	-126.008	40
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.503	-126.008	60
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.503	-126.008	80
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.503	-126.008	100
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.503	-126.008	125
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	150
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	175
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	200
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	225
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	250
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.5	-126	275
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	300
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.5	-126	350
10	Main	SO245-10-10	SO245_10-01	2016.1.11	-33.5	-126	400
10	Main	SO245-10-03	SO245_10-01	2016.1.11	-33.5	-126	500
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	600
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	750
10	Main	SO245-10-03	SO245_10-01	2016.1.11	-33.5	-126	1000
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	1250
10	Main	SO245-10-01	SO245_10-01	2016.1.11	-33.5	-126	1500
10	Main	SO245-10-06	SO245_10-01	2016.1.11	-33.5	-126	1750
10	Main	SO245-10-01	SO245_10-01	2016.1.11	-33.5	-126	2000
10	Main	SO245-10-03	SO245_10-01	2016.1.11	-33.5	-126	2400
10	Main	SO245-10-03	SO245_10-01	2016.1.11	-33.5	-126	2800
10	Main	SO245-10-01	SO245_10-01	2016.1.11	-33.5	-126	3200
10	Main	SO245-10-01	SO245_10-01	2016.1.11	-33.5	-126	3600
10	Main	SO245-10-01	SO245_10-01	2016.1.11	-33.5	-126	3930
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	5
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	20
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	50

11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	75
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	100
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	125
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	150
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	175
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	200
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	300
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	400
11	Intermediate	SO245-11-01	SO245_11-01	2016.1.14	-36.362	-132.675	500
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	5
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	10
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	20
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	40
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	60
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	80
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	100
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	125
12	Main	SO245-12-10	SO245_12-02	2016.1.16	-39.31	-139.81	150
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	175
12	Main	SO245-12-10	SO245_12-02	2016.1.16	-39.31	-139.81	200
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	225
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	250
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	275
12	Main	SO245-12-10	SO245_12-02	2016.1.16	-39.31	-139.81	300
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	350
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	400
12	Main	SO245-12-06	SO245_12-02	2016.1.15	-39.31	-139.81	500
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	600
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	750
12	Main	SO245-12-14	SO245_12-02	2016.1.16	-39.31	-139.81	800
12	Main	SO245-12-06	SO245_12-02	2016.1.15	-39.31	-139.81	1000
12	Main	SO245-12-06	SO245_12-02	2016.1.15	-39.31	-139.81	1250
12	Main	SO245-12-06	SO245_12-02	2016.1.15	-39.31	-139.81	1500
12	Main	SO245-12-06	SO245_12-02	2016.1.15	-39.31	-139.81	2000
12	Main	SO245-12-06	SO245_12-02	2016.1.15	-39.31	-139.81	2500
12	Main	SO245-12-02	SO245_12-02	2016.1.15	-39.31	-139.81	3000
12	Main	SO245-12-06	SO245_12-02	2016.1.15	-39.31	-139.81	4000
12	Main	SO245-12-02	SO245_12-02	2016.1.15	-39.31	-139.81	4500
12	Main	SO245-12-02	SO245_12-02	2016.1.15	-39.31	-139.81	5125
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	5
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	20
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	50
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	75
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	100
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	125
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	150

13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	175
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	200
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	300
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	400
13	Intermediate	SO245-13-01	SO245_13-01	2016.1.18	-38.998	-150	500
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	5
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	10
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	20
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	40
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	60
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	80
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	100
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	125
14	Main	SO245-14-14	SO245_14-02	2016.1.21	-39	-160.001	150
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	175
14	Main	SO245-14-14	SO245_14-02	2016.1.21	-39	-160.001	200
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	225
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	250
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	275
14	Main	SO245-14-14	SO245_14-02	2016.1.21	-39	-160.001	300
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	350
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	400
14	Main	SO245-14-06	SO245_14-02	2016.1.20	-39	-160	500
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	600
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	750
14	Main	SO245-14-04	SO245_14-02	2016.1.20	-39	-160	800
14	Main	SO245-14-06	SO245_14-02	2016.1.20	-39	-160	1000
14	Main	SO245-14-14	SO245_14-02	2016.1.20	-39	-160	1250
14	Main	SO245-14-14	SO245_14-02	2016.1.20	-39	-160	1500
14	Main	SO245-14-06	SO245_14-02	2016.1.20	-39	-160	2000
14	Main	SO245-14-06	SO245_14-02	2016.1.20	-39	-160	2500
14	Main	SO245-14-02	SO245_14-02	2016.1.20	-39	-160	3000
14	Main	SO245-14-02	SO245_14-02	2016.1.20	-39	-160	3500
14	Main	SO245-14-02	SO245_14-02	2016.1.20	-39	-160	4000
14	Main	SO245-14-02	SO245_14-02	2016.1.20	-39	-160	4500
14	Main	SO245-14-02	SO245_14-02	2016.1.20	-39	-160	5000
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	5
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	10
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	20
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	40
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	60
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	80
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	100
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	125
15	Main	SO245-15-09	SO245_15-13	2016.1.23	-39	-170	150
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	175

15	Main	SO245-15-09	SO245_15-13	2016.1.23	-39	-170	200
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	225
15	Main	SO245-15-09	SO245_15-13	2016.1.23	-39	-170	250
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	275
15	Main	SO245-15-09	SO245_15-13	2016.1.23	-39	-170	300
15	Main	SO245-15-11	SO245_15-13	2016.1.24	-39	-170	350
15	Main	SO245-15-09	SO245_15-13	2016.1.23	-39	-170	400
15	Main	SO245-15-04	SO245_15-13	2016.1.23	-39	-170	500
15	Main	SO245-15-09	SO245_15-13	2016.1.23	-39	-170	600
15	Main	SO245-15-04	SO245_15-13	2016.1.23	-39	-170	750
15	Main	SO245-15-04	SO245_15-13	2016.1.23	-39	-170	910
15	Main	SO245-15-04	SO245_15-13	2016.1.23	-39	-170	1000
15	Main	SO245-15-04	SO245_15-13	2016.1.23	-39	-170	1250
15	Main	SO245-15-04	SO245_15-13	2016.1.23	-39	-170	1500
15	Main	SO245-15-04	SO245_15-13	2016.1.23	-39	-170	2000
15	Main	SO245-15-13	SO245_15-13	2016.1.24	-39	-170	2400
15	Main	SO245-15-13	SO245_15-13	2016.1.24	-39	-170	2800
15	Main	SO245-15-13	SO245_15-13	2016.1.24	-39	-170	3200
15	Main	SO245-15-13	SO245_15-13	2016.1.24	-39	-170	3600
15	Main	SO245-15-13	SO245_15-13	2016.1.24	-39	-170	4000
15	Main	SO245-15-13	SO245_15-13	2016.1.24	-39	-170	4600

Supplementary Table S2. Decision table of individual methodological steps of the onboard sequencing pipeline (DNA extraction, PCR, quantification, size selection, sequencing and data processing). Multiple methodological options for each step are highlighted by their advantages and disadvantages. Methods and possible optimization steps which enable a fast, cost effective onboard sequencing are indicated on the right.

Method Selection and Optimization			
	Advantages	*Disadvantages*	*Optimization / Selection*
DNA Extraction			
Spin column-based extraction / Kit based extraction	*Reduced handling time.* *Feasible under rough sea condition.* *Easy to transport: no hazardous chemicals.*	*Required special equipment (centrifuge, Vortexer).*	*Mobio Power Water Kit specialized for extraction of cells on filters.*
Liquid Extraction SDS-Chloroform	*Inexpensive.* *High DNA yield.*	*Hazardous chemicals which require special transport.* *Numerous buffer which require preparation.* *Long handling times.* *Requires specialized equipment (centrifuge, fume hold).*	*Not possible under rough sea conditions.*
PCR			
Primer selection	*Large selection of universal primers available.* *Can produce fusion primers (with sequencing adapter) to reduce number of steps in sequencing protocol.* *Primers can be barcoded to enable pooling of samples.*	*No "truly" universal primer set.* *Require specific length of amplicon for individual sequencing technologies.* *Illumina 300 - 350bp.* *Ion Torrent < 600bp.* *454 < 600bp.*	*Primer set chosen based on previous evaluations of known universal primer sets (Klindworth et al 2015).* *Fusion primers with barcodes prepared to reduce sequencing protocol steps.*
Polymerase selection			
TAQ DNA polymerase kit (Thermo Fisher)	*Low cost.* *High amplicon production.*	*Long amplification times. No proof reading, higher base error.* *Requires multiple other ingredients in master mix;* *Higher contamination risk and more material to transport.*	*High base error compared to other polymerases, therefore not ideal for NGS.*
Phusion High Fidelity polymerase (Thermo Fisher)	*Added proof reading.* *High amplification.* *Quick amplification times.*	*Requires multiple other ingredients in master mix;* *Higher contamination risk and more material to transport.*	*Lower base error and good for NGS but higher contamination risk due to master mix preparation.*
Platinum PCR SuperMix High Fidelity polymerase kit (Thermo Fisher)	*Single tube containing all ingredients of master mix.* *Simple transport.* *Quick amplification time.* *Requires only the addition of primers and template DNA. Added proof reading.*	*Expensive.*	*Best option for minimal transport, low base error and low handling time.*
Quantification			
Gel-electrophoresis	*Easy and inexpensive. Low contamination risk.*	*Limited detection efficiency (10 ng).* *Limited quantification.* *Bulky material and equipment transport.*	*Gels cannot be made onboard because gel pouring and electrophoresis proved impractical due to ship motion.*

E-Gel (Thermo Fisher)	*Easy to use.* *Reduced handling time.*	*Limited quantification.* *High price (gels).* *Bulky material and equipment transport.*	*Good option for field-based studies but limited quantification.*
Qubit (Thermo Fisher)	*Transportable.* *Inexpensive.* *Good quantification range (0,2 -100 ng)*	*Time consuming (measure single samples).*	*Good option for field-based studies but high handling time with many samples.*
Fragment analyzer (AATI)	*Multiple samples run simultaneously.* *High capacity (396 well plates).* *High quantification (25 bp – 5,000 bp and up to a minimum of 0.1 ng μl^{-1}).* *Good data storage.*	*Expensive.* *Bulky equipment transport.*	*Best option for high quantification with reduced handling time.* *Requires optimization for onboard use (see methods).*
Size Selection			
QIAquick Gel Extraction Kit (Qiagen)	*High yield.* *Precise size selection.*	*High handling time.* *Hazardous chemicals and specialized equipment (UV table).*	*Cannot be made onboard because gel pouring and electrophoresis proved impractical due to ship motion.*
E-gel size select (Thermo Fisher)	*Easy to use.* *Low handling time.*	*Limited capacity (gel pocket number).* *Expensive.* *High loss*	*High loss of amplicons due to pipetting errors and variable run speed of individual sample lanes.*
Blue Pipping	*Easy to use.* *Low handling time but high run time*	*Limited capacity (gel size).* *Expensive due to extra gels and machine.* *Bulky equipment transport.*	*Difficult to use under motion due to liquid chamber*
QIAquick PCR purification kit (Qiagen), MinElute kit (Qiagen))	*Easy to use.* *Low handling time.*	*Small DNA fragments are not full removed, not good size selection.*	*Size selection not optimal.*
AMPureXP beads (Beckman Coulter)	*High throughput.* *Good size selection and cleanup.* *Easy to transport.*	*Requires additional equipment (magnet tube stand).*	*Best option for low price, high efficiency, low handling time and transportability.*
Sequencing technology			
Ion Torrent PGM (Thermo Fisher)	*Compact dimensions and robustness.* *User friendly, interactive hardware and software components.* *Low cost of individual runs (500 - 700€). High output (100 Mb – 2 Gb) , with long read lengths (400 – 450 bp).* *Low run time (4 – 8 hr).*	*Hard drive sensitivity.* *Indel errors, single-pass error rate ~1% (1, 2).*	*Hard drive sensitivity – pack additional hard drives.*
454 GS Junior (Roche, Life Sciences)	*Optimized for smaller applications, transportable.*	*High cost of sequencing chemistry.*	*Out dated /discontinued technology.*
Illumina (Illumina Biotechnology, USA)	*Low cost (400 €).* *High accuracy (0.8% raw error rate (2)).*	*High run time (27 h).* *Low read length (150 bp)*	*Not feasible for field-based research.*
MinION (Oxford Nanopore Technologies)	*Portable, small technology.* *Rapid sequencing (low preparation time).*	*Low per base accuracy (error rate 38%, (3)).*	*Future improvements in nanopore chemistry will deliver more reliable*

	Full length 16s rRNA sequencing.		*information which is useful for microbial diversity studies.*
Data Processing			
Outsource data processing.	*Use data processing facility with larger servers to process data.* *Quick processing.*	*Required high speed internet connection and personnel to process.* *Possible slower processing time.*	*Limited internet connections in remote locations.*
Develop transportable "offline" server	*Independent data analysis, direct results.* *Quick processing time.* *User interactive analysis.*	*Hard drive sensitivity, time consuming development of system.* *High cost (hardware/server).*	*Optimize storage of server onboard for hard drive protection.* *Only feasible option for on-site analyses.*

References

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Supplementary Table S3. On board sequencing time table using PGM Ion Torrent sequencing platform and the subsequent analysis pipeline “Lab on a ship” offline server.

On Board Sequencing Time Table		
Time requirements for the analysis of a set of 40 sample		
	Ion 314 chip time (min)	Ion 318 chip time (min)
Filtration	180	180
DNA extraction	90	90
DNA quantification (Fragment Analyser)	70	70
PCR	120	120
PCR clean up and size selection	60	60
Amplicon quantification (Fragment Analyser)	70	70
Pool calculation and preparation	60	60
OT2	480	480
ES	60	60
Sequencing	240	420
Ion torrent suite	120	240
Offline Server Analysis (for 300,000 reads)		
Import	3	3
Cluster	10	10
Align	8	8
Classify	100	100
Export (rarefaction, stats, taxplots)	20	20
Plotting results	30	60
	1721	2051
	29 hours	34 hours