

Cruise Report: NIOZ North Sea Cruise 64 PE 452, leg 2.

Brown Bank and Sabellaria Reefs

Pelagia, 18-23 May 2019.

By Jip Vrooman, North Sea Foundation, 06-06-2019

1. Introduction

The focus of this expedition was to learn more about the *Sabellaria* reefs that were discovered on the Brown Bank in 2017 (Van Der Reijden, K. J., Koop, L., O'flynn, S., Garcia, S., Bos, O., Van Sluis, C., ... & Ysebaert, T. (2019). Discovery of *Sabellaria spinulosa* reefs in an intensively fished area of the Dutch Continental Shelf, North Sea. *Journal of Sea Research*, 144, 85-94.). This report presents the day-to-day account of the cruise.

Scientific/Communication crew: Jip Vrooman, Karin van der Reijden, Leo Koop, Nadia Hijner, Zita Veugen, John Bastiaan, Raoul Michels, Elisabeth van Spelden, Jan Macher.

2. Verbal account of the activities

This was leg 2 of the expedition. We started with new station numbers in CASINO. There were two focus areas, east and west of the main sand ridge that runs through the length of the Brown Bank area. Survey locations were determined and updated during the week, since they depended on the results of the multibeam. For maps of the survey area, see Chapter 4.

Day 11 – may 18th

The first day was dedicated to steaming to survey area and testing the multifrequency multibeam echosounder from the TUDelft, hereafter MBES, on a specified test site for a Patch test. At this site an object, rising approximately 4 m above the seafloor was to be sailed over a certain amount of times to calibrate the MF-MBES and check its setting and properties. A CTD was also performed, and water samples were taken and stored to analyse for eDNA (station 1). This was performed for all CTD's taken during this expedition. The MBES had been attached to a pole that is lowered into the water on the left side of the ship. It took a while to define the optimal speed for the equipment, which turned out to be rather low (2.6 kn with reference to the water), to prevent wobbling. The test (station 2) took about 4 to 5 hours in the end, after which we steamed to the actual location of interest (Brown Bank). There a CTD was performed (station 3), after which the MBES survey started that lasted through the nights, covering four pre-defined lines (station 4).

Day 12- may 19th

Today we started with deploying the NIOZ Video Frame system (Hopper camera). Four transects of 200 m were performed (station 5 to 8). Unfortunately the *Sabellaria* reefs that were found on these locations 2 years ago did not appear on the video. During transect 5 (station 9) the connection between the camerasystem and deck was lost, and the transect was terminated prematurely. The next try also failed (station 10), so it was decided to stop working with the Hopper camera. The prognosis was that it wouldn't be fixable in the short term, so BRUCE, the camera system of Karin van der Reijden, was set up. With this, 2 transects were performed (station 11 & 12). However, during the last transect the currents were too strong and it was impossible to get BRUCE to the seafloor, so the transect was terminated.

After that two boxcores were taken (station 13 & station 14). Sediment samples were taken from the boxcores, to analyse for foraminifers. The content of the boxcores was sieved, and the remnants

4. Maps of sample locations

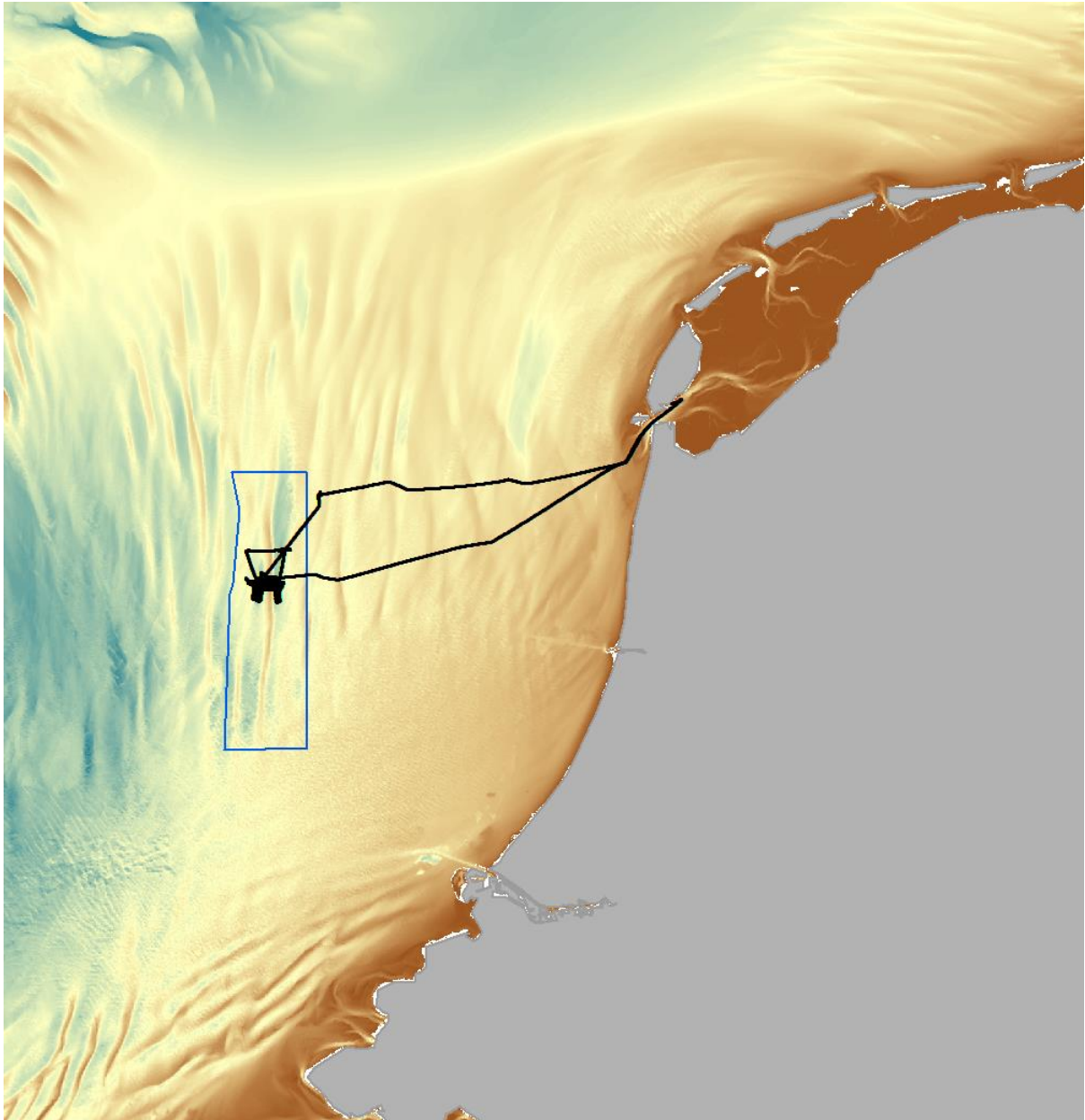


Figure 1. Overall route (black line) on top of depth map. The blue box represents the ecologically interesting area 'Brown Bank'.

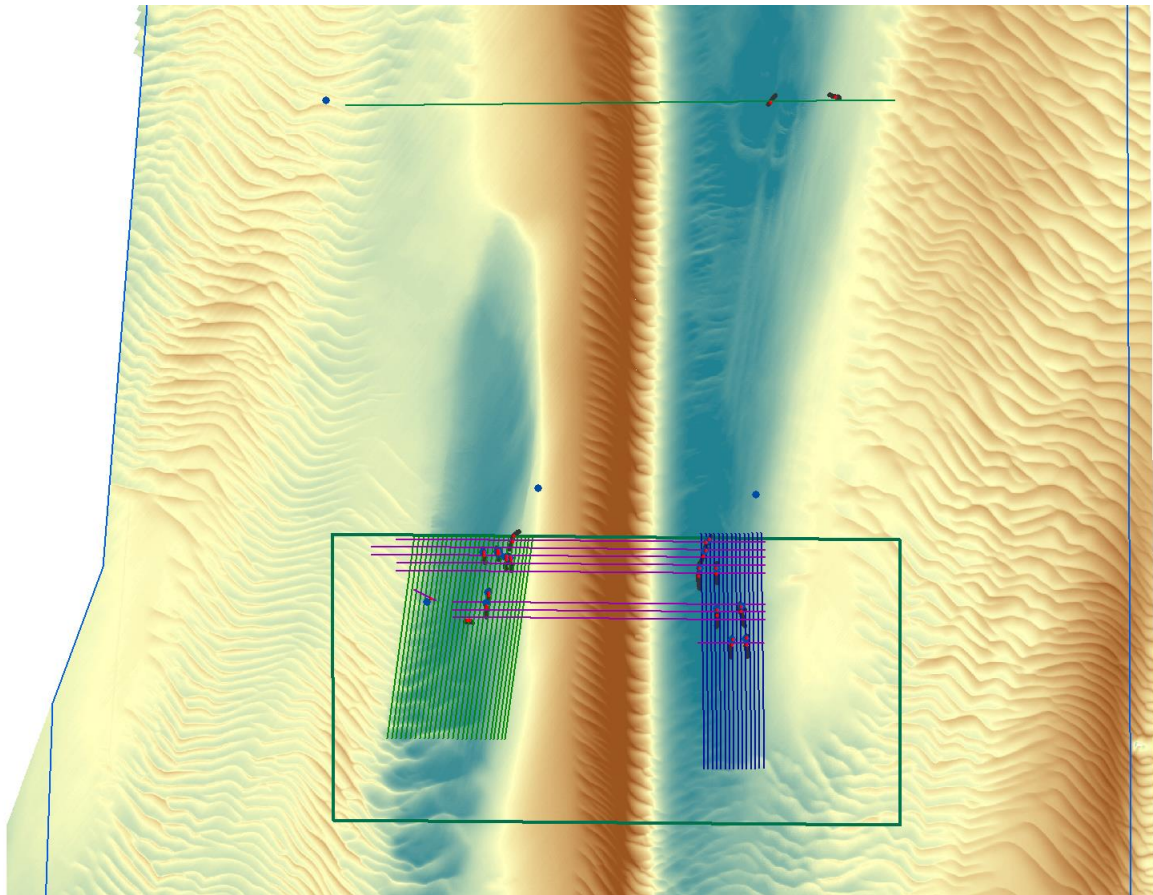


Figure 2. Detailed map of sampling locations for boxcores (red dots), CTD's (blue triangles), videotransect (dark grey lines) and MBES lines (green, purple and blue lines (not all were sailed)). The sand ridge running through the Brown Bank can be clearly seen as the brown line running from north to south on the depth map.

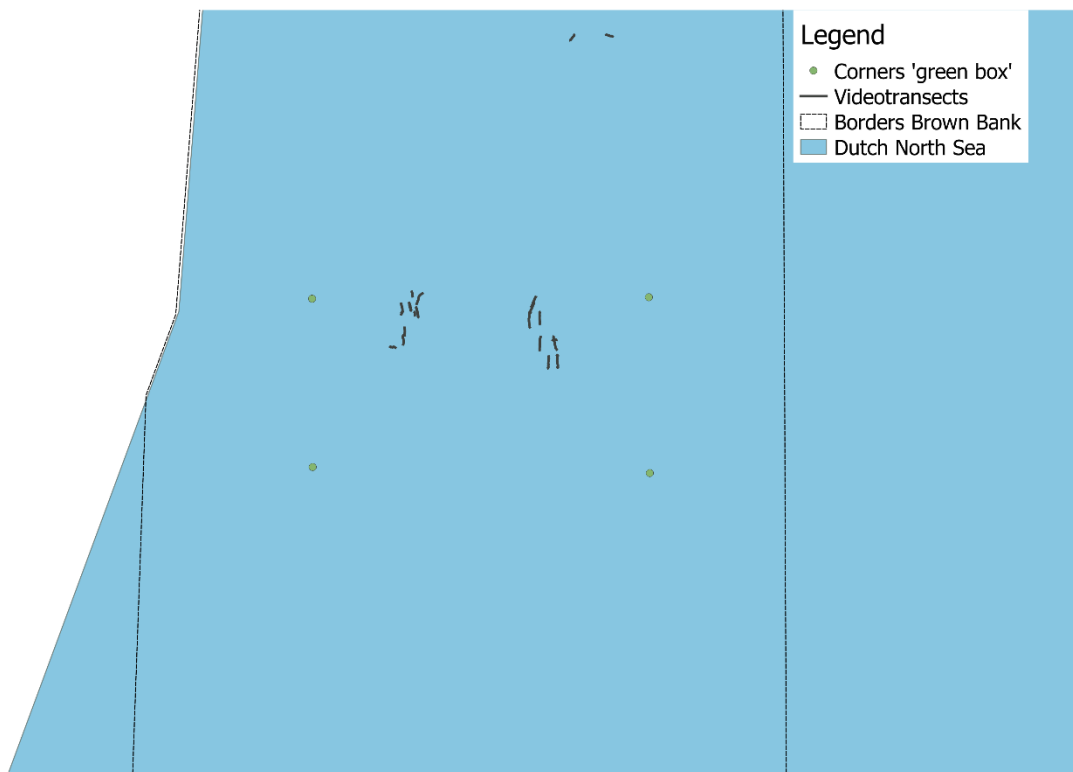


Figure 3. Detailed map of videotransects

5. Casino data (selection)

Date	Time	Latitude(deg. min.milli)	Longitude(deg. min.milli)	Device name	Action name	Station number	Depth (m)
18/05/2019	14:12:35	52,81686	3,501642	CTD	Begin	1	31,36
18/05/2019	14:14:45	52,81683	3,501748	CTD	Bottom	1	31,35
18/05/2019	14:19:20	52,81682	3,501762	CTD	End	1	31,47
18/05/2019	15:01:32	52,82357	3,50442	HF Multibeam	Begin	2	31,49
18/05/2019	18:46:27	52,8025	3,499358	HF Multibeam	End	2	31,66
18/05/2019	20:30:38	52,6254	3,290168	CTD	Begin	3	37,68
18/05/2019	20:31:50	52,62539	3,290142	CTD	Bottom	3	37,79
18/05/2019	20:36:14	52,62538	3,290163	CTD	End	3	38,06
18/05/2019	21:28:46	52,6255	3,290005	Multibeam	Begin	4	37,88
19/05/2019	05:09:16	52,62644	3,287928	Multibeam	End	4	39,84
19/05/2019	06:13:49	52,62179	3,285102	Hopper camera	Begin	5	41,5
19/05/2019	06:22:32	52,6223	3,284973	Hopper camera	Start track	5	40,97
19/05/2019	06:30:56	52,62346	3,284572	Hopper camera	Stop track	5	42,27
19/05/2019	06:33:44	52,6237	3,284495	Hopper camera	End	5	42,42
19/05/2019	06:48:13	52,62177	3,285312	Hopper camera	Begin	6	40,93
19/05/2019	06:53:36	52,62224	3,285252	Hopper camera	Start track	6	41,1
19/05/2019	07:05:26	52,62356	3,28483	Hopper camera	Stop track	6	41,76
19/05/2019	07:09:54	52,6231	3,284625	Hopper camera	End	6	41,69
19/05/2019	07:39:06	52,61996	3,288525	Hopper camera	Begin	7	38,06
19/05/2019	07:50:08	52,62126	3,28819	Hopper camera	Start track	7	38,82
19/05/2019	08:02:59	52,62249	3,287675	Hopper camera	Stop track	7	39,15
19/05/2019	08:05:49	52,6224	3,287615	Hopper camera	End	7	39,34
19/05/2019	08:20:55	52,62036	3,287085	Hopper camera	Begin	8	38,63
19/05/2019	08:31:53	52,62127	3,28687	Hopper camera	End	8	39,4
19/05/2019	09:08:27	52,62064	3,28097	Hopper camera	Begin	9	43,04
19/05/2019	09:13:45	52,62118	3,281228	Hopper camera	End	9	43,07
19/05/2019	11:57:42	52,62141	3,281645	Towed video	Begin	10	42,54
19/05/2019	12:08:03	52,62218	3,281545	Towed video	Start track	10	42,69

19/05/2019	12:18:21	52,62334	3,28108	Towed video	Stop track	10	42,84
19/05/2019	12:21:59	52,62353	3,280973	Towed video	End	10	43,22
19/05/2019	13:10:28	52,62345	3,287832	Towed video	Begin		38,97
19/05/2019	13:15:37	52,62391	3,288112	Towed video	Start track		38,84
19/05/2019	13:29:56	52,6256	3,288998	Towed video	Stop track		39,21
19/05/2019	13:35:27	52,62627	3,290395	Towed video	End		37,78
19/05/2019	14:18:50	52,62672	3,285713	Towed video	Begin	12	42,2
19/05/2019	14:32:40	52,6255	3,286027	Towed video	End	12	41,47
19/05/2019	15:02:24	52,62542	3,289058	Boxcore	Bottom	13	38,73
19/05/2019	15:25:59	52,62464	3,288742	Boxcore	Bottom	14	38,92
19/05/2019	16:41:39	52,62274	3,284987	CTD with samples	Begin	15	41,44
19/05/2019	16:43:29	52,62273	3,28499	CTD with samples	Bottom	15	41,57
19/05/2019	16:48:11	52,62273	3,284957	CTD with samples	End	15	41,57
19/05/2019	17:00:32	52,62309	3,28481	CTD with samples	Begin	16	41,83
19/05/2019	17:02:18	52,62312	3,284768	CTD with samples	Bottom	16	41,68
19/05/2019	17:06:52	52,62309	3,284778	CTD with samples	End	16	41,81
19/05/2019	17:15:33	52,62318	3,285022	CTD with samples	Begin	17	41,77
19/05/2019	17:18:02	52,62318	3,28509	CTD with samples	Bottom	17	41,28
19/05/2019	17:21:36	52,62316	3,285107	CTD with samples	End	17	41,65
19/05/2019	17:36:44	52,62268	3,285272	CTD with samples	Begin	18	41,26
19/05/2019	17:38:21	52,62266	3,28539	CTD with samples	Bottom	18	41,38
19/05/2019	17:43:31	52,62268	3,285378	CTD with samples	End	18	41,31
19/05/2019	17:52:19	52,62217	3,286958	CTD with samples	Begin	19	39,55
19/05/2019	17:53:33	52,6222	3,286958	CTD with samples	Bottom	19	39,78
19/05/2019	17:58:11	52,62221	3,286993	CTD with samples	End	19	39,43
19/05/2019	18:59:12	52,62702	3,283248	Multibeam	Begin	20	0
19/05/2019	20:17:36	52,62664	3,279368	Multibeam	End	20	61,98
19/05/2019	21:09:25	52,62586	3,34214	Multibeam	Begin	21	0
20/05/2019	05:18:12	52,58779	3,341675	Multibeam	End	21	0
20/05/2019	06:16:20	52,61799	3,341942	Hopper camera	Begin	22	45,09

20/05/2019	06:24:39	52,61893	3,341853	Hopper camera	Start track	22	45,5
20/05/2019	06:46:16	52,62101	3,341877	Hopper camera	Stop track	22	45,13
20/05/2019	06:47:48	52,6211	3,341895	Hopper camera	End	22	45,71
20/05/2019	07:16:50	52,61112	3,349248	Hopper camera	Begin	23	41,06
20/05/2019	07:39:30	52,61267	3,348415	Hopper camera	Start track	23	41,8
20/05/2019	08:05:01	52,61459	3,347855	Hopper camera	Stop track	23	42,27
20/05/2019	08:06:28	52,61462	3,347855	Hopper camera	End	23	41,5
20/05/2019	08:32:42	52,60614	3,34547	Hopper camera	Begin	24	43,03
20/05/2019	08:49:45	52,60742	3,345525	Hopper camera	Start track	24	42,93
20/05/2019	09:12:49	52,60935	3,345788	Hopper camera	Stop track	24	42,76
20/05/2019	09:14:25	52,60926	3,34569	Hopper camera	End	24	43,84
20/05/2019	09:44:39	52,62257	3,338258	Hopper camera	Begin	25	44,34
20/05/2019	09:54:46	52,62356	3,338925	Hopper camera	Start track	25	46,86
20/05/2019	10:14:20	52,62538	3,340242	Hopper camera	Stop track	25	47,05
20/05/2019	10:15:31	52,62542	3,340292	Hopper camera	End	25	45,71
20/05/2019	11:03:01	52,61709	3,337427	Hopper camera	Begin	26	44,22
20/05/2019	11:17:53	52,61895	3,337108	Hopper camera	Start track	26	44,16
20/05/2019	11:35:45	52,6208	3,337317	Hopper camera	Stop track	26	44,2
20/05/2019	11:39:29	52,621	3,33782	Hopper camera	End	26	44,95
20/05/2019	12:09:25	52,61101	3,341747	Hopper camera	Begin	27	44,12
20/05/2019	12:34:56	52,61443	3,342187	Hopper camera	Stop track	27	44,18
20/05/2019	12:35:07	52,61445	3,342188	Hopper camera	End	27	43,61
20/05/2019	13:04:20	52,60628	3,349507	Hopper camera	Begin	28	39,78
20/05/2019	13:15:22	52,60793	3,349428	Hopper camera	Start track	28	39,78
20/05/2019	13:27:23	52,60952	3,349693	Hopper camera	Stop track	28	40,09
20/05/2019	13:28:55	52,60959	3,349427	Hopper camera	End	28	40,06

20/05/2019	14:10:42	52,62123	3,33784	Hopper camera	Begin	29	44,71
20/05/2019	14:12:18	52,62137	3,337817	Hopper camera	Start track	29	44,76
20/05/2019	14:35:01	52,62344	3,339335	Hopper camera	Stop track	29	46,53
20/05/2019	14:37:03	52,62356	3,339298	Hopper camera	End	29	46,69
20/05/2019	15:04:44	52,60918	3,349455	Boxcore	Bottom	30	41,1
20/05/2019	15:21:42	52,6089	3,345937	Boxcore	Bottom	31	43,3
20/05/2019	15:42:10	52,61419	3,348123	Boxcore	Bottom	32	41,53
20/05/2019	15:58:03	52,61369	3,341942	Boxcore	Bottom	33	45,38
20/05/2019	16:50:41	52,63302	3,29543	CTD with samples	Begin	34	34,04
20/05/2019	16:52:46	52,633	3,295505	CTD with samples	Bottom	34	34,15
20/05/2019	16:57:20	52,63298	3,295482	CTD with samples	End	34	33,72
20/05/2019	17:37:52	52,62617	3,294522	HF Multibeam	Begin	35	34,12
20/05/2019	18:09:24	52,62594	3,294162	HF Multibeam	End	35	0
20/05/2019	18:52:05	52,626	3,294562	Multibeam	Begin	36	0
21/05/2019	05:17:44	52,58775	3,346148	Multibeam	End	36	0
21/05/2019	06:09:44	52,60802	3,349533	Boxcore	Bottom	37	40,78
21/05/2019	06:31:13	52,60804	3,345693	Boxcore	Bottom	38	43,03
21/05/2019	06:44:36	52,60811	3,345863	Boxcore	Bottom	39	42,99
21/05/2019	07:05:29	52,61348	3,348153	Boxcore	Bottom	40	41,48
21/05/2019	07:18:38	52,61344	3,348072	Boxcore	Bottom	41	42,15
21/05/2019	07:39:13	52,61278	3,341862	Boxcore	Bottom	42	44,64
21/05/2019	08:02:23	52,61933	3,34164	Boxcore	Bottom	43	46,85
21/05/2019	08:16:04	52,6202	3,341812	Boxcore	Bottom	44	46,01
21/05/2019	08:35:03	52,61901	3,33718	Boxcore	Bottom	45	44,76
21/05/2019	08:46:59	52,62025	3,337253	Boxcore	Bottom	46	45,33
21/05/2019	09:03:49	52,62216	3,33839	Boxcore	Bottom	47	45,52
21/05/2019	09:18:33	52,62307	3,339033	Boxcore	Bottom	48	45,71
21/05/2019	09:30:28	52,62423	3,33919	Boxcore	Bottom	49	46,09
21/05/2019	09:36:09	52,62429	3,339115	Boxcore	Bottom	50	46,48
21/05/2019	09:48:26	52,62496	3,339905	Boxcore	Bottom	51	45,7
21/05/2019	09:56:44	52,62485	3,339943	Boxcore	Bottom	52	46,14
21/05/2019	11:13:12	52,6151	3,2825	Hopper camera	Begin	53	39,32
21/05/2019	11:20:31	52,61591	3,282528	Hopper camera	Start track	53	40,35
21/05/2019	11:28:45	52,61679	3,282553	Hopper camera	Stop track	53	40,78
21/05/2019	11:30:45	52,61711	3,28242	Hopper camera	End	53	40,74
21/05/2019	11:47:05	52,61266	3,281833	Hopper camera	Begin	54	38,98

21/05/2019	11:58:09	52,614	3,281927	Hopper camera	Start track	54	40,26
21/05/2019	12:04:58	52,61496	3,281783	Hopper camera	Stop track	54	39,77
21/05/2019	12:08:53	52,61499	3,281918	Hopper camera	End	54	40,03
21/05/2019	12:29:01	52,61202	3,276123	Hopper camera	Begin	55	43,21
21/05/2019	12:30:55	52,61203	3,276325	Hopper camera	Start track	55	43,8
21/05/2019	12:40:14	52,61198	3,277937	Hopper camera	Stop track	55	41,91
21/05/2019	12:42:06	52,61179	3,278378	Hopper camera	End	55	40,74
21/05/2019	12:56:10	52,61216	3,27746	Boxcore	Bottom	56	41,91
21/05/2019	13:08:53	999	999	Boxcore	Bottom	57	42,65
21/05/2019	13:36:10	52,61421	3,281887	Boxcore	Bottom	58	39,44
21/05/2019	13:48:17	52,61448	3,281787	Boxcore	Bottom	59	39,67
21/05/2019	14:05:26	52,61606	3,282577	Boxcore	Bottom	60	39,62
21/05/2019	14:13:29	52,61641	3,282575	Boxcore	Bottom	61	40,92
21/05/2019	14:33:18	52,62239	3,281385	Boxcore	Bottom	62	43,42
21/05/2019	14:42:56	52,62299	3,281305	Boxcore	Bottom	63	43,22
21/05/2019	14:55:38	52,62267	3,285217	Boxcore	Bottom	64	41,81
21/05/2019	15:05:15	52,62267	3,284905	Boxcore	Bottom	65	41,5
21/05/2019	15:15:12	52,62315	3,284758	Boxcore	Bottom	66	41,89
21/05/2019	15:24:12	52,62321	3,28508	Boxcore	Bottom	67	42,07
21/05/2019	15:38:55	52,62229	3,287115	Boxcore	Bottom	68	40,53
21/05/2019	16:34:43	52,62177	3,287187	Boxcore	Bottom	69	39,49
21/05/2019	16:43:35	52,62217	3,288167	Boxcore	Bottom	70	38,74
21/05/2019	16:53:16	52,62169	3,288288	Boxcore	Bottom	71	38,82
21/05/2019	17:16:34	52,61559	3,267425	Boxcore	Bottom	72	41,11
21/05/2019	17:31:25	52,61507	3,266372	CTD with samples	Begin	73	40,24
21/05/2019	17:33:19	52,61508	3,26641	CTD with samples	Bottom	73	41,12
21/05/2019	17:37:39	52,61508	3,266443	CTD with samples	End	73	39,8
21/05/2019	18:45:39	52,62535	3,257943	Multibeam	Begin	74	0
22/05/2019	04:41:45	52,60843	3,355213	Multibeam	End	74	0
22/05/2019	06:08:43	52,61364	3,34755	Hopper camera	Begin	75	42,22
22/05/2019	06:10:05	52,61367	3,347558	Hopper camera	Start track	75	42,27
22/05/2019	06:21:54	52,61372	3,349158	Hopper camera	Stop track	75	40,88
22/05/2019	06:23:12	52,61371	3,349188	Hopper camera	End	75	40,55
22/05/2019	06:35:00	52,6142	3,348338	CTD with samples	Begin	76	41,72

22/05/2019	06:36:49	52,61423	3,348247	CTD with samples	Bottom	76	41,64
22/05/2019	06:41:18	52,6142	3,348328	CTD with samples	End	76	41,59
22/05/2019	06:55:06	52,61385	3,341935	CTD with samples	Begin	77	44,95
22/05/2019	06:57:16	52,61385	3,341803	CTD with samples	Bottom	77	44,91
22/05/2019	07:01:28	52,61388	3,341777	CTD with samples	End	77	45,23
22/05/2019	07:19:53	52,60909	3,349415	CTD with samples	Begin	78	40,87
22/05/2019	07:21:23	52,60905	3,349425	CTD with samples	Bottom	78	41,31
22/05/2019	07:25:46	52,60906	3,349493	CTD with samples	End	78	40,69
22/05/2019	07:38:08	52,60893	3,345803	CTD with samples	Begin	79	43,17
22/05/2019	07:39:39	52,60894	3,345868	CTD with samples	Bottom	79	42,61
22/05/2019	07:44:22	52,60896	3,345973	CTD with samples	End	79	42,81
22/05/2019	08:02:40	52,62008	3,342113	CTD with samples	Begin	80	45,06
22/05/2019	08:04:29	52,62007	3,341975	CTD with samples	Bottom	80	44,95
22/05/2019	08:09:10	52,62003	3,341623	CTD with samples	End	80	45,52
22/05/2019	08:20:11	52,62023	3,33762	CTD with samples	Begin	81	45,49
22/05/2019	08:21:53	52,62023	3,337488	CTD with samples	Bottom	81	45,51
22/05/2019	08:26:14	52,62032	3,337438	CTD with samples	End	81	45,71
22/05/2019	08:38:01	52,62296	3,33906	CTD with samples	Begin	82	44,96
22/05/2019	08:39:48	52,62298	3,338912	CTD with samples	Bottom	82	45,22
22/05/2019	08:44:01	52,62292	3,338933	CTD with samples	End	82	44,85
22/05/2019	08:55:47	52,62477	3,33962	CTD with samples	Begin	83	46,2
22/05/2019	08:57:15	52,62475	3,339632	CTD with samples	Bottom	83	46,29
22/05/2019	09:01:42	52,62482	3,339738	CTD with samples	End	83	45,91
22/05/2019	09:31:05	52,62204	3,288268	CTD with samples	Begin	84	38,63
22/05/2019	09:32:24	52,62207	3,288167	CTD with samples	Bottom	84	38,76
22/05/2019	09:36:24	52,62204	3,288068	CTD with samples	End	84	38,99

22/05/2019	09:47:10	52,62292	3,281105	CTD with samples	Begin	85	42,58
22/05/2019	09:48:29	52,62292	3,281095	CTD with samples	Bottom	85	43,61
22/05/2019	09:52:26	52,62296	3,281075	CTD with samples	End	85	43,42
22/05/2019	10:04:30	52,61658	3,282165	CTD with samples	Begin	86	-1
22/05/2019	10:08:07	52,61654	3,282252	CTD with samples	Bottom	86	40,35
22/05/2019	10:11:06	52,61628	3,282198	CTD with samples	End	86	40,34
22/05/2019	10:18:52	52,61479	3,282135	CTD with samples	Begin	57	40,35
22/05/2019	10:22:27	52,6149	3,281948	CTD with samples	Bottom	57	39,3
22/05/2019	10:24:04	52,61499	3,28201	CTD with samples	End	57	39,96
22/05/2019	11:23:05	52,69407	3,241548	CTD with samples	Begin	88	33,42
22/05/2019	11:26:05	52,69454	3,240608	CTD with samples	Bottom	88	33,82
22/05/2019	11:30:30	52,69457	3,240648	CTD with samples	End	88	33,79
22/05/2019	11:58:27	52,69397	3,27825	Multibeam	Begin	89	32,85
22/05/2019	13:07:26	52,69699	3,390712	Multibeam	End	89	31,74
22/05/2019	13:54:37	52,69468	3,374478	Hopper camera	Begin	90	36,53
22/05/2019	13:57:19	52,69479	3,374302	Hopper camera	Start track	90	36,11
22/05/2019	14:10:35	52,69512	3,37186	Hopper camera	Stop track	90	37,01
22/05/2019	14:15:07	52,69513	3,371745	Hopper camera	End	90	36,89
22/05/2019	14:35:27	52,69371	3,35585	Hopper camera	Begin	91	44,16
22/05/2019	14:39:22	52,69384	3,356047	Hopper camera	Start track	91	44,37
22/05/2019	14:56:16	52,69505	3,357632	Hopper camera	Stop track	91	44,18
22/05/2019	14:58:48	52,69517	3,357688	Hopper camera	End	91	44,45
22/05/2019	15:12:13	52,69396	3,356485	Boxcore	Bottom	92	44,59
22/05/2019	15:29:48	52,69491	3,37342	Boxcore	Bottom	93	37,06
22/05/2019	15:37:22	52,6948	3,373405	Boxcore	Bottom	94	37,1
22/05/2019	16:36:05	52,63191	3,352278	CTD with samples	Begin	95	40,55
22/05/2019	16:37:35	52,63191	3,352332	CTD with samples	Bottom	95	39,97
22/05/2019	16:42:10	52,63181	3,352455	CTD with samples	End	95	39,92

22/05/2019	16:52:00	52,62728	3,352438	Multibeam	Begin	96	39,4
22/05/2019	19:54:30	52,62621	3,339025	Multibeam	End	96	44,95
22/05/2019	20:26:36	52,62557	3,293248	Multibeam	Begin	97	34,6
23/05/2019	01:45:04	52,6413	3,482003	Multibeam	End	97	34,71