

Annex 6: Standard and Cruise Reports of BITS surveys presented at the WGBIFS-2017 meeting

Note: Authors are fully responsible for quality of the prepared text and all kind of presented data.

I. List of standard reports:

1. BITS 2016 Quarter 4 Standard Report of Sweden;
2. BITS 2016 Quarter 4 Standard Report of Germany;
3. BITS 2016 Quarter 4 Standard Report of Estonia;
4. BITS 2016 Quarter 4 Standard Report of Poland;
5. BITS 2016 Quarter 4 Standard Report of Latvia;
6. BITS 2016 Quarter 4 Standard Report of Denmark;
7. BITS 2016 Quarter 4 Standard Report of Lithuania;
8. BITS 2016 Quarter 4 Standard Report of Russia;
9. BITS 2017 Quarter 1 Standard Report of Sweden;
10. BITS 2017 Quarter 1 Standard Report of Germany;
11. BITS 2017 Quarter 1 Standard Report of Poland;
12. BITS 2017 Quarter 1 Standard Report of Latvia;
13. BITS 2017 Quarter 1 Standard Report of Denmark;
14. BITS 2017 Quarter 1 Standard Report of Denmark KASU-1;
15. BITS 2017 Quarter 1 Standard Report of Lithuania.

II. List of cruise reports:

1. BITS 2016 Quarter 4 Cruise Report of Germany;
2. BITS 2016 Quarter 4 Cruise Report of Latvia;
3. BITS 2016 Quarter 4 Cruise Report of Russia.

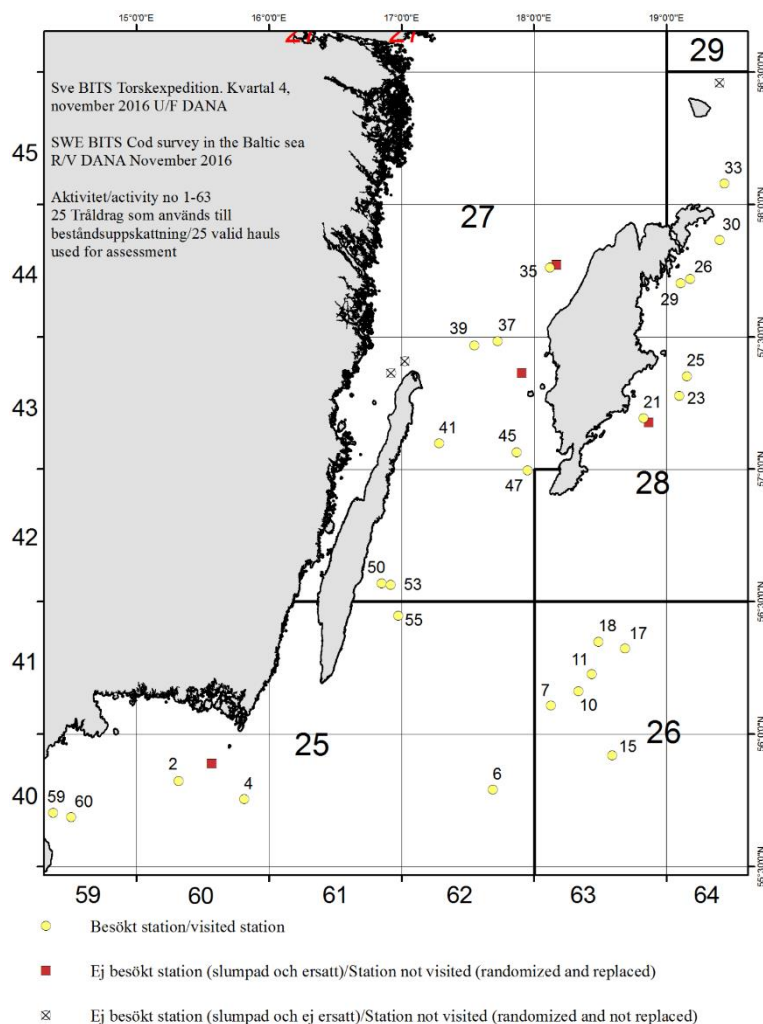
NATION:	SWEDEN	VESSEL:	RV "DANA"
Survey:	BITS Q4 2016	Dates:	19-27 November 2016
Cruise			
Gear details:	The large (930#) standard TV3 trawl was used. No tows are done with the rock hopper ground gear on harder ground stations. The trawl construction is according to the specification in the BITS manual.		
Notes from survey (e.g. problems, additional work etc.):	30 stations were allocated, 25 of these were trawled. Two hauls were cancelled in the ICES SD 27 and one in the ICES SD 28 because the Swedish Armed Forces (SAF) did not grant us permission. Two invalid hauls this time. Four complementary hauls, not included here. A total of nine hauls in the ICES SDs 25, 26, 27 and 28 had oxygen deficiency.		
Additional comments:			

ICES SUB- DIVISIO NS	GEAR (TVL, TVS)	DEPTH STRATA (2-6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR		NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS		NUMBER OF ASSUMED ZERO- CATCH HAULS		NUMBER OF REPLACE- MENT HAULS		NUMBER OF INVALID HAULS	STATIONS FISHED %	REMARKS
25	TVL	21-40 m	1	0	-	0	0	0	1	0	2			
25	TVL	41-60 m	4	4	-	0	2	0	100					
25	TVL	61-80 m	1	0	-	1	0	0	100					
26	TVL	41-60 m	2	2	-	0	0	0	100					
26	TVL	61-80 m	2	1	-	1	0	0	100					
26	TVL	>100 m	2	2	-	0	0	0	100					
27	TVL	41-60m	2	0	-	0	0	0	0	0	1			
27	TVL	61-80 m	4	4	-	1	1	0	125					
27	TVL	81-100 m	1	0	-	1	0	0	100					
27	TVL	>100 m	3	0	-	2	1	0	67	1, 2				
28	TVL	21-40 m	1	0	-	0	0	1	0	2				
28	TVL	41-60 m	3	3	-	0	1	0	100					
28	TVL	61-80 m	2	0	-	1	0	0	50	1				
28	TVL	81-100 m	2	0	-	2	0	0	100					

Remark 1. The % number deviates from 100 because we were prohibited by Swedish Armed Forces to visit some of the stations.

Remark 2. The % number deviates from 100 because we don't have any replacement stations at that depth and area.

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
<i>Gadus morhua</i>	5 307	700
<i>Clupea harengus</i>	467 015	
<i>Sprattus sprattus</i>	641 928	
<i>Cyclopterus lumpus</i>	7	
<i>Enchelyopus cimbrius</i>	25	
<i>Engraulis encrasicolus</i>	2	
<i>Gasterosteus aculeatus</i>	496	
<i>Limanda limanda</i>	7	
<i>Lumpenus lampretaeformis</i>	12	
<i>Merlangius merlangus</i>	8	
<i>Myoxocephalus quadricornis</i>	2 657	
<i>Myoxocephalus scorpius</i>	1 358	
<i>Platichthys flesus</i>	2 808	759
<i>Pleuronectes platessa</i>	90	
<i>Pomatoschistus</i>	3	
<i>Pungitius pungitius</i>	1	
<i>Scophthalmus maximus</i>	15	
<i>Trachurus trachurus</i>	1	
<i>Zoarces viviparus</i>	79	



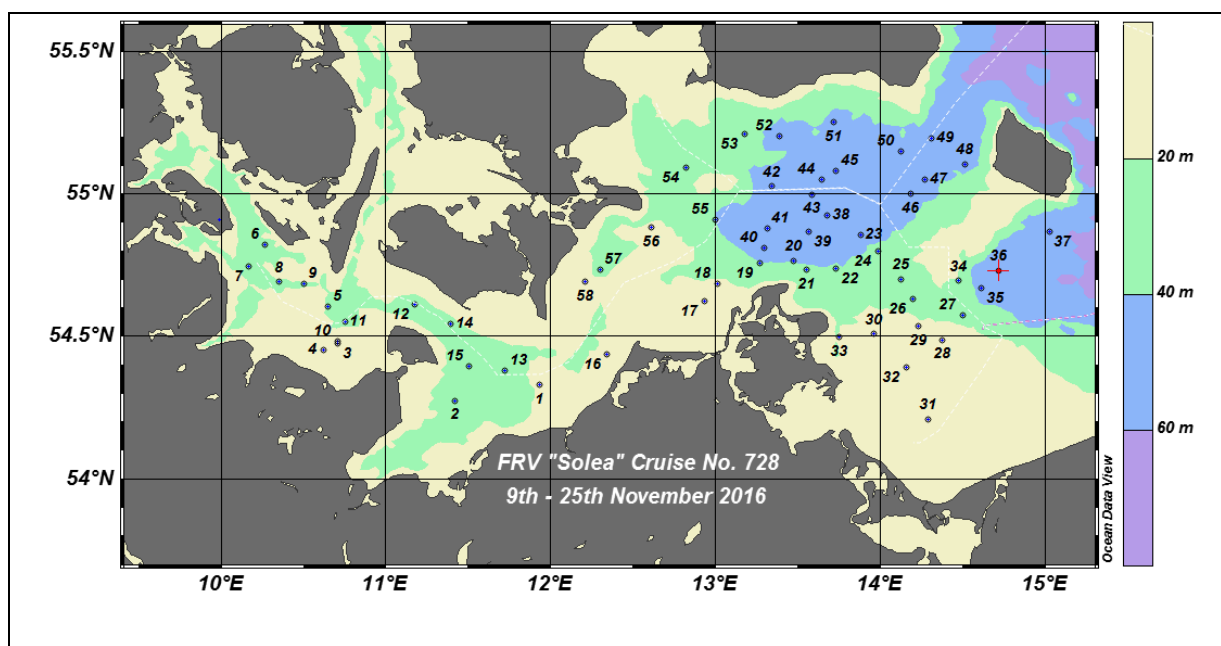
NATION:	GERMANY	VESSEL:	FRV "SOLEA"
Survey:	BITS 2016, quarter 4	Dates:	9 th – 25 th November 2016

Cruise	
Gear details:	The small (520#) standard TV3 trawl was used. All Tow Database stations are fished without rock-hoppers. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	Total 54 fishing hauls and 54 hydrographical stations were performed. One station in Swedish territorial waters was not allowed to carry out.
Additional comments:	

ICES SUB-DIVISIONS	GEAR (TVL, TVS)	DEPTH STRATA (2–6)	NUMBER OF HAULS PLANED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACE-MENT HAULS	NUMBER OF INVALID HAULS	% STATION S FISHED
22	TVS	1	15	13	-		1	2	87
24	TVS	1	17	16	-		1	-	94
24	TVS	2	26	25	-		-	-	96

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):

SPECIES	LENGTH	AGE
<i>Gadus morhua</i>	17560	1026
<i>Platichthys flesus</i>	16670	637
<i>Pleuronectes platessa</i>	8349	920
<i>Limanda limanda</i>	15413	726
<i>Psetta maxima</i>	210	196
<i>Scophthalmus rhombus</i>	6	5
<i>Clupea harengus</i>	19481	-
<i>Sprattus sprattus</i>	72052	-

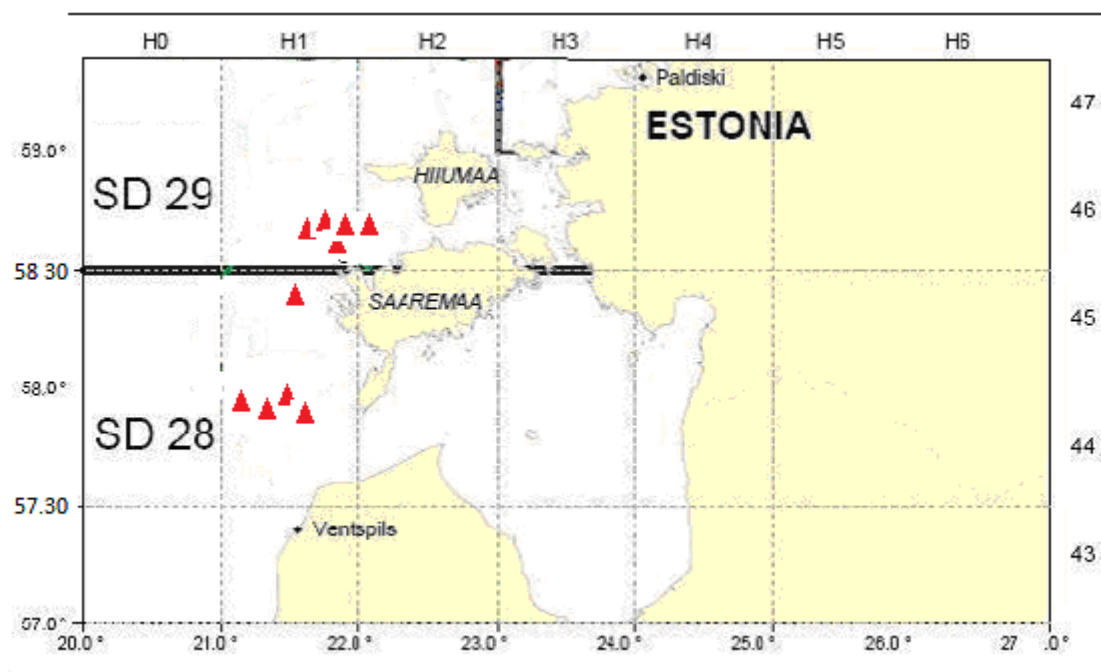


NATION:	ESTONIA	VESSEL:	CEV
Survey:	BITS16IVQRT	Dates:	13-14 November 2016

Cruise	
Gear details:	The small (530) standard TV3 trawl was used. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	The survey was carried out as planned. Survey started from the Port of Dirhamn in the western Gulf of Finland late evening on 13th of November 2016, steaming to the ICES subdivision 28.2. The weather conditions were extremely poor; however it was possible to carry out all 5 trawl hauls on November, 14th, as planned. Since the weather forecast was bad for the coming week, it was decided to continue with the rest of survey in the ICES Subdivision 29. So, after accomplishing the planned work in ICES subdivision 28.2, the vessel steamed to the ICES subdivision 29, where all planned 5 hauls were performed. The survey was finished in late hours of 14 November 2016 in the Port of Veere. No technical problems were observed during the survey this year. All catches were analysed at the field station of the Estonian Marine Institute on Saaremaa Island.

ICES SUB-DIVISIONS	GEAR (TVL,TV S)	DEPTH STRATA (1-6)	NUMBER OF VALID HAULS		NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
			NUMBER OF HAULS PLANNED	REALIZED USING "STANDARD" GROUND GEAR					
28	TVS	40-59	2	2	0	0	0	0	100
28	TVS	60-79m	3	3	0	0	0	0	100
28	TVS	80-99m	0	0	0	0	0	0	n/a
29	TVS	20-39m	2	2	0	0	0	0	100
29	TVS	40-59m	2	2	0	0	0	0	100
29	TVS	60-79m	1	1	0	0	0	0	100

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
SPECIES	AGE	LENGTH
<i>Gadus morhua</i>	58	58
<i>Sprattus sprattus</i>	200	701
<i>Clupea harengus</i>	200	1554
<i>Platichthys flesus</i>	391	1554



Approximate positions of realised hauls during Estonian BITS survey in 4 QRT 2016

EST BITS 4 QRT 2016	Catch composition, kg per 30' haul										
	1	2	3	4	5	6	7	8	9	10	
Haul ID.	28091	28030	28059	28192	28061	2901	2902	2903	2904	2905	
Sd	28	28	28	28	28	29	29	29	29	29	
Depth, m	42	50	65	61	68	45	75	46	38	34	
Date	14.11.2016	14.11.2016	14.11.2016	14.11.2016	14.11.2016	14.11.2016	14.11.2016	14.11.2016	14.11.2016	14.11.2016	
Coordinates	5756_2138	5755_2133	5754_2127	5759_2115	5828_2139	5835_2151	5837_2133	5837_2150	2835_2152	5833_2200	Total
<i>Clupea harengus</i>	1,1032	7,1104	5,8939	6,1526	2,3227	0,1167	0,8141	0,4127	0,8012	1,9487	26,6762
<i>Sprattus sprattus</i>	0,115	1,754	3,022	0,645	0,206	0,137	1,857	0,361	0,03	0,09	8,217
<i>Platichthys flesus</i>	11,201	36,334	12,463	5,696	7,558	0,181	0,279	4,337	6,7205	12,587	97,356
<i>Gadus morhua</i>	0,0019	0,0024	0,0017	0,0022	0	0	0	0	0	0	0,0081
<i>Osmerus eperlanus</i>	1,26	1,95	0,37	0,25	0,53	0,04	0,03	2,20	4,16	3,49	14,2818
<i>Scophthalmus maximus</i>	0	0	0,2105	0	0	0	0	0	0	0	0,2105
<i>Neogobius melanostomus</i>	1,3229	1,8285	0,6729	0	0,0519	0	0	0	0	0	3,8762
<i>Gobius sp.</i>	0,2945	0,0787	0,0009	0,0013	0	0	0	0,039	0,129	0,1565	0,7001
<i>Gasterosteus aculeatus</i>	0,0019	0,0051	0,0016	0	0,0023	0,0036	0	0,047	0,032	0,0297	0,1226
<i>Pungitius pungitius</i>	0	0	0	0	0	0	0	0,002	0,002	0	0,0038
<i>Myoxocephalus scorpius</i>	0,2472	1,4393	0,9466	0	0	0	0	0,440	0,866	1,0674	5,0067
<i>Zoarces viviparus</i>	0,0612	0,0625	0	0	0	0	0	0,035	0,162	0,0344	0,3543
<i>Cyclopterus lumpus</i>	0,1906	0	0	0	0	0	0	0	0	0	0,1906
<i>Myoxocephalus quadricornis</i>	0,2528	0	0	0	0	0	0	0	0,687	0,605	1,5448
<i>Taurulus bubalis</i>	0	0	0	0	0	0	0	0	0,0323	0	0,0323
<i>Lumpenus lampretaeformis</i>	0	0,0218	0	0	0	0	0	0	0	0	0,0218
<i>Enchelyopus cimbrius</i>	0	0	0	0	0,076	0	0	0	0	0	0,0755
Total	16,05	50,59	23,37	12,74	10,7479	0,48	2,9842	7,8721	13,6228	20,0068	158,68

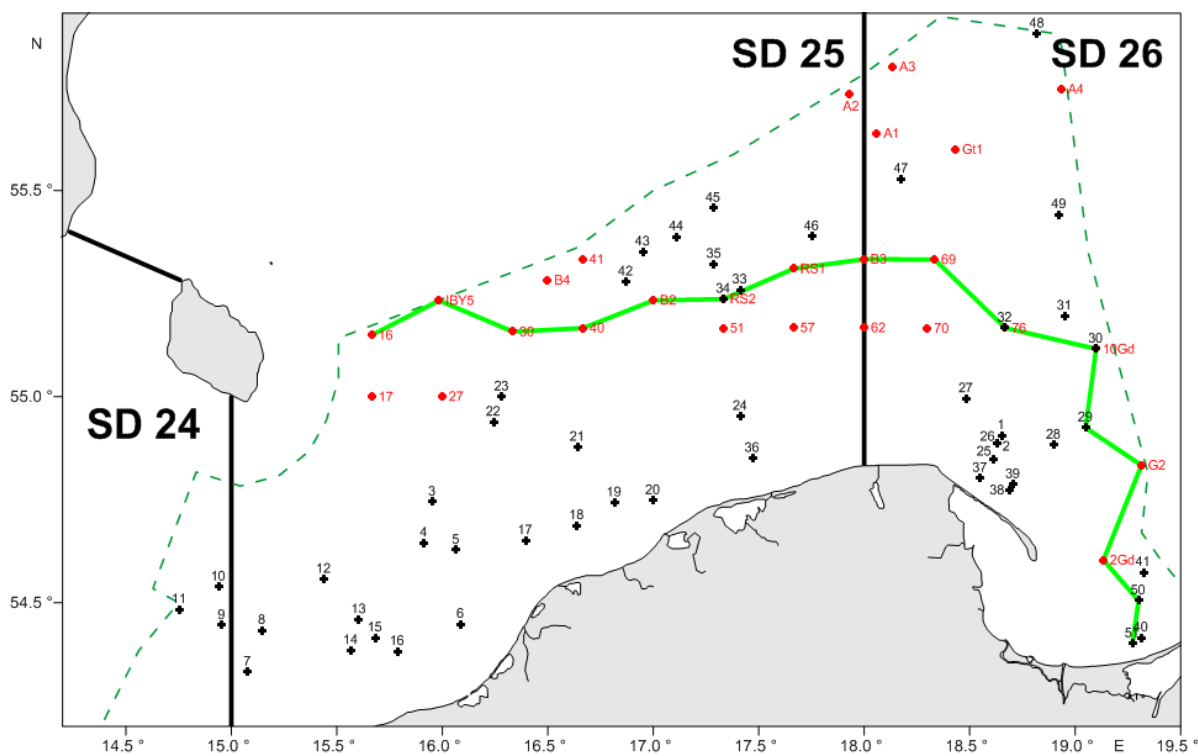
NATION:	POLAND	VESSEL:	RV "BALTICA"
Survey:	BITS-Q4/2016	Dates:	08-29/11/2016

Cruise	No. 18/2016/MIR
Gear details:	The standard rigging cod ground trawl type TV-3#930, with 10-mm mesh bar length in the codend was applied for fish control-catches realisation. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	<p>According to the WGBIFS recent (March/April 2016) recommendations, the vessel "Baltica" was designated to cover parts of the ICES subdivisions 24, 25 and 26 with totally 60 randomly selected fish control-hauls. The catch-stations were located at the seabed depth range of 16-110 m. Totally, 51 fish catch-stations can be accepted as representative. Among the 51 hauls, three planned catch-stations, <i>i.e.</i> No. 26087, 26257 and 26091 were only initiated because the oxygen content in the bottom waters was below critical minimum (1.5 ml/l). For the above-mentioned three hauls, zero catch was assumed. In 48 fully realised catch-stations, zero catches were not achieved.</p> <p>Due to a rocky bottom appearance at part of trawling transects connected with hauls Nos. 25006, 25089, 26138 and 26211 fishing was shortened to 15 minutes. Haul No. 26163 was shortened to 15 minutes due to dense fish concentrations near seabed, observed on the EK-60 SIMRAD echosounder.</p> <p>Every control-haul was preceded by the seawater temperature, salinity and oxygen content measurements, made continuously from the sea-surface to a seafloor. Overall, 50 fish catch-stations starting positions and 28 standard hydrographic stations were controlled by the Neil-Brown CTD-probe combined with the rosette sampler (the bathometer rosette). As the standard hydrographic station RS2 was made on the same position as control-haul No. 25339 therefore its results were also attached to control-haul No. 2533. Oxygen content was determined by the standard Winkler's method.</p>
Additional comments:	Due to stormy weather occurred on 21-22.11.2017 and partly on 14.11.2017 the number of realised hauls was reduced vs. planned.

ICES SUB-DIVISIONS	GEAR (TVL, TVS)	DEPTH STRATA (2-6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACE-MENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
24	TVL	10-39 m	3	2	0	0	0	0	66.6
24	TVL	40-59 m	0	1	0	0	0	0	200
25	TVL	10-39 m	13	12	0	0	0	0	92
25	TVL	40-59 m	10	9	0	0	0	0	90
25	TVL	60-79 m	6	5	0	0	0	0	83
25	TVL	80-100 m	2	2	0	0	0	0	100
26	TVL	10-39 m	5	4	0	0	0	0	80
26	TVL	40-59 m	4	4	0	0	0	0	100
26	TVL	60-79 m	6	3	0	0	0	0	50
26	TVL	80-100 m	9	7	0	2	0	0	78
26	TVL	101-120 m	2	2	0	1	0	0	100

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
SPECIES (LATIN NAME)	Length	Age and maturity
<i>Gadus morhua</i>	9609	512
<i>Platichthys flesus</i>	3471	788
<i>Clupea harengus</i>	6514	1024
<i>Sprattus sprattus</i>	4714	515
<i>Pleuronectes platessa</i>	821	498
<i>Scophthalmus maximus</i>	25	24
<i>Cyclopterus lumpus</i>	7	4
<i>Enchelyopus cimbrius</i>	616	95
<i>Hyperoplus lanceolatus</i>	128	35
<i>Osmerus eperlanus</i>	114	3
<i>Merlangius merlangus</i>	19	19
<i>Myoxocephalus scorpius</i>	87	80

<i>Lampetra fluviatilis</i>	1	0
<i>Pomatoschistus minutus</i>	12	6
<i>Pungitius pungitius</i>	1	0
<i>Alosa fallax</i>	3	3
<i>Trachurus trachurus</i>	3	2
<i>Engraulis encrasicolus</i>	39	15
<i>Gasterosteus aculeatus</i>	61	0
<i>Neogobius melanostomus</i>	9	7
<i>Perca fluviatilis</i>	1	1
<i>Sander lucioperca</i>	52	15
<i>Agonus cataphractus</i>	3	0
<i>Anguilla anguilla</i>	1	0



Marks used: crosses – fish control stations, red dots – hydrological stations, green line – hydrological profile.

NATION:	LATVIA	VESSEL:	RV "BALTICA"
Survey:	BITS-Q4/2016	Dates:	03-12/12/2016

Cruise	No. 2/2016
Gear details:	The hard bottom ground-rope (rockhopper) trawl, type TV-3#930 (with 10-mm mesh bar length in the codend) was applied for fish catches. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	<p>The original surveys plan provided that 25 control-hauls will be realised during the survey in the Latvian EEZ (19 trawls in the ICES SD 28, 6 trawls in the ICES SD 26). Five additional hauls, in case, if main control-hauls are made were planned in the Lithuanian EEZ (ICES SD 26).</p> <p>The r.v. "Baltica" realised 14 bottom trawl control-hauls from the 25 planned, incl. the Latvian territorial waters (Fig. 1, Table 1).</p> <p>All trawl catches were performed in the daylight. The hard bottom ground-rope (rockhopper) trawl, type TV-3#930 (with 10-mm mesh bar length in the codend) was applied for fish catches. The standard trawling duration was planned 30 minutes. The mean speed of vessel while trawling was 3.0 knots. However, in the case of 14 hauls, their duration was shortened to 15 minutes, due to dense clupeids concentrations observed on the echosounder, bad bottom or bad weather.</p> <p>The length measurements in the 1.0-cm classes were realised for 48 cod and 358 flounder. Length measurements in the 0.5-cm classes were realised for 1379 herring and 1449 sprat. In total, 48 cod and 276 flounder individuals were taken for biological analysis. The details about fish biological sampling are presented in Table 2. Stomachs from the 46 cod were taken for investigation of cod feeding.</p> <p>Acoustic data, i.e. the echo-integration records (SA = NASCs; Nautical Area Scattering (Strength) Coefficient) were collected with the EK-60 scientific echosounder during fishing operations and on the distances between consecutive hauls. Echo-sounding data collected during the BITS survey were delivered to the Latvian researchers for further analysis.</p> <p>Directly before every haul, the seawater temperature, salinity and oxygen content were measured continuously from the sea surface to a bottom. The seawater samples were taken also at the standard HELCOM stations. Totally, 19 hydrological stations were inspected with the Neil-Brown CTD-probe combined with the rosette sampler (the bathometer rosette). Oxygen content was determined by the standard Winkler's method. Meteorological observations of wind velocity and directions and the sea state were realised at the actual geographic position of each control-haul.</p>
Additional comments:	Due to the very bad weather conditions 5 working days during the survey were lost.

ICES SUB-DIVISIONS	GEAR (TVL, TVS)	DEPTH STRATA (2–6)	NUMBER OF HAULS PLANED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACE-MENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
26	TVL	3	1		1				100
26	TVL	4	1		1				100
26	TVL	5	2		1				50
26	TVL	6	2		1				50
28	TVL	2	6		2				33
28	TVL	3	4		3				75
28	TVL	4	6		5				83
28	TVL	5	3						0

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
SPECIES	LENGTH	AGE
<i>Gadus morhua</i>	48	48
<i>Platichthys flesus</i>	358	276
<i>Clupea harengus</i>	1379	
<i>Sprattus sprattus</i>	1449	
<i>Scophthalmus maximus</i>	1	
<i>Zoarces viviparus</i>	1	
<i>Cyclopterus lumpus</i>	1	
<i>Myoxocephalus scorpius</i>	10	
<i>Osmerus eperlanus</i>	32	
<i>Gasterosteus aculeatus</i>	33	
<i>Neogobius melanostomus</i>	4	
<i>Engraulis encrasicolus</i>	1	
<i>Gasterosteus pungitius</i>	4	
<i>Pleuronectes platessa</i>	3	

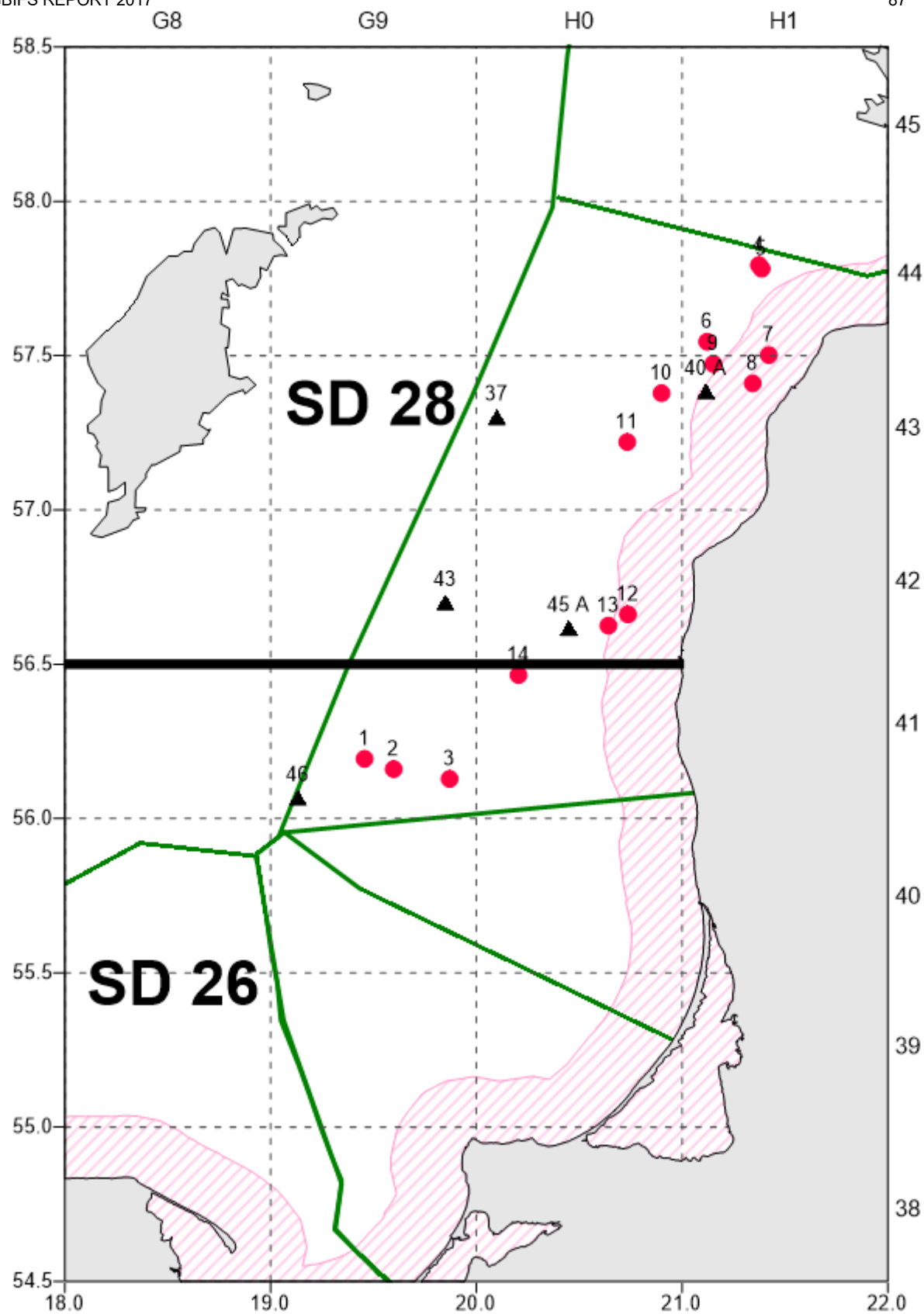


Figure 1. Location of the realized fish control-hauls (marked with red dots) and the HELCOM standard hydrological stations (marked with black triangles), green lines - national fishing zone borders.

Nation:	Denmark	Vessel:	Dana
Survey:	BITS	Dates:	1-18/11 - 2016

Cruise	
Gear details:	The big (#920) standard TV3 trawl is used. The construction of the trawl follows the specifications in the manual. No rock hopper was used
Notes from survey (e.g. problems, additional work etc.):	Stomack sampling from cod, plankton fishing during night.

ICES Sub-Divisions and Depth stratum	Gear (TVL,TVS)	Number of hauls planed	Number of valid hauls realized using "Standard" ground gear	Number of valid hauls realized using Rock-hoppers	Number of assumed zero-catch hauls	Number of replacement hauls	Number of invalid hauls	% stations fished
25								
2	TVL	0	1	0	0	0	0	
3	TVL	16	15	0	0	0	0	81,3
4	TVL	22	22	0	0	0	0	86,4
5	TVL	11	10	0	0	0	0	90,9
6	TVL	0	1	0	0	0	0	
26								
3	TVL	1	1	0	0	0	0	100,0
4	TVL	1	1	0	0	0	0	100,0
24								
2	TVL	1	1	0	0	0	0	100,0
3	TVL	4	4	0	0	0	0	100,0

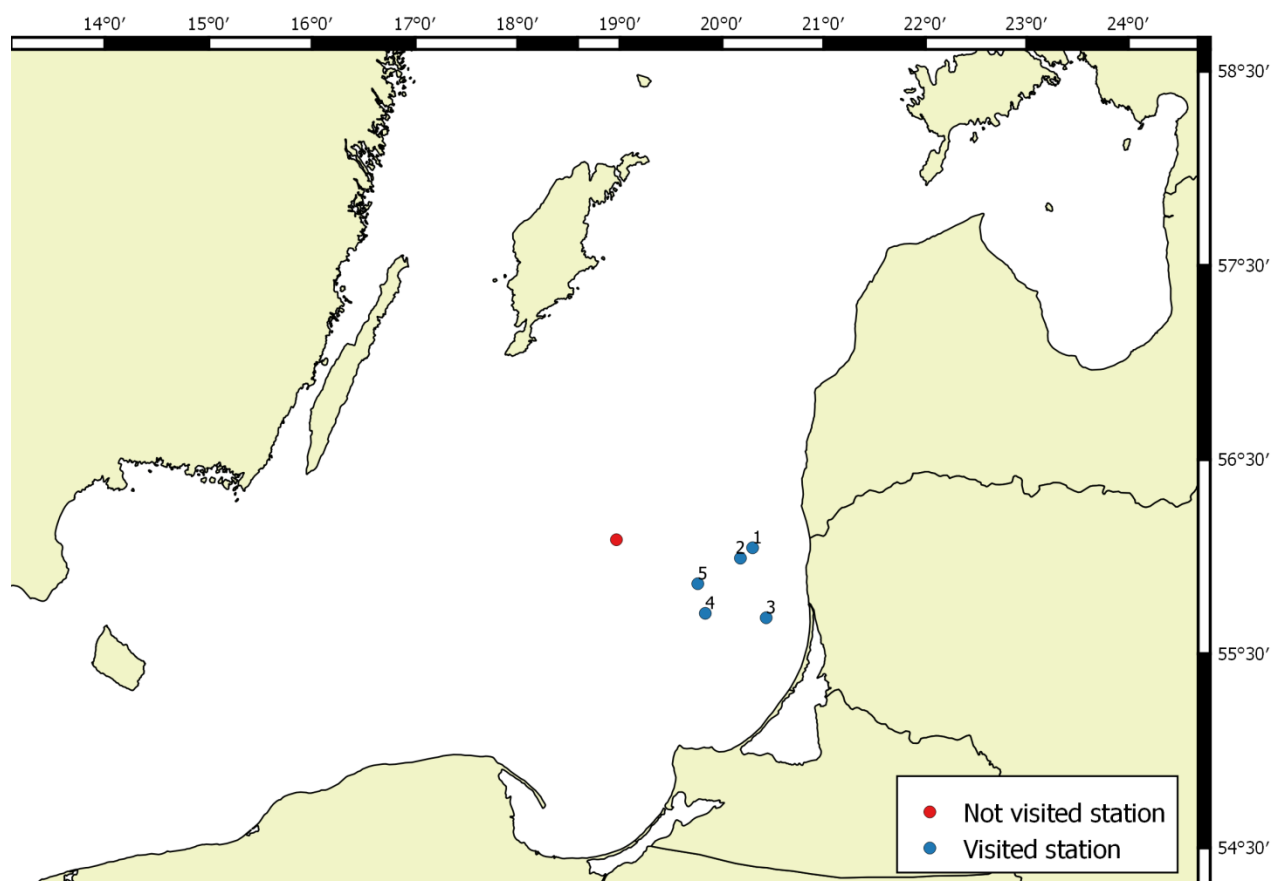
Number of biological samples (maturity and age material, *maturity only):			
Species	Age	Species	Age
<i>Clupea harengus</i>			
<i>Gadus morhua</i>			
<i>Sprattus sprattus</i>			

Nation:	Lithuania	Vessel:	RV «Darius»
Survey:	BITS-Q4/2016	Dates:	24-25 /11/2016

Cruise	
Gear details:	The small (530) standard TV3 trawl was used. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	Total 6 trawls were planned. 5 trawls were made in the ICES SD26, 41H0 and 40H0 rectangles. One station was empty. One trawl was not made during bad weather condition. Due to bad weather conditions only two hydrological stations were made. Cod stomachs were no collected. Litters from the trawls were recorded.
Additional comments:	

ICES SUB- DIVISIONS	GEAR (TVS)	DEPTH STRATA	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALIZED USING “STANDARD” GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACE- MENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
26	TVS	20-39	2	2	0	0	0	0	100
26	TVS	40-59m	1	1	0	0	0	0	100
26	TVS	60-79m	2	2	0	1	0	0	100
26	TVS	80-99m	1	0	0	0	0	0	0

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
SPECIES	AGE	LENGTH	MATURITY
<i>Gadus morhua</i>	298	545	
<i>Platichthys flesus</i>	323	820	
<i>Pleuronectes platessa</i>	1	1	
<i>Psetta maxima</i>	5	5	
<i>Clupea harengus</i>		648	
<i>Sprattus sprattus</i>		30	
<i>Osmerus eperlanus</i>		24	
<i>Myoxocephalus scorpius</i>		17	
<i>Cyclopterus lumpus</i>		1	

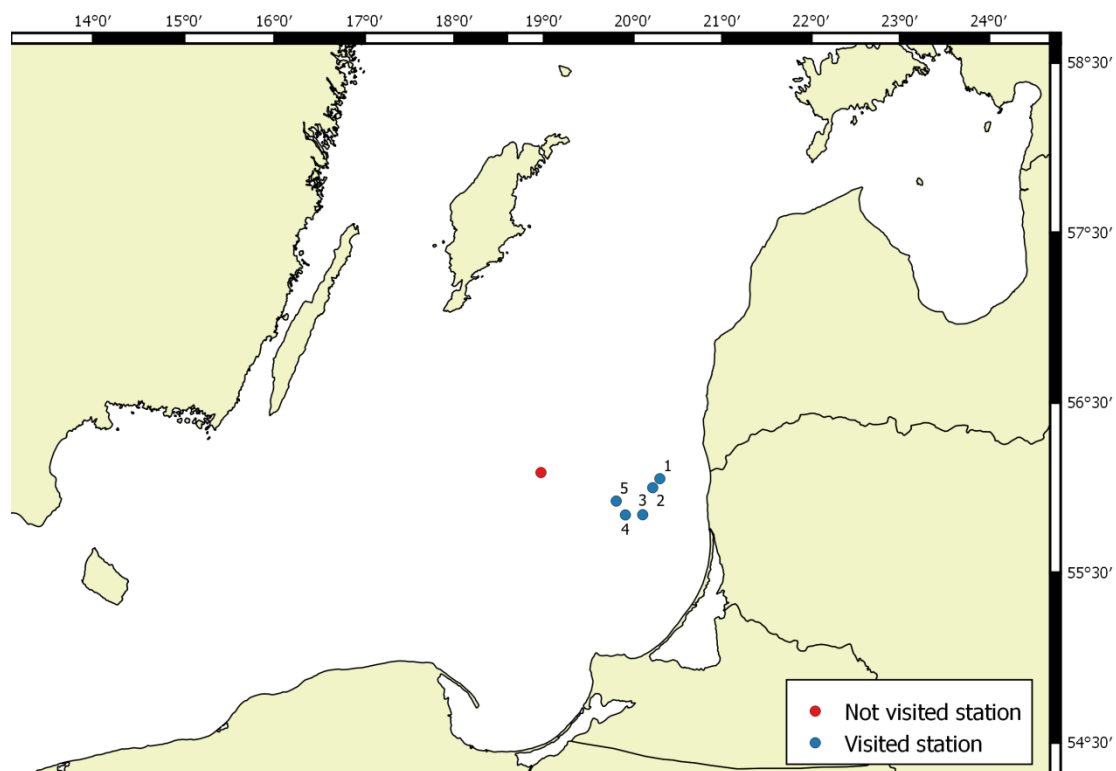


Nation:	Lithuania	Vessel:	RV «Darius»
Survey:	BITS-Q1/2017	Dates:	15-16 02/2017

Cruise	
Gear details:	The small (530) standard TV3 trawl was used. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	Total 6 trawls were planned. 5 trawls were made. One trawl was not made during bad sea ground. Every control-haul was preceded by the water temperature, salinity and oxygen content measurements, made continuously from the sea-surface to a bottom
Additional comments:	

ICES SUB-DIVISIONS	GEAR (TVS)	DEPTH STRATA	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACE-MENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
26	TVS	20-39	2	1	0	0	0	0	100
26	TVS	40-59m	1	1	0	0	0	0	100
26	TVS	60-79m	2	2	0	0	0	0	100
26	TVS	80-99m	1	0	0	0	0	0	0

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
SPECIES	AGE	LENGTH	MATURITY
<i>Gadus morhua</i>	60	76	
<i>Platichthys flesus</i>	292	1016	
<i>Psetta maxima</i>	2	2	
<i>Clupea harengus</i>		782	
<i>Sprattus sprattus</i>		1333	
<i>Osmerus eperlanus</i>		435	
<i>Myoxocephalus scorpius</i>		54	
<i>Cyclopterus lumpus</i>		3	
<i>Zoarces viviparus</i>		1	



Draft template for standardised reporting of BITS survey:

Nation:	Russia	Vessel:	Atlantniro
Survey:	65	Dates:	11 – 18 October 2016

Cruise	
Gear details:	The large standard TV3 trawl is used. Following the recommendations in the TOW database stations are fished either without rockhoppers. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	No problems were experienced during the survey. Low content of oxygen in one trawl station 26135 (depth >100 m) – therefore hydrological researches have been made only.
Additional comments:	The national scientific program causes performance of trawl stations 26089, 26097 – Russia. These trawl stations have been made in addition to the planned BITS stations. Trawl station 26112 have been made instead of 26154. Trawl stations 26121 did not carried after 2009 (invalid in March 2009).

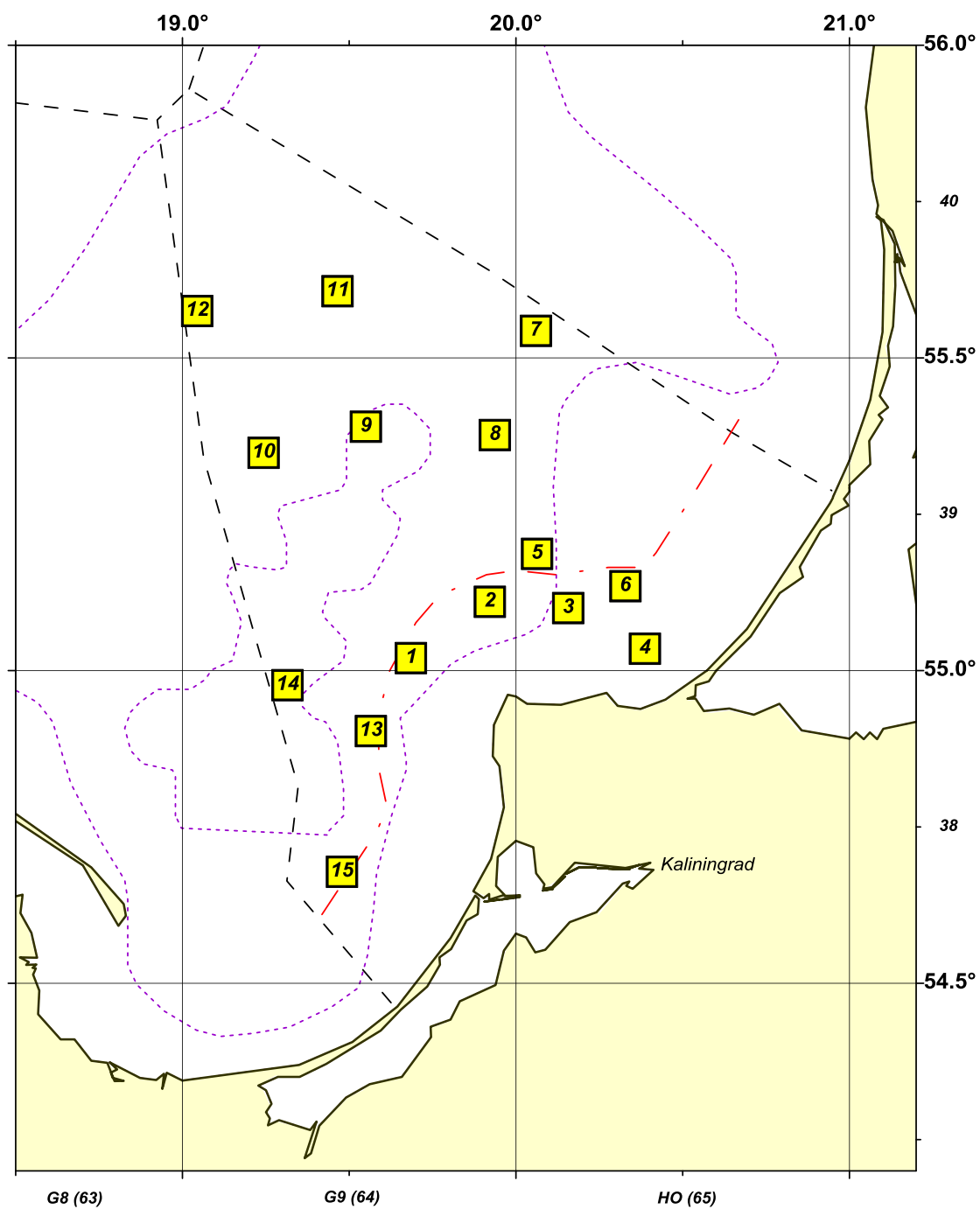
Stations fished

(Please insert line according to your needs)

ICES Sub-divisions	Gear (TVL, TV S)	Depth strata (1 -6)	Number of hauls planed	Number of valid hauls realised using “Standard” ground gear	Number of valid hauls realised using Rockhoppers	Number of assumed zero-catch hauls	Number of replacement hauls	Number of invalid hauls	% stations fished
26	TVL	1	0	0	0	0	0	0	
26	TVL	2	1	1	0	0	0	0	
26	TVL	3	2	2	0	0	0	0	
26	TVL	4	3	3	0	0	0	0	
26	TVL	5	7	8	0	0	1	0	
26	TVL	6	2	1	0	0	0	0	

Number of biological samples (maturity and age material, *maturity only):			
Species	Length	Maturity	Age (otoliths)
<i>Clupea harengus</i>	3526	924	355
<i>Gadus morhua</i>	3789	1026	526
<i>Platichthys flesus</i>	981	512	511
<i>Sprattus sprattus</i>	799	122	122

Other species may need to be added for your survey

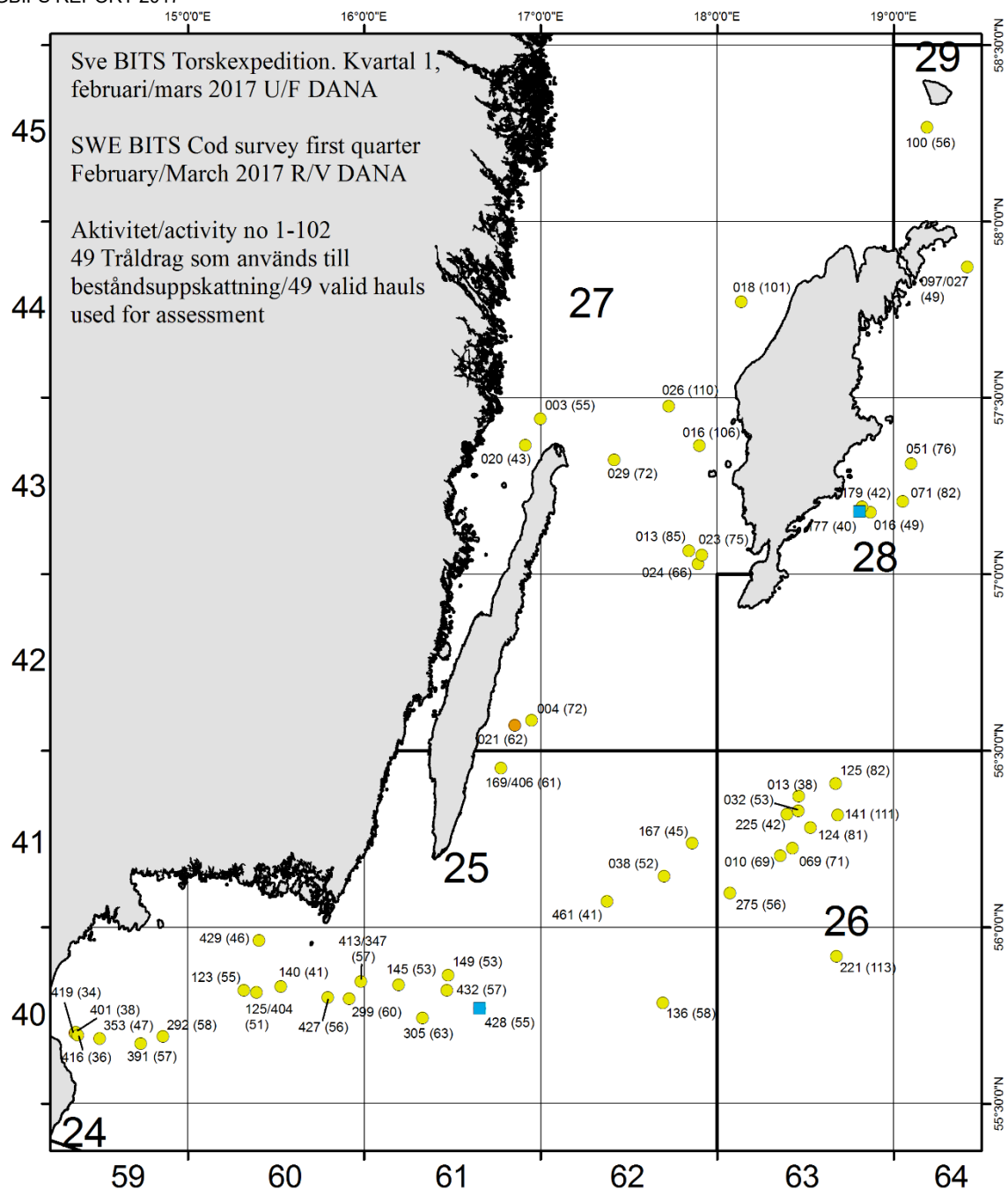


Trawl positions for RV "ATLANTNIRO" in October 2016

NATION:	SWEDEN	VESSEL:	RV "DANA"
Survey:	BITS Q1 2017	Dates:	23 February - 07 Mars 2017
Cruise			
Gear details:	The large (930#) standard TV3 trawl was used. No tows are done with the rock hopper ground gear on harder ground stations. The trawl construction is according to the specification in the BITS manual.		
Notes from survey (e.g. problems, additional work etc.):	50 stations were allocated, 49 of these were trawled. One invalid hauls this time. A total of ten hauls in the ICES SDs 25, 26, 27 and 28 had oxygen deficiency.		
Additional comments:	No stations where forbidden by the Swedish Armed Forces		

ICES SUB- DIVISIO NS	GEAR (TVL, TVS)	DEPTH STRATA (2-6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO- CATCH HAULS	NUMBER OF REPLACE- MENT HAULS	NUMBER OF INVALID HAULS	STATIONS FISHED %
25	TVL	21-40 m	3	3	-		0		100
25	TVL	41-60 m	17	16	-		2	1	94
25	TVL	61-80 m	3	3	-		0		100
26	TVL	21-40 m	1	1	-		0		100
26	TVL	41-60 m	3	3	-		0		100
26	TVL	61-80 m	2	2	-		0		100
26	TVL	81-100 m	2	2	-	1	0		100
26	TVL	>100 m	2	2	-	1	0		100
27	TVL	41-60 m	2	2	-		0		100
27	TVL	61-80 m	4	4	-	3	0		100
27	TVL	81-100 m	1	1	-	1	0		100
27	TVL	>100 m	3	3	-	3	0		100
28	TVL	21-40 m	1	1	-		1		100
28	TVL	41-60 m	4	4	-		1		100
28	TVL	61-80 m	1	1	-		0		100
28	TVL	81-100 m	1	1	-	1	0		100

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Lenght	Age	Stomachs
<i>Alosa fallax</i>	1		
<i>Aphia minuta</i>	1		
<i>Clupea harengus</i>	8 289		
<i>Cyclopteridae</i>	1		
<i>Cyclopterus lumpus</i>	25		
<i>Enchelyopus cimbrius</i>	131		
<i>Gadus morhua</i>	4 770	870	577
<i>Gasterosteus aculeatus</i>	173		
<i>Hyperoplus lanceolatus</i>	2		
<i>Limanda limanda</i>	37		
<i>Liparis liparis</i>	1		
<i>Lumpenus lampretaeformis</i>	7		
<i>Merlangius merlangus</i>	18		
<i>Myoxocephalus quadricornis</i>	330		
<i>Myoxocephalus scorpius</i>	1 604		
<i>Osmerus eperlanus</i>	1		
<i>Pholis gunnellus</i>	1		
<i>Platichthys flesus</i>	3 665	1 079	417
<i>Pleuronectes platessa</i>	580		
<i>Pomatoschistus spp</i>	88		
<i>Pungitius pungitius</i>	1		
<i>Scophthalmus maximus</i>	38		
<i>Spinachia spinachia</i>	2		
<i>Sprattus sprattus</i>	4 510		
<i>Zoarces viviparus</i>	34		

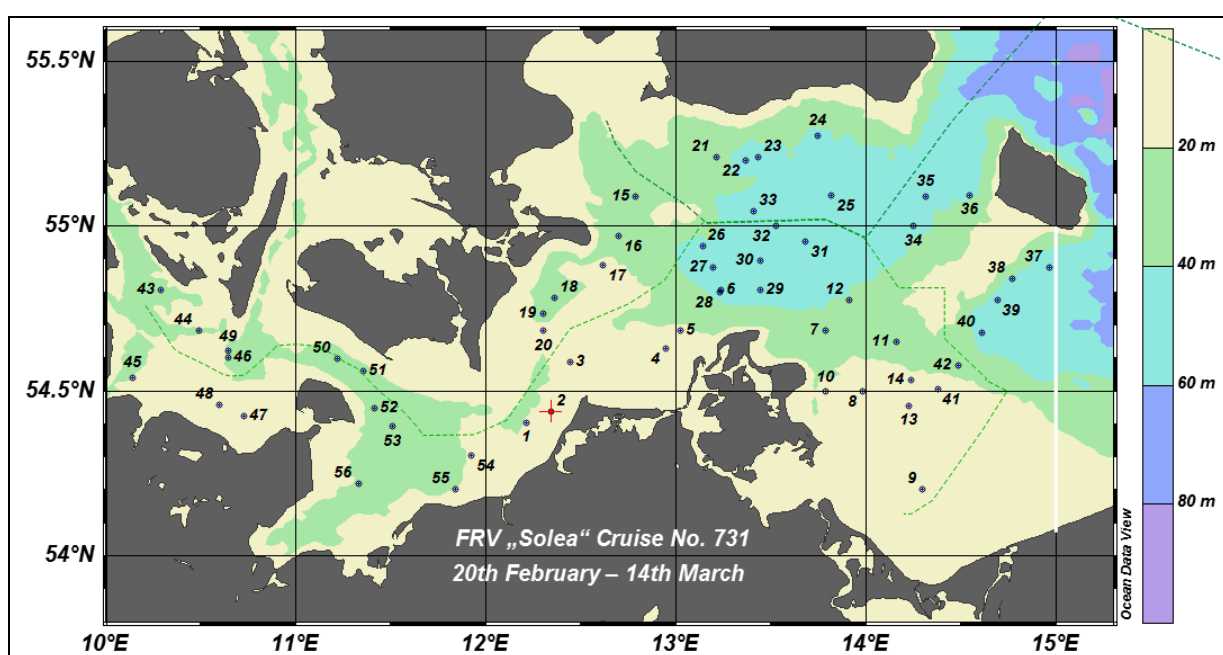


NATION:	GERMANY	VESSEL:	FRV "SOLEA"
Survey:	BITS 2017, quarter 1	Dates:	20 th February to 14 th March 2016
Cruise			
Gear details:	The small (520#) standard TV3 trawl was used. All Tow Database stations are fished without rock-hoppers. The construction of the trawl follows the specifications in the manual.		
Notes from survey (e.g. problems, additional work etc.):	Total 55 fishing hauls and 55 hydrographical stations were performed.		
Additional comments:			

ICES SUB-DIVISIONS	GEAR (TVL, TVS)	DEPTH STRATA (1–5)	NUMBER OF HAULS PLANED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACE-MENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
22	TVS	1	15	14			1	0	93
24	TVS	1	20	20			1	-	100
24	TVS	2	22	20			2	1	90

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):

SPECIES	LENGTH	AGE
<i>Gadus morhua</i>	10425	1285
<i>Platichthys flesus</i>	4303	682
<i>Limanda limanda</i>	5735	536
<i>Pleuronectes platessa</i>	4476	758
<i>Psetta maxima</i>	136	132
<i>Scophthalmus rhombus</i>	4	3
<i>Clupea harengus</i>	5769	-
<i>Sprattus sprattus</i>	5449	-



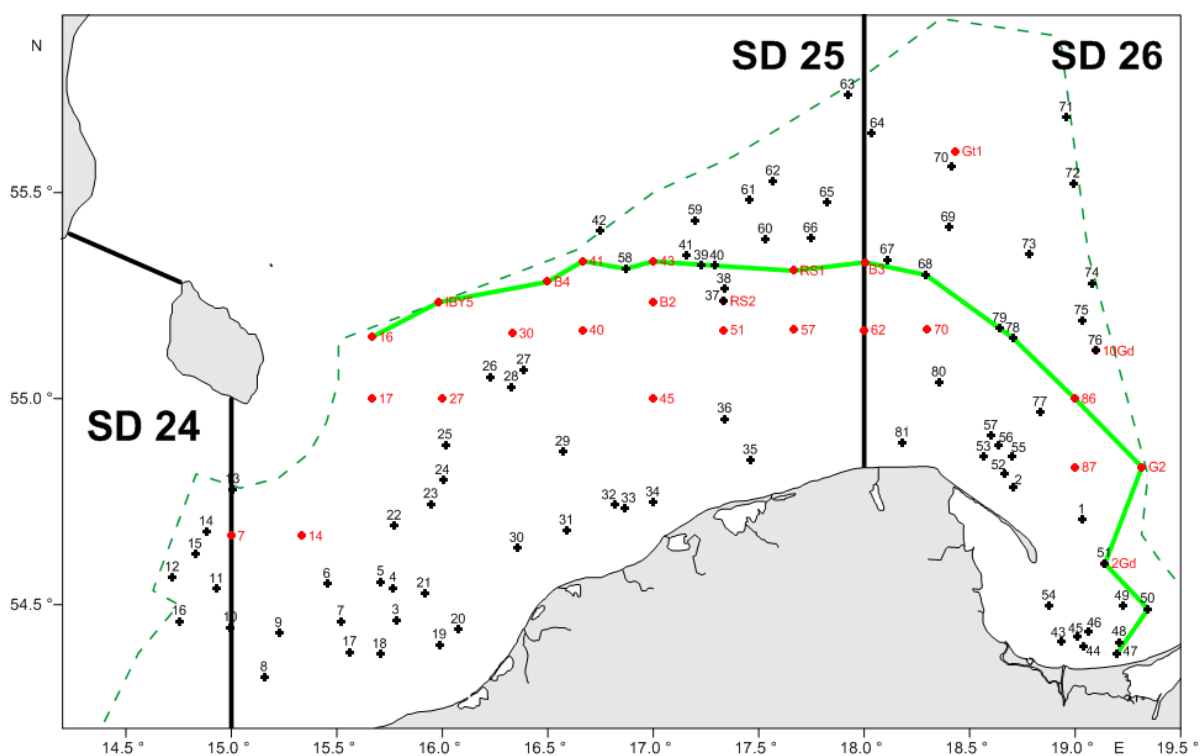
NATION:	POLAND	VESSEL:	RV "BALTICA"
Survey:	BITS-Q1/2017	Dates:	09/02-08/03/2017

Cruise	No. 4/2017/MIR
Gear details:	The standard rigging cod ground trawl type TV-3#930, with 10-mm mesh bar length in the codend was applied for fish control-catches realisation. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	<p>According to the WGBIFS recent (March/April 2016) recommendations, the vessel "Baltica" was designated to cover parts of the ICES subdivisions 24, 25 and 26 with totally 81 randomly selected fish control-hauls. The catch-stations were located at the seabed depth range of 16 - 99 m. Totally, 81 realised fish catch-stations can be accepted as representative.</p> <p>Due to a rocky bottom appearance at part of trawling transects connected with hauls Nos. 25046, 25011, 25014, 25017, 25308, 26050 and 26046 fishing was shortened to 15 or 20 minutes. Hauls Nos. 25046, 24278, 25054, 25056, 25232, 25008, 25290, 26107, 26045, 26094 and 26091 were shortened to 15 or 20 minutes due to dense fish concentrations observed on the EK-60 SIMRAD echosounder. Haul No. 26272 was shortened to 15 minutes due to presence of the salmon drift hooks on the vessel course.</p> <p>Every control-haul was preceded by the seawater temperature, salinity and oxygen content measurements, made continuously from the sea-surface to a seafloor. Overall, 80 fish catch-stations starting positions and 26 standard hydrographic stations were controlled by the Neil-Brown CTD-probe combined with the rosette sampler (the bathometer rosette). As the standard hydrographic station 10Gd was made on the same position as the control-haul No. 26091 therefore its results were also attached to control-haul No. 26091. Oxygen content was determined by the standard Winkler's method.</p>
Additional comments:	

ICES SUB-DIVISIONS	GEAR (TVL, TVS)	DEPTH STRATA (2-6)	NUMBER OF HAULS PLANED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACE-MENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
24	TVL	10-39 m	4	4	0	0	0	0	100
24	TVL	40-59 m	3	3	0	0	0	0	100
25	TVL	10-39 m	15	14	0	0	0	0	93
25	TVL	40-59 m	13	14	0	0	0	0	108
25	TVL	60-79 m	11	11	0	0	0	0	100
25	TVL	80-100 m	2	2	0	0	0	0	100
26	TVL	10-39 m	6	6	0	0	0	0	100
26	TVL	40-59 m	6	6	0	0	0	0	100
26	TVL	60-79 m	8	8	0	0	0	0	100
26	TVL	80-100 m	13	13	0	0	0	0	100

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
SPECIES (LATIN NAME)	Length	Age and maturity
<i>Gadus morhua</i>	13197	661
<i>Platichthys flesus</i>	9752	1045
<i>Clupea harengus</i>	10583	979
<i>Sprattus sprattus</i>	8476	730
<i>Pleuronectes platessa</i>	1819	754
<i>Scophthalmus maximus</i>	53	52
<i>Cyclopterus lumpus</i>	68	4
<i>Enchelyopus cimbrius</i>	583	13
<i>Hyperoplus lanceolatus</i>	11	0
<i>Osmerus eperlanus</i>	287	0
<i>Merlangius merlangus</i>	157	72
<i>Myoxocephalus scorpius</i>	576	8
<i>Zoarces viviparus</i>	27	0
<i>Pomatoschistus minutus</i>	47	0

<i>Alosa fallax</i>	58	2
<i>Trachurus trachurus</i>	15	4
<i>Engraulis encrasicolus</i>	42	6
<i>Gasterosteus aculeatus</i>	5	0
<i>Neogobius melanostomus</i>	109	0
<i>Perca fluviatilis</i>	7	0
<i>Sander lucioperca</i>	9	1
<i>Agonus cataphractus</i>	8	0
<i>Scomber scombrus</i>	8	4
<i>Trisopterus minutus</i>	1	1
<i>Lumpenus lampretæformis</i>	2	0
<i>Liparis liparis</i>	1	0
<i>Chelidonichthys lucerna</i>	1	0



Marks used: crosses – fish control stations, red dots – hydrological stations, green line – hydrological profile.

NATION:	LATVIA	VESSEL:	RV "BALTICA"
Survey:	BITS-Q1/2017	Dates:	11-19/03/2017

Cruise	No. 1/2017
Gear details:	The hard bottom ground-rope (rockhopper) trawl, type TV-3#930 (with 10-mm mesh bar length in the codend) was applied for fish catches. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	<p>The original surveys plan provided that 20 control-hauls will be realized in the Latvian EEZ (all trawls in the ICES SD 28) and 5 control-hauls in the Estonian EEZ (ICES SD 28). Ten additional trawls were planned in the ICES SD 26 (5 trawls in the Latvian EEZ and 5 trawls in the Lithuanian EEZ. Before the trip, we received a request from the Danish colleagues to help with 4 trawls originally allocated for Denmark in Latvian EEZ, in the ICES SD 26. The reason was bad grounds in Latvian EEZ and TV3 with rockhopper which is used during Latvian-Polish BITS survey.</p> <p>The r.v. "Baltica" realized 28 bottom trawl control-hauls from the 25 + 4 planned, incl. the Latvian territorial waters (Fig.1, Table 1). From to Latvia allocated 25 hauls 23 were realized. Weather conditions influenced the realization of all planned tracks. Four originally allocated hauls for Denmark and 1 additional track were realized in Latvian EEZ in the ICES SD 26. In the trawling position (track 28088) the depth did not match the information included into trawling database. Actual depth belongs to the depth zone 6, not depth zone 5. Trawling was performed in this position. Trawl database administrator will be informed about this problem.</p> <p>All trawl catches were performed in the daylight. The hard bottom ground-rope (rockhopper) trawl, type TV-3#930 (with 10-mm mesh bar length in the codend) was applied for fish catches. The standard trawling duration was 30 minutes. The mean speed of vessel while trawling was 3.0 knots. However, in the case of 24 hauls, their duration was shortened to 15 minutes, due to dense clupeids concentrations observed on the echosounder, bad weather or bad fishing ground.</p> <p>The length measurements in the 1.0-cm classes were realised for 1340 cod and 1840 flounder. Length measurements in the 0.5-cm classes were realized for 2795 herring and 2350 sprat. In total, 596 cod and 539 flounder individuals were taken for biological analysis. The details about fish biological sampling are presented in Table 2. Stomachs from the 439 cod were taken for investigation of cod feeding.</p> <p>Acoustic data, i.e. the echo-integration records (SA = NASCs; Nautical Area Scattering (Strength) Coefficient) were collected with the EK-60 scientific echosounder during fishing operations and on the distances between consecutive hauls. Echo-sounding data collected during the BITS survey were delivered to the Latvian researchers for further analysis.</p> <p>Directly before every haul, the seawater temperature, salinity and oxygen content were measured continuously from the sea surface to a bottom. The seawater samples were taken also at the standard HELCOM stations. Totally, 33 hydrological stations were inspected with the Neil-Brown CTD-probe combined with the rosette sampler (the bathometer rosette). Oxygen content was determined by the standard Winkler's method. Meteorological observations of wind velocity and directions and the sea state were realized at the actual geographic position of each control-haul.</p>
Additional comments:	

ICES SUB-DIVISIONS	GEAR (TVL, TVS)	DEPTH STRATA (2-6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACE-MENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
26	TVL	3	1*		1				100
26	TVL	4	1*		1				100
26	TVL	5	1*		1				100
26	TVL	6	1*		1				100
28	TVL	2	6		4				67
28	TVL	3	5		5				100
28	TVL	4	9		9				100
28	TVL	5	5		4				80
28	TVL	6			1				

*Trawls originally allocated for Denmark, realized by Latvia

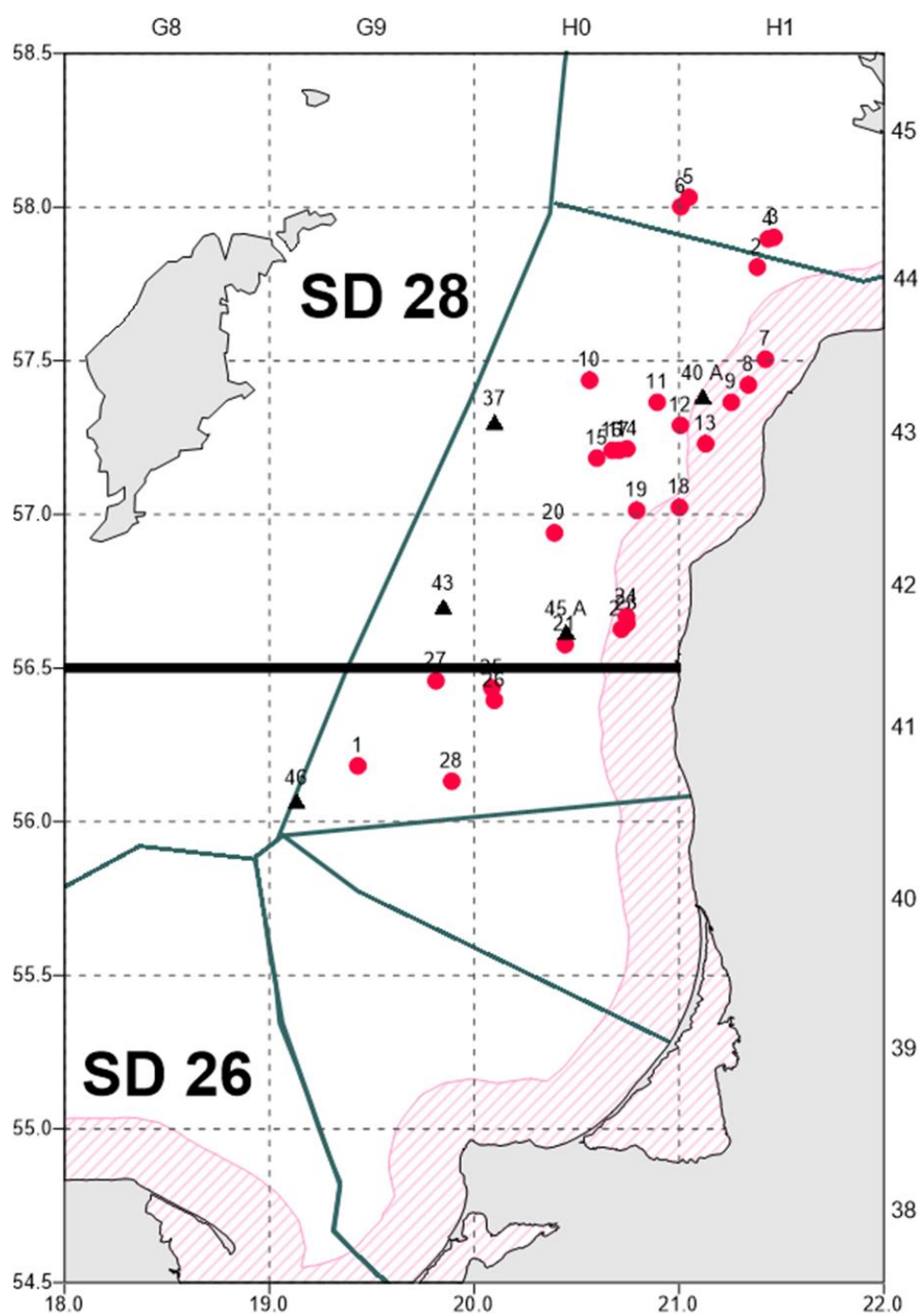


Figure 1. Location of the realized fish control-hauls (marked with red dots) and the HELCOM standard hydrological stations (marked with black triangles), blue lines - national fishing zone borders.

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
SPECIES	LENGTH	AGE
<i>Gadus morhua</i>	1340	596
<i>Platichthys flesus</i>	1840	539
<i>Clupea harengus</i>	2795	
<i>Sprattus sprattus</i>	2350	
<i>Zoarces viviparus</i>	16	
<i>Lumpenus lampretaeformis</i>	1	
<i>Cyclopterus lumpus</i>	2	
<i>Pleuronectes platessa</i>	1	
<i>Myoxocephalus scorpius</i>	41	
<i>Osmerus eperlanus</i>	100	
<i>Gasterosteus aculeatus</i>	14	
<i>Enchelyopus cimbrius</i>	16	
<i>Hyperoplus lanceolatus</i>	1	
<i>Neogobius melanostomus</i>	11	
<i>Scophthalmus maximus</i>	3	

Nation:	Denmark	Vessel:	Dana
Survey:	BITS	Dates:	7-25/3 - 2017

Cruise	
Gear details:	The big (#920) standard TV3 trawl is used. The construction of the trawl follows the specifications in the manual. No rock hopper was used
Notes from survey (e.g. problems, additional work etc.):	Stomack sampling from cod, plankton fishing during night.

ICES Sub-divisions and depth stratum	Gear (TVL,TVS)	Number of hauls planed	Number of valid hauls realized using "Standard" ground gear	Number of valid hauls realized using Rock-hoppers	Number of assumed zero-catch hauls	Number of replacement hauls	Number of invalid hauls	% stations fished
25	TVL							
3	TVL	9	7	0	0	0	1	88,9
4	TVL	24	21	0	0	0	0	87,5
5	TVL	10	13	0	0	0	0	130,0
6	TVL	0	1	0	0	0	0	-
26	TVL							
3	TVL	3	3	0	0	0	0	100,0
4	TVL	4	4	0	0	0	0	100,0
5	TVL	4	1	0	0	0	0	25,0

Number of biological samples (maturity and age material, *maturity only):

Species	Age	Species	Age
<i>Clupea harengus</i>			
<i>Gadus morhua</i>			
<i>Sprattus sprattus</i>			

Nation:	Denmark	Vessel:	Havfisken/26HF
Survey:	KASU-1	Dates:	15/2-6/3-2017

Cruise	
Gear details:	The small (#520) standard TV3 trawl is used. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	

ICES Sub-Divisions		Gear (TVL,TVS)	Depth strata (1 -6)	Number of hauls planed	Number of valid hauls realized using "Standard" ground gear	Number of valid hauls realized using Rockhoppers	Number of assumed zero-catch hauls	Number of replacement hauls	Number of invalid hauls	% stations fished
22		TVS	1(0-19m)	14	14					100%
22		TVS	2(20-39m)	9	9					100%
21		TVS	1(0-19m)	6	6					100%
21		TVS	2(20-39m)	11	11					100%
21		TVS	3(40-59m)	3	3					100%
21		TVS	4(60-79m)	1	1					100%
21		TVS	5(80-99m)	1	1					100%
20		TVS	2(20-39m)	3	3					100%
23		TVS	1(0-19m)	3	3					100%
23		TVS	2(20-39m)	2	2					100%
24		TVS	2(20-39m)	1	1					100%

Number of biological samples (maturity and age material, *maturity only):

Species	Number of otoliths	Species	Number of otoliths
Sole	48	Saith	6
Cod	550	Dab	361
Withing	216	Haddock	33
Witch	27	Turbot	38*
Hake	0	Brill	118*
Plaice	799		

Institute of Baltic Sea Fisheries

Alter Hafen Süd 2, 18069 Rostock

Phone: +49 381 8116123

Fax: + 49 381 8116199

Date: 21/12/2016

Mail andres.velasco@thuenen.de

Cruise report Cruise number 728 FRV „SOLEA“ 09/11/ - 25/11/2016

Baltic International Trawl Autumn Survey (BITS) in the Arkona Sea and in the Mecklenburg Bight (ICES SDs 24+22)

Scientist in charge: **Dr. A. Velasco**

1. Summary

The 728th cruise of the FRV “SOLEA” is the 35th November survey since 1981. It was part of the Baltic International Trawl Survey (BITS) which was coordinated by ICES WGBIFS. The main objective of the survey was the estimation of fishery independent stock indices for both Baltic cod stocks, flounder and other flat fish.

In total 58 fishery and 58 hydrography stations were carried out.

A preliminary analysis of the survey results suggests a stronger year class of cod in 2016 as compared with the previous year class 2015 (recruits at length range 10-25 cm). The proportion of recruits between 26-40 cm was lower in all depth layers as compared to the previous year with the exception of the depth layer of 20 – 39 meters in subdivision 24.

The abundance of flounder decreased in all depth layers as compared to the previous year.

The oxygen concentration close to the bottom was above 3.41 ml/l, with exception of two stations.

Verteiler:

BLE, Hamburg
Schiffsführung FFS „Solea“
BMELV, Ref. 614
TI, Präsidialbüro (M. Welling)
TI, OF TI
TI, FOE
TI, SF
TI, FIZ
Fahrtteilnehmer
Eurobaltic Mukran
Verantw. Seeinsatzplanung, Herr Dr. Rohlf
BFEL Hamburg, FB Fischqualität
IFM-GEOMAR, Kiel
Institut für Fischerei der Landesforschungsanstalt
LA für Landwirtschaft, Lebensmittels. u. Fischerei
BSH, Hamburg

Deutscher Fischerei-Verband e. V., Hamburg
Leibniz-Institut für Ostseeforschung
Doggerbank GmbH
Mecklenburger Hochseefischerei Sassnitz
Kutter- und Küstenfisch Sassnitz
Landesverband der Kutter- und Küstenfischer
Sassnitzer Seefischer
Deutsche Fischfang Union Cuxhaven

2. Research programme

The cruise took place from 9th until 25th November 2016. Corresponding to the recommendations of the WGBIFS in 2007, the survey of the FRV "SOLEA" covered the ICES subdivisions 22 and 24 (Figure 1).

The following stock assessment objectives were covered during the survey:

- Collecting data for assessing stock indices, the structure and recruitment of the stocks, especially for cod and flatfish
- Monitoring the composition of fish species in the western Baltic Sea
- Collecting samples of cod and flounder for biological investigations (i.e. sex, maturity, fecundity, age)
- Monitoring the actual hydrographical situation in the survey area

3. Narrative

The internationally coordinated trawl survey is planned as a Stratified Random Survey where ICES subdivisions and depth layers are used as strata. A total of 60 stations (45 in the ICES subdivision 24 and 15 in the ICES subdivision 22) were planned for the German part of the survey which covered the southern part of the ICES subdivision 22 and the ICES subdivision 24 in total. The haul positions were selected from the TOW Database by the coordinator of the BITS surveys (ICES 2008, WGBIFS report as reference). 58 fishing stations were realized and can be used for stock assessment. The fishing hauls were carried out between 7:00 and 15:00 UTC (8:00 and 16:00 local time).

The positions of the trawl hauls are shown in Figure 1. 15 fishing hauls and 15 hydrographic stations were done in subdivision 22, and 43 fishing hauls and 43 hydrographical stations were realized in subdivision 24.

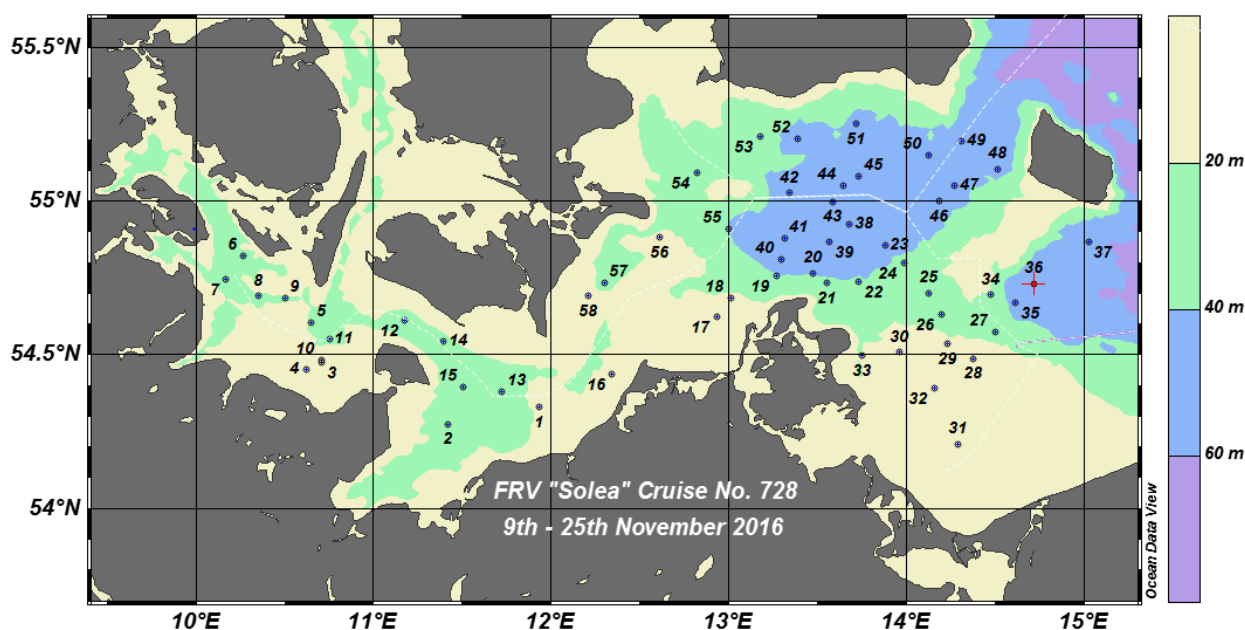


Fig. 1 Stations of the 728th FRV "SOLEA" cruise (Ocean Data View, R. Schlitzer, www.awi-bremerhaven.de/GEO/ODV)

The numbers of fishing hauls and hydrographic stations by subdivision and 10 m depth layers are given in Table 1. All hauls in subdivision 22 were located at depths from 20 m to 29 m and 24 of 43 hauls in subdivision 24 between 40 and 59 m.

Tab. 1 Sampling intensity (evaluated fishing stations)

Area		Stations		
Subdivision	Stratum Depth [m]	Total trawl distance [sm]	Fishing [n]	Hydrography [n]
22	2 [10-19]	-	-	-
	3 [20-29]	22.4	15	15
24	2 [10-19]	8.9	6	6
	3 [20-29]	11.9	8	8
	4 [30-39]	4.2	3	3
	5 [40-49]	35.9	24	24
	6 [50-59]	3.1	2	2

Trawling was done with the standard BITS trawl "TV3 520#". The stretched mesh size in the codend was 20 mm. The duration of each haul was 30 minutes at a velocity of 3 kn as required in the BITS manual. The total catch of a haul was analysed to determine species composition in weight and number as well as the length distribution of all species. Subsamples of cod, flounder, plaice, dab and turbot were investigated concerning sex, maturity and age.

Vertical profiles of the hydrographical parameters temperature, salinity and oxygen were sampled from the surface to the bottom immediately after every fishing haul with a CTDO probe (Sea Bird 19 +).

4. Preliminary results

4.1 Biological data

In total 1026 cod, 637 flounder, 920 plaice, 726 dab, 196 turbot and 5 brill were collected for measuring length, weight, sex, maturity and age. The total catches and numbers of length samples of cod and flounder are given in Table 2 by subdivision and depth stratum.

Tab. 2 Numbers of length measurements of cod and flounder by depth stratum and ICES subdivision

Area		Sample			
		Cod		Flounder	
Subdivision	Depth [m]	Weight [kg]	Number [n]	Weight [kg]	Number [n]
22	10-29	161.6	9086	112.1	374
24	10-19	18.5	129	500.6	2185
	20-39	347.4	2200	817.8	3525
	40-59	2355.4	6155	2415.7	10590

Area		Sample			
		Plaice		Dab	
Subdivision	Depth [m]	Weight [kg]	Number [n]	Weight [kg]	Number [n]
22	10-29	423.4	1460	1158.2	13700
24	10-19	38.8	449	14.3	62
	20-39	138.8	746	168.1	1430
	40-59	1258.2	5678	36.3	220

The mean catch per half hour (CPUE) was 33.3 kg of cod and 44.5 kg of flounder. In general the catch composition was dominated by cod and flounder. However, plaice and dab were also abundant in the catches. The mean fraction of cod biomass in the hauls was 23% and mean fraction of flounder, plaice and dab was 30.7%, 14.9 % and 11 %, respectively. Sprat and herring represented 10.8 % of the total biomass in mean.

The highest abundances in weight and number of cod and flounder were observed in subdivision 24 in depths between 40 - 59 m.

Mean CPUE of cod and flounder are given in Table 3 by subdivision and depth stratum.

Tab. 3 Mean CPUE of cod and flounder and average individual weights by subdivision and depth

Area		Catch							
		Cod				Flounder			
Subdivision	Depth [m]	Weight [kg/sm]	Number [n/sm]	Average Weight [g]	Stations [n]	Weight [kg/sm]	Number [n/sm]	Average Weight [g]	Stations [n]
22	10-29	7.2	406	17.8	15	5.0	17	299.7	15
24	10-19	2.1	14	143.7	6	56.0	244	229.1	6
	20-39	21.5	136	157.9	11	50.7	218	232.0	11
	40-59	60.4	158	382.7	26	61.9	272	228.1	26

Area		Catch							
		Plaice				Dab			
Subdivision	Depth [m]	Weight [kg/sm]	Number [n/sm]	Average Weight [g]	Stations [n]	Weight [kg/sm]	Number [n/sm]	Average Weight [g]	Stations [n]
22	10-29	18.9	65	290.0	15	51.8	613	84.5	15
24	10-19	4.3	50	86.3	6	1.6	7	230.5	6
	20-39	8.6	46	186.0	11	10.4	89	117.6	11
	40-59	32.3	146	221.2	26	0.9	6	164.8	26

The frequencies of cod grouped by subdivision and depth strata are presented in Figures 1 to 3.

Noteworthy is the low abundance of cod recruits of the year class 2015 ranging in length from 26 to 40 cm in subdivision 24 and subdivision 22. The length range 10–25 cm of young cod compared to the previous year has increased in all depths layers in the ICES subdivision 24 and the ICES subdivision 22 (Table 4 and Figures 1 to 3).

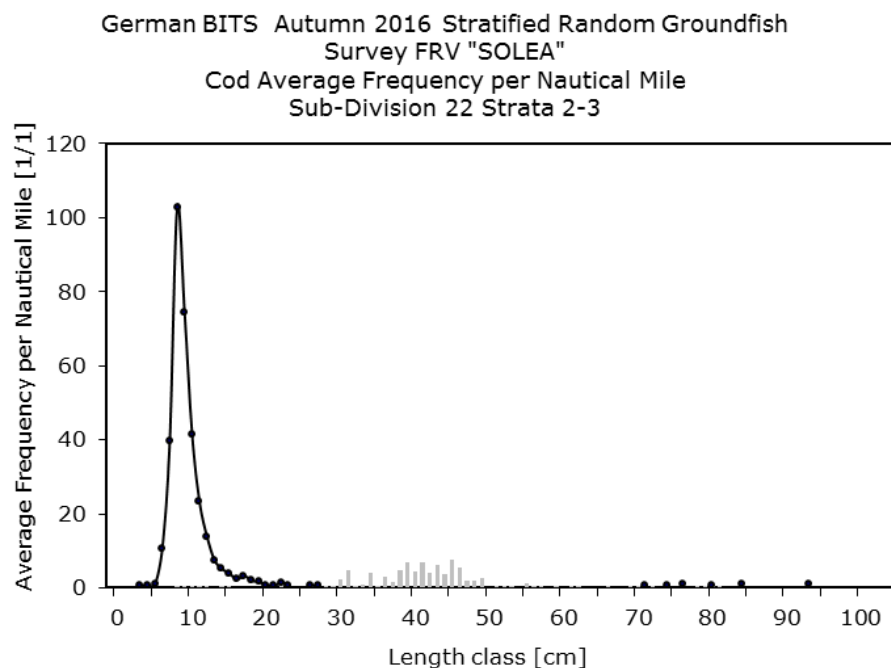


Fig. 1 Length frequencies of cod in number per mile in depth strata 10 m to 29 m in the ICES SD 22 2016 (line) and 2015 (bars), (15 Hauls)

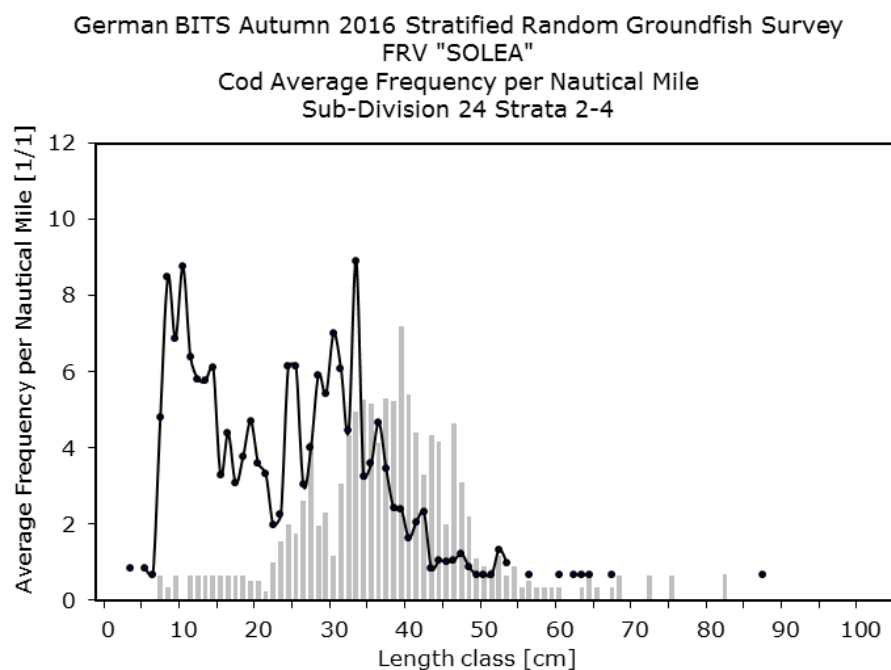


Fig. 2 Length frequencies of cod in number per mile in depth strata 10 m to 39 m in the ICES SD 24 2016 (line) and 2015 (bars), (17 Hauls)

German BITS Autumn 2016 Stratified Random Groundfish Survey
FRV "SOLEA"
Cod Average Frequency per Nautical Mile
Sub-Division 24 Strata 5-6

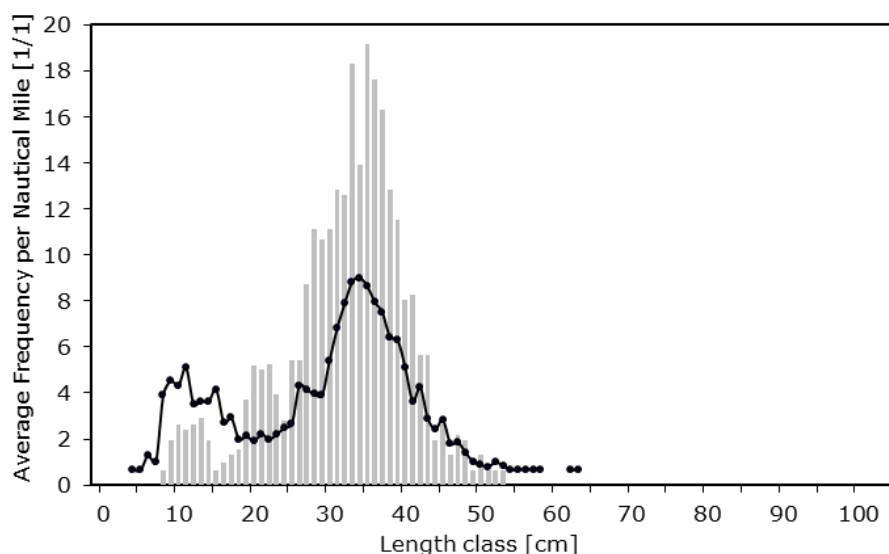


Fig. 3 Length frequencies of cod in number per mile in depth strata 40 m to 59 m in the ICES SD 24 2016 (line) and 2015 (bars), (26 Hauls)

Tab. 4 Recruitment of length groups of the year 2016 in comparison to the previous year

Jahr	Area		Catch			
	Subdivision	Depth [m]	Length range [cm]	Number [n]	Number/ Mile [n/sm]	Trawl distance [sm]
2016	22	10-29	10 - 25	3856	172	22.4
	24	10-19		89	10	8.9
		20-39		1049	65	16.1
		40-59		1179	30	39.0
	22 - 24	10-59		6173	71	86.4
2015	22	10-29	10 - 25	10	1	15.3
	24	10-19		15	2	9.0
		20-39		41	3	13.7
		40-59		324	9	34.6
	22 - 24	10-59		390	5	72.6
Jahr	Area		Catch			
	Subdivision	Depth [m]	Length range [cm]	Number [n]	Number/ Mile [n/sm]	Trawl distance [sm]
2016	22	10-29	26 - 40	2	0	22.4
	24	10-19		17	2	8.9
		20-39		458	28	16.1
		40-59		2790	72	39.0
	22 - 24	10-59		3267	38	86.4
2015	22	10-29	26 - 40	77	5	15.3
	24	10-19		215	24	9.0
		20-39		432	28	13.7
		40-59		4516	130	34.6
	22 - 24	10-59		5240	72	72.6

Under the assumption that the survey covered all nursery grounds of cod, a stronger year class 2016 (top tables) than the year class 2015 (tables below) can be assumed.

4.2 Hydrographical data

Figure 4 shows the distribution of temperature, salinity and oxygen near the bottom and at the surface in the covered area.

The hydrography was characterised by typical autumn conditions with surface temperatures between 6.9 °C and 9.9 °C. The salinity of the surface water decreased from 15.9 to 7.5 from west to east. The lowest temperature value was found in the area north west of Hiddensee at 6.9 °C. The salinity above the permanent halocline at a water depth of 29 m south of Bornholm was approx. 8.2. The salinity increased below the halocline at a depth of 44 m in the Arkona Sea up to 21.7.

The oxygen concentration close to the bottom was between 3.4-9.6 ml/l, with exception of two stations (sts.-nrs. 6 and 7: 0.06 and 0.02 ml/l).

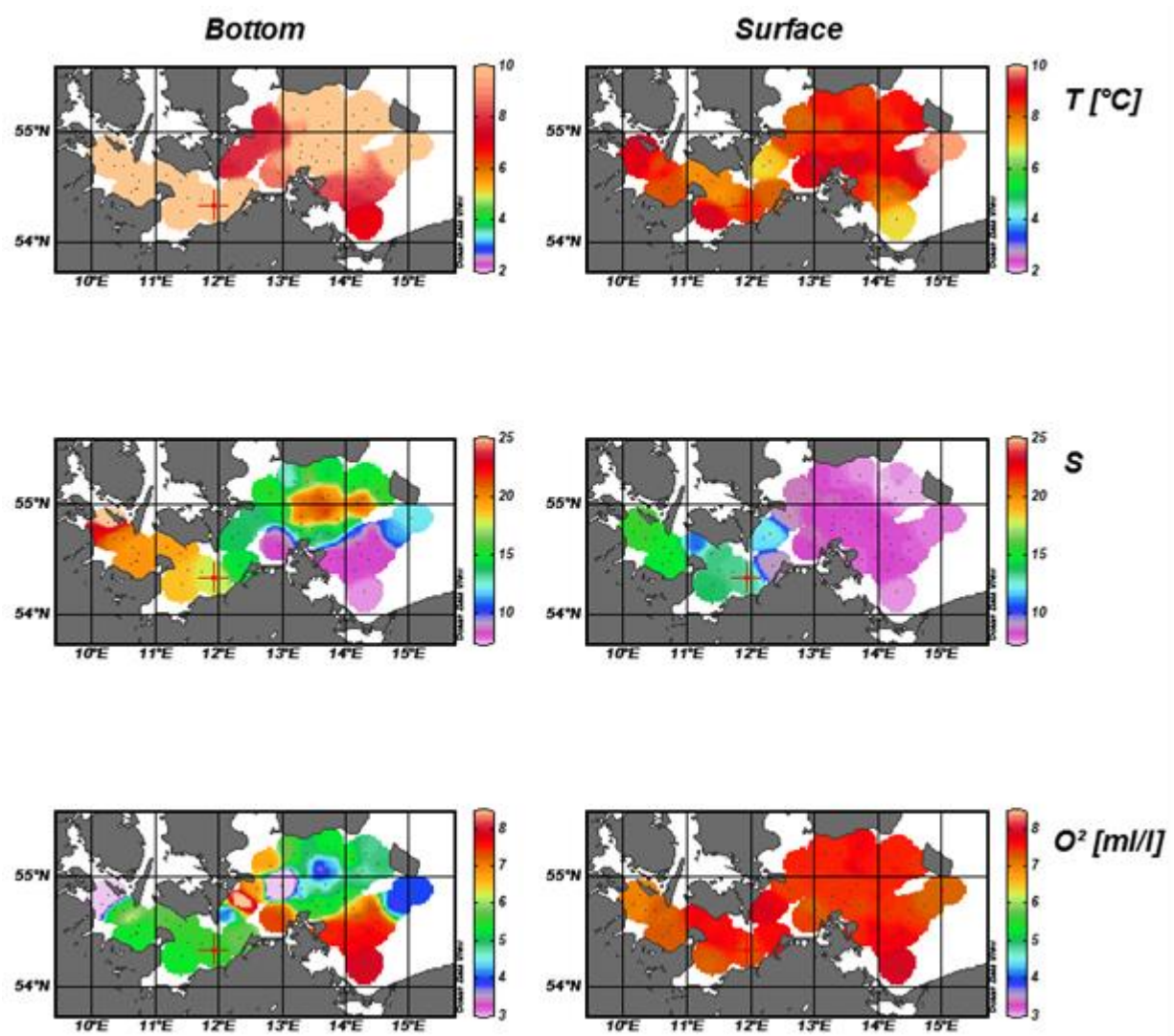


Fig. 4 Hydrography of the survey near the bottom (left) and at the surface (right)

5. Participants

A. Velasco	TI-OF	Scientist in charge
T. Hogh	TI-OF	Chief technician
C. Albrecht	TI-OF	Technician
S. Dressler	TI-OF	Technician
R. Wiechert	TI-OF	Technician
M. Koth	TI-OF	Technician
C. Elwert	University of Rostock	Student helper
A. Bühler	University of Rostock	Student helper

6. Acknowledgements

I would like to express my gratitude to Captain Koops and his crew on the FRV "Solea" for their good cooperation.

Scientist in charge



Institute of Food Safety, Animal Health and Environment “BIOR” Riga (Latvia)
National Marine Fisheries Research Institute, Gdynia (Poland)

THE CRUISE REPORT

FROM THE JOINT LATVIAN-POLISH BITS 4Q SURVEY ON THE POLISH R.V. “BALTICA”
IN THE CENTRAL-EASTERN BALTIC (03-12 December 2016)

by
Ivo Sics*, Radosław Zaporowski** and Lena Szymanek**

* Institute of Food Safety, Animal Health and Environment “BIOR” Riga (Latvia),

** National Marine Fisheries Research Institute, Gdynia (Poland)



Gdynia - Riga, January 2017

INTRODUCTION

The joint Latvian-Polish BITS survey, conducted in the period of 03-12.12.2016 on the r.v. “Baltica”, was based on the agreement between the Institute of Food Safety, Animal Health and Environment “BIOR” in Riga and the National Marine Fisheries Research Institute (NMFRI) in Gdynia. The joint Latvian-Polish BITS 4Q survey was conducted in the Latvian EEZs (the ICES Sub-divisions 26 and 28). It was part of the Baltic International Trawl Survey (BITS), which was coordinated by the ICES Baltic International Fish Survey Working Group [WGBIFS] (Anon. 2016).

The main aims of reported cruise were:

1. Collecting materials to investigate the distribution, abundance and biological structure of cod stock.
2. Determine distribution and abundance of cod recruits. Estimates of year – class strength of cod.
3. Collecting materials to investigate the distribution abundance and biological structure of Flounder stock.
4. Collect data on cod feeding.
5. Analysis of the hydro-meteorological conditions (seawater temperature, salinity, oxygen content, air temperature, atmospheric pressure, wind velocity and directions) in the ICES Sub-divisions 26N and 28.
6. Acoustical data recording during trawling and on the distance between consecutive catch-stations.
7. A collection of information about marine litter.

MATERIALS AND METHODS

Personnel

The BITS Q4 - 2016 survey scientific staff was composed of nine persons, i.e.:

Radosław Zaporowski, NMFRI, Poland - cruise leader,

Jakub Słembarski, NMFRI, Poland - acoustician,

Anetta Ameryk, NMFRI, Poland - hydrologist,

Władysław Gawęł, NMFRI, Poland - ichthyologist,

Ivo Sics, BIOR, Latvia - scientific staff leader,

Ivars Putnis, BIOR, Latvia - ichthyologist,

Guntars Strods, BIOR, Latvia - ichthyologist,

Laura Briekmane, BIOR, Latvia – ichthyologist,

Janis Gruduls, BIOR, Latvia – ichthyologist.

Narrative

The reported survey research tasks realisation took place during the period of 03-12 December 2016 and overall ten full days was devoted to survey plan accomplishment. The at sea researches were conducted within the Latvian EEZs (the ICES Sub-divisions 26 and 28) moreover, inside the Latvian territorial waters not shallower than 20 m (the ICES Sub-division 28).

The vessel left the Gdynia port (Poland) on 02.12.2016 at 22.00 o'clock and was navigated towards the south-western corner of the Latvian EEZs (Fig. 1). The direct at sea researches begins on 03.12.2016, in the morning and was ended on 11.12.2016. Due to the very bad

weather conditions, 5 working days during the survey were lost. On 12.12.2016 r/v “Baltica” returned back to the homeport.

Survey design and realization

The original surveys plan provided that 25 control-hauls will be realised during the survey in the Latvian EEZ (19 trawls in SD 28, 6 trawls in SD 26). Five additional hauls, in case, if main control-hauls are made were planned in the Lithuanian EEZ (SD 26).

The r.v. “Baltica” realised 14 bottom trawl control-hauls from the 25 planned, incl. the Latvian territorial waters (Fig. 1, Table 1).

All trawl catches were performed in the daylight. The hard bottom ground-rope (rockhopper) trawl, type TV-3#930 (with 10-mm mesh bar length in the codend) was applied for fish catches. The standard trawling duration was planned 30 minutes. The mean speed of vessel while trawling was 3.0 knots. However, in the case of 14 hauls, their duration was shortened to 15 minutes, due to dense clupeids concentrations observed on the echosounder, bad bottom or bad weather.

The length measurements in the 1.0-cm classes were realised for 48 cod and 358 flounder. Length measurements in the 0.5-cm classes were realised for 1379 herring and 1449 sprat. In total, 48 cod and 276 flounder individuals were taken for biological analysis. The details about fish biological sampling are presented in Table 2. Stomachs from the 46 cod were taken for investigation of cod feeding.

Acoustic data, i.e. the echo-integration records (SA = NASCs; Nautical Area Scattering (Strength) Coefficient) were collected with the EK-60 scientific echosounder during fishing operations and on the distances between consecutive hauls. Echo-sounding data collected during the BITS survey were delivered to the Latvian researchers for further analysis.

Directly before every haul, the seawater temperature, salinity and oxygen content were measured continuously from the sea surface to a bottom. The seawater samples were taken also at the standard HELCOM stations. Totally, 19 hydrological stations were inspected with the Irdonaut CTD-probe combined with the rosette sampler (the bathometer rosette). Oxygen content was determined by the standard Winkler’s method. Meteorological observations of wind velocity and directions and the sea state were realised at the actual geographic position of each control-haul.

RESULTS

Fish catches and biological data

The control-catches basic results collected in December 2016 during the Latvian-Polish BITS-4Q survey are presented in Table 1. Overall, 14 fish species were recognised in hauls performed in the central-eastern Baltic. Sprat dominated by mass in the ICES Sub- division 26 with the average share of 91.9% respectively. Herring was the next species most frequently represented in terms of mass, i.e. 6.3%. The share of flounder and cod in control-catches made out in the ICES SD 26 was 1.1 and 0.7 %, respectively. By-catch of other fishes was insignificant.

Herring dominated by mass in the ICES Sub- division 28 with the average share of 68.7% respectively. Sprat was the next species most frequently represented in terms of mass, i.e. 28.3%. Flounder was the third species most frequently represented in terms of mass in the ICES SD 28 (mean share was 2.6%, respectively). The share of cod in control-catches made out in the ICES SD 28 was 0.2 %, respectively. By-catch of other fishes was insignificant.

The mean CPUE for all species in SD 26 amounted 724 kg/0.5h, and in this 665.0, 4.8, 45.9 and 8 kg/0.5h were for sprat, cod, herring and flounder, respectively.

The mean CPUE for all species in SD 28 amounted 255.9 kg/0.5h, and in this 7.0, 177.1, 0.6 and 70.6 kg/0.5h were for flounder, herring, cod and sprat, respectively.

The length distribution of cod, flounder, herring and sprat, according to the ICES Sub-divisions 26 and 28 and particular hauls is illustrated in Figures 2-5 and Tables 3-6.

Cod

All 48 cod caught during the survey were biologically analysed. The total length of cod in scrutinised samples ranged from 4 to 55 (Fig.2; Table 3).

Flounder

For all flounder caught during the survey biological analyse and length measurement was made. The total length of flounder in samples ranged from 18 to 40 cm in the ICES Sub-division 26, and from 10 to 32 cm with dominating length classes of 18-24 cm in the ICES Sub-division 28 (Fig. 3; Table 4).

Herring

The length range of collected herring was 14-24 cm, and specimens from the length classes of 15-18 cm were most frequently represented in samples from the ICES Sub-divisions 26 (Fig. 4; Table 5).

The length range of collected herring was 12-24 cm, and specimens from the length classes of 14-18 cm were most frequently represented in samples from the ICES Sub-divisions 28 (Fig. 4; Table 5).

Sprat

The length range of collected sprat was 6-15 cm. The length frequency apex of 8-9 and 11-13 was characteristically for sprat samples from the ICES Sub-26, respectively and the length frequency apexes of 7-8cm and 10-12 cm were characteristically for sprat samples from the ICES Sub-28, respectively (Fig. 5; Table 6).

Hydrological situation in December 2016

Graphic illustration of the main hydrological parameters are shown on the figures. Hydrological parameters were measured at each trawling (14) and hydrological stations (7) (Fig. 1). Measurements were conducted with the Idronaut CTD-probe combined with the rosette sampler. Oxygen content was determined by the standard Winkler's method. The STD data were aggregated to the 1-m depth strata. The oxygen probes were taken on every 10 meters. The salinity parameter was presented in Practical Salinity Unit (PSU). Meteorological parameters were measured by MicroStep-MIS AMS 111 automatic weather station.

The most frequent winds (Fig. 6) were from directions: WNW-WSW and NNW. The average (10 min) wind speed varied from 0.4 m/s to 17.7 m/s. The air temperature ranged from 0.8 °C to 9.1 °C, and average temperature was 3.7°C.

The seawater temperature in the surface layer varied from 4.25 to 7.55 °C. The lowest values were observed at the trawl 7, while the warmest surface water was at the trawl 2. The average value equalled 6.25 °C.

The average surface salinity was 7.15 PSU. The minimum value was 6.80 PSU (hydrological station 5) and maximum 7.40 PSU (trawl 14).

The highest oxygen content in surface layer was 8.67 ml/l (trawl 8) while the lowest one 7.84 ml/l (hydrological station 46). Mean value of dissolved oxygen equalled 8.13 ml/l.

Near - bottom layer conditions are presented in the (Fig.7,8). Water temperature varied from 4.81 °C (trawl 7) to 7.73 °C (trawl 2). The mean value calculated for the whole area covered during the cruise was 6.43 °C.

The average salinity in the close-to-the-bottom water layers was 9.36 PSU. The highest value was measured at the hydrological station 37 (13.38 PSU). The lowest one was 6.98 PSU (trawl 7).

The dissolved oxygen varied from 0.08 ml/l (hydrological station 37) to 8.54 ml/l (trawl 8).The mean value was 4.41 ml/l.

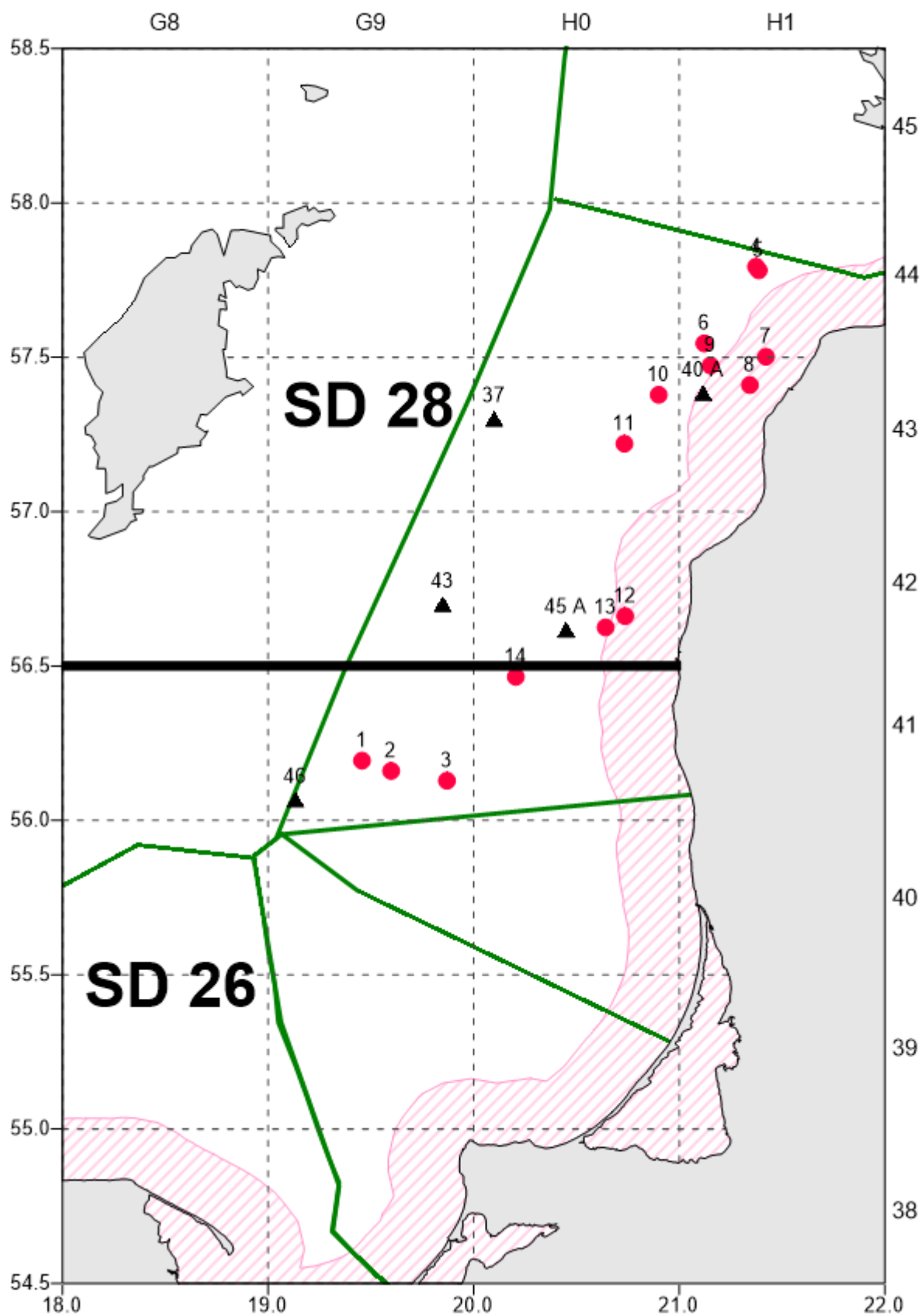


Figure 1. Location of the realized fish control-hauls (marked with red dots) and the HELCOM standard hydrological stations (marked with blue triangles), green lines - national fishing zone borders.

Table 1. Catch results from the Latvian-Polish BITS 4Q survey; r/v "Baltica", 03-12 December 2016

Haul number	Date of catch	EEZ	ICES rectangle	ICES SD	Depth to the bottom [m]	The ship's course during fishing [°]	Geographical position of the catch station				Time of		Haul duration [min.]	Total catch	all species CPUE [kg/0.5h]	CATCH of particular fish species [kg]				
							start		end		shutting net	pulling up net				Sprat	Herring	Cod	Flounder	Others
							latitude 00°00' N	longitude 00°00' E	latitude 00°00' N	longitude 00°00'E										
1	04.12.2016	LAT	41G9	26	102	225	56°11'6'	19°27" 4'	56° 11' 1"	19° 26' 7"	08:15	08:30	15	37.618	75.236	7.015	14.455	5.85	9.795	0.503
2	04.12.2016	LAT	41G9	26	65	205	56°09'6'	19°35" 9'	56° 08' 8"	19° 35' 5"	10:15	10:30	15	1037.085	2074.17	1023.838	12.622	0.625		0
3	04.12.2016	LAT	41G9	26	59	80	56°07"7"	19°52" 2'	56° 07' 8"	19° 53' 3"	12:15	12:30	15	348.485	696.97	281.076	58.184	3.2	6.025	0
4	06.12.2016	LAT	44H1	28	73	175	57°47'6'	21°22" 4'	57° 47' 0"	21° 22' 5"	08:15	08:30	15	228.887	457.774	108.978	118.402	0.891	0.587	0.029
5	06.12.2016	LAT	44H1	28	69	165	57°46'9'	21°23" 2'	57° 46' 2"	21° 23' 4"	09:55	10:10	15	198.468	396.936	74.247	121.733	0.714	1.23	0.544
6	06.12.2016	LAT	44H1	28	67	190	57°32'7"	21°07" 3'	57° 31' 4"	21° 06' 7"	13:30	14:00	30	216.16	216.16	79.953	134.547		1.510	0.15
7	07.12.2016	LAT	44H1	28	26	350	57°30'1'	21°25" 3'	57° 30' 8"	21° 25' 3"	08:15	08:30	15	51.029	102.058	2.61	40.58		7.48	0.359
8	10.12.2016	LAT	43H1	28	33	355	57°24'6'	21°20" 6'	57° 25' 3"	21° 20' 4"	08:20	08:35	15	26.421	52.842	3.1	18.04		4.795	0.486
9	10.12.2016	LAT	43H1	28	69	335	57°28'4'	21°09" 1'	57° 29' 0"	21° 08' 6"	09:50	10:05	15	199.215	398.43	29.919	168.961		0.335	0
10	10.12.2016	LAT	43H0	28	61	200	57°22'7"	20°54" 0'	57° 22' 1"	20° 53' 5"	11:45	12:00	15	230.867	461.734	31.134	197.826	1.278	0.505	0.124
11	10.12.2016	LAT	43H0	28	59	185	57°13'2'	20°44" 0'	57° 12' 6"	20° 43' 9"	14:10	14:25	15	46.52	93.04	39.948	6.572			0
12	11.12.2016	LAT	42H0	28	43	35	56°39'7"	20°44" 2'	56° 40' 4"	20° 44' 8"	08:20	08:35	15	99.811	199.622	14.855	71.145		13.15	0.661
13	11.12.2016	LAT	42H0	28	50	40	56°37'5'	20°38" 5'	56° 38' 2"	20° 39' 2"	09:55	10:10	15	90.034	180.068	8.094	74.786	0.25	6.285	0.619
14	11.12.2016	LAT	41H0	26	80	25	56°27'9"	20°12" 3'	56° 28' 8"	20° 12' 6"	13:30	13:45	15	24.752	49.504	18.02	6.58		0.135	0.017

Table 2. Numbers of fish biologically analysed during the BITS-4q survey; r.v. "Baltica" (03-12 December 2016).

Species	ICES SD	Number of samples	Number of fish	
			measured	analyzed
Cod	26	3		34
	28	4		14
	Total	7		48
Flounder	26	3		64
	28	9	82	212
	Total	12	82	276
Turbot	26			
	28	1	1	
	Total	1	1	
Plaice	26	1	3	
	28			
	Total	1	3	
Herring	26	4	342	
	28	10	1037	
	Total	14	1379	
Sprat	26	4	419	
	28	10	1030	
	Total	14	1449	
All other Species	26	2	6	
	28	8	84	
	Total	10	90	
Total	26	17	770	98
	28	42	2234	226
	Total	59	3004	324
Species	ICES SD	Number of samples	Number of stomachs collected	
Cod stomach samples	26	3	32	
	28	4	14	
	Total	7	46	

Fig. 2. Length frequency of cod from Sub-Divisions 26 and 28 in the control catches during the r/v "Baltica" BITS survey, 03-12 December 2016

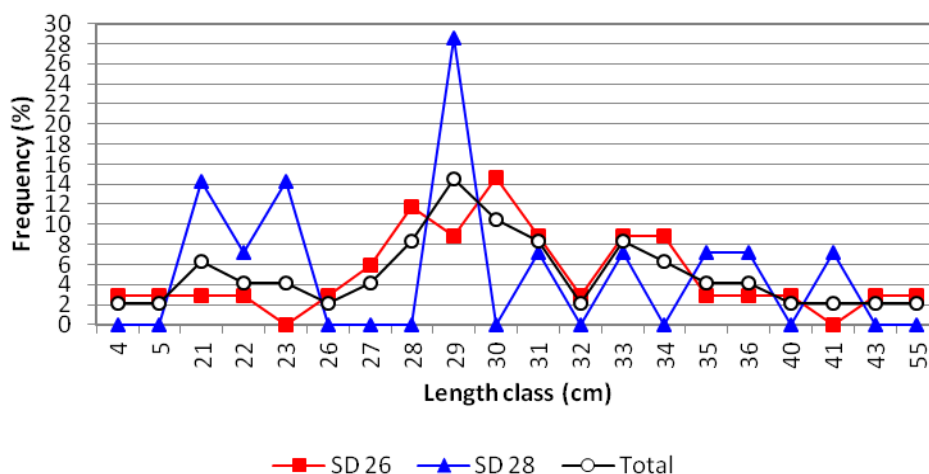


Fig. 3. Length frequency of flounder from Sub-Divisions 26 and 28 in the control catches during the r/v "Baltica" BITS survey, 03-12 December 2016

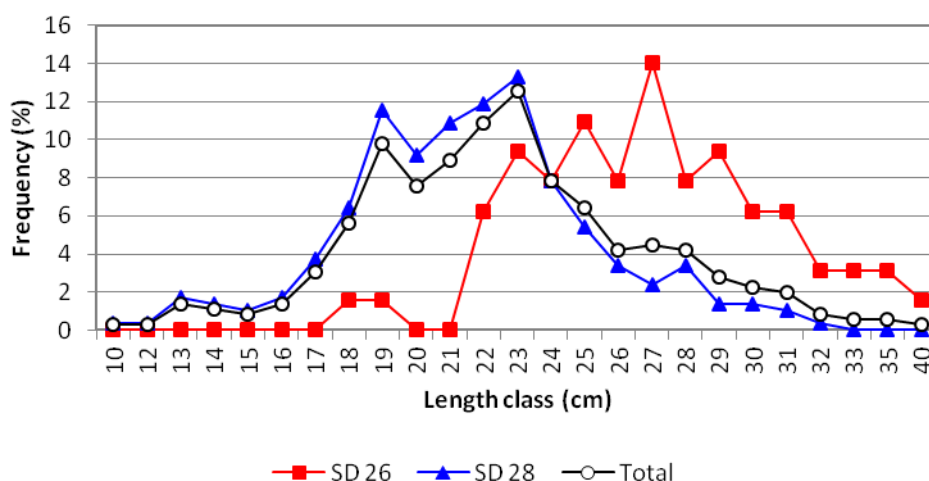
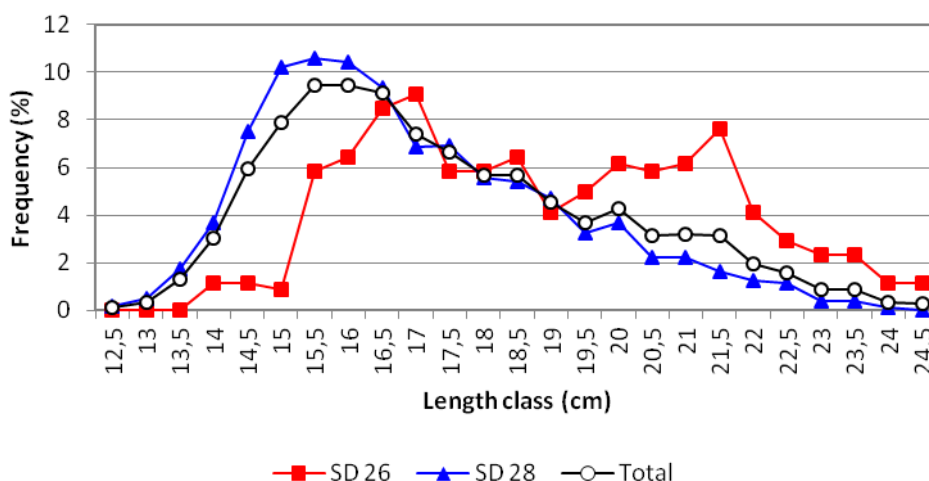


Fig. 4. Length frequency of herring from Sub-Divisions 26 and 28 in the control catches during the r/v "Baltica" BITS survey, 03-12 December 2016



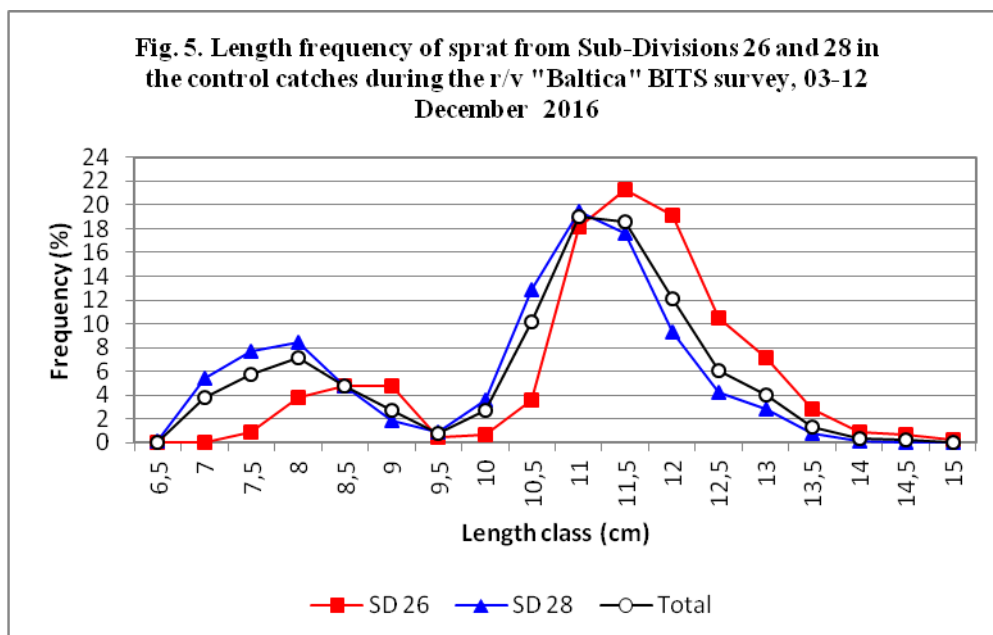


Table 3. Cod length measurements by consecutive hauls in the r/v “Baltica” Latvian - Polish BITS survey (03- 12 December 2016); specimens grouped by 5-cm length classes.

Haul no	SD	cm_groups								Sum
		0-4	5-9	20-24	25-29	30-34	35-39	40-44	55-59	
1	26	1	1	1	7	9	2	2		23
2	26					2				2
3	26			1	3	4			1	9
4	28						1	1		2
5	28				2	1				3
10	28			5	2		1			8
13	28					1				1
SD 26		1	1	2	10	15	2	2	1	34
SD 28				5	4	2	2	1		14
Total		1	1	7	14	17	4	3	1	48

Table 4. Flounder length measurements by consecutive hauls in the r/v “Baltica” Latvian - Polish BITS survey (03- 12 December 2016); specimens grouped by 2-cm length classes.

GRAB SURVEY (05-12-2006 to 10-12-2010), Specimens grouped by 2 cm length classes.																
Haul no	SD	cm_group														Sum
		10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	32-33	34-35	38-40	
1	26							3	8	7	8	2	4	2	1	35
3	26							7	4	7	3	6				27
4	28							1	1		1					3
5	28							3	2	1		1				7
6	28				1	3	2	5	2							13
7	28		6	5	7	18	20	17	9							82
8	28	1		1	2	8	9	10	3	4	2					40
9	28							1	1							2
10	28						1	2	1							4
12	28			1	5	16	19	22	16	7	7	4	1			98
13	28				1	8	8	13	4	5	4	2				45
14	26					2										2
SD 26		0	0	0	0	2	0	10	12	14	11	8	4	2	1	64
SD 28		1	6	7	16	53	59	74	39	17	14	7	1	0	0	294
Total		1	6	7	16	55	59	84	51	31	25	15	5	2	1	358

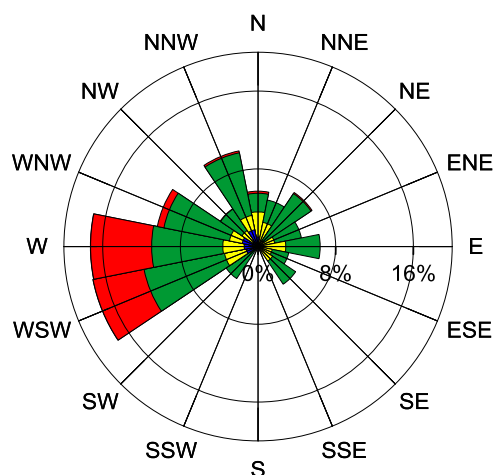
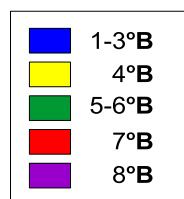
Table 5. Herring length measurements by consecutive hauls in the r/v “Baltica” Latvian-Polish BITS survey (03- 12 December 2016); specimens grouped by 1cm length classes.

Haul no	SD	cm_group													Sum
		12	13	14	15	16	17	18	19	20	21	22	23	24	
1	26				2	12	12	11	8	15	16	11	7	7	101
2	26				1	4	4	1				1			11
3	26			7	11	19	22	14	14	11	16	8	6	1	129
4	28	1	3	21	31	22	10	11	2	2	1	1			105
5	28		5	17	27	24	14	9	2	2	1		1		102
6	28		2	12	24	25	10	10	11	4	4				102
7	28		1	15	20	24	15	12	7	1	5	2	0		102
8	28		1	6	14	27	14	11	13	9	2	0	3		100
9	28		2	6	26	29	17	8	8	3	2	1	0		102
10	28	1	3	18	24	19	16	4	7	3	4	3	0		102
11	28		6	18	36	12	15	8	2	5	5	0	0		107
12	28			2	8	8	22	22	16	13	7	9	4	1	112
13	28			1	6	15	10	19	15	19	9	9			103
14	26			1	9	16	13	16	9	15	15	4	3		101
SD 26				8	23	51	51	42	31	41	47	24	16	8	342
SD 28		2	23	116	216	205	143	114	83	61	40	25	8	1	1037
Total		2	23	124	239	256	194	156	114	102	87	49	24	9	1379

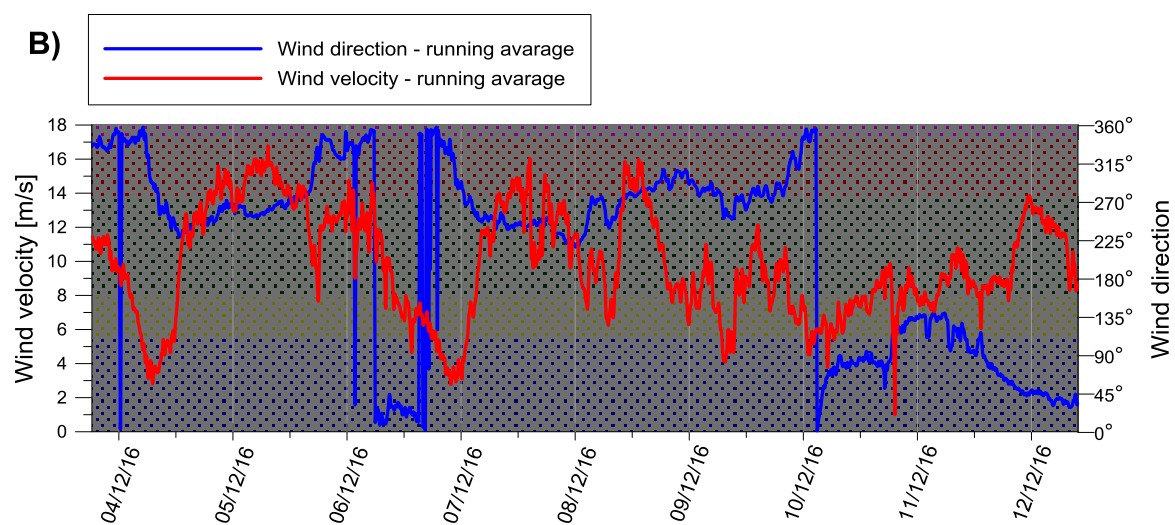
Table 6. Sprat length measurements by consecutive hauls in the r/v “Baltica” Latvian-Polish BITS survey (03- 12 December 2016); specimens grouped by 0.5 cm length classes.

Haul no	SD	cm_group																		Sum
		6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	
1	26					1					10	14	29	19	15	8	4	3	1	104
2	26							1		1	29	31	26	7	8	1				104
3	26			4	13	15	16		1	9	21	18	5	5	1					108
4	28							2	5	12	38	25	12	5	3	1				103
5	28					1		1	1	15	28	28	14	6	7					101
6	28		2	5	11	10	6	1	16	24	18	7	2	2						104
7	28	1	35	37	13			1	1	1	2	3	3	2	2					101
8	28		10	13	13	2	1	1	1	13	13	24	6	2	1					100
9	28			2	3	3	2		5	14	26	22	13	6	5	3				104
10	28		8	16	17	7	1	2	3	9	4	11	12	6	1	1	2			100
11	28		1	4	18	7	1		1	16	29	15	9	6	4					111
12	28			2	9	17	7	1	3	19	15	17	7	4	3	1				105
13	28				3	2	1		1	10	27	29	18	5	3	2				101
14	26				3	4	4	1	2	5	16	26	20	13	6	3				103
SD 26		4 16 20 20 2 3 15 76 89 80 44 30 12 4 3 1																		419
SD 28		1	56	79	87	49	19	9	37	133	200	181	96	44	29	8	2			1030
Total		1	56	83	103	69	39	11	40	148	276	270	176	88	59	20	6	3	1	1449

A)



B)



C)

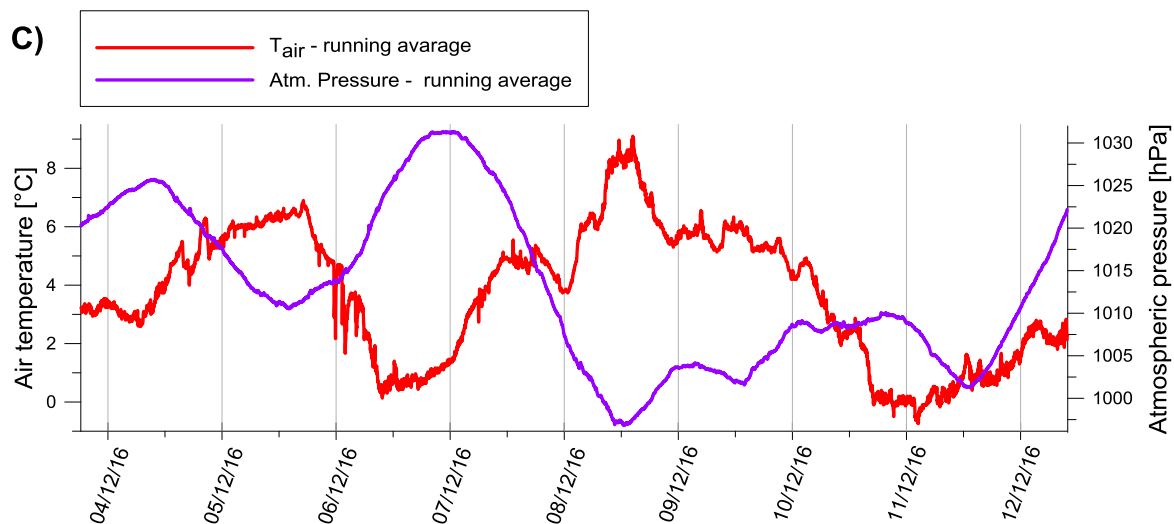


Figure 6. Changes of the main meteorological parameters (December 2016).

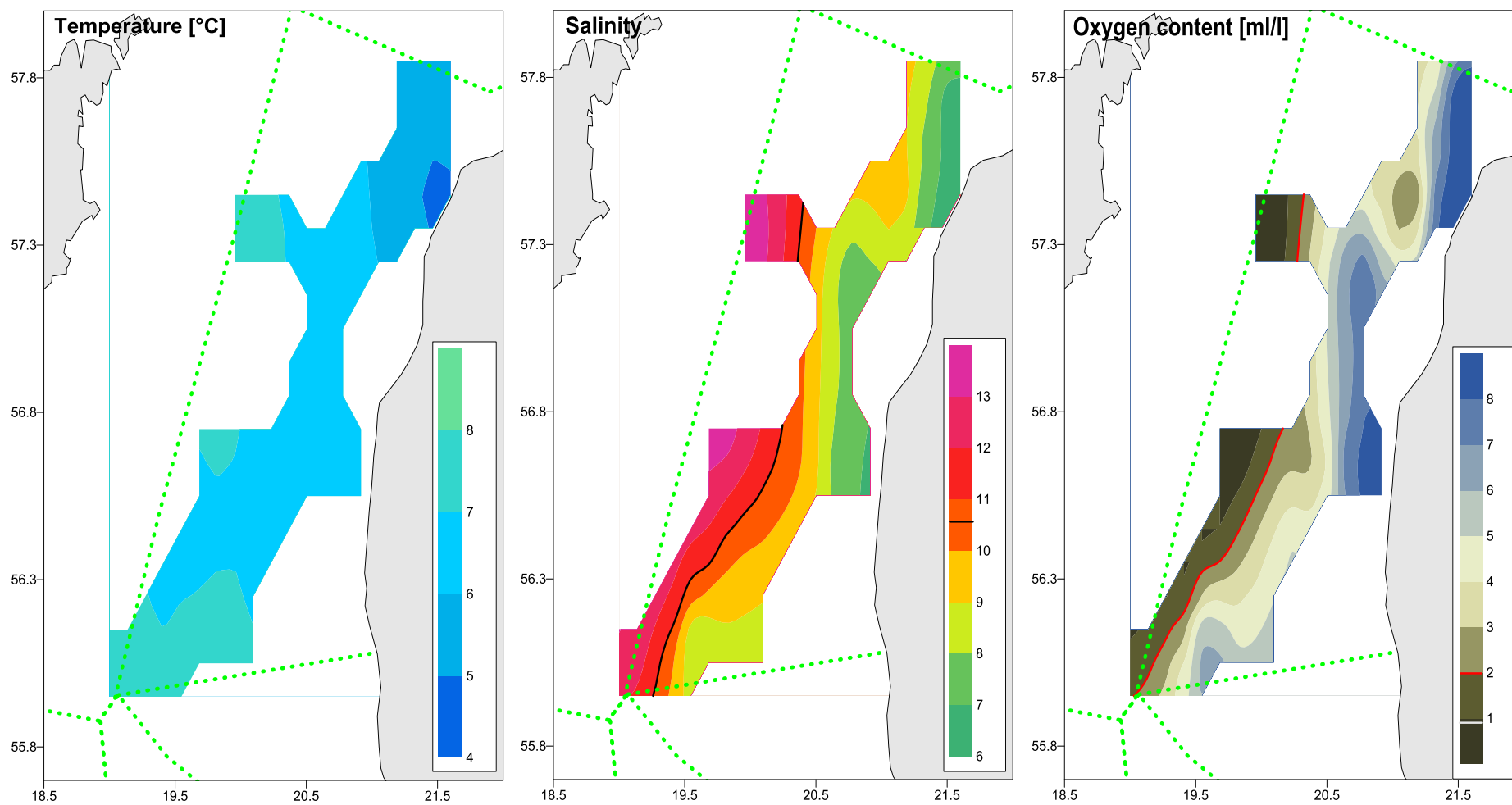


Figure 7. Distribution of the seawater temperature, salinity and oxygen content in the near bottom waters (December 2016).

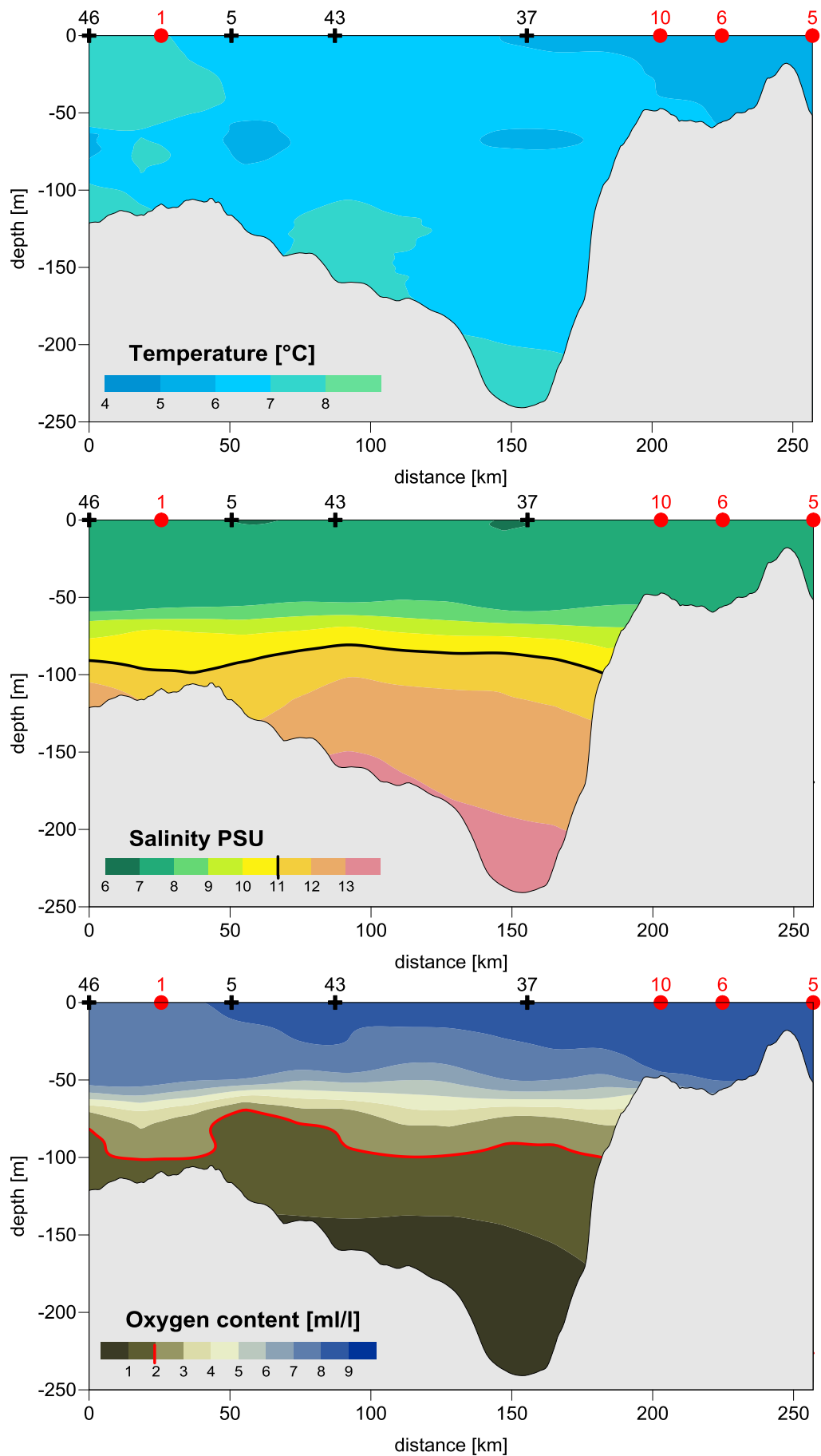


Figure 8. Vertical distribution of the seawater temperature, salinity and oxygen content along the hydrological profile (December 2016).

Russian Demersal Trawl Survey Report for RV “ATLANTNIRO” 11-18.10.2016

by A. Karpushevskaya, A. Zezera, I. Karpushevskiy

Atlantic Scientific Research Institute of Marine Fisheries and Oceanography (AtlantNIRO),
Kaliningrad, Russia

1 INTRODUCTION

The main objective is to assess recruits resources of cod in the Baltic Sea. The demersal trawl survey is conducted two times annually - in the autumn and in the spring to supply the ICES with the data on amount young cod and cod of advanced ages. The present survey data will provide to the ICES Baltic Fisheries Assessment Working Group (WGBFAS). These data are necessary for an estimation of the stock size of cod in East part of the Baltic Sea (ICES subdivisions 25-32).

2 METHODS

2.1 Personnel

A. Zezera	AtlantNIRO, Kaliningrad, Russia - cruise leader
A. Karpushevskaya	AtlantNIRO, Kaliningrad, Russia - scientific leader
A. Malishko	AtlantNIRO, Kaliningrad, Russia – acoustic
M. Sokolov	AtlantNIRO, Kaliningrad, Russia – acoustic
S. Alekseev	AtlantNIRO, Kaliningrad, Russia - hydrologist
S. Ivanov	AtlantNIRO, Kaliningrad, Russia - engineer
N. Kalinina	AtlantNIRO, Kaliningrad, Russia - engineer
I. Trufanova	AtlantNIRO, Kaliningrad, Russia - engineer
N. Dyushkov	AtlantNIRO, Kaliningrad, Russia - engineer

2.2 Narrative

The RV‘ATLANTNIRO’ cruise number 65 was started from port Kaliningrad 30 September and continued to 19 October of 2016. The demersal trawl survey was carried out from 11 till 18 October, 2016. The demersal trawl survey was intended to cover the waters of Russian zone.

2.3 Survey design

The international bottom trawl survey was carried out in from of a stratified random survey. The depth of demersal trawls is in the range between 27 and 106 m. The number of trawl stations to the depth strata according to recommendations ICES (ICES CM 2002/G:05 Ref. H) and according to solution ICES WGBIFS (ICES CM 2008/LRC:08 Ref. Acom). The survey zone to cover the water area of Russian zone. (fig. 1).

2.4 Biological data – fishing stations

Trawling was done with the standard ground trawl –TV3#930 in a bottom. The mesh size in the codend was 6.5 mm. The trawling depth and the net opening were controlled by a netsonde. Normally a net opening was achieved of about 5 m. The trawling time lasted 30 minutes, the trawling time duration for one fishing station was reduced to 20 minutes. From each haul sub-samples were taken to determine of length and weight of fish. Samples of cod, flounder, herring and sprat were investigated onboard a vessel (i.e. sex, maturity, age). After each trawl haul it was intended to investigate the hydrographic condition by a CTD-probe.

3 RESULTS

3.1 Biological data

It was in total made 15 control ground trawls in the Russian water area. Catches of a fish were from 3.0 kg up to 520.7 kg for 30 minutes of a trawl (cod – 60.4%, flounder – 9.2%, herring – 27.5%, sprat - 2.4%). The average catch for a trawl has made 197.4 kg. The results of the catch composition are presented in Table 1.

Cod catches were insignificant and varied from 1.1 up 334.3 kg (abundance from 2 up to 496) for 30 minutes of a trawl. Flounder catches varied from 0.19 up to 131.2 kg. 1026 cod, 512 flounder, herring and sprat were investigated in lab onboard a vessel. Age samples of cod 565 and age samples of flounder 511 have been researched in the institute.

Landings of cod (kg) and landings of young cod in length up to 30 cm (in numbers) for 30 minutes of a haul in October 2016 are presented in Figures 2 – 3. Landings of flounder (kg) for 30 minutes of a haul in October 2016 are presented in Figure 4.

The length distributions of cod and flounder are presented in Fig. 5-6.

3.2 Hydrographic data

In the period from 02 till 18 October 2016 on the water area of Russian economic region oceanographic survey has been made (40 hydrological stations). The water temperature, salinity and the oxygen concentrations were determined by a sonde SBE-19Plus (Sea Bird Electronic, Ltd., USA).

The water temperature on the surface had been changing from 7.5°C up to 16.5°C. Seasonal thermocline was found at the depth of 35 m.

Salinity of water on the surface had been changing within the narrow range of 6.96‰-7.45‰. High limit of a halocline was found at the depth of 65-75 m. The maximum values of salinity have been fixed in a benthic stratum in the central part of Gdansk Deep (13.4-13.5‰).

The oxygen concentration was high 6.2-6.8 ml/l on the surface, saturation of water 95-98%. In the bottom layer to the main part of the area with depths of more than 80-85 m was observed under hypoxic conditions, and oxygen was absent in the center of the Gdansk Deep. At the end of the second decade of October the inflow of the North Sea waters genesis was noted, that characterized by increased bottom temperature to 8.2°C, significant increase in salinity to 14.5‰ and the improvement of the oxygen regime.

The locations of stations, temperature, salinity distribution and the oxygen concentration at the bottom, vertical distribution are shown on fig. 7-12.

4 DISCUSSION

Structure of catches of demersal trawl survey is shown on table 1.

The total length of the main fish species ranged as follows:

- cod – 15 –70 cm (average length of 36.5 cm, average weight 433 g)
- flounder – 15-41 cm (average length of 26.5 cm, average weight 208 g)
- herring – 11.0 – 29.0 cm (average length of 20.6 cm, average weight 51.1 g)
- sprat – 6.5 – 14.5 cm (average length of 10.7 cm, average weight 8.25 g)

5 REFERENCES

Report of the Baltic International Fish Survey Working Group. ICES CM 2014/SSGESST:13 Ref. SCICOM & ACOM Manual for the Baltic International Trawl Surveys (BITS).

Figure 1: Trawl positions for RV "ATLANTNIRO" in 11-18 October 2016

Figure 2: Landings of cod (kg) for 30 minutes of a haul in 11-18 October 2016

Figure 3: Landings of young cod in length up to 30 cm (in numbers) for 30 minutes of a haul in 11-18 October 2016

Figure 4: Landings of flounder (kg) for 30 minutes of a haul in 11-18 October 2016

Figure 5: Length distribution of cod in Russian water area (ICES subdivision 26) in 11-18 October 2016 (materials of international demersal trawl survey)

Figure 6: Length distribution of flounder in Russian water area in 11-18 October 2016 (materials of international demersal trawl survey)

Figure 7: Location of hydrographic stations in 02-18 October 2016, RV "ATLANTNIRO"

Figure 8: Bottom water temperature distribution (°C) in 02-13 October 2016, RV "ATLANTNIRO"

Figure 9: Bottom water salinity distribution (‰) in 02-13 October 2016, RV "ATLANTNIRO"

Figure 10: Bottom water oxygen concentration (ml/l) in 02-13 October 2016, RV "ATLANTNIRO"

Figure 11: The vertical distribution of the seawater temperature (°C) and salinity (‰) in October 2016 on the research profile through Gdansk Deep and south part of Gotland Deep, RV "ATLANTNIRO"

Figure 12: The vertical distribution of the oxygen concentration (ml/l) and oxygen saturation (%) in October 2016 on the research profile through Gdansk Deep and south part of Gotland Deep, RV "ATLANTNIRO"

Table 1: Catch composition on the International demersal trawl survey in 11-18 October 2016

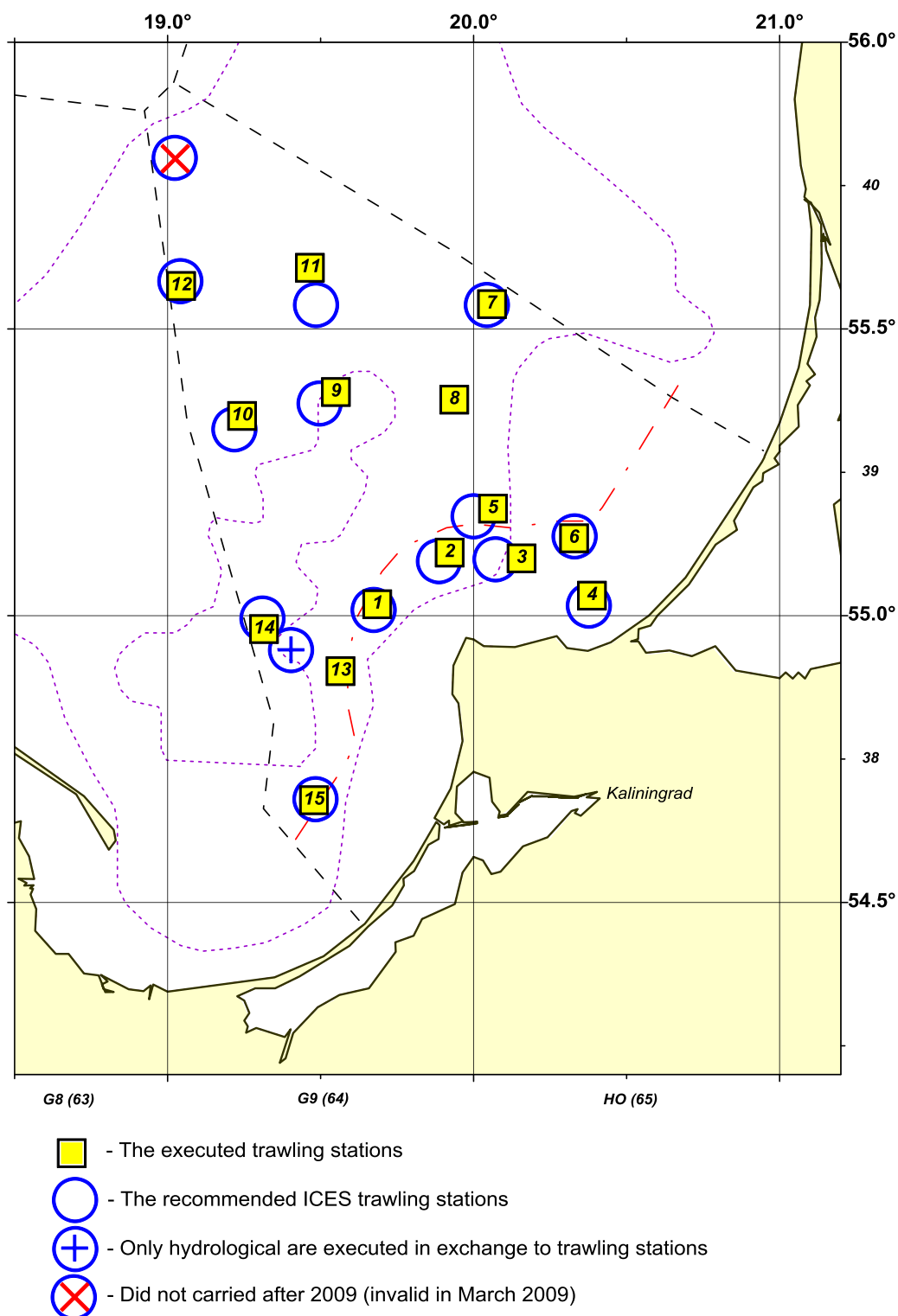


Fig. 1. Trawl positions for RV "ATLANTNIRO" in 11-18 October 2016

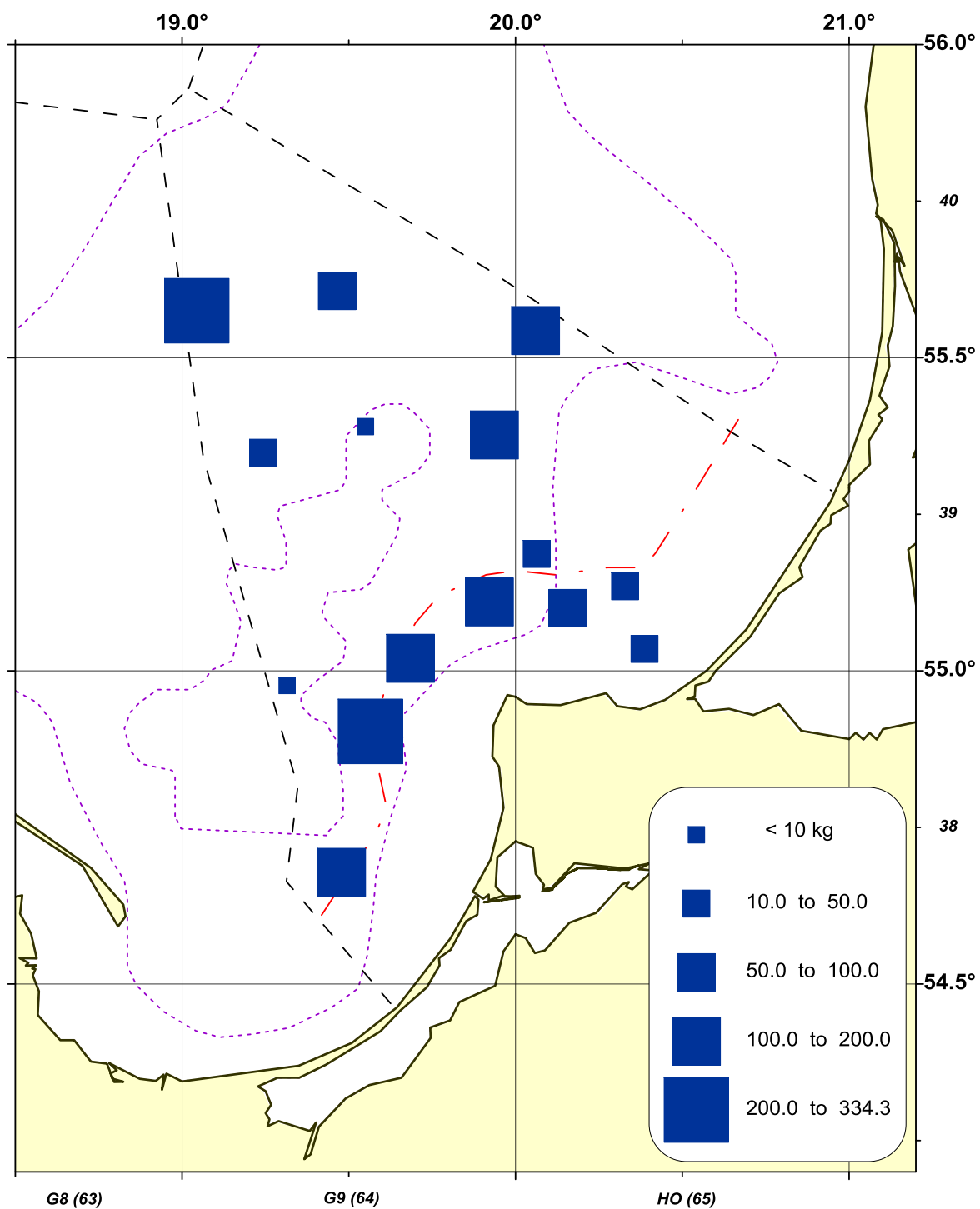


Fig. 2. Landings of cod (kg) for 30 minutes of a haul in 11-18 October 2016

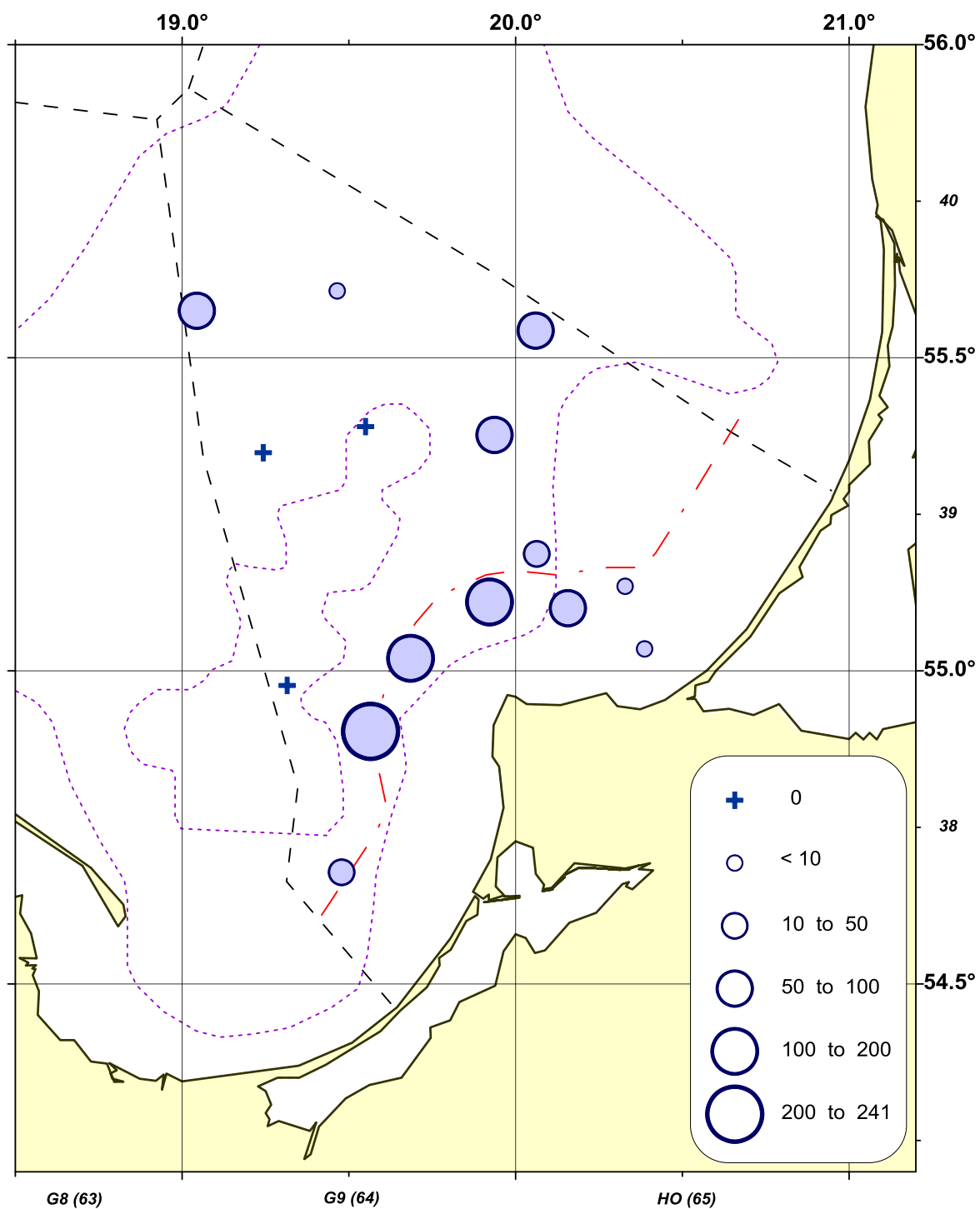


Fig. 3. Landings of young cod in length up to 30 cm (in numbers) for 30 minutes of a haul in 11-18 October 2016

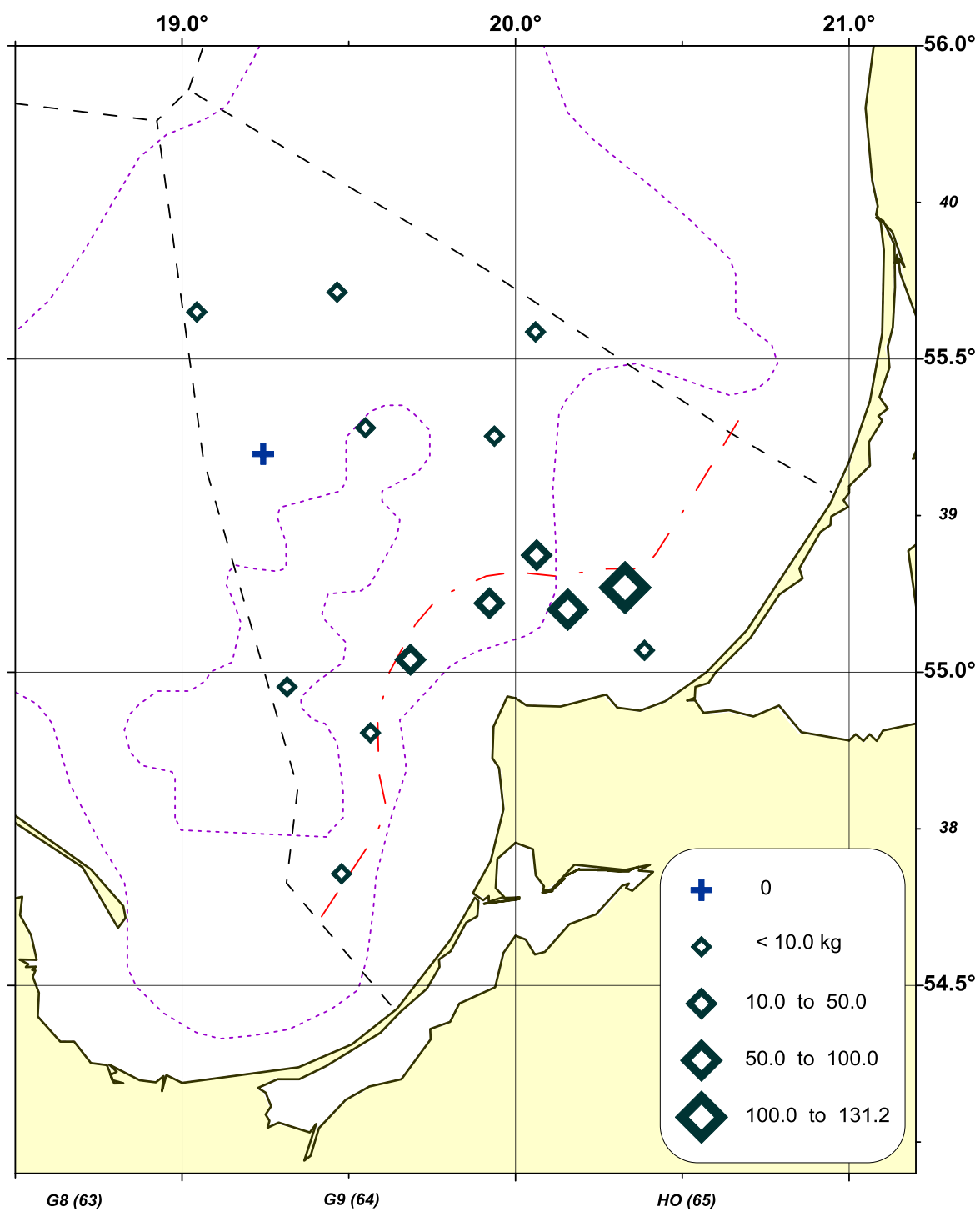


Fig. 4. Landings of flounder (kg) for 30 minutes of a haul in 11-18 October 2016

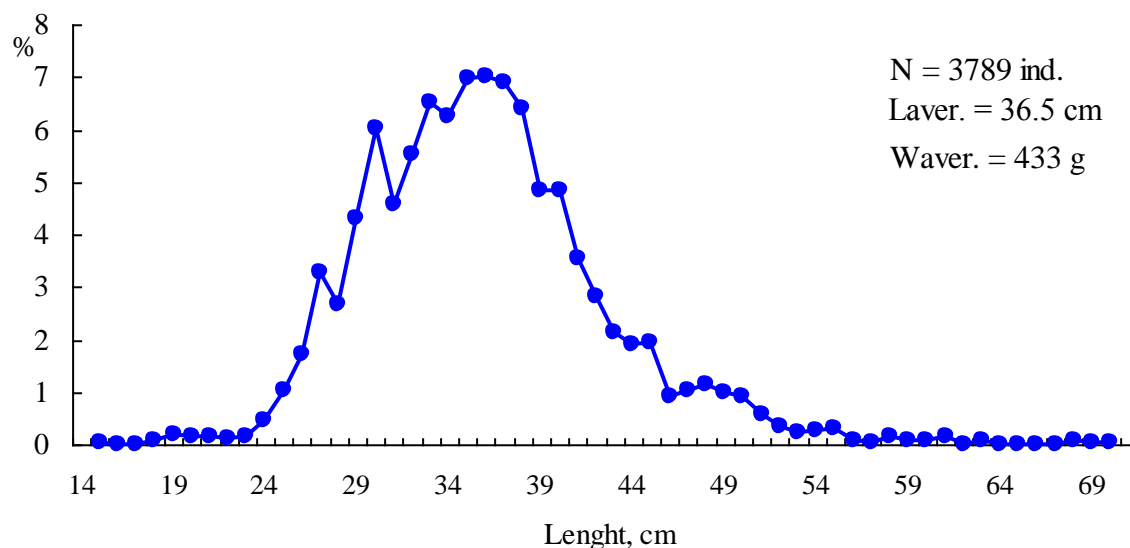


Fig. 5. Length distribution of *cod* in Russian water area (Sub-division 26) in 11-18 October 2016 (materials of international bottom trawl survey)

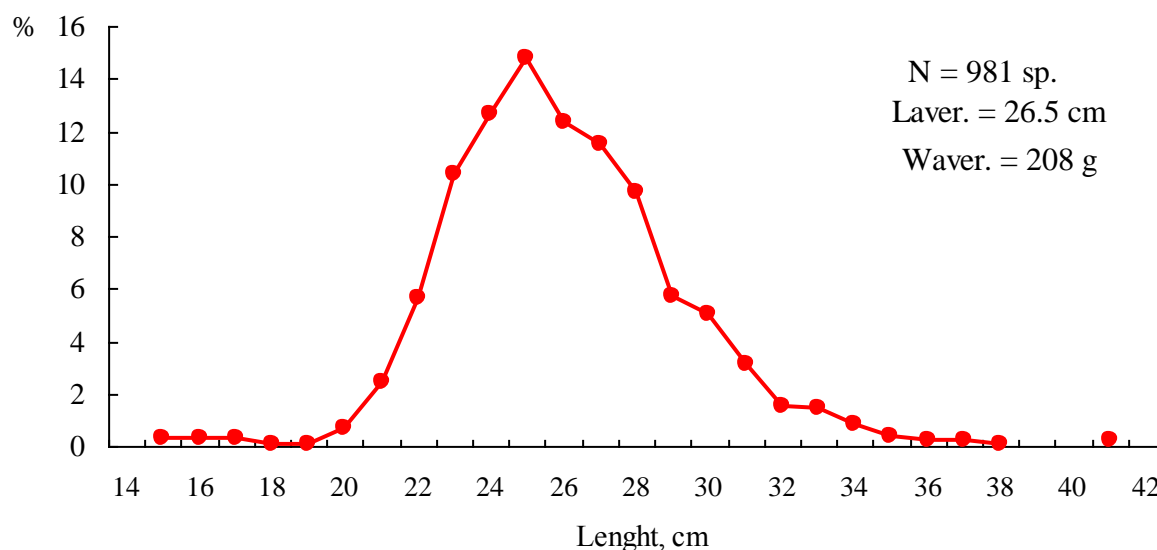


Fig. 6. Length distribution of *flounder* in Russian water area (Sub-division 26) in 11-18 October 2016 (materials of international bottom trawl survey)

Table 1

Catch composition on the International demersal trawl survey in 11-18 October 2016

ICES subdivision: 26

Vessel: STM - "Atlantniro"

Net type: bottom trawl - TV-3#930

Month/Year: October/2016. Haul duration: 30 minute

Mesh bar size: 6.5 mm

Total of hauls	rectangle	depth meter	haul duration	total catch, kg	cod		flounder		herring		sprat	
					kg	%	kg	%	kg	%	kg	%
15	4064, 4065, 3864, 3964, 3965	27-106	30	2890.4	1735.4	60.0	273.1	9.4	797.8	27.6	71.0	2.5

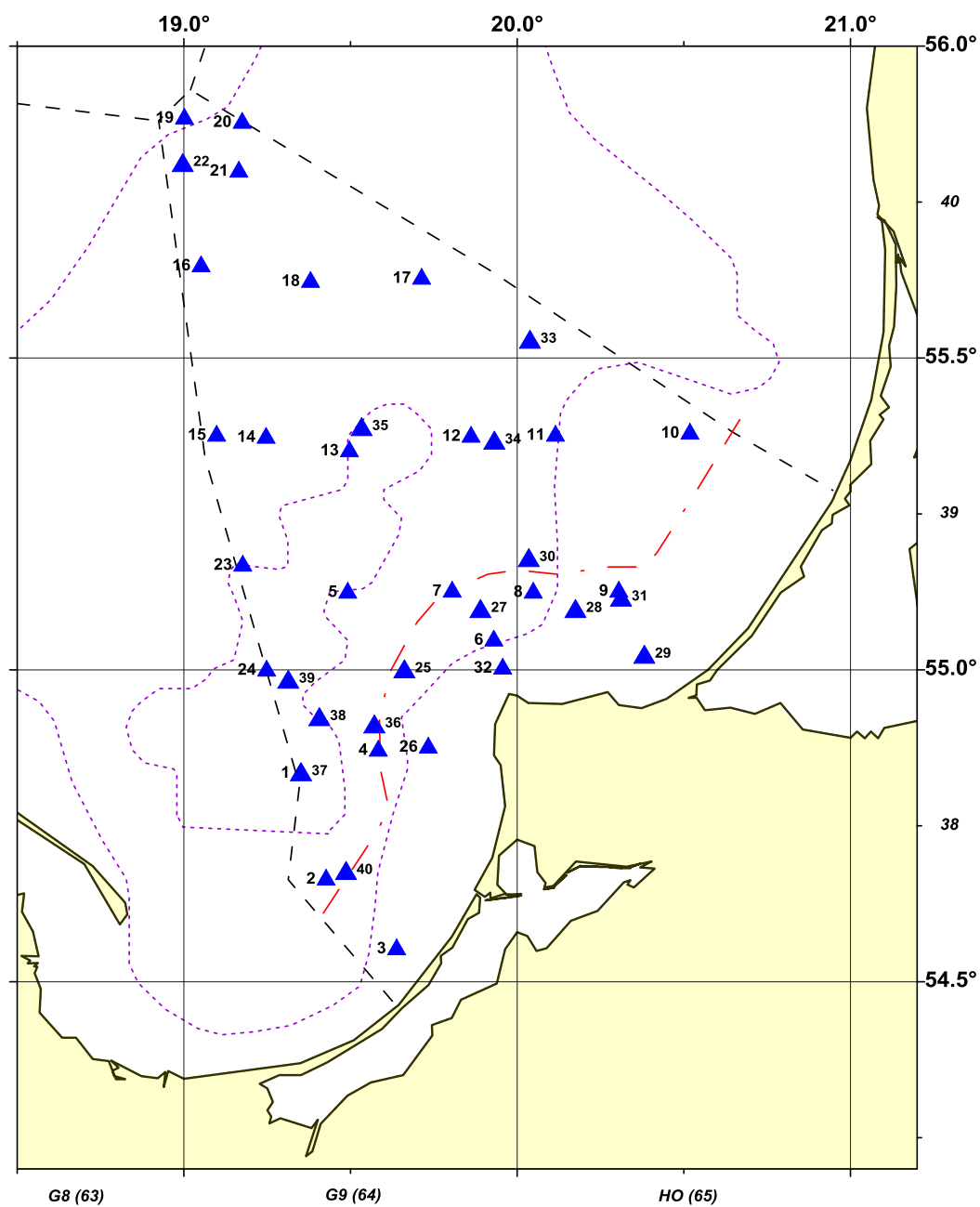


Fig. 7. Location of hydrographic stations in 02-18 October 2016, RV “ATLANTNIRO”

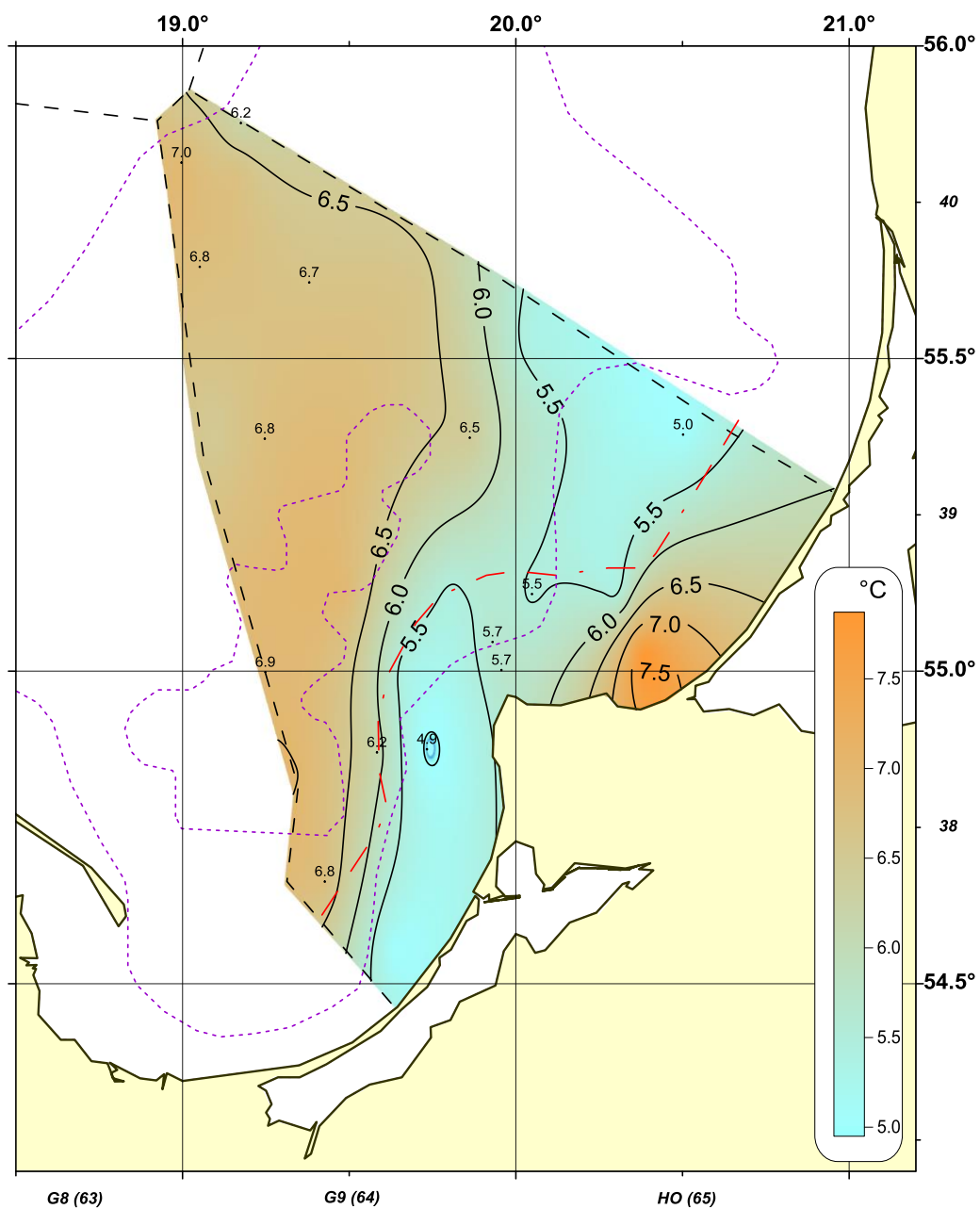


Fig. 8. Bottom water temperature distribution (°C) in 02-13 October 2016, RV "ATLANTNIRO"

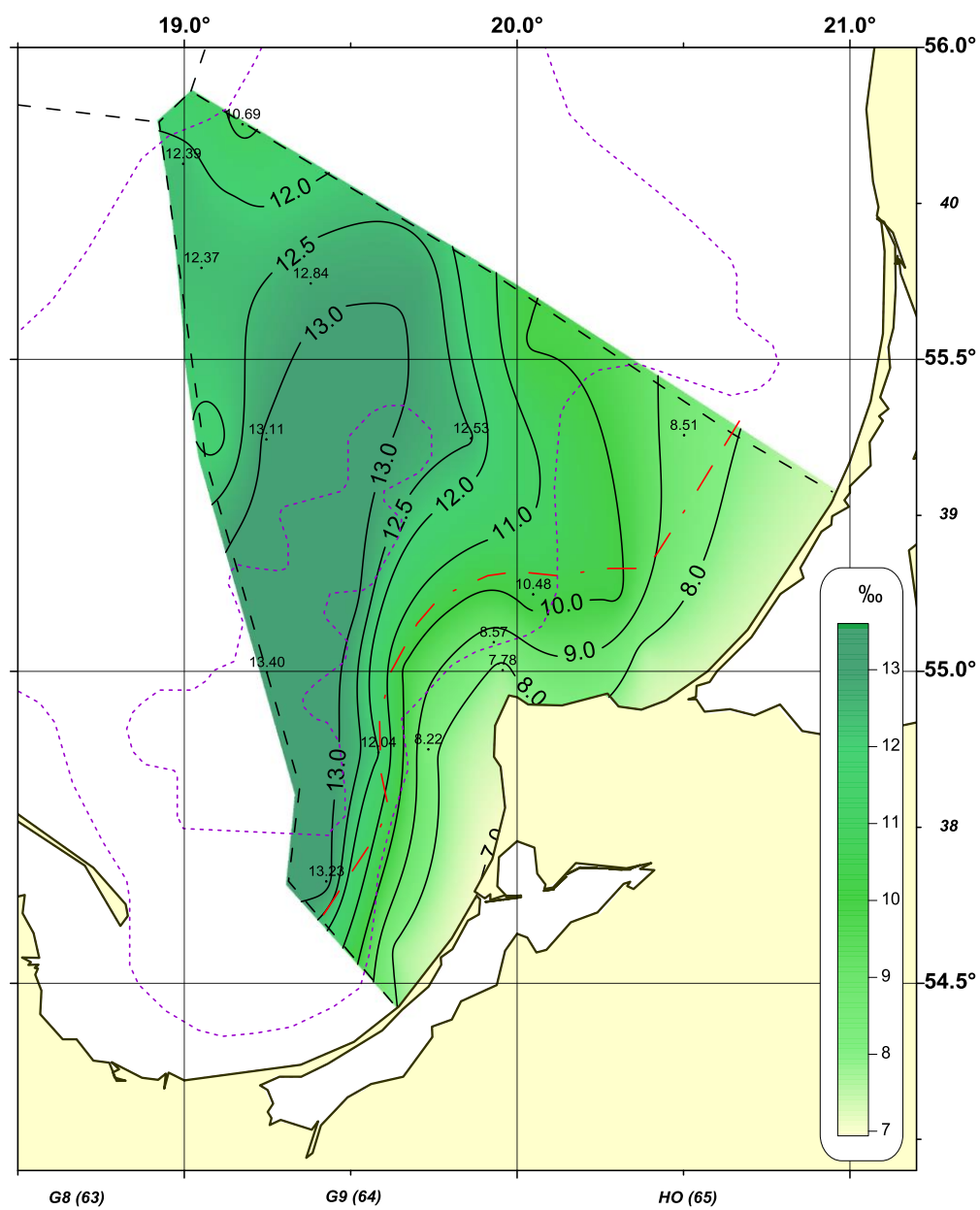


Fig. 9. Bottom water salinity distribution (‰) in 02-13 October 2016, RV "ATLANTNIRO"

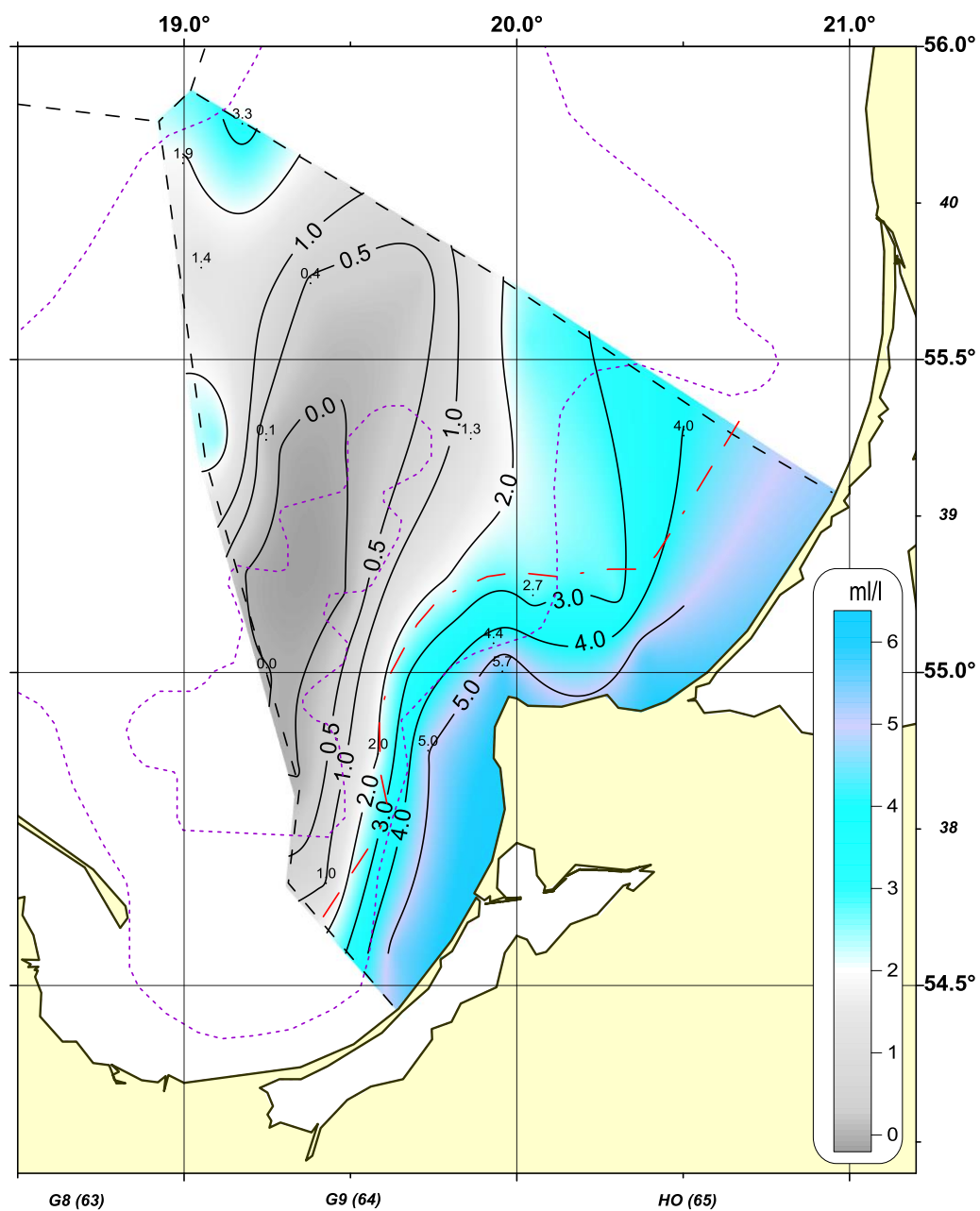


Fig. 10. Bottom water oxygen concentration (ml/l) in 02-13 October 2016, RV "ATLANTNIRO"

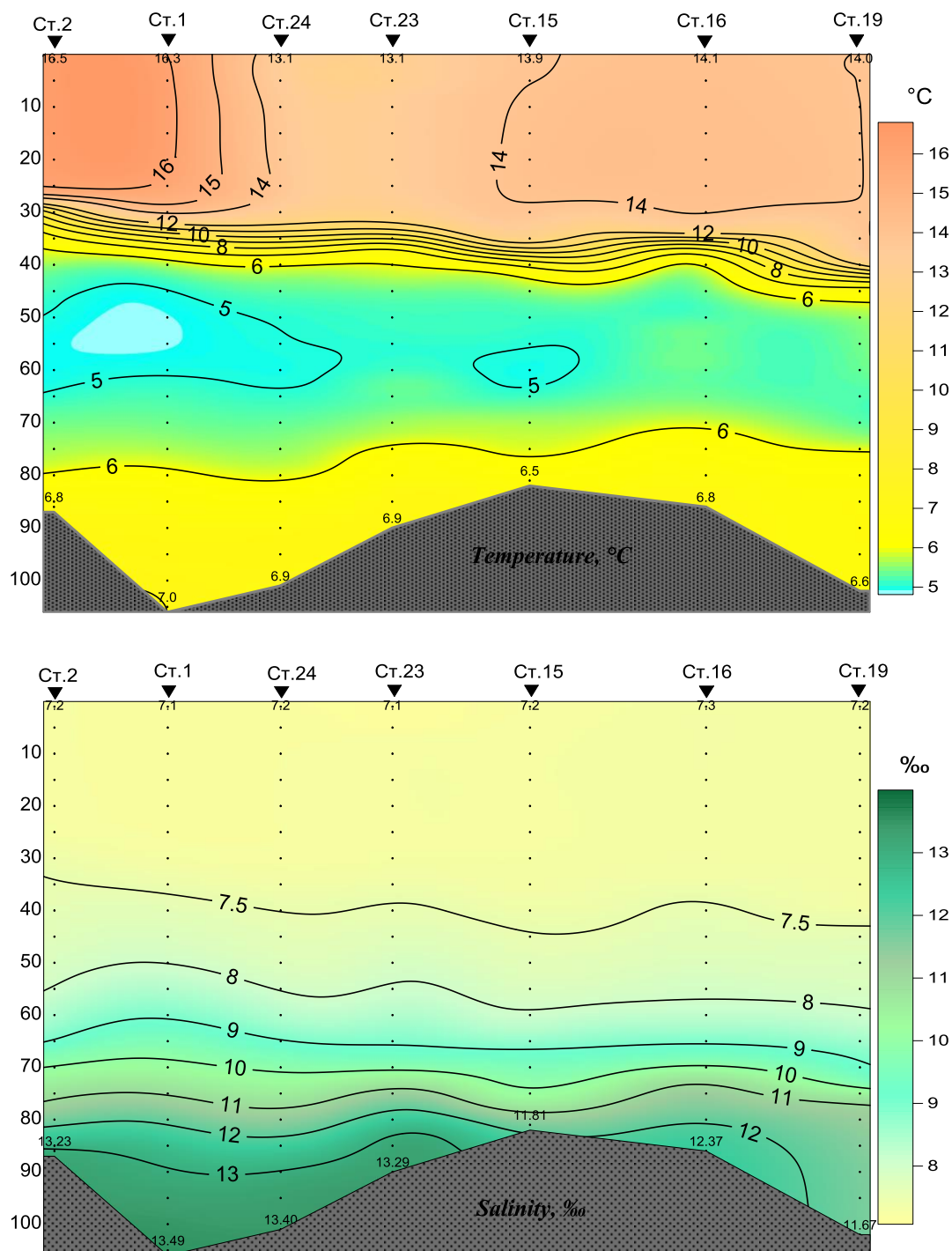


Fig. 11. The vertical distribution of the seawater temperature (°C) and salinity (‰) in October 2016 on the research profile through Gdansk Deep and south part of Gotland Deep, RV "ATLANTNIRO"

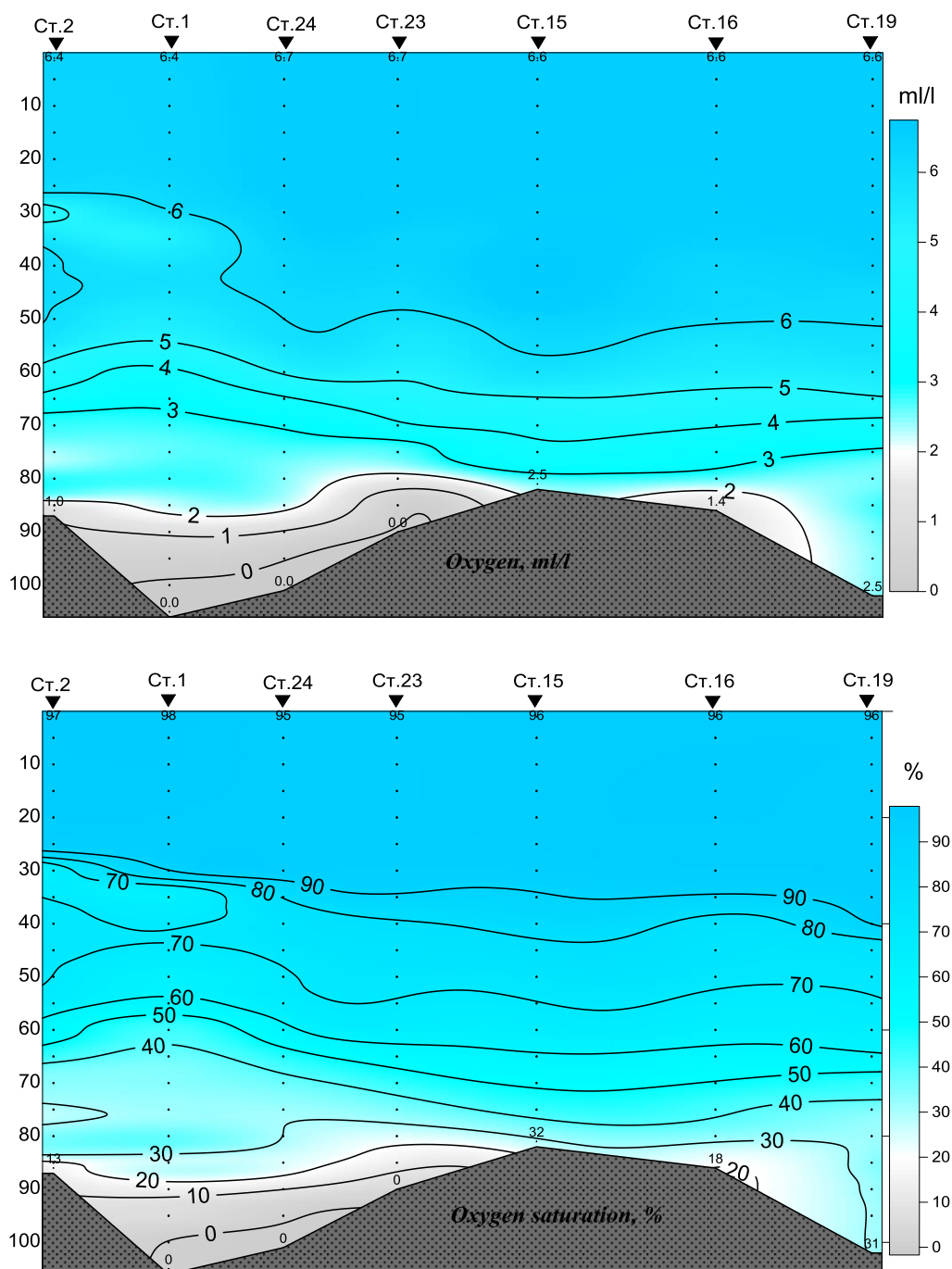


Fig. 12. The vertical distribution of the oxygen concentration (ml/l) and oxygen saturation (%) in October 2016 on the research profile through Gdansk Deep and south part of Gotland Deep, RV “ATLANTNIRO”