



## **CRUISE REPORT**

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### ***RV Simon Stevin Cruise 18-240 (16/04 – 20/04/2018)***

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**Status:** Final draft  
**Datum:** 1/6/2018  
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## 1. HISTORY OF DOCUMENT

Version	Name	Date	Info
V1	Jonas Mortelmans	7 May 2018	Draft
V2	Jonas Mortelmans	1 june 2018	Final Draft

## 2. GENERAL FORM RV SIMON STEVIN

**Cruise number:** 18-240 (<http://www.vliz.be/vmdcdata/midas/report.php?cruise=1835>)

**Datum/Time:** ETD 16/04/2018 10:00  
ETA 20/04/2018 12:00

**Chief scientist:** Jonas Mortelmans

**Participating institutes:** Flanders Marine Institute (VLIZ)  
University of Ghent, Protistology and Aquatic Ecology (*Ugent PAE*)

**Geographical regions:** Thames estuary (<http://marineregions.org/mrgid/3241>)  
Southern bight of the north sea (<http://marineregions.org/mrgid/2399>)  
Eastern English Channel (<http://marineregions.org/mrgid/2389>)

**DIPCLEAR:** Dutch waters (approved 08/03/2018)  
English waters (approved 16/03/2018)  
French waters (approved 29/03/2018)

### 3. LIST OF PARTICIPANTS

Name	Institute	Gender	Email	16/04 ->20/04/2018
Jonas Mortelmans	VLIZ	M	jonas.mortelmans@vliz.be	Yes
Jolien Goossens	VLIZ	F	jolien.goossens@vliz.be	Yes
Reinoud de Blok	PAE	M	Reinoud.deBlok@UGent.be	Yes
Michiel T'Jampens	VLIZ	M	Michiel.tjampens@vliz.be	No: 19-20/4/2018
<b>Total number of participants:</b>				4

Assignment of the cabins by the Chief-Scientist at the start of the campaign.

#### 4. SCIENTIFIC OBJECTIVES

The spatial distribution of phytoplankton functional groups during the *Phaeocystis*/Diatom bloom from the Eastern Channel towards the North Sea

How is the phyto-and-zooplankton composition distributed in space, biodiversity difference, relation of FCM-parameters to other (bulk) sensor parameters, microscopic data, pigment analyses etc, How stable and robust is the outcome of FCM data over the years.

#### 5. RESEARCH AREA – SAMPLING STATIONS

##### 5.1. List of scheduled stations for sampling

point	Country	y	x	lat	long	CTD	Niskin	WP2	Fyto
1	BE	51,19	2,75	51°11.40'	2°45'	1	1	1	1
2	FR	51,12	2,5	51°7.20'	2°30'	1	1	1	1
3	FR	51,1	2,25	51°6.00'	2°15'	1	1	1	1
4	FR	51,06	2	51°3.60'	2°0'	1	1	1	1
5	GB	51,12	1,75	51°7.20'	1°45'	1	1	1	1
6	FR	50,95	1,66	50°57.00'	1°40'	1	1	1	1
7	FR	50,83	1,5	50°49.80'	1°30'	1	1	1	1
8	FR	50,65	1,5	50°39.00'	1°30'	1	1	1	1
9	FR	50,42	1,5	50°25.20'	1°30'	1	1	1	1
10	FR	50,23	1,5	50°13.80'	1°30'	1	1	1	1
11	FR	50,1	1,25	50°6.00'	1°15'	1	1	1	1
12	FR	50,37	1,25	50°22.19'	1°15'	1	1	1	1
13	GB	50,37	1	50°22.19'	1°0'	1	1	1	1
14	GB	50,63	1	50°37.80'	1°0'	1	1	1	1
15	GB	50,64	0,75	50°38.4'	0°45'	1	1	1	1
16	GB	50,86	0,75	50°51.6'	0°45'	1	1	1	1
17	GB	50,87	1	50°52.20'	1°0'	1	1	1	1
18	GB	51,06	1,25	51°3.60'	1°15'	1	1	1	1
19	GB	50,85	1,25	50°51'	1°15'	1	1	1	1
20	FR	50,62	1,25	50°37.20'	1°15'	1	1	1	1
21	GB	51,15	1,5	51°9'	1°30'	1	1	1	1
22	GB	51,39	1,75	51°23.4'	1°45'	1	1	1	1
23	GB	51,41	1,5	51°24.60'	1°30'	1	1	1	1
24	GB	51,43	1,25	51°25.8'	1°15'	1	1	1	1
25	GB	51,55	1	51°33'	1°0'	1	1	1	1
26	GB	51,64	1,25	51°38.4'	1°15'	1	1	1	1
27	GB	51,83	1,25	51°49.8'	1°15'	1	1	1	1
28	GB	51,87	1,5	51°52.2'	1°30'	1	1	1	1

29	GB	51,65	1,5	51°39'	1°30'	1	1	1	1
30	GB	51,66	1,75	51°39.60'	1°45'	1	1	1	1
31	GB	51,88	1,75	51°52.80'	1°45'	1	1	1	1
32	GB	51,86	2	51°51.6'	2°0'	1	1	1	1
33	GB	51,59	2	51°35.40'	2°0'	1	1	1	1
34	GB	51,34	2	51°20.40'	2°0'	1	1	1	1
35	FR	51,36	2,25	51°21.6'	2°15'	1	1	1	1
36	BE	51,38	2,5	51°22.80'	2°30'	1	1	1	1
37	BE	51,65	2,5	51°38.99'	2°30'	1	1	1	1
38	GB	51,61	2,25	51°36.6'	2°15'	1	1	1	1
39	GB	51,85	2,25	51°51.00'	2°15'	1	1	1	1
40	NL	51,9	2,5	51°54'	2°30'	1	1	1	1
41	NL	51,87	2,75	51°52.2'	2°45'	1	1	1	1
42	BE	51,62	2,75	51°37.2'	2°45'	1	1	1	1
43	NL	51,89	3	51°53.4'	3°0'	1	1	1	1
44	NL	51,89	3,25	51°53.4'	3°15'	1	1	1	1
45	NL	52,12	3,5	52°7.2'	3°30'	1	1	1	1
46	NL	52,12	3,75	52°7.2'	3°45'	1	1	1	1
47	NL	52,01	4	52°0.6'	4°0'	1	1	1	1
48	NL	51,85	3,75	51°51'	3°45'	1	1	1	1
49	NL	51,86	3,5	51°51.6'	3°30'	1	1	1	1
50	NL	51,65	3,5	51°39'	3°30'	1	1	1	1
51	NL	51,63	3,25	51°37.8'	3°15'	1	1	1	1
52	NL	51,44	3,5	51°26.4'	3°30'	1	1	1	1
53	BE	51,39	3,25	51°23.4'	3°15'	1	1	1	1
54	NL	51,61	3	51°36.6'	3°0'	1	1	1	1
55	BE	51,39	3	51°23.4'	3°0'	1	1	1	1
56	BE	51,39	2,75	51°23.4'	2°45'	1	1	1	1

## 5.2. Map of scheduled stations

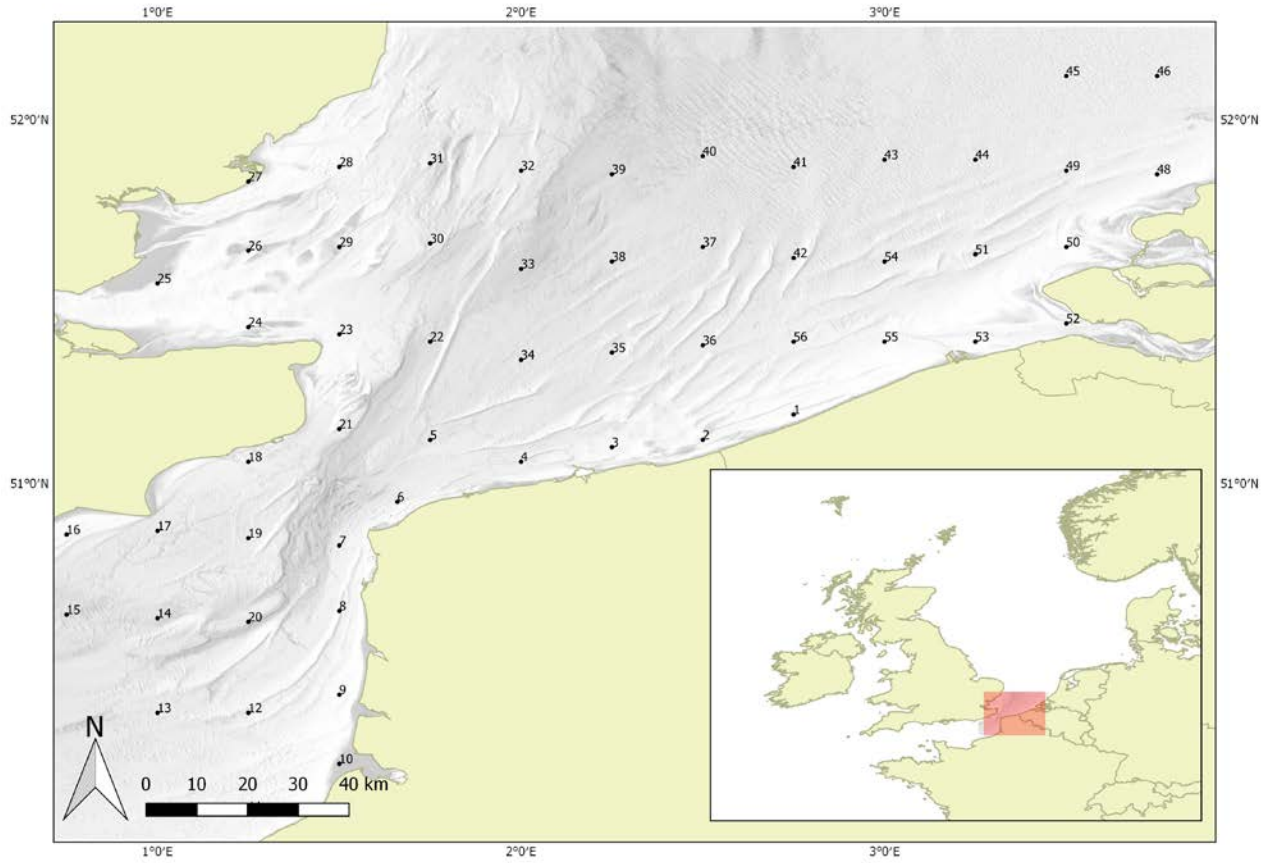


Fig 1: map of the working area (Eastern English Channel, Southern Bight of the North Sea, Thames estuary) with scheduled sampling stations marked from 1 to 56.

## 6. SAMPLING – ON BOARD ANALYSIS

### 6.1. List of discrete measurements and actions

<b>Niskin bottles</b>	49 samples
Pigment HPLC (Niskin)	48 samples
Nutrients (Niskin):	48 samples
Samples for NGS (Niskin)	48 samples
<b>CTD profiles</b>	49 profiles
<b>Zooplankton (WP2)</b>	50 samples
<b>Turbidity (Secchi)</b>	27 measurements
<b>Phytoplankton (Apstein)</b>	50 samples

For a complete overview of actions taken aboard the RV Simon Stevin, including date and location, see appendix 1

### 6.2. Map of discrete measurements

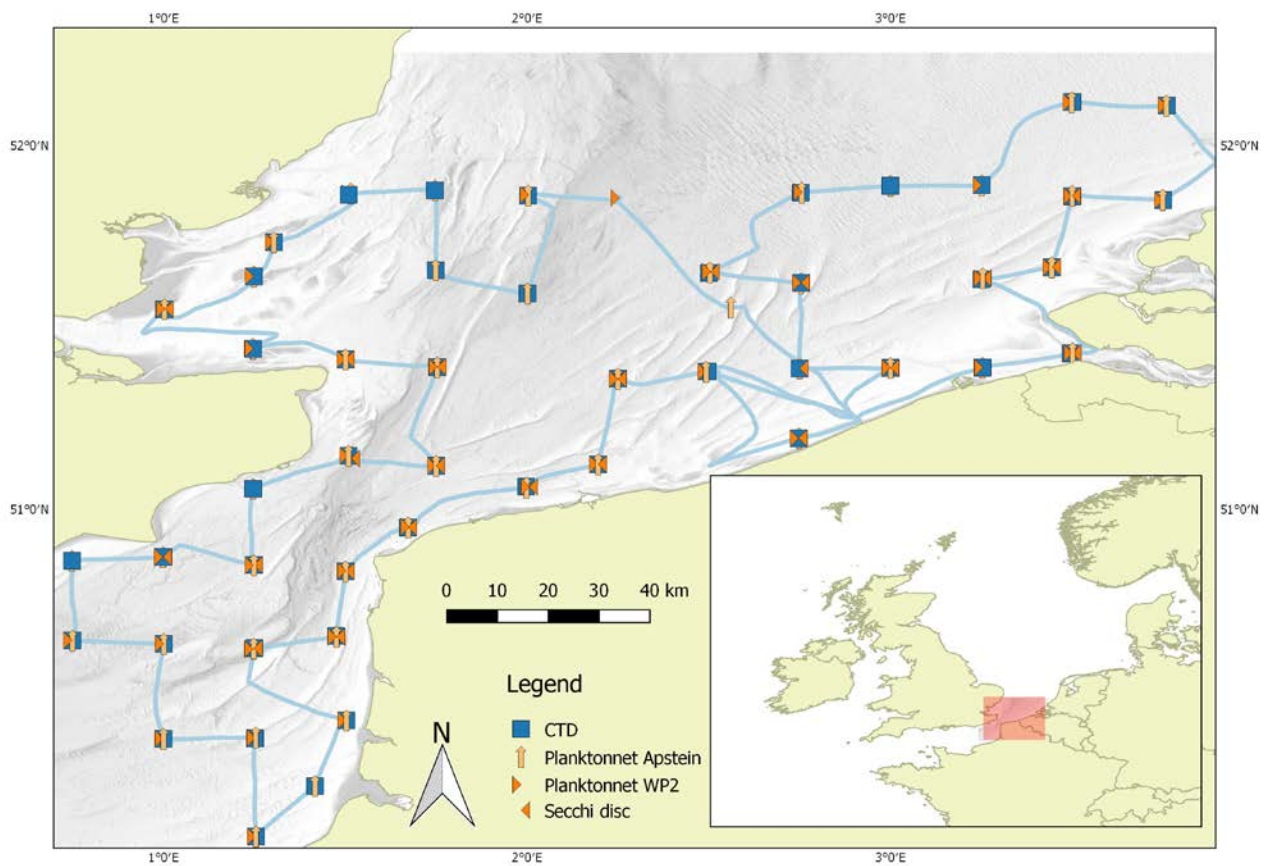


Fig 2: map with discrete measurements plotted (Eastern English Channel, Southern Bight of the North Sea, Thames estuary). Discrete measurements (CTD casts, Secchi, WP2, and Apstein actions).

### 6.3. List of underway measurements

Instrument	Parameter	Data acquisition rate	
		5 sec	20 min
Flow Cytometer (VLIZ)	Phytoplankton densities		x
RTK GPS	Current time, latitude, longitude, depth 200khz, course over ground, speed over ground	x	
?	Octans heading, odom depth 33khz, gpsfix, nav depth 50kzh, speedlog	x	
SBE21	water temperature, salinity, Chlorophyll A, sound velocity	x	
?	Time stamp, FLRTchla,	x	
AWS	Temperature, Relative Humidity, True wind direction, True wind speed, Air pressure, draught	x	
SBE38	Temperature	x	
Flowmeter	Water flow	x	



#### 6.4. Map of underway measurements

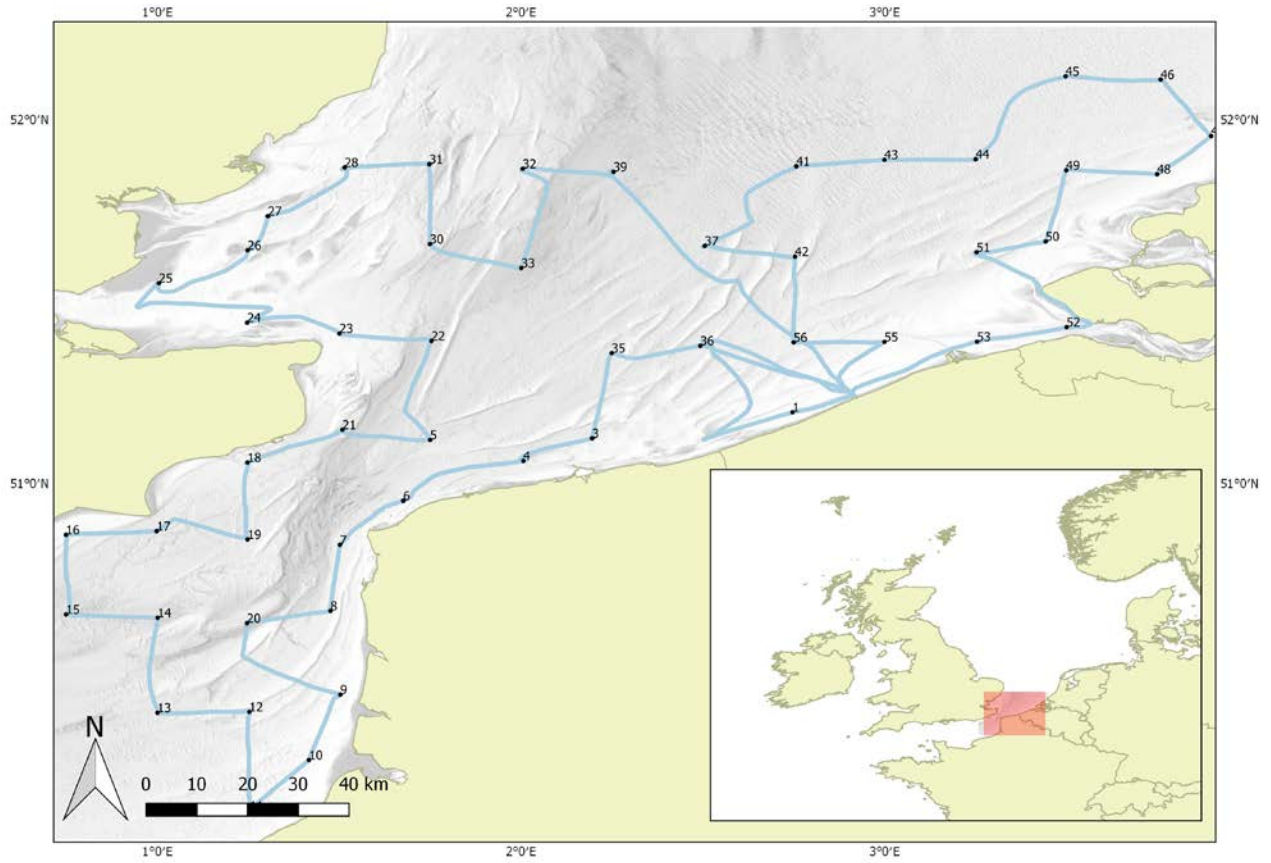


Fig 2: map with the trajectory of the RV Simon Stevin plotted, on this trajectory, underway data was collected (Eastern English Channel, Southern Bight of the North Sea, Thames estuary).

## **7. CHEMICALS**

Several types of chemicals were used, listed in appendix 2: protocol section.

## **8. ISSUES/TROUBLES/REMARKS**

### **7.1 General issues**

- No general issues encountered, besides the issues described below.
- During the complete cruise we enjoyed good weather: little wind, warm, small wave height, ...
- Although initially scheduled to tow VPR at night, and mainly rely on underway parameters, the issues as described below obliged us to tighten the schedule and continue the sampling at night. Despite the huge delays, we were able to sample 49 out of the scheduled 56 stations.  
This tightened schedule also affects the data collection: parameters that can only be measured during daytime, will now only be fragmentary (e.g. secchi depths).

### **7.2 CTD**

- At station 39, severe problems occurred with the CTD carousel. At first, the ship's mechanic assisted the scientist for initial troubleshooting, unsuccessful. Second, onshore technicians from VLIZ advised the scientist through WhatsApp. As the problem occurred in the data cable, and this part is impossible to repair at sea, the head scientist decided to return to harbour (approx. 3h30m sailing time). After arrival in the harbour, VLIZ technicians prepared a backup CTD and installed the device on board. Michiel T'Jampens (VLIZ technician) joined the rest of the cruise for troubleshooting further technical issues from the CTD.
- As the new CTD was incapable to record certain parameters, there will be a shift pre and post station 39 (being 4:20am, 19<sup>th</sup> April 2018).

### **7.3 Water quality parameters**

- We encountered no problems during the sampling of water quality parameters.

### **7.4 Planktonnet - WP2**

- We encountered no problems during the sampling of phytoplankton, although the flowmeter was not working for some of the samples. In that case volume will be estimated by the depth of the water column at that time.

### **7.5 PlanktonNet - Fytoplankton**

- We encountered no problems during the sampling of phytoplankton. 50 L of seawater was filtered during each action.

### **7.6 FCM**

- The VLIZ Flow cytometer was mainly handled by Reinhoud de Blok and regularly flushed, and beads inserted.
- In general, the scheduler was active. When arriving to a certain station, manual activation of the three protocols.
- Shortly after departure, the FCM became severely clogged. Initial troubleshooting by the scientists was unsuccessful, nor did the troubleshooting by phone with CytoSense could solve the problem. Shortly after arriving at station 36, the chief scientist decided to return to harbour (approx. 1h30 sailing time) and requested a urgent repair by CytoSense. The following morning, Harry Kools arrived in Ostend for repairing the FCM (changing the sampling inlet and motor). Exactly 24h after departure, the RV Simon Stevin continued the campaign.
- During the rest of the campaign no issues were encountered with the FCM.

**APPENDIX 1:** list of discrete measurements taken during the JericoNext 2018 cruise

ID	Writer	ActionType	StartLat	StartLong	StartDate	EndDate	Station
107920	goossens jolien	Planktonnet Apstein	51,196103	2,74831	16/04/2018 8:14	16/04/2018 8:22	1
107917	goossens jolien	CTD	51,195927	2,747584	16/04/2018 8:18	16/04/2018 8:19	1
107918	de Blok Reinhoud	Niskin Bottle	51,19593	2,747539	16/04/2018 8:18	16/04/2018 8:18	1
107921	de Blok Reinhoud	Secchi disc	51,195927	2,747036	16/04/2018 8:22	16/04/2018 8:22	1
107919	Mortelmans Jonas	Planktonnet WP2	51,195923	2,747011	16/04/2018 8:22	16/04/2018 8:22	1
107929	goossens jolien	Secchi disc	51,379547	2,496707	17/04/2018 9:27	17/04/2018 9:27	36
107932	de Blok Reinhoud	CTD	51,379532	2,496628	17/04/2018 9:28	17/04/2018 9:33	36
107928	de Blok Reinhoud	Niskin Bottle	51,379458	2,496242	17/04/2018 9:28	17/04/2018 9:32	36
107931	Mortelmans Jonas	Planktonnet WP2	51,378724	2,493284	17/04/2018 9:32	17/04/2018 9:34	36
107930	Mortelmans Jonas	Planktonnet Apstein	51,37848	2,492296	17/04/2018 9:33	17/04/2018 9:33	36
107935	Mortelmans Jonas	CTD	51,359591	2,250468	17/04/2018 10:25	17/04/2018 10:32	35
107936	de Blok Reinhoud	Planktonnet Apstein	51,35909	2,250068	17/04/2018 10:27	17/04/2018 10:32	35
107937	goossens jolien	Secchi disc	51,358641	2,249639	17/04/2018 10:28	17/04/2018 10:28	35
107934	goossens jolien	Planktonnet WP2	51,358438	2,249424	17/04/2018 10:29	17/04/2018 10:30	35
107938	de Blok Reinhoud	Niskin Bottle	51,357675	2,248499	17/04/2018 10:32	17/04/2018 10:32	35
107940	goossens jolien	CTD	51,124247	2,195486	17/04/2018 11:52	17/04/2018 11:57	3
107941	de Blok Reinhoud	Planktonnet WP2	51,124247	2,195486	17/04/2018 11:52	17/04/2018 11:53	3
107942	Mortelmans Jonas	Planktonnet Apstein	51,124261	2,195544	17/04/2018 11:52	17/04/2018 11:57	3
107943	de Blok Reinhoud	Secchi disc	51,124261	2,195544	17/04/2018 11:52	17/04/2018 11:52	3
107939	Mortelmans Jonas	Niskin Bottle	51,125293	2,19881	17/04/2018 11:56	17/04/2018 11:56	3
107947	goossens jolien	CTD	51,063202	1,997365	17/04/2018 12:54	17/04/2018 13:03	4
107946	Mortelmans Jonas	Planktonnet Apstein	51,060062	1,998663	17/04/2018 12:57	17/04/2018 13:03	4
107948	de Blok Reinhoud	Niskin Bottle	51,062103	2,005346	17/04/2018 13:03	17/04/2018 13:03	4

<b>107944</b>	de Blok Reinoud	Secchi disc	51,06216	2,005546	17/04/2018 13:03	17/04/2018 13:03	4
<b>107945</b>	Mortelmans Jonas	Planktonnet WP2	51,062413	2,006555	17/04/2018 13:04	17/04/2018 13:11	4
<b>107954</b>	de Blok Reinoud	CTD	50,95051	1,671512	17/04/2018 14:55	17/04/2018 15:02	6
<b>107951</b>	Mortelmans Jonas	Planktonnet Apstein	50,951056	1,673073	17/04/2018 14:57	17/04/2018 15:01	6
<b>107949</b>	Mortelmans Jonas	Secchi disc	50,951083	1,673127	17/04/2018 14:58	17/04/2018 14:58	6
<b>107953</b>	Mortelmans Jonas	Niskin Bottle	50,952336	1,675546	17/04/2018 15:01	17/04/2018 15:02	6
<b>107950</b>	Mortelmans Jonas	Planktonnet WP2	50,952599	1,676041	17/04/2018 15:02	17/04/2018 15:04	6
<b>107955</b>	Mortelmans Jonas	CTD	50,830176	1,500646	17/04/2018 16:09	17/04/2018 16:15	7
<b>107957</b>	Mortelmans Jonas	Secchi disc	50,830197	1,500659	17/04/2018 16:09	17/04/2018 16:10	7
<b>107959</b>	Mortelmans Jonas	Planktonnet Apstein	50,830197	1,500659	17/04/2018 16:09	17/04/2018 16:15	7
<b>107956</b>	Mortelmans Jonas	Niskin Bottle	50,831279	1,501601	17/04/2018 16:15	17/04/2018 16:15	7
<b>107958</b>	Mortelmans Jonas	Planktonnet WP2	50,831587	1,501854	17/04/2018 16:17	17/04/2018 16:18	7
<b>107961</b>	Mortelmans Jonas	CTD	50,652742	1,474777	17/04/2018 17:16	17/04/2018 17:23	8
<b>107962</b>	Mortelmans Jonas	Niskin Bottle	50,650309	1,475723	17/04/2018 17:23	17/04/2018 17:23	8
<b>107960</b>	Mortelmans Jonas	Planktonnet Apstein	50,650286	1,475733	17/04/2018 17:23	17/04/2018 17:23	8
<b>107963</b>	Mortelmans Jonas	Planktonnet WP2	50,650241	1,475744	17/04/2018 17:23	17/04/2018 17:24	8
<b>107964</b>	Mortelmans Jonas	Secchi disc	50,650218	1,475752	17/04/2018 17:23	17/04/2018 17:23	8
<b>107966</b>	Mortelmans Jonas	CTD	50,619328	1,249586	17/04/2018 18:11	17/04/2018 18:18	20
<b>107969</b>	Mortelmans Jonas	Planktonnet Apstein	50,617994	1,247921	17/04/2018 18:15	17/04/2018 18:18	20
<b>107967</b>	Mortelmans Jonas	Niskin Bottle	50,617971	1,247896	17/04/2018 18:15	17/04/2018 18:15	20
<b>107965</b>	Mortelmans Jonas	Secchi disc	50,617943	1,247866	17/04/2018 18:15	17/04/2018 18:15	20
<b>107968</b>	Mortelmans Jonas	Planktonnet WP2	50,61644	1,246042	17/04/2018 18:20	17/04/2018 18:22	20
<b>107970</b>	Mortelmans Jonas	CTD	50,42032	1,503017	17/04/2018 19:55	17/04/2018 19:57	9
<b>107972</b>	Mortelmans Jonas	Planktonnet WP2	50,420293	1,503007	17/04/2018 19:55	17/04/2018 19:55	9

<b>107973</b>	Mortelmans Jonas	Planktonnet Apstein	50,420293	1,503007	17/04/2018 19:55	17/04/2018 19:55	9
<b>107971</b>	Mortelmans Jonas	Niskin Bottle	50,419783	1,503003	17/04/2018 19:57	17/04/2018 19:57	9
<b>107975</b>	Mortelmans Jonas	Planktonnet WP2	50,240323	1,416563	17/04/2018 21:06	17/04/2018 21:06	10
<b>107976</b>	Mortelmans Jonas	CTD	50,240323	1,416563	17/04/2018 21:06	17/04/2018 21:07	10
<b>107974</b>	Mortelmans Jonas	Planktonnet Apstein	50,240342	1,416586	17/04/2018 21:06	17/04/2018 21:06	10
<b>107977</b>	Mortelmans Jonas	Niskin Bottle	50,240353	1,416617	17/04/2018 21:07	17/04/2018 21:07	10
<b>107978</b>	Mortelmans Jonas	CTD	50,101493	1,253924	17/04/2018 22:24	17/04/2018 22:25	11
<b>107980</b>	Mortelmans Jonas	Planktonnet WP2	50,101543	1,254009	17/04/2018 22:24	17/04/2018 22:24	11
<b>107981</b>	Mortelmans Jonas	Planktonnet Apstein	50,101562	1,254051	17/04/2018 22:24	17/04/2018 22:24	11
<b>107979</b>	Mortelmans Jonas	Niskin Bottle	50,101731	1,254358	17/04/2018 22:25	17/04/2018 22:25	11
<b>107984</b>	goossens jolie	CTD	50,371216	1,251667	17/04/2018 23:49	17/04/2018 23:55	12
<b>107983</b>	goossens jolie	Planktonnet WP2	50,372591	1,252567	17/04/2018 23:52	17/04/2018 23:55	12
<b>107982</b>	goossens jolie	Planktonnet Apstein	50,373667	1,253751	17/04/2018 23:55	17/04/2018 23:55	12
<b>107986</b>	goossens jolie	Niskin Bottle	50,374009	1,254131	17/04/2018 23:55	17/04/2018 23:55	12
<b>107988</b>	goossens jolie	CTD	50,370107	0,999698	18/04/2018 0:57	18/04/2018 1:05	13
<b>107989</b>	goossens jolie	Planktonnet WP2	50,370107	0,999698	18/04/2018 0:57	18/04/2018 1:02	13
<b>107990</b>	goossens jolie	Planktonnet Apstein	50,370107	0,999698	18/04/2018 0:57	18/04/2018 1:02	13
<b>107987</b>	goossens jolie	Niskin Bottle	50,372482	1,00105	18/04/2018 1:05	18/04/2018 1:05	13
<b>107992</b>	goossens jolie	CTD	50,63081	1,000493	18/04/2018 2:30	18/04/2018 2:33	14
<b>107991</b>	goossens jolie	Planktonnet Apstein	50,630821	1,000487	18/04/2018 2:30	18/04/2018 2:37	14
<b>107993</b>	goossens jolie	Niskin Bottle	50,631212	1,000443	18/04/2018 2:33	18/04/2018 2:33	14
<b>107994</b>	goossens jolie	Planktonnet WP2	50,631212	1,000443	18/04/2018 2:33	18/04/2018 2:37	14
<b>107997</b>	goossens jolie	CTD	50,640344	0,74957	18/04/2018 3:32	18/04/2018 3:34	15
<b>107996</b>	goossens jolie	Planktonnet Apstein	50,640345	0,749558	18/04/2018 3:32	18/04/2018 3:32	15

<b>107998</b>	goossens jolien	Niskin Bottle	50,640395	0,749138	18/04/2018 3:34	18/04/2018 3:34	15
<b>107995</b>	goossens jolien	Planktonnet WP2	50,640459	0,748313	18/04/2018 3:37	18/04/2018 3:38	15
<b>107999</b>	de Blok Reinhoud	Planktonnet WP2	50,859126	0,748187	18/04/2018 4:56	18/04/2018 4:56	16
<b>108000</b>	de Blok Reinhoud	Planktonnet Apstein	50,859115	0,748164	18/04/2018 4:56	18/04/2018 4:56	16
<b>108001</b>	de Blok Reinhoud	CTD	50,859115	0,748164	18/04/2018 4:56	18/04/2018 4:57	16
<b>108002</b>	de Blok Reinhoud	Niskin Bottle	50,859013	0,747925	18/04/2018 4:57	18/04/2018 4:57	16
<b>108004</b>	de Blok Reinhoud	Planktonnet Apstein	50,869942	0,998997	18/04/2018 5:59	18/04/2018 5:59	17
<b>108005</b>	de Blok Reinhoud	CTD	50,869942	0,998997	18/04/2018 5:59	18/04/2018 6:01	17
<b>108007</b>	de Blok Reinhoud	Secchi disc	50,86967	0,99853	18/04/2018 6:00	18/04/2018 6:00	17
<b>108006</b>	de Blok Reinhoud	Niskin Bottle	50,869589	0,998381	18/04/2018 6:01	18/04/2018 6:01	17
<b>108003</b>	de Blok Reinhoud	Planktonnet WP2	50,869284	0,99775	18/04/2018 6:02	18/04/2018 6:04	17
<b>108013</b>	de Blok Reinhoud	CTD	50,847919	1,249258	18/04/2018 7:13	18/04/2018 7:15	19
<b>108012</b>	de Blok Reinhoud	Secchi disc	50,847452	1,248825	18/04/2018 7:14	18/04/2018 7:14	19
<b>108011</b>	de Blok Reinhoud	Planktonnet Apstein	50,847324	1,2487	18/04/2018 7:14	18/04/2018 7:14	19
<b>108014</b>	de Blok Reinhoud	Niskin Bottle	50,84719	1,248559	18/04/2018 7:15	18/04/2018 7:15	19
<b>108010</b>	de Blok Reinhoud	Planktonnet WP2	50,846516	1,247789	18/04/2018 7:16	18/04/2018 7:18	19
<b>108015</b>	de Blok Reinhoud	Planktonnet WP2	51,05781	1,247653	18/04/2018 8:41	18/04/2018 8:41	18
<b>108017</b>	de Blok Reinhoud	Secchi disc	51,057352	1,24654	18/04/2018 8:42	18/04/2018 8:42	18
<b>108016</b>	de Blok Reinhoud	Planktonnet Apstein	51,057325	1,246467	18/04/2018 8:42	18/04/2018 8:42	18
<b>108018</b>	de Blok Reinhoud	CTD	51,057297	1,246398	18/04/2018 8:42	18/04/2018 8:43	18
<b>108019</b>	de Blok Reinhoud	Niskin Bottle	51,057158	1,246042	18/04/2018 8:43	18/04/2018 8:43	18
<b>108023</b>	Mortelmans Jonas	CTD	51,147829	1,508586	18/04/2018 10:10	18/04/2018 10:16	21
<b>108020</b>	Mortelmans Jonas	Planktonnet WP2	51,147777	1,508531	18/04/2018 10:10	18/04/2018 10:10	21
<b>108021</b>	Mortelmans Jonas	Planktonnet Apstein	51,147777	1,508531	18/04/2018 10:10	18/04/2018 10:10	21

<b>108024</b>	Mortelmans Jonas	Niskin Bottle	51,140198	1,515586	18/04/2018 10:16	18/04/2018 10:16	21
<b>108022</b>	Mortelmans Jonas	Secchi disc	51,140053	1,515913	18/04/2018 10:16	18/04/2018 10:16	21
<b>108025</b>	Mortelmans Jonas	CTD	51,120214	1,750033	18/04/2018 11:16	18/04/2018 11:20	5
<b>108027</b>	Mortelmans Jonas	Planktonnet WP2	51,120217	1,750012	18/04/2018 11:16	18/04/2018 11:17	5
<b>108028</b>	Mortelmans Jonas	Planktonnet Apstein	51,120217	1,750012	18/04/2018 11:16	18/04/2018 11:16	5
<b>108029</b>	Mortelmans Jonas	Secchi disc	51,120347	1,749476	18/04/2018 11:20	18/04/2018 11:20	5
<b>108026</b>	Mortelmans Jonas	Niskin Bottle	51,120353	1,749456	18/04/2018 11:20	18/04/2018 11:20	5
<b>108032</b>	Mortelmans Jonas	CTD	51,391106	1,752653	18/04/2018 13:53	18/04/2018 13:59	22
<b>108036</b>	Mortelmans Jonas	Planktonnet Apstein	51,391135	1,752684	18/04/2018 13:53	18/04/2018 13:53	22
<b>108035</b>	Mortelmans Jonas	Planktonnet WP2	51,391987	1,75338	18/04/2018 13:55	18/04/2018 13:57	22
<b>108034</b>	Mortelmans Jonas	Secchi disc	51,392027	1,753406	18/04/2018 13:55	18/04/2018 13:55	22
<b>108033</b>	Mortelmans Jonas	Niskin Bottle	51,39416	1,754507	18/04/2018 13:59	18/04/2018 13:59	22
<b>108039</b>	Mortelmans Jonas	CTD	51,412678	1,500528	18/04/2018 15:03	18/04/2018 15:03	23
<b>108041</b>	Mortelmans Jonas	Secchi disc	51,412678	1,500528	18/04/2018 15:03	18/04/2018 15:03	23
<b>108038</b>	Mortelmans Jonas	Planktonnet WP2	51,412698	1,500542	18/04/2018 15:03	18/04/2018 15:03	23
<b>108037</b>	Mortelmans Jonas	Planktonnet Apstein	51,412718	1,500555	18/04/2018 15:03	18/04/2018 15:03	23
<b>108040</b>	Mortelmans Jonas	Niskin Bottle	51,412739	1,50057	18/04/2018 15:03	18/04/2018 15:03	23
<b>108042</b>	de Blok Reinhoud	Secchi disc	51,441935	1,245808	18/04/2018 16:14	18/04/2018 16:18	24
<b>108044</b>	de Blok Reinhoud	Planktonnet Apstein	51,441935	1,245808	18/04/2018 16:14	18/04/2018 16:18	24
<b>108045</b>	goossens jolien	CTD	51,441935	1,245808	18/04/2018 16:14	18/04/2018 16:18	24
<b>108043</b>	goossens jolien	Planktonnet WP2	51,442251	1,246941	18/04/2018 16:15	18/04/2018 16:15	24
<b>108046</b>	goossens jolien	Niskin Bottle	51,44295	1,24915	18/04/2018 16:18	18/04/2018 16:18	24
<b>108048</b>	goossens jolien	CTD	51,550365	1,000999	18/04/2018 18:32	18/04/2018 18:37	25
<b>108050</b>	goossens jolien	Planktonnet Apstein	51,550523	1,002181	18/04/2018 18:34	18/04/2018 18:40	25

<b>108047</b>	goossens jolien	Niskin Bottle	51,550694	1,003556	18/04/2018 18:37	18/04/2018 18:37	25
<b>108049</b>	goossens jolien	Planktonnet WP2	51,550755	1,003741	18/04/2018 18:38	18/04/2018 18:39	25
<b>108051</b>	goossens jolien	Secchi disc	51,550822	1,003795	18/04/2018 18:40	18/04/2018 18:40	25
<b>108053</b>	goossens jolien	Planktonnet Apstein	51,640774	1,248642	18/04/2018 19:51	18/04/2018 19:51	26
<b>108055</b>	goossens jolien	CTD	51,640774	1,248642	18/04/2018 19:51	18/04/2018 19:52	26
<b>108054</b>	goossens jolien	Niskin Bottle	51,640853	1,248532	18/04/2018 19:52	18/04/2018 19:52	26
<b>108052</b>	goossens jolien	Planktonnet WP2	51,640839	1,2479	18/04/2018 19:55	18/04/2018 19:55	26
<b>108056</b>	goossens jolien	CTD	51,734749	1,30382	18/04/2018 20:39	18/04/2018 20:40	27
<b>108058</b>	goossens jolien	Planktonnet WP2	51,734749	1,30382	18/04/2018 20:39	18/04/2018 20:39	27
<b>108057</b>	goossens jolien	Niskin Bottle	51,734661	1,30325	18/04/2018 20:39	18/04/2018 20:39	27
<b>108060</b>	goossens jolien	Planktonnet Apstein	51,734649	1,303178	18/04/2018 20:40	18/04/2018 20:40	27
<b>108071</b>	goossens jolien	Planktonnet Apstein	51,868808	1,515005	18/04/2018 22:10	18/04/2018 22:14	28
<b>108070</b>	de Blok Reinhoud	Planktonnet WP2	51,868597	1,514692	18/04/2018 22:10	18/04/2018 22:11	28
<b>108068</b>	de Blok Reinhoud	CTD	51,864937	1,509102	18/04/2018 22:17	18/04/2018 22:17	28
<b>108069</b>	de Blok Reinhoud	Niskin Bottle	51,864685	1,508737	18/04/2018 22:17	18/04/2018 22:17	28
<b>108072</b>	de Blok Reinhoud	Planktonnet WP2	51,8776	1,747695	18/04/2018 23:23	18/04/2018 23:24	31
<b>108073</b>	de Blok Reinhoud	Planktonnet Apstein	51,877167	1,747158	18/04/2018 23:24	18/04/2018 23:24	31
<b>108074</b>	de Blok Reinhoud	CTD	51,876576	1,74644	18/04/2018 23:25	18/04/2018 23:26	31
<b>108075</b>	de Blok Reinhoud	Niskin Bottle	51,875892	1,745708	18/04/2018 23:26	18/04/2018 23:26	31
<b>108077</b>	de Blok Reinhoud	Planktonnet WP2	51,658165	1,74938	19/04/2018 0:33	19/04/2018 0:33	30
<b>108078</b>	de Blok Reinhoud	CTD	51,657746	1,748912	19/04/2018 0:35	19/04/2018 0:36	30
<b>108076</b>	de Blok Reinhoud	Planktonnet Apstein	51,657612	1,748749	19/04/2018 0:35	19/04/2018 0:35	30
<b>108079</b>	de Blok Reinhoud	Niskin Bottle	51,657376	1,748455	19/04/2018 0:36	19/04/2018 0:36	30
<b>108080</b>	de Blok Reinhoud	Planktonnet WP2	51,592374	2,000574	19/04/2018 1:43	19/04/2018 1:43	33



<b>108082</b>	de Blok Reinhoud	CTD	51,593747	2,001226	19/04/2018 1:48	19/04/2018 1:48	33
<b>108083</b>	de Blok Reinhoud	Niskin Bottle	51,593769	2,001231	19/04/2018 1:48	19/04/2018 1:48	33
<b>108081</b>	de Blok Reinhoud	Planktonnet Apstein	51,593792	2,001239	19/04/2018 1:48	19/04/2018 1:48	33
<b>108086</b>	de Blok Reinhoud	CTD	51,862442	2,002789	19/04/2018 3:16	19/04/2018 3:18	32
<b>108085</b>	de Blok Reinhoud	Planktonnet Apstein	51,863098	2,003243	19/04/2018 3:17	19/04/2018 3:17	32
<b>108087</b>	de Blok Reinhoud	Niskin Bottle	51,863566	2,003548	19/04/2018 3:18	19/04/2018 3:18	32
<b>108084</b>	de Blok Reinhoud	Planktonnet WP2	51,865028	2,004519	19/04/2018 3:21	19/04/2018 3:22	32
<b>108089</b>	Mortelmans Jonas	Planktonnet WP2	51,85654	2,254207	19/04/2018 4:19	19/04/2018 8:57	39
<b>108088</b>	Mortelmans Jonas	Planktonnet Apstein	51,555098	2,560895	19/04/2018 8:57	19/04/2018 8:57	39
<b>108096</b>	goossens jolien	Planktonnet Apstein	51,389822	3,252969	19/04/2018 13:39	19/04/2018 13:41	53
<b>108097</b>	goossens jolien	Secchi disc	51,389822	3,252969	19/04/2018 13:39	19/04/2018 13:39	53
<b>108094</b>	goossens jolien	CTD	51,389819	3,253191	19/04/2018 13:39	19/04/2018 13:43	53
<b>108095</b>	goossens jolien	Planktonnet WP2	51,38983	3,254412	19/04/2018 13:40	19/04/2018 13:40	53
<b>108093</b>	goossens jolien	Niskin Bottle	51,390125	3,259181	19/04/2018 13:43	19/04/2018 13:43	53
<b>108102</b>	goossens jolien	CTD	51,429188	3,495092	19/04/2018 14:29	19/04/2018 14:37	52
<b>108098</b>	de Blok Reinhoud	Secchi disc	51,429856	3,500878	19/04/2018 14:33	19/04/2018 14:33	52
<b>108099</b>	goossens jolien	Planktonnet WP2	51,429856	3,500878	19/04/2018 14:33	19/04/2018 14:33	52
<b>108100</b>	de Blok Reinhoud	Planktonnet Apstein	51,429856	3,500878	19/04/2018 14:33	19/04/2018 14:33	52
<b>108101</b>	goossens jolien	Niskin Bottle	51,429572	3,505431	19/04/2018 14:37	19/04/2018 14:37	52
<b>108103</b>	de Blok Reinhoud	CTD	51,632659	3,250064	19/04/2018 16:36	19/04/2018 16:45	51
<b>108105</b>	de Blok Reinhoud	Secchi disc	51,635612	3,253356	19/04/2018 16:44	19/04/2018 16:44	51
<b>108106</b>	de Blok Reinhoud	Planktonnet WP2	51,635612	3,253356	19/04/2018 16:44	19/04/2018 16:44	51
<b>108107</b>	de Blok Reinhoud	Planktonnet Apstein	51,635641	3,253389	19/04/2018 16:44	19/04/2018 16:44	51
<b>108104</b>	de Blok Reinhoud	Niskin Bottle	51,636084	3,253881	19/04/2018 16:45	19/04/2018 16:45	51

<b>108111</b>	de Blok Reinhoud	CTD	51,665353	3,443412	19/04/2018 17:29	19/04/2018 17:35	50
<b>108108</b>	de Blok Reinhoud	Planktonnet WP2	51,665402	3,443451	19/04/2018 17:29	19/04/2018 17:30	50
<b>108109</b>	de Blok Reinhoud	Planktonnet Apstein	51,665562	3,443589	19/04/2018 17:30	19/04/2018 17:30	50
<b>108112</b>	de Blok Reinhoud	Niskin Bottle	51,666805	3,444645	19/04/2018 17:35	19/04/2018 17:35	50
<b>108110</b>	de Blok Reinhoud	Secchi disc	51,666889	3,444706	19/04/2018 17:35	19/04/2018 17:35	50
<b>108116</b>	de Blok Reinhoud	CTD	51,860784	3,499803	19/04/2018 18:35	19/04/2018 18:42	49
<b>108113</b>	de Blok Reinhoud	Planktonnet WP2	51,860903	3,499801	19/04/2018 18:35	19/04/2018 18:38	49
<b>108114</b>	de Blok Reinhoud	Planktonnet Apstein	51,862285	3,499845	19/04/2018 18:38	19/04/2018 18:38	49
<b>108115</b>	de Blok Reinhoud	Secchi disc	51,862285	3,499845	19/04/2018 18:38	19/04/2018 18:38	49
<b>108117</b>	de Blok Reinhoud	Niskin Bottle	51,863196	3,49976	19/04/2018 18:41	19/04/2018 18:41	49
<b>108120</b>	de Blok Reinhoud	CTD	51,850158	3,750072	19/04/2018 19:33	19/04/2018 19:51	48
<b>108118</b>	de Blok Reinhoud	Planktonnet WP2	51,850178	3,750048	19/04/2018 19:34	19/04/2018 19:38	48
<b>108119</b>	de Blok Reinhoud	Planktonnet Apstein	51,850795	3,74859	19/04/2018 19:38	19/04/2018 19:38	48
<b>108121</b>	de Blok Reinhoud	Niskin Bottle	51,850951	3,748343	19/04/2018 19:40	19/04/2018 19:40	48
<b>108124</b>	de Blok Reinhoud	CTD	51,955272	3,898773	19/04/2018 20:34	19/04/2018 20:40	47
<b>108122</b>	de Blok Reinhoud	Planktonnet WP2	51,955271	3,898493	19/04/2018 20:35	19/04/2018 20:36	47
<b>108123</b>	de Blok Reinhoud	Planktonnet Apstein	51,95512	3,896978	19/04/2018 20:39	19/04/2018 20:39	47
<b>108125</b>	de Blok Reinhoud	Niskin Bottle	51,955007	3,896546	19/04/2018 20:40	19/04/2018 20:40	47
<b>108128</b>	de Blok Reinhoud	CTD	52,110314	3,759905	19/04/2018 21:50	19/04/2018 21:55	46
<b>108126</b>	de Blok Reinhoud	Planktonnet WP2	52,110238	3,759659	19/04/2018 21:50	19/04/2018 21:52	46
<b>108127</b>	de Blok Reinhoud	Planktonnet Apstein	52,109772	3,758852	19/04/2018 21:52	19/04/2018 21:52	46
<b>108129</b>	de Blok Reinhoud	Niskin Bottle	52,109062	3,757672	19/04/2018 21:55	19/04/2018 21:55	46
<b>108132</b>	Mortelmans Jonas	CTD	52,120299	3,500324	19/04/2018 22:55	19/04/2018 23:03	45
<b>108130</b>	Mortelmans Jonas	Planktonnet WP2	52,11906	3,498284	19/04/2018 22:59	19/04/2018 22:59	45

<b>108131</b>	Mortelmans Jonas	Planktonnet Apstein	52,11906	3,498284	19/04/2018 22:59	19/04/2018 22:59	45
<b>108133</b>	Mortelmans Jonas	Niskin Bottle	52,118122	3,49663	19/04/2018 23:02	19/04/2018 23:02	45
<b>108134</b>	Mortelmans Jonas	Planktonnet Apstein	51,891387	3,250942	20/04/2018 0:40	20/04/2018 0:40	44
<b>108136</b>	Mortelmans Jonas	CTD	51,891387	3,250942	20/04/2018 0:40	20/04/2018 0:44	44
<b>108135</b>	Mortelmans Jonas	Planktonnet WP2	51,891368	3,250913	20/04/2018 0:40	20/04/2018 0:40	44
<b>108137</b>	Mortelmans Jonas	Niskin Bottle	51,890761	3,250032	20/04/2018 0:43	20/04/2018 0:43	44
<b>108140</b>	Mortelmans Jonas	Planktonnet WP2	51,889835	2,999749	20/04/2018 1:47	20/04/2018 1:49	43
<b>108141</b>	Mortelmans Jonas	Planktonnet Apstein	51,889835	2,999749	20/04/2018 1:47	20/04/2018 1:48	43
<b>108138</b>	Mortelmans Jonas	CTD	51,889776	2,999708	20/04/2018 1:49	20/04/2018 1:51	43
<b>108139</b>	Mortelmans Jonas	Niskin Bottle	51,88972	2,999731	20/04/2018 1:50	20/04/2018 1:50	43
<b>108143</b>	Mortelmans Jonas	CTD	51,870361	2,753027	20/04/2018 2:55	20/04/2018 3:01	41
<b>108142</b>	Mortelmans Jonas	Planktonnet Apstein	51,870944	2,755259	20/04/2018 2:59	20/04/2018 2:59	41
<b>108144</b>	Mortelmans Jonas	Niskin Bottle	51,871314	2,756149	20/04/2018 3:01	20/04/2018 3:01	41
<b>108145</b>	Mortelmans Jonas	Planktonnet WP2	51,871918	2,757377	20/04/2018 3:03	20/04/2018 3:05	41
<b>108148</b>	goossens jolie	CTD	51,650285	2,500106	20/04/2018 5:14	20/04/2018 5:21	37
<b>108147</b>	goossens jolie	Planktonnet Apstein	51,651749	2,503242	20/04/2018 5:17	20/04/2018 5:18	37
<b>108149</b>	goossens jolie	Niskin Bottle	51,652886	2,50497	20/04/2018 5:21	20/04/2018 5:21	37
<b>108150</b>	goossens jolie	Secchi disc	51,653393	2,505571	20/04/2018 5:22	20/04/2018 5:24	37
<b>108146</b>	goossens jolie	Planktonnet WP2	51,653393	2,505571	20/04/2018 5:22	20/04/2018 5:25	37
<b>108153</b>	goossens jolie	Planktonnet Apstein	51,621988	2,753489	20/04/2018 6:31	20/04/2018 6:31	42
<b>108155</b>	goossens jolie	CTD	51,622533	2,753587	20/04/2018 6:32	20/04/2018 6:34	42
<b>108154</b>	goossens jolie	Niskin Bottle	51,623165	2,753657	20/04/2018 6:34	20/04/2018 6:34	42
<b>108151</b>	goossens jolie	Secchi disc	51,623642	2,753768	20/04/2018 6:35	20/04/2018 6:37	42
<b>108152</b>	goossens jolie	Planktonnet WP2	51,623642	2,753768	20/04/2018 6:35	20/04/2018 6:37	42

<b>108159</b>	goossens jolien	Planktonnet WP2	51,387865	2,749982	20/04/2018 8:21	20/04/2018 8:21	56
<b>108160</b>	goossens jolien	Planktonnet Apstein	51,387865	2,749972	20/04/2018 8:22	20/04/2018 8:22	56
<b>108156</b>	Mortelmans Jonas	CTD	51,387861	2,749866	20/04/2018 8:22	20/04/2018 8:23	56
<b>108157</b>	Mortelmans Jonas	Niskin Bottle	51,387861	2,749809	20/04/2018 8:23	20/04/2018 8:23	56
<b>108158</b>	goossens jolien	Secchi disc	51,387861	2,7498	20/04/2018 8:23	20/04/2018 8:23	56
<b>108165</b>	goossens jolien	CTD	51,389391	3,000121	20/04/2018 9:29	20/04/2018 9:34	55
<b>108161</b>	de Blok Reinoud	Planktonnet Apstein	51,389384	3,000058	20/04/2018 9:30	20/04/2018 9:32	55
<b>108163</b>	Mortelmans Jonas	Secchi disc	51,389349	2,999858	20/04/2018 9:30	20/04/2018 9:32	55
<b>108162</b>	Mortelmans Jonas	Planktonnet WP2	51,38933	2,999761	20/04/2018 9:31	20/04/2018 9:34	55
<b>108164</b>	goossens jolien	Niskin Bottle	51,389135	2,998576	20/04/2018 9:34	20/04/2018 9:34	55

## **APPENDIX 2:** list of used protocols and chemicals on board

### **Next generation sequencing**

#### Tools

- Vacuum filtration unit
- 50 \* 0.2 µm polycarbonate filters
- Niskinbottles
- Tweezers
- Milli-Q-water
- cleaning solutions to remove all DNA (bleach or a DNase product)
- 50 \* 1.5 ml Eppendorf epjes
- Eppendorf stickers and cryogen pen
- tape
- Liquid nitrogen

#### Protocol

- Clean all used materials before filtration thoroughly with Milli-Q-water
- Rinse syringe and filtercap by pressing a full syringe with Milli-Q-water three times over the filterholder
- To remove all DNA, before sampling, the filtration unit or syringe can be cleaned with bleach or DNase. Make sure you clean it afterwards with Milli-Q-water to remove all cleaning product
- Place a 0.2 µm polycarbonate filter (25 mm) in de filter holder (vacuum system or syringe) and filtrate as much as possible
- Note the filtrated volume, sampling data and sampling location
- Put the filter with a cleaned (Milli-Q-water, bleach, DNase or Ethanol) tweezers in a 1.5 ml Eppendorf epje
- Put a sticker with all the relevant information on the Eppendorf epje and wrap scotch tape around the sticker and the lid. Don't forget this, because the sticker will not stick anymore when you put it in liquid nitrogen!!!
- Store the Eppendorf epjes with filters in the liquid nitrogen container until they can be stored -80 °C freezer

### **HPLC Pigments**

#### Tools

- vacuum pomp and tubing
- 50 \* GFF filter
- 50 \* 2ml tubes
- roll of paper to dry
- tape
- cryopen
- cryolabels

#### To do

- done

#### Protocol

- 1) Connect vacuum pump to filter unit
- 2) Place filter and cup on filter unit
- 3) Fill cup with known amount of collected sample water (eg 500 mL)
- 4) Open t-valve and turn on vacuum pump to start filtering
- 5) Refill cup as much as possible, as long the filter is not clogged (for coastal stations, generally around 500mL in total, for deeper water, generally around 2000mL or more)
- 6) Note total volume of filtered water in excel report
- 7) Once the filter runs dry, flush sides of cup clean with distilled water and remove cup
- 8) Remove filter, fold and dry filter on paper tissue (filter has to be very dry!)

- 9) Store the filter in the specifically designed storage unit.
- 10) Label storage unit with the cryopen: VLIZ Date Station Chla "Volume filtered" ml  
(eg VLIZ 20141218\_130\_500ml\_ChIA)
- 11) Wrap tape around the label to ensure it stays attached in liquid nitrogen.
- 12) Store in liquid nitrogen.

Clean all used equipment properly by rinsing 3 times with Milli-Q water

### Nutrients

#### Tools

- 50 \* 50 mL jars and caps
- 50 \* cellulose acetate filters 0.2µm

#### Protocol

- Connect vacuum pump to Erlenmeyer
- Place cellulose acetate filter and cup on filter unit
- Fill cup (depends on sea state, generally around 300mL)
- Open t-valve and turn on vacuum to start filtering
- When the filter runs dry, pour the filtered water into a nutrient-recipient
- 150ml for official lab nutrient analysis (label with VLIZ, station, date, Nutrients...)
- Clean the Erlenmeyer and all other equipment properly, rinse 3 times with Milli-Q water.
- put in -24

### Flowcam

#### Tools

- 1 \* 10 µm net
- 1 \* 50µm net
- 1 \* 50L barrel
- 50 \* 1L recipient (or alternatively: the typical falcons).
- 1 \* bucket and rope
- 1 \* lugol

#### To do

- attach strong rope to big bucket.

#### Protocol

- Filter 50 liters water, from a bucket sample, on 50 µm net
- but contents of the 50µm net into a falcon (or larger recipient).
- Preserve with lugol 2% final concentration
- store in 4°, attach aluminium foil

#### Dilutions

Volume	Sea Water	Volume	Lugol
1000	mL zeewater	5	mL lugol
500	mL zeewater	2.5	mL lugol
250	mL zeewater	1.25	mL lugol
125	mL zeewater	0.625	mL lugol
62.5	mL zeewater	0.3125	mL lugol

31.25	mL zeewater	0.15625	mL lugol
15.625	mL zeewater	0.078125	mL lugol
7.8125	mL zeewater	0.039063	mL lugol
3.90625	mL zeewater	0.019531	mL lugol
1.953125	mL zeewater	0.009766	mL lugol

### Zooplankton

#### Tools

- WP2 net (200  $\mu$ m)
- Flowmeter
- gas-water
- formalin

#### Protocol

- Tell the crew to haul the WP2 net. Ask them to install the flowmeter in order to know the volume of water that passed the net. Note this flow on the excel report file
- Register in MIDAS when the WP2 net is hauled up.
- Once the WP2 net is up, make sure to rinse the outside of the net so all material is certainly in the red flask on the bottom.
- take the red flask on the bottom and try to lose as many water as possible. Pour this material in a 1L flask.
- Rinse the flask very thoroughly with soda water and add it to the recipient
- Dependant on the volume of zooplankton, add 20ml 35% formol, or more! Do this shortly after collecting since zooplankton will predate each other within the recipient.
- In the lab, after fixation, formol will be replaced by 70% ethanol.

#### Dilutions

Volume Plankton	add formol to obtain 4% concentration (in mL)
100	11.11
200	22.22
300	33.33
400	44.44
500	55.56
600	66.67
700	77.78
800	88.89
900	100.00
1000	111.11