

DTU Aqua



15.10.2014, 20.11-22.12.2014, Jnr 14/13235

Cruise Report

Sand eel Dredge Survey, Sand eel Area 1, 2 and 3, 2014

Vessel: Salling

Cruise dates (planned): 21.11.2014 –
15.12.2013

Cruise number: 2014

Cruise name: Sand eel Dredge Survey, Sand
eel Area 1, 2 and 3

Port of departure:	Esbjerg	Date:	21.11.2014
Port of return:	Esbjerg	Date:	14.12.2014
Other ports:		Date and justification:	

Participants

Leg #: 1		
Name	Institute	Function and main tasks
Dirk Tijssen	DTU Aqua	Cruise leader

Leg #:		
Name	Institute	Function and main tasks

Objectives

The purpose of the sand eel dredge survey was to collect sand eels buried in the seabed and compare catches (number and age composition) with the previous year's collections to assess the 2014 year class strength of sand eel in the different areas adopted by ICES in 2009. Data from the dredge survey is the basis for calculating an index, which will be used in the stock assessment.

In addition, to try to validate/quality ensure each haul using bottom contact sensors mounted on the gear (dredges).

Itinerary

The vessel departed Esbjerg Harbor 21.11.2014 at 20.00 hrs. and returned to Esbjerg Harbor at 11.00 hrs 14.12.2014. Sampling with the modified dredge typically started just after sunset (UTC 17.00 hrs) and the last station of the night was completed before sunrise (UTC 04.00 – 06.00 hrs) i.e. fishing was only conducted during darkness.

Achievements

Types of data collected

- GPS Positions
- Depth
- Dredge (sand eels; species, weight, length)
- Van Veen grab (sediment samples; grain size composition)

Achievements in 2014:

- 23 days at sea (planned: 24)
- 305 stations; 57 sediment grab samples and 248 dredge hauls distributed over 82 sample positions (planned 68 with high priority and 35 with low priority).

Methods

On each sampling location three hauls were carried out with the modified mussel dredge according to descriptions for fishing with modified mussel dredge used since 2004. The DK II dredge was used as the primary gear and the DK IV dredge served as 'back-up'. On new sample locations sediment samples were taken with the Van Veen grab (0.2m²), for the determination of grain size composition i.e. whether the bottom could be classified as a suitable habitat for sand eel (e.g. could a very fine-grained sediment be unfit as overwintering habitat).

Time of sampling

Sand eels survive the winter by burying in the seabed, but can under some circumstances be forced to seek food in the water column. In these cases, the food search is almost exclusively carried out in darkness. In order to ensure that as large and constantly a fraction of sand eels as possible is available for the fishing gear the fishing was therefore exclusively done during darkness (i.e. optimizing the constancy of the catch ability). Sailing between sampling locations were hence, if possible, done during the light hours of the day.

Prioritization of the sampling

It was sought after, that samples should be collected from all of the planned positions. In the event of problems causing exclusion of locations, e.g. by bad weather, the highest priority was given to the locations where samples had been collected during previous sand eel surveys or where the samples were considered to provide important information for a specific area. Lowest priority was given to the positions where only a few previous sand eel cruises had taken samples or where the samples were not considered to have important information for a specific area. The organization of the sampling (sail route) was done, so time spent sailing between locations was minimized.

Processing of samples at sea

- Greater sand eel (*Hyperoplus lanceolatus*) and Smooth sand eel (*Gymnammodytessemisquamatus*) were identified at sea and discarded to separate samplebags. Small sand eel (*Ammodytes tobianus*) were not separated, and thus measured together with the lesser sand eel and first identified on land.
- Numbers of sand eels (total or sample) was recorded in a station scheme for each haul.
- At least one of the 3 hauls for each sample location was processed at sea
- All sand eels (or a sample) was length measured to the nearest half cm (scm) and the results were introduced in a graduated scheme.
- The fish were gathered in bags for each scm group, for each haul, which again were gathered for each location.

Bottom contact

In order to be able to carry out an assessment of the individual hauls validity (in addition to the skipper's assessment of the haul quality) various forms of technical means for the determination of the dredge's contact with the bottom were used. There were mechanical bottom contacts fitted on both the dredges, each connected to a log, which registered contact/no contact each second. This enabled the calculation of the part of the haul where the dredge had bottom contact. This was used to exclude hauls with a low bottom contact frequency from the later data analysis.

Results

The sand eel dredge survey in sand eel areas 1, 2 and 3 was carried out in accordance with the survey protocol in the period from November 21 - December 14. 82 positions were sampled; 32 in area 1, 11 in area 2 and 39 in area 3. Mean catch (number of sand eel /position) was highest in area 3 due to very high catch rates on some of the positions in Norwegian EEZ.

Table 1. Station list. VV refers to Van Veen grab (sediment samples) and DK2 and DK4 are dredges (hauls).

Date	Position	Station	Sandeel_area	Gear	Start_UTC	End_UTC	Start_lat_dec	Start_lon_dec	End_lat_dec	End_lon_dec	Depth_m
22/11/2014	4165.16	1	1	VV	16:05	16:09	56.2972	5.5869	56.2986	5.5861	35.5
22/11/2014	4165.16	2	1	DK2	16:26	16:36	56.3019	5.5798	56.2979	5.5865	35.5
22/11/2014	4165.16	3	1	DK2	16:48	16:58	56.2978	5.5877	56.2955	5.5778	35.5
22/11/2014	4165.16	4	1	DK2	17:13	17:23	56.2943	5.5849	56.3003	5.5879	35.5
22/11/2014	4165.02	5	1	VV	19:35	19:37	56.0625	5.2861	56.0630	5.2865	38
22/11/2014	4165.02	6	1	DK2	19:50	20:00	56.0638	5.2862	56.0585	5.2868	39.5
22/11/2014	4165.02	7	1	DK2	20:14	20:24	56.0619	5.2873	56.0641	5.2774	37
22/11/2014	4165.02	8	1	DK2	20:40	20:50	56.0617	5.2855	56.0671	5.2926	37
22/11/2014	4165.01	9	1	VV	21:17	21:19	56.0286	5.2580	56.0286	5.2582	35
22/11/2014	4165.01	10	1	DK2	21:32	21:42	56.0274	5.2576	56.0330	5.2628	35.5
22/11/2014	4165.01	11	1	DK2	21:58	22:08	56.0312	5.2554	56.0312	5.2624	35.8
22/11/2014	4165.01	12	1	DK2	22:22	22:32	56.0285	5.2638	56.0294	5.2534	35.8
22/11/2014	4065.03	13	1	VV	23:05	23:08	55.9656	5.2474	55.9659	5.2476	42.5
22/11/2014	4065.03	14	1	DK2	23:25	23:35	55.9636	5.2452	55.9687	5.2522	42.5
22/11/2014	4065.03	15	1	DK2	23:46	23:56	55.9688	5.2471	55.9614	5.2506	42.5
23/11/2014	4065.03	16	1	DK2	00:18	00:28	55.9653	5.2527	55.9673	5.2418	42.5
23/11/2014	4065.02	17	1	VV	01:05	01:08	55.8905	5.1473	55.8906	5.1471	33
23/11/2014	4065.02	18	1	DK2	01:20	01:30					32.5

							55.8886	5.1441	55.8930	5.1519	
23/11/2014	4065.02	19	1	DK2	01:45	01:55	55.8932	5.1460	55.8880	5.1506	32.5
23/11/2014	4065.02	20	1	DK2	02:10	02:20	55.8913	5.1528	55.8908	5.1414	32.5
23/11/2014	4065.01	21	1	VV	03:30	03:34	55.7750	5.0555	55.7755	5.0562	31
23/11/2014	4065.01	22	1	DK2	03:45	03:55	55.7753	5.0479	55.7755	5.0586	31
23/11/2014	4065.01	23	1	DK2	04:10	04:20	55.7733	5.0586	55.7775	5.0495	31
23/11/2014	4065.01	24	1	DK2	04:31	04:41	55.7767	5.0548	55.7700	5.0508	31
23/11/2014	3964.03	25	1	VV	16:14	16:16	55.4833	4.4086	55.4835	4.4089	27.7
23/11/2014	3964.03	26	1	DK2	16:27	16:37	55.4833	4.4072	55.4814	4.4194	28
23/11/2014	3964.03	27	1	DK2	16:53	17:03	55.4853	4.4138	55.4805	4.4051	28
23/11/2014	3964.03	28	1	DK2	17:28	17:38	55.4788	4.4121	55.4849	4.4095	28
23/11/2014	3964.02	29	1	VV	18:06	18:09	55.4161	4.3172	55.4154	4.3176	31
23/11/2014	3964.02	30	1	DK2	18:21	18:31	55.4125	4.3211	55.4195	4.3144	34
23/11/2014	3964.02	31	1	DK2	18:45	18:55	55.4156	4.3122	55.4144	4.3256	32
23/11/2014	3964.02	32	1	DK2	19:10	19:20	55.4163	4.3190	55.4137	4.3131	32
23/11/2014	3964.01	33	1	VV	20:40	20:43	55.4181	4.0657	55.4178	4.0657	25
23/11/2014	3964.01	34	1	DK4	21:24	21:34	55.4161	4.0581	55.4185	4.0708	25
23/11/2014	3964.01	35	1	DK4	21:49	21:59	55.4196	4.0650	55.4124	4.0613	25
23/11/2014	3964.01	36	1	DK4	22:12	22:22	55.4148	4.0681	55.4215	4.0629	25
24/11/2014	3963.04	37	1	VV	00:00	00:04	55.2636	3.7197	55.2635	3.7255	30
24/11/2014	3963.04	38	1	DK4	00:16	00:26	55.2593	3.7237	55.2653	3.7274	30
24/11/2014	3963.04	39	1	DK4	00:38	00:48	55.2653	3.7225	55.2600	3.7314	30
24/11/2014	3963.04	40	1	DK4	01:00	01:10	55.2634	3.7291	55.2644	3.7190	30
24/11/2014	3963.01	41	1	VV	02:36	02:38	55.0867	3.4760	55.0869	3.4757	30
24/11/2014	3963.01	42	1	DK4	03:00	03:10	55.0831	3.4731	55.0889	3.4772	30
24/11/2014	3963.01	43	1	DK4	03:23	03:33	55.0884	3.4736	55.0830	3.4810	30
24/11/2014	3963.01	44	1	DK4	03:45	03:55	55.0878	3.4817	55.0863	3.4713	30
24/11/2014	3762.05	45	1	VV	16:30	16:32	54.4920	2.3813	54.4917	2.3824	16
24/11/2014	3762.05	46	1	DK4	16:42	16:52	54.4943	2.3850	54.4900	2.3767	16
24/11/2014	3762.05	47	1	DK4	17:07	17:17	54.4940	2.3747	54.4904	2.3859	16
24/11/2014	3762.05	48	1	DK4	17:29	17:39	54.4883	2.3822	54.4937	2.3802	16
24/11/2014	3762.01	49	1	VV	18:40	18:43	54.4571	2.1356	54.4568	2.1408	14

24/11/2014	3762.01	50	1	DK4	18:53	19:03	54.4578	2.1356	54.4560	2.1462	14
24/11/2014	3762.01	51	1	DK4	19:14	19:24	54.4599	2.1461	54.4565	2.1374	14
24/11/2014	3762.01	52	1	DK4	19:36	19:46	54.4550	2.1401	54.4609	2.1423	14
24/11/2014	3862.01	53	1	VV	21:00	21:03	54.5808	2.1475	54.5804	2.1470	16
24/11/2014	3862.01	54	1	DK4	21:13	21:23	54.5821	2.1524	54.5796	2.1421	16
24/11/2014	3862.01	55	1	DK4	21:32	21:42	54.5785	2.1466	54.5850	2.1490	16
24/11/2014	3862.01	56	1	DK4	21:54	22:04	54.5826	2.1443	54.5784	2.1524	16
24/11/2014	3861.36	57	1	VV	23:10	23:13	54.5790	1.8827	54.5791	1.8815	18
24/11/2014	3861.36	58	1	DK4	23:22	23:32	54.5791	1.8771	54.5766	1.8887	18
24/11/2014	3861.36	59	1	DK4	23:43	23:53	54.5805	1.8861	54.5769	1.8767	18
25/11/2014	3861.36	60	1	DK4	00:03	00:13	54.5759	1.8802	54.5839	1.8866	18
25/11/2014	3761.04	61	1	VV	01:16	01:19	54.4679	1.9841	54.4680	1.9841	14
25/11/2014	3761.04	62	1	DK4	01:29	01:39	54.4705	1.9855	54.4637	1.9812	14
25/11/2014	3761.04	63	1	DK4	01:49	01:59	54.4645	1.9859	54.4721	1.9818	14
25/11/2014	3761.04	64	1	DK4	02:10	02:20	54.4686	1.9781	54.4659	1.9902	14
25/11/2014	3762.02	65	1	VV	16:25	16:27	54.1499	2.0597	54.1499	2.0596	24
25/11/2014	3762.02	66	1	DK4	16:38	16:48	54.1524	2.0613	54.1459	2.0568	25
25/11/2014	3762.02	67	1	DK4	17:00	17:10	54.1471	2.0631	54.1471	2.0572	23
25/11/2014	3762.02	68	1	DK4	17:21	17:31	54.1504	2.0533	54.1491	2.0645	24
25/11/2014	3761.08	69	1	VV	19:23	19:26	54.1894	1.5786	54.1890	1.5785	27
25/11/2014	3761.08	70	1	DK4	19:42	19:52	54.1911	1.5828	54.1882	1.5728	29
25/11/2014	3761.08	71	1	DK4	20:03	20:13	54.1867	1.5789	54.1928	1.5797	26
25/11/2014	3761.08	72	1	DK4	20:24	20:34	54.1923	1.5727	54.1887	1.5817	27
25/11/2014	3760.03	73	1	VV	23:23	23:26	54.2058	0.8386	54.2061	0.8384	30
25/11/2014	3760.03	74	1	DK4	23:38	23:48	54.2050	0.8400	54.2119	0.8331	38
26/11/2014	3760.03	75	1	DK4	00:00	00:10	54.2067	0.8325	54.2058	0.8431	40
26/11/2014	3760.03	76	1	DK4	00:25	00:35	54.2071	0.8389	54.2032	0.8293	42
26/11/2014	3760.04	77	1	VV	01:05	01:10	54.2629	0.7985	54.2645	0.7971	53
26/11/2014	3760.04	78	1	DK4	01:23	01:33	54.2630	0.7928	54.2615	0.8032	46
26/11/2014	3760.04	79	1	DK4	01:42	01:52	54.2634	0.7996	54.2629	0.7865	46
26/11/2014	3760.04	80	1	DK4	02:05	02:15	54.2595	0.7942	54.2652	0.8002	54
26/11/2014	3760.05	81	1	VV	02:57	03:00					45

							54.3161	0.9282	54.3167	0.9268	
26/11/2014	3760.05	82	1	DK4	03:12	03:22	54.3173	0.9231	54.3148	0.9329	48
26/11/2014	3760.05	83	1	DK4	03:34	03:44	54.3169	0.9314	54.3142	0.9202	44
26/11/2014	3760.05	84	1	DK4	03:56	04:06	54.3133	0.9263	54.3187	0.9295	45
26/11/2014	3861.02	85	1	VV	16:18	16:20	54.6658	1.1140	54.6654	1.1135	32
26/11/2014	3861.02	86	1	DK4	16:30	16:40	54.6640	1.1109	54.6681	1.1185	34
26/11/2014	3861.02	87	1	DK4	16:54	17:04	54.6687	1.1125	54.6622	1.1156	32
26/11/2014	3861.02	88	1	DK4	17:16	17:26	54.6647	1.1206	54.6682	1.1109	32
26/11/2014	3861.19	89	1	VV	18:33	18:43	54.5673	1.2631	54.5665	1.2626	23
26/11/2014	3861.19	90	1	DK4	18:46	18:56	54.5663	1.2596	54.5680	1.2677	22
26/11/2014	3861.19	91	1	DK4	19:12	19:22	54.5712	1.2637	54.5648	1.2620	22
26/11/2014	3861.19	92	1	DK4	19:32	19:42	54.5646	1.2686	54.5646	1.2601	22
26/11/2014	3861.34	93	1	VV	20:42	20:45	54.5288	1.3638	54.5286	1.3637	28
26/11/2014	3861.34	94	1	DK4	20:55	21:05	54.5276	1.3671	54.5311	1.3608	27
26/11/2014	3861.34	95	1	DK4	21:23	21:33	54.5266	1.3575	54.5306	1.3664	26
26/11/2014	3861.34	96	1	DK4	21:39	21:49	54.5329	1.3623	54.5262	1.3615	28
26/11/2014	3861.22	97	1	VV	22:44	22:46	54.5388	1.5719	54.5391	1.5718	21
26/11/2014	3861.22	98	1	DK4	22:57	23:07	54.5358	1.5728	54.5419	1.5697	22
26/11/2014	3861.22	99	1	DK4	23:18	23:28	54.5392	1.5657	54.5376	1.5758	22
26/11/2014	3861.22	100	1	DK4	23:38	23:48	54.5417	1.5762	54.5389	1.5662	22
27/11/2014	3861.23	101	1	VV	00:08	00:10	54.5459	1.6224	54.5460	1.6225	16
27/11/2014	3861.23	102	1	DK4	00:18	00:28	54.5483	1.6171	54.5445	1.6249	20
27/11/2014	3861.23	103	1	DK4	00:40	00:50	54.5478	1.6268	54.5462	1.6154	15
27/11/2014	3861.23	104	1	DK4	01:05	01:15	54.5448	1.6231	54.5521	1.6222	17
27/11/2014	3861.14	105	1	VV	03:05	03:08	54.8499	1.4321	54.8503	1.4315	20
27/11/2014	3861.14	106	1	DK4	03:17	03:27	54.8514	1.4270	54.8486	1.4359	21
27/11/2014	3861.14	107	1	DK4	03:38	03:48	54.8459	1.4352	54.8523	1.4302	21
27/11/2014	3861.14	108	1	DK4	04:00	04:10	54.8521	1.4339	54.8473	1.4277	20
27/11/2014	3861.17	109	1	VV	16:20	16:22	54.8393	1.9956	54.8392	1.9946	20
27/11/2014	3861.17	110	1	DK4	16:34	16:44	54.8361	1.9938	54.8422	1.9956	20
27/11/2014	3861.17	111	1	DK4	16:55	17:05	54.8409	1.9900	54.8454	1.9993	20
27/11/2014	3861.17	112	1	DK4	17:16	17:26	54.8412	1.9992	54.8392	1.9878	19

27/11/2014	3861.32	113	1	VV	18:35	18:38	54.9885	1.8460	54.9887	1.8460	24
27/11/2014	3861.32	114	1	DK4	18:45	18:55	54.9885	1.8509	54.9862	1.8401	23
27/11/2014	3861.32	115	1	DK4	19:08	19:18	54.9853	1.8459	54.9933	1.8477	24
27/11/2014	3861.32	116	1	DK4	19:33	19:43	54.9899	1.8415	54.9857	1.8502	24
27/11/2014	3961.29	117	1	VV	21:37	21:39	55.0177	1.3513	55.0179	1.3512	30
27/11/2014	3961.29	118	1	DK4	21:50	22:00	55.0172	1.3457	55.0179	1.3562	28
27/11/2014	3961.29	119	1	DK4	22:12	22:22	55.0207	1.3543	55.0155	1.3481	28
27/11/2014	3961.29	120	1	DK4	22:34	22:44	55.0157	1.3520	55.0237	1.3507	28
27/11/2014	3961.28	121	1	VV	23:08	23:11	55.0762	1.3816	55.0765	1.3813	31
27/11/2014	3961.28	122	1	DK4	23:19	23:29	55.0788	1.3813	55.0720	1.3808	29
27/11/2014	3961.28	123	1	DK4	23:46	23:56	55.0755	1.3850	55.0781	1.3722	30
28/11/2014	3961.28	124	1	DK4	00:12	00:22	55.0733	1.3765	55.0784	1.3853	31
28/11/2014	3961.42	125	1	VV	01:22	01:25	55.2124	1.5314	55.2131	1.5306	32
28/11/2014	3961.42	126	1	DK4	01:33	01:43	55.2166	1.5322	55.2103	1.5289	32
28/11/2014	3961.42	127	1	DK4	01:52	02:02	55.2113	1.5346	55.2157	1.5229	32
28/11/2014	3961.42	128	1	DK4	01:22	01:32	55.2107	1.5252	55.2129	1.5359	35
30/11/2014	4264.05	129	3	VV	16:04	16:08	56.6629	4.4168	56.6630	4.4164	48
30/11/2014	4264.05	130	3	DK4	16:19	16:29	56.6661	4.4179	56.6598	4.4152	48
30/11/2014	4264.05	131	3	DK4	16:45	16:55	56.6621	4.4114	56.6639	4.4232	47
30/11/2014	4264.05	132	3	DK4	17:10	17:20	56.6618	4.4197	56.6657	4.4093	49
30/11/2014	4264.03	133	3	VV	18:17	18:21	56.6665	4.1496	56.6664	4.1483	46
30/11/2014	4264.03	134	3	DK4	18:30	18:40	56.6686	4.1496	56.6617	4.1473	46
30/11/2014	4264.03	135	3	DK4	18:57	19:07	56.6661	4.1519	56.6706	4.1387	46
30/11/2014	4264.03	136	3	DK4	19:24	19:34	56.6661	4.1445	56.6673	4.1561	46
30/11/2014	4263.03	137	3	VV	21:10	21:14	56.8186	3.8146	56.8190	3.8146	54
30/11/2014	4263.03	138	3	DK4	21:25	21:35	56.8214	3.8152	56.8149	3.8175	51
30/11/2014	4263.03	139	3	DK4	22:37	22:47	56.8201	3.8202	56.8153	3.8120	54
30/11/2014	4263.03	140	3	DK4	23:10	23:20	56.8178	3.8108	56.8183	3.8237	52
30/11/2014	4263.02	141	3	VV	23:53	23:57	56.8127	3.7111	56.8132	3.7105	54
01/12/2014	4263.02	142	3	DK4	00:10	00:20	56.8133	3.7061	56.8139	3.7196	56
01/12/2014	4263.02	143	3	DK4	01:15	01:25	56.8161	3.7135	56.8100	3.7089	53
01/12/2014	4263.02	144	3	DK4	02:08	02:18					53

							56.8115	3.7144	56.8174	3.7078	
01/12/2014	4463.05	145	3	VV	16:04	16:07	57.6443	3.0885	57.6451	3.0883	59
01/12/2014	4463.05	146	3	DK4	16:20	16:30	57.6470	3.0939	57.6437	3.0824	59
01/12/2014	4463.05	147	3	DK4	16:45	16:55	57.6440	3.0884	57.6510	3.0905	59
01/12/2014	4463.05	148	3	DK4	17:11	17:21	57.6440	3.0884	57.6425	3.0911	59
01/12/2014	4463.06	149	3	VV	18:05	18:15	57.7269	3.0429	57.7267	3.0418	59
01/12/2014	4463.06	150	3	DK4	18:24	18:34	57.7242	3.0438	57.7305	3.0439	59
01/12/2014	4463.06	151	3	DK4	18:49	18:59	57.7242	3.0420	57.7240	3.0556	59
01/12/2014	4463.06	152	3	DK4	19:14	19:24	57.7282	3.0495	57.7261	3.0393	59
01/12/2014	4463.03	153	3	DK4	21:56	22:06	57.7491	3.6658	57.7508	3.6770	64
01/12/2014	4463.03	154	3	DK4	22:23	22:33	57.7519	3.6722	57.7459	3.6683	64
01/12/2014	4463.03	155	3	DK4	22:48	22:58	57.7487	3.6737	57.7546	3.6673	64
02/12/2014	4464.06	156	3	DK4	01:17	01:27	57.7468	4.2044	57.7503	4.2146	66
02/12/2014	4464.06	157	3	DK4	01:43	01:53	57.7515	4.2062	57.7447	4.2062	68
02/12/2014	4464.06	158	3	DK4	02:05	02:15	57.7464	4.2102	57.7501	4.1990	67
02/12/2014	4464.04	159	3	DK4	02:57	03:07	57.7265	4.3110	57.7244	4.3219	64
02/12/2014	4464.04	160	3	DK4	03:22	03:32	57.7277	4.3202	57.7234	4.3119	65
02/12/2014	4464.04	161	3	DK4	03:45	03:55	57.7242	4.3166	57.7314	4.3171	65
02/12/2014	4464.07	162	3	VV	16:00	16:04	57.6585	4.1899	57.6570	4.1905	65
02/12/2014	4464.07	163	3	DK4	16:17	16:27	57.6539	4.1901	57.6607	4.1896	64
02/12/2014	4464.07	164	3	DK4	16:47	16:57	57.6587	4.1867	57.6546	4.1980	64
02/12/2014	4464.07	165	3	DK4	17:08	17:18	57.6596	4.1980	57.6575	4.1862	64
02/12/2014	4464.05	166	3	VV	17:49	17:54	57.6446	4.3104	57.6434	4.3114	65
02/12/2014	4464.05	167	3	DK4	18:05	18:15	57.6446	4.3160	57.6437	4.3035	65
02/12/2014	4464.05	168	3	DK4	18:28	18:38	57.6405	4.3092	57.6473	4.3111	65
02/12/2014	4464.05	169	3	DK4	18:54	19:04	57.6463	4.3065	57.6404	4.3134	65
02/12/2014	4364.08	170	3	VV	21:00	21:04	57.3345	4.2547	57.3338	4.2554	64
02/12/2014	4364.08	171	3	DK4	21:16	21:26	57.3338	4.2512	57.3350	4.2623	63
02/12/2014	4364.08	172	3	DK4	21:44	21:54	57.3369	4.2533	57.3300	4.2509	64
02/12/2014	4364.08	173	3	DK4	22:11	22:21	57.3320	4.2569	57.3382	4.2510	63
02/12/2014	4364.07	174	3	VV	23:35	23:39	57.3014	4.5661	57.3008	4.5663	55
02/12/2014	4364.07	175	3	DK4	23:51	00:01	57.3009	4.5734	57.3017	4.5603	55

03/12/2014	4364.07	176	3	DK4	23:18	23:28	57.3002	4.5644	57.3058	4.5697	56
03/12/2014	4364.07	177	3	DK4	23:40	23:50	57.3036	4.5633	57.2974	4.5710	56
03/12/2014	4364.05	178	3	VV	16:10	16:14	57.1568	4.7293	57.1570	4.7298	50
03/12/2014	4364.05	179	3	DK4	16:25	16:35	57.1599	4.7284	57.1531	4.7285	52
03/12/2014	4364.05	180	3	DK4	16:48	16:58	57.1558	4.7314	57.1594	4.7206	52
03/12/2014	4364.05	181	3	DK4	17:12	17:22	57.1559	4.7246	57.1576	4.7360	53
03/12/2014	4365.12	182	3	VV	18:47	18:51	57.2751	5.0991	57.2750	5.0998	49
03/12/2014	4365.12	183	3	DK4	19:02	19:12	57.2743	5.1047	57.2750	5.0920	50
03/12/2014	4365.12	184	3	DK4	19:26	19:36	57.2726	5.0957	57.2774	5.1045	50
03/12/2014	4365.12	185	3	DK4	19:50	20:00	57.2777	5.0981	57.2712	5.0987	48
03/12/2014	4365.14	186	3	VV	21:15	21:20	57.3249	5.4415	57.3246	5.4426	62
03/12/2014	4365.14	187	3	DK4	21:30	21:40	57.3268	5.4426	57.3214	5.4356	64
03/12/2014	4365.14	188	3	DK4	21:54	22:04	57.3220	5.4418	57.3286	5.4378	58
03/12/2014	4365.14	189	3	DK4	22:20	22:30	57.3252	5.4388	57.3227	5.4504	59
03/12/2014	4365.01	190	3	VV	23:03	23:07	57.2547	5.5249	57.2547	5.5250	53
03/12/2014	4365.01	191	3	DK4	23:16	23:26	57.2517	5.5286	57.2575	5.5214	54
03/12/2014	4365.01	192	3	DK4	23:43	23:53	57.2546	5.5197	57.2547	5.5327	58
04/12/2014	4365.01	193	3	DK4	00:10	00:20	57.2563	5.5278	57.2512	5.5180	56
04/12/2014	4365.1	194	3	VV	01:28	01:32	57.1935	5.8108	57.1933	5.8110	51
04/12/2014	4365.1	195	3	DK4	01:41	01:51	57.1956	5.8144	57.1905	5.8034	54
04/12/2014	4365.1	196	3	DK4	02:10	02:20	57.1901	5.8101	57.1974	5.8101	50
04/12/2014	4365.1	197	3	DK4	02:35	02:45	57.1948	5.8073	57.1902	5.8169	51
04/12/2014	4365.13	198	3	VV	16:04	16:08	57.0365	5.1007	57.0370	5.1008	53
04/12/2014	4365.13	199	3	DK4	16:19	16:29	57.0375	5.0932	57.0369	5.1058	54
04/12/2014	4365.13	200	3	DK4	16:43	16:53	57.0386	5.1028	57.0342	5.0952	51
04/12/2014	4365.13	201	3	DK4	17:12	17:22	57.0342	5.1010	57.0409	5.0972	51
04/12/2014	4365.08	202	3	VV	18:11	18:15	57.1323	5.2190	57.1329	5.2191	50
04/12/2014	4365.08	203	3	DK4	18:24	18:34	57.1352	5.2218	57.1289	5.2164	50
04/12/2014	4365.08	204	3	DK4	18:48	18:58	57.1294	5.2213	57.1353	5.2149	49
04/12/2014	4365.08	205	3	DK4	19:13	19:23	57.1322	5.2150	57.1306	5.2274	50
04/12/2014	4365.04	206	3	VV	20:58	21:02	57.1421	5.4264	57.1422	5.4763	43
04/12/2014	4365.04	207	3	DK4	21:12	21:22					42

							57.1393	5.4793	57.1448	5.4737	
04/12/2014	4365.04	208	3	DK4	21:34	21:44	57.1411	5.4712	57.1419	5.4829	43
04/12/2014	4365.04	209	3	DK4	22:00	22:10	57.1443	5.4786	57.1381	5.4735	43
04/12/2014	4365.11	210	3	VV	23:19	23:23	57.0066	5.6819	57.0068	5.6814	48
04/12/2014	4365.11	211	3	DK4	23:37	23:47	57.0031	5.6795	57.0099	5.6821	47
05/12/2014	4365.11	212	3	DK4	00:00	00:10	57.0091	5.6768	57.0043	5.6864	47
05/12/2014	4365.11	213	3	DK4	00:27	00:37	57.0070	5.6834	57.0057	5.6711	47
05/12/2014	4265.01	214	3	VV	16:02	16:05	56.8418	5.6300	56.8418	5.6302	47
05/12/2014	4265.01	215	3	DK4	16:16	16:26	56.8423	5.6304	56.8460	5.6315	48
05/12/2014	4265.01	216	3	DK4	16:40	16:50	56.8435	5.6271	56.8383	5.6349	44
05/12/2014	4265.01	217	3	DK4	17:04	17:14	56.8422	5.6360	56.8410	5.6242	47
05/12/2014	4266.01	218	3	VV	18:53	18:57	56.9352	6.0622	56.9349	6.0632	49
05/12/2014	4266.01	219	3	DK4	19:08	19:18	56.9374	6.0644	56.9316	6.0588	49
05/12/2014	4266.01	220	3	DK4	19:32	19:42	56.9328	6.0649	56.9384	6.0574	49
05/12/2014	4266.01	221	3	DK4	19:57	20:07	56.9348	6.0569	56.9346	6.0686	49
05/12/2014	4366.06	222	3	VV	21:20	21:25	57.1019	6.1261	57.1019	6.1268	46
05/12/2014	4366.06	223	3	DK4	21:35	21:45	57.0982	6.1247	57.1046	6.1259	46
05/12/2014	4366.06	224	3	DK4	21:52	22:02	57.1028	6.1223	57.0981	6.1312	46
05/12/2014	4366.06	225	3	DK4	22:26	22:36	57.1022	6.1320	57.1012	6.1198	46
06/12/2014	4366.13	226	3	VV	15:52	15:56	57.1201	6.4710	57.1201	6.4723	52
06/12/2014	4366.13	227	3	DK4	16:06	16:16	57.1185	6.4769	57.1227	6.4669	52
06/12/2014	4366.13	228	3	DK4	16:30	16:40	57.1187	6.4668	57.1225	6.4793	52
06/12/2014	4366.13	229	3	DK4	16:55	17:05	57.1242	6.4740	57.1180	6.4726	52
06/12/2014	4366.11	230	3	VV	17:57	18:01	57.0740	6.7047	57.0738	6.6897	50
06/12/2014	4366.11	231	3	DK4	18:10	18:20	57.0716	6.6924	57.0776	6.6859	49
06/12/2014	4366.11	232	3	DK4	18:35	18:45	57.0743	6.6847	57.0745	6.6981	51
06/12/2014	4366.11	233	3	DK4	18:58	19:08	57.0773	6.6924	57.0728	6.6834	53
06/12/2014	4367.02	234	3	VV	20:18	20:24	57.0428	7.0046	57.0430	7.0063	39
06/12/2014	4367.02	235	3	DK4	20:30	20:40	57.0397	7.0113	57.0460	7.0024	34
06/12/2014	4367.02	236	3	DK4	20:55	21:05	57.0428	7.0027	57.0433	7.0185	39
06/12/2014	4367.02	237	3	DK4	21:22	21:32	57.0460	7.0123	57.0402	7.0024	38
06/12/2014	4367.06	238	3	DK4	21:58	22:08	57.0500	7.0967	57.0528	7.1134	24

06/12/2014	4367.06	239	3	DK4	22:26	22:36	57.0567	7.1067	57.0500	7.1018	24
06/12/2014	4367.06	240	3	DK4	22:42	22:52	57.0485	7.1082	57.0583	7.1091	21
07/12/2014	4367.16	241	3	DK4	00:18	00:28	57.0897	7.4284	57.0916	7.4456	23
07/12/2014	4367.16	242	3	DK4	00:37	00:47	57.0952	7.4391	57.0889	7.4346	24
07/12/2014	4367.16	243	3	DK4	01:00	01:10	57.0898	7.4391	57.0966	7.4368	23
07/12/2014	4267.12	244	3	DK4	16:05	16:15	56.9457	7.4291	56.9395	7.4348	27
07/12/2014	4267.12	245	3	DK4	16:26	16:36	56.9457	7.4387	56.9422	7.4267	23
07/12/2014	4267.12	246	3	DK4	16:47	16:57	56.9406	7.4273	56.9469	7.4377	26
07/12/2014	4267.27	247	3	DK4	17:37	17:47	56.9149	7.5978	56.9120	7.6116	20
07/12/2014	4267.27	248	3	DK4	17:59	18:09	56.9163	7.6121	56.9127	7.6018	20
07/12/2014	4267.27	249	3	DK4	18:20	18:30	56.9099	7.6031	56.9163	7.6105	20
07/12/2014	4267.25	250	3	DK4	19:03	19:13	56.9786	7.6915	56.9851	7.7018	17
07/12/2014	4267.25	251	3	DK4	19:25	19:35	56.9870	7.6960	56.9810	7.6995	19
07/12/2014	4267.25	252	3	DK4	19:43	19:53	56.9802	7.7047	56.9846	7.6978	19
07/12/2014	4367.23	253	3	DK4	20:54	21:04	57.0783	7.6746	57.0860	7.6710	21
07/12/2014	4367.23	254	3	DK4	21:14	21:24	57.0839	7.6769	57.0777	7.6681	26
07/12/2014	4367.23	255	3	DK4	21:35	21:45	57.0800	7.6789	57.0820	7.6670	24
08/12/2014	4368.01	256	3	DK4	00:26	00:36	57.1030	8.4324	57.0983	8.4415	16
08/12/2014	4368.01	257	3	DK4	00:45	00:55	57.1021	8.4433	57.0978	8.4315	17
08/12/2014	4368.01	258	3	DK4	01:05	01:15	57.0977	8.4372	57.1049	8.4392	16
08/12/2014	4469.02	259	3	DK4	16:05	16:15	57.5757	9.5280	57.5714	9.5396	16
08/12/2014	4469.02	260	3	DK4	16:28	16:38	57.5745	9.5402	57.5710	9.5298	17
08/12/2014	4469.02	261	3	DK4	16:48	16:58	57.5693	9.5344	57.5769	9.5375	15
08/12/2014	4368.06	262	3	DK4	20:34	20:44	57.4066	8.6436	57.4047	8.6308	22
08/12/2014	4368.06	263	3	DK4	20:53	21:03	57.4014	8.6351	57.4081	8.6402	25
08/12/2014	4368.06	264	3	DK4	21:13	21:23	57.4076	8.6326	57.4020	8.6428	20
08/12/2014	4368.05	265	3	DK4	22:20	22:30	57.3703	8.5523	57.3679	8.5400	26
08/12/2014	4368.05	266	3	DK4	22:40	22:50	57.3640	8.5457	57.3711	8.5437	29
08/12/2014	4368.05	267	3	DK4	23:00	23:10	57.3699	8.5389	57.3654	8.5516	27
09/12/2014	4368.03	268	3	DK4	00:18	00:28	57.2098	8.5224	57.2034	8.5213	20
09/12/2014	4368.03	269	3	DK4	00:38	00:48	57.2047	8.5264	57.2063	8.5133	18
09/12/2014	4368.03	270	3	DK4	00:57	01:07					17

							57.2031	8.5159	57.2070	8.5278	
09/12/2014	4067.05	271	2	DK4	15:58	16:08	55.9549	7.2662	55.9574	7.2536	23
09/12/2014	4067.05	272	2	DK4	16:20	16:30	55.9538	7.2560	55.9606	7.2666	22
09/12/2014	4067.05	273	2	DK4	16:40	16:50	55.9598	7.2589	55.9523	7.2580	22
12/12/2014	3966.03	274	2	DK4	05:21	05:31	55.3012	6.8148	55.3020	6.8247	23
12/12/2014	3966.03	275	2	DK4	05:42	05:52	55.3058	6.8213	55.2996	6.8191	23
12/12/2014	3966.03	276	2	DK4	06:04	06:14	55.2997	6.8221	55.3058	6.8177	23
12/12/2014	3966.04	277	2	DK4	16:26	16:36	55.1775	6.8662	55.1775	6.8748	25
12/12/2014	3966.04	278	2	DK4	16:47	16:57	55.1824	6.8694	55.1762	6.8723	25
12/12/2014	3966.04	279	2	DK4	17:06	17:16	55.1792	6.8758	55.1817	6.8669	26
12/12/2014	3966.04	280	2	DK4	17:22	17:32	55.1803	6.8683	55.1787	6.8808	25
12/12/2014	3966.05	281	2	DK4	18:13	18:23	55.1027	6.9000	55.0963	6.9032	25
12/12/2014	3966.05	282	2	DK4	18:33	18:43	55.0987	6.9069	55.0976	6.8966	25
12/12/2014	3966.05	283	2	DK4	18:52	19:02	55.0951	6.8995	55.1011	6.9069	25
12/12/2014	3866.01	284	2	DK4	20:00	20:10	54.9694	6.9253	54.9626	6.9262	26
12/12/2014	3866.01	285	2	DK4	20:18	20:28	54.9649	6.9285	54.9674	6.9173	26
12/12/2014	3866.01	286	2	DK4	20:35	20:45	54.9668	6.9199	54.9654	6.9351	26
12/12/2014	3866.01	287	2	DK4	20:56	21:06	54.9679	6.9315	54.9643	6.9230	26
12/12/2014	3867.02	288	2	DK4	23:24	23:34	54.6994	7.2967	54.6952	7.3075	22
12/12/2014	3867.02	289	2	DK4	23:46	23:56	54.6992	7.3045	54.6955	7.2949	21
13/12/2014	3867.02	290	2	DK4	00:06	00:16	54.6934	7.2989	54.7013	7.2999	21
13/12/2014	3867.06	291	2	DK4	04:25	04:35	54.5986	7.4979	54.5960	7.5095	20
13/12/2014	3867.06	292	2	DK4	04:47	04:57	54.5999	7.5083	54.5952	7.5019	20
13/12/2014	3867.06	293	2	DK4	05:07	05:17	54.5944	7.5049	54.6004	7.5062	20
13/12/2014	3967.02	294	2	DK4	15:57	16:07	55.1210	7.2903	55.1249	7.2990	21
13/12/2014	3967.02	295	2	DK4	16:19	16:29	55.1279	7.2949	55.1213	7.2976	19
13/12/2014	3967.02	296	2	DK4	16:38	16:48	55.1240	7.2997	55.1267	7.2893	21
13/12/2014	3967.06	297	2	DK4	17:45	17:55	55.1308	7.5166	55.1310	7.5281	20
13/12/2014	3967.06	298	2	DK4	18:05	18:15	55.1329	7.5248	55.1262	7.5229	20
13/12/2014	3967.06	299	2	DK4	18:23	18:33	55.1285	7.5277	55.1344	7.5197	20
13/12/2014	4067.07	300	2	DK4	21:45	21:55	55.6229	7.4237	55.6303	7.4247	11
13/12/2014	4067.07	301	2	DK4	22:04	22:14	55.6294	7.4208	55.6238	7.4286	12

13/12/2014	4067.07	302	2	DK4	22:26	22:36	55.6281	7.4313	55.6253	7.4208	12
13/12/2014	4067.02	303	2	DK4	23:34	23:44	55.7171	7.6134	55.7221	7.6237	11
13/12/2014	4067.02	304	2	DK4	23:53	00:03	55.7236	7.6194	55.7157	7.6217	12
14/12/2014	4067.02	305	2	DK4	00:10	00:20	55.7189	7.6262	55.7221	7.6135	12

Others

A cruise summary report will be delivered online to

http://seadata.bsh.de/csr/online/V1_index.html.

