Institut für Seefischerei (TI-SF)

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Cruise Report
FRV „Solea" cruise 851
30.6. – 20.07.2025

The 2025 ICES Coordinated Acoustic Survey in the Skagerrak and Kattegat, the North Sea, West of Scotland and the Malin Shelf area (HERAS)

Cruise Leader: Dr. Matthias Schaber

Summary

The survey was part of an international hydroacoustic survey providing information on stock parameters of small pelagic fishes (Acoustic Survey in the Skagerrak and Kattegat, the North Sea, West of Scotland and the Malin Shelf area, HERAS), coordinated by the ICES Working Group on International Pelagic Surveys (WGIPS). Denmark, Ireland, the Netherlands, Norway and Scotland also participated in the survey. In general, this survey provides the most important fisheries independent contribution to the assessment of herring stocks in the North Sea, Western Baltic Sea, Skagerrak/Kattegat as well as areas west of Scotland and the Irish Sea. The total survey area largely covers ICES Divisions 27.3.a, 27.4.a, 27.4.b and 27.6.a.

The survey design has been standardized across participants and the survey area is partitioned into 23 strata out of which five strata (some in part) comprising the southern North Sea have been allocated to Germany. Main focus was set on herring (*Clupea harengus*) and sprat (*Sprattus sprattus*), whereas distribution patterns and abundance of anchovy (*Engraulis encrasicolus*) as well as sardine (*Sardina pilchardus*) were another objective of the survey.

Altogether, 1414 nautical miles of hydroacoustic transects were covered (planned 1429 nmi). Several phases of inclement weather required interruption of survey work for altogether ca. three days.

The distribution of backscatter values allocated to clupeid fishes largely followed the observations made in previous years. Even though the highest concentrations of clupeid schools were again registered in stratum 51, the usually high concentration of schools in the southwestern part of that stratum seemed less dense in 2025, as were the registrations recorded in the northern parts bordering stratum 131. Similarly, the backscatter values from the southeastern, inner German Bight in stratum 61 were lower than the otherwise usually notable registrations recorded there.

Verteiler:

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Deutsche Fischfang-Union, Cuxhaven
Deutscher Fischereiverband Hamburg
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Fahrtteilnehmer*innen

In the northern coastal stratum 71, significantly higher overall NASC values were registered in 2025 compared to previous years. Fish schools there were concentrated along the western boundary of that stratum.

To allocate biological information to echorecordings and for the collection of biological samples, 34 fishery hauls were conducted. As in the previous years, sprat contributed the bulk of biomass of catch weight. Herring mostly co-occurred with sprat in mixed schools, but was caught in very low numbers and was distributed mostly in the northern and western survey area. Sardines and anchovies were caught only on occasion and mostly in relatively small quantities, but partly (sardine) also in large numbers.

Vertical profiles of ambient hydrographic parameters were measured on 85 stations.

1. Cruise objectives

The following objectives were planned for SB851 HERAS:

- Calibration of hydroacoustic equipment
- Hydroacoustic measurements for the estimation of stock parameters (indices of abundance, SSB etc.) for the assessment of small pelagics (herring, sprat, sardine, anchovy) in the allocated survey area (strata 51, 61, 71, 81 and 131)
- (Targeted) biological sampling including species composition and length-frequency/age distribution of key species in the survey area
- Measurements of hydrographic parameters (e. g. temperature and salinity) in the survey area
- Additional sampling of broadband/FM hydroacoustic data and recording of hydroacoustic raw-data using an omnidirectional sonar.

1.1 Survey design

The survey design has been standardized across participants. Where applicable, systematic parallel transect lines with randomized starting points and with transects running perpendicular to lines of bathymetry were followed. Planned survey effort was maintained at a similar level to the previous years. Altogether, 23 strata were covered by all participants in the 2025 HERAS survey, out of which five had been allocated to Germany by the HERAS survey coordinator of the ICES Working Group on International Pelagic Surveys WGIPS (Fig. 1) (ICES, 2025a). Transects in strata 81 and 131 were partitioned between Germany and the Netherlands, with FRV “Solea” scheduled to cover the southern parts of the corresponding strata.

2. Cruise narrative and preliminary results

2.1 Cruise narrative

The scientific equipment was loaded in the morning of June 30th. FRV “Solea” left Cuxhaven port for calibration of the scientific echosounders on noon that day. Calibration was accomplished near Helgoland Island. Survey operations commenced on the 1st of July on the northernmost transect of stratum 71. Following a short interruption due to inclement weather, stratum 71 was accomplished after 4.5 days in the afternoon of July 4th, after which survey operations continued in stratum 61. Pertaining bad weather required another interruption of survey efforts on July 5th. On July 6th and 7th, the survey continued in stratum 61 before another weather-related interruption halted survey operations until July 9th. Stratum 61 was accomplished on the afternoon of July 10th, when FRV “Solea” steamed to the southernmost transect in stratum 51, where the survey commenced off Lowestoft on the morning of July 11th. Stratum 51 was accomplished on the late evening of July 16th. On July 17th, the zig-zag transects allocated in stratum 81 were accomplished before the long, southernmost transect in stratum 131 was covered on July 18th and 19th. Survey operations ended in late afternoon of July 19th and FRV “Solea” headed back to port. The 2025 HERAS survey ended on July 20th.

Altogether, the strata allocated for the 2025 HERAS survey during SB851 were covered as planned. Due to repeated severe weather situations and an accumulating loss of survey time from necessary interruptions of about 3 days, one transect section in stratum 81 could not be covered. This transect was however planned as “extra” transect depending on remaining survey time. The total transect distance covered was 1414 (of a planned 1429) nautical miles. Including the “extra” transect, total planned transect length was 1532.

2.2 Hydroacoustics

2.2.1 Calibration

All transducers of the Simrad EK80 scientific echosounder (38, 70, 120 and 200 kHz) were calibrated on June 30th in stratum 61 southeast of Helgoland (54°07'645'' N, 007°58'673'' E). Calibration was conducted in CW-mode as well as in FM-mode with very good results based on calculated RMS-values. Transducer parameters from combined calibration results were applied for data-collection and post-processing of survey data.

2.2.2 Echo recording

Hydroacoustic data were recorded continuously along the transects with a Simrad EK80 scientific echosounder with hull-mounted 38, 70, 120 and 200 kHz transducers at a standard ship speed of 10 kn. Transducer and sample settings applied were in accordance with the specifications provided in the HERAS survey manual (ICES, 2025b).

Survey operations were conducted during daytime between 4 am and 6 pm UTC to allocate for the diurnal activity patterns of clupeids schooling at daytime and dispersing and migrating into shallower water layers during nighttime, rendering the fishes indiscernible from other scattering sources and distributed within the transducer nearfield. Post-processing and analysis of data were conducted with Echoview 15 software (Echoview Software Pty Ltd, 2025).

Clupeids in the survey area are discernible on echograms by their typical pillar shaped schools, either sitting on the seafloor or in pelagic layers. The Nautical Area Scattering Coefficient (NASC) values measured and allocated to clupeids through post-processing of the data were not distributed evenly throughout the survey area. As in the previous years, transect sections and regions with particularly high clupeid densities alternated with sections without any detections of clupeid schools.

The overall distribution of clupeid NASC measured largely resembled patterns observed in the previous years. In stratum 51, dense aggregations of clupeids were again mostly recorded on the western boundary off the British coast, arching and towards the center and eastern boundaries of the stratum on more northerly transects. Overall registrations in that stratum seemed somewhat less dense than in previous years though. In stratum 61, registrations on the easternmost transect south of Helgoland in the inner German Bight were comparatively dense as in the previous years. However, further westward in the central stratum and towards the western stratum boundary, very low densities were measured. In the northern stratum 71, measured acoustic backscatter values appeared distinctly higher than in the previous year and were again recorded in the "offshore" areas along the western boundary of that stratum, with virtually no registrations in northeastern and eastern coastal areas. Registrations in the southern part of the newly covered stratum 81 were low along the zig-zag transects. Only in the area south of the Dogger Bank, bordering the western boundary of stratum 51, largely increased NASC values were recorded. On the southern transect in stratum 131, registrations were low but distinctly increased towards the eastern stratum boundary, mirroring the large patches of clupeids registered in stratum 51 in that area.

Based on corresponding targeted pelagic trawl hauls, the measured backscatter largely originated from sprat with varying but generally distinctly low contributions of herring across all strata. Notable higher densities of herring as derived from acoustic registrations and trawl catches were only detected in the southwestern coastal area of stratum 51, on the eastern half of the northernmost transect in that stratum as well as in the northwestern "offshore" part of stratum 71. Since with very few exceptions no "clean" sprat or herring school was sampled in any of the strata sampled, all of the clupeid schools recorded were allocated the CLU and MIX category in post-processing (with corresponding exceptions) that will be disaggregated into species specific NASC values during the combined survey analysis.

2.3 Biological sampling (N. Rohlf)

Thirty-four trawl hauls were conducted during the summer acoustic survey. Trawling was carried out using a PSN 388 pelagic trawl ("Krake"). Trawl duration varied between 8 and 55 minutes. All catches were standardized to 30 minutes trawl duration. Hauls were conducted according to echo signals. Additionally, exclusion/validation hauls were shot in areas with echo signals of unclear origin. The positions of all hauls are depicted in Fig. 2. Catches were sorted according to species, and length- and weight-distributions of

individual species were measured. Of all clupeids (herring, sprat, pilchard and anchovy), 10 individuals per 0.5 cm length-class were sampled per trawl. Their individual weight, sex and maturity stage was determined and the otoliths were sampled to enable age estimation. Fin clips were collected for assignment of genetic origin and according stock assignment.

In total, 16 different fish species and one cephalopod species were caught during the survey. A detailed overview on catch compositions (CPUE in kg 30min^{-1}) of all 34 hauls is given in Tab. 1. The catch composition of pelagic schooling species possibly contributing to the hydroacoustic registrations as well as the normalized aggregated CPUE of the target species (clupeids) per haul are depicted in figures 3 and 4 respectively.

As in the previous years, sprat contributed the bulk of biomass of catch weight (5.716 tonnes, i.e., 75%) and had a high occurence in the catches (in 23 hauls, resp. 68 %). The amounts of Herring were 119 kg. This is much lower when compared to recent years. Mackerel occurred in 71% of the catches, amounting to 395 kilos in total weight. It needs to be noted that catches alone are not representative for the abundance of small pelagics. Detailed conclusions on abundance cannot be given until echo integration is accomplished and trawl haul and hydroacoustic data are combined.

A detailed overview on numbers, weights and mean lengths of herring, sprat, pilchards and anchovies sampled is given in Tab. 2a-d, together with their proportion on the total catch. Figures 5 - 8 show length distributions of these species as derived from total catches. Herring show a trimodal distribution, with lengths ranging from 6.25 to 20.25 cm. The length distribution was dominated by small fish below 12.25 cm total length, showing one peak around 10.75 cm. Larger herring above 21 cm were not present in the area (Figure 5). Sprat lengths ranged from 4.75 to 14.25 cm. There were two peaks in the length distribution, a smaller one at 8.25 cm and the second at 11.25 cm (Figure 6). Anchovy were caught only on occasion and in relatively small quantities. Total catch in numbers of anchovy was 51 fish with a mode at 15.25 cm (Figure 7). Pilchards/sardines were only caught in 2 hauls, albeit in partly large numbers. Altogether, 1314 individuals were caught, most of them in haul 13. With one exception, they were all larger fish > 18.25 cm and a mode at 23.25cm.

Individual and combined abundance estimates for herring and sprat derived from survey data will be available after a final evaluation, combination and analysis of acoustic and trawl data with StoX software (Johnsen et al., 2019) and will be published in a combined survey report in the 2026 WGIPS report.

2.4 Hydrography

Vertical profiles of temperature, salinity and oxygen concentration were measured on 85 stations using a SeaBird CTD. Measurements presented here are preliminary – a quality check/calibration check will be performed before hydrographic data will be uploaded to oceanographic databases.

Surface temperatures in the survey area ranged from around 15° C in the western part of the southwestern stratum 81 to over 19° C in the coastal regions of the inner German Bight (Fig. 9). The water column was well mixed in the shallow coastal areas south of ca 54° N. Further northward, a thermocline appeared separating the warm surface water from cold deeper layers where temperatures partly dropped to below 9° C in the central, deep parts of the survey area.

Salinities ranged from around 31 to 35 PSU, with the lower salinities measured along the coasts in the southeastern North Sea/German Bight. No stratification in salinity was evident.

3. Survey participants

Name	Function	Institute
Dr. Matthias Schaber	Cruise Leader (Hydroacoustics, Hydrography)	TI-SF
Dr. Sven Gastauer	Hydroacoustics, Hydrography	TI-SF
Jörg Appel	Fishery biology	TI-SF
Maxime Duranson	Fishery biology	TI-SF
Franziska Hermann	Fishery biology	TI-SF
Clara Nietz	Fishery biology	TI-SF

4. References

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ICES. 2025a. Working Group on International Pelagic Surveys (WGIPS). ICES Scientific Reports. 7:54. 131 pp. https://doi.org/https://doi.org/10.17895/ices.pub.28890038

ICES. 2025b. ICES Survey protocols - Manual for International Pelagic Surveys, coordinated by ICES Working Group of International Pelagic Surveys (WGIPS). ICES Techniques in Marine Environmental Sciences Vol. 71. 227 pp. https://doi.org/10.17895/ices.pub.28269671

Johnsen, E., Totland, A., Skålevik, Å., Holmin, A. J., Dingsør, G. E., Fuglebakk, E., & Handegard, N. O. (2019). StoX: An open source software for marine survey analyses. Methods in Ecology and Evolution. 10:1523 –1528. https://doi.org/10.1111/2041-210X.13250

5. Acknowledgements

I hereby thank the crew of FRV “Solea” and Captain M. Hickmann as well as all participants for their outstanding cooperation and commitment that facilitated the accomplishment of this survey.

(Dr. M. Schaber, TI-SF / Scientist in charge)

Figures

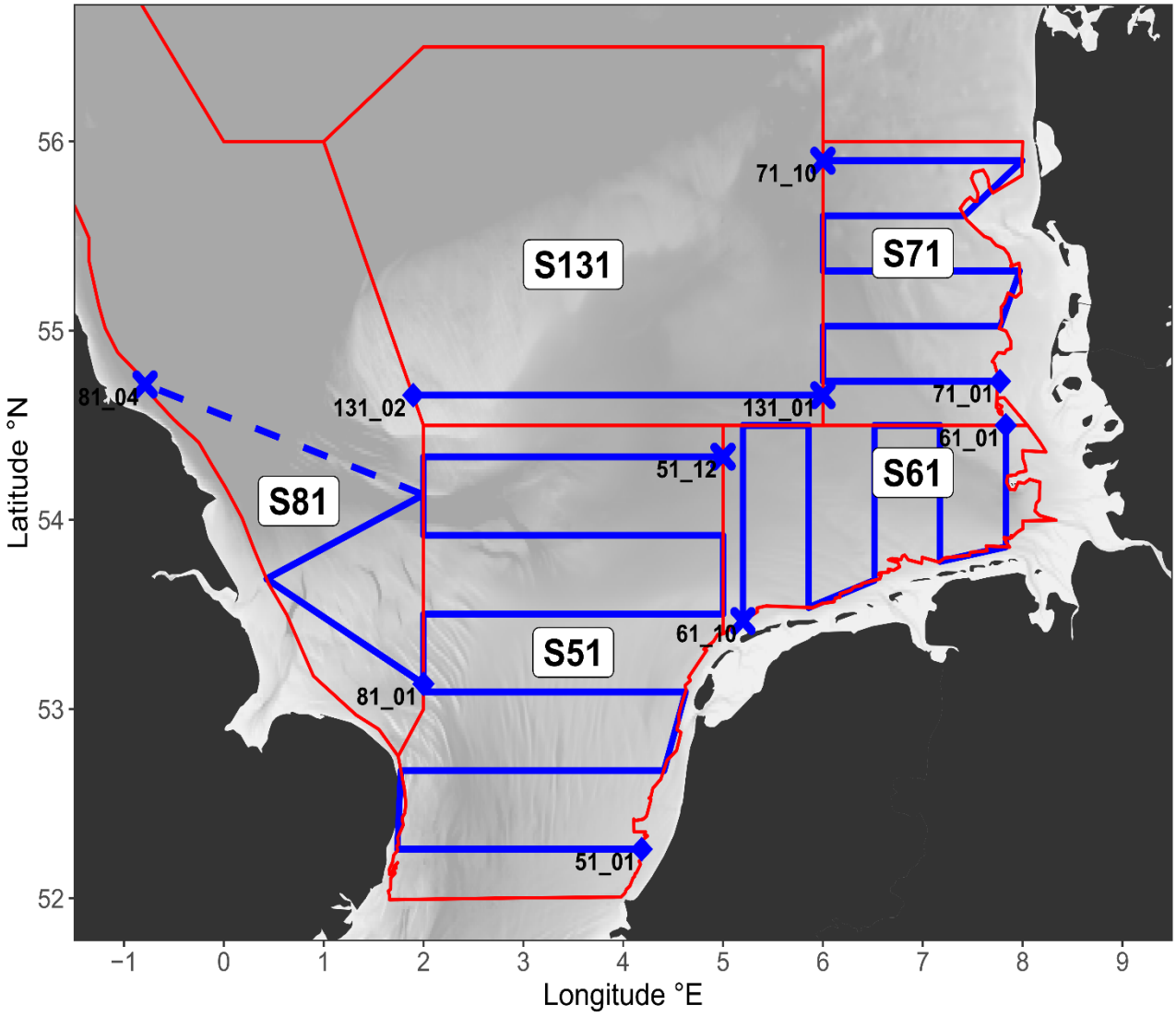

Figure 1: FRV "Solea" cruise 851/2025. Survey plan. Total survey area and strata covered (S51, S61, S71, S81, S131) outlined in red. Planned transect lines depicted as blue lines. Dashed lines represent further transects in the corresponding strata to be covered with sufficient survey time remaining. Refer to Figures 2 and 3 for realized transects/accomplished strata.

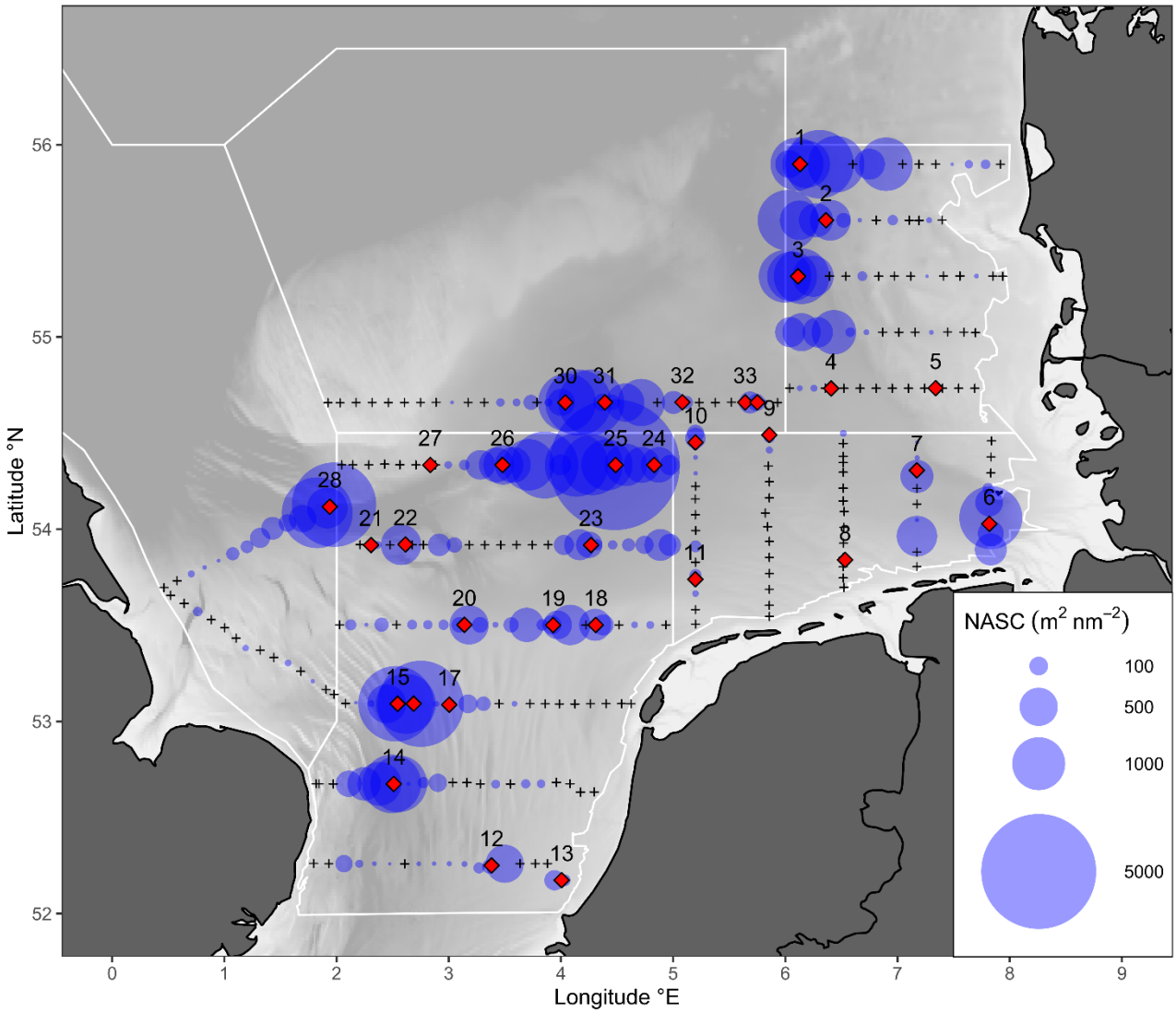

Figure 2: FRV "Solea" cruise 851/2025. Mean aggregated Nautical Area Scattering Coefficient (NASC in m^2nm^{-2}) measured (blue dots, 5 nmi intervals) along the realized transects allocated to clupeids (or mixed aggregations containing clupeids) for further dis-aggregation and to be used in abundance/biomass estimates. Empty intervals indicated by crosses. Red dots indicate (valid) trawl hauls targeting the registered fish aggregations. Total survey area and strata outlined in white.

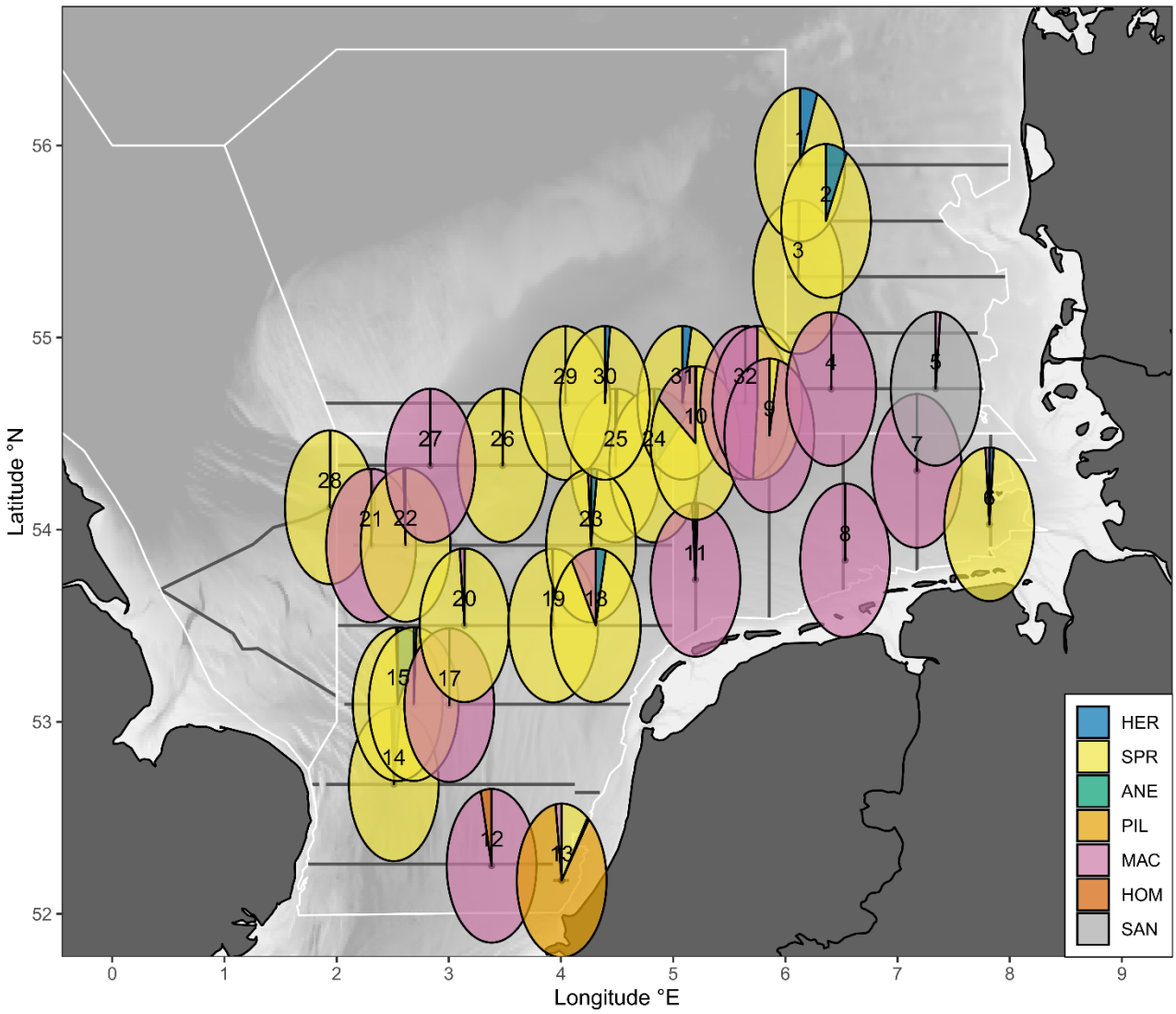

Figure 3: FRV "Solea" cruise 851/2025. Catch composition of pelagic/schooling fishes (ANE - anchovy *Engraulis encrasicolus*, HER - herring *Clupea harengus*, HOM - horse mackerel *Trachurus trachurus*, MAC - mackerel *Scomber scombrus*, PIL - sardine *Sardina pilchardus*, SAN – sandeel *Ammodytidae*, SPR - sprat *Sprattus sprattus*. Numbers indicate haul/station number. Pie size fixed. Survey area/strata outlined in white. Accomplished transects depicted as black lines.

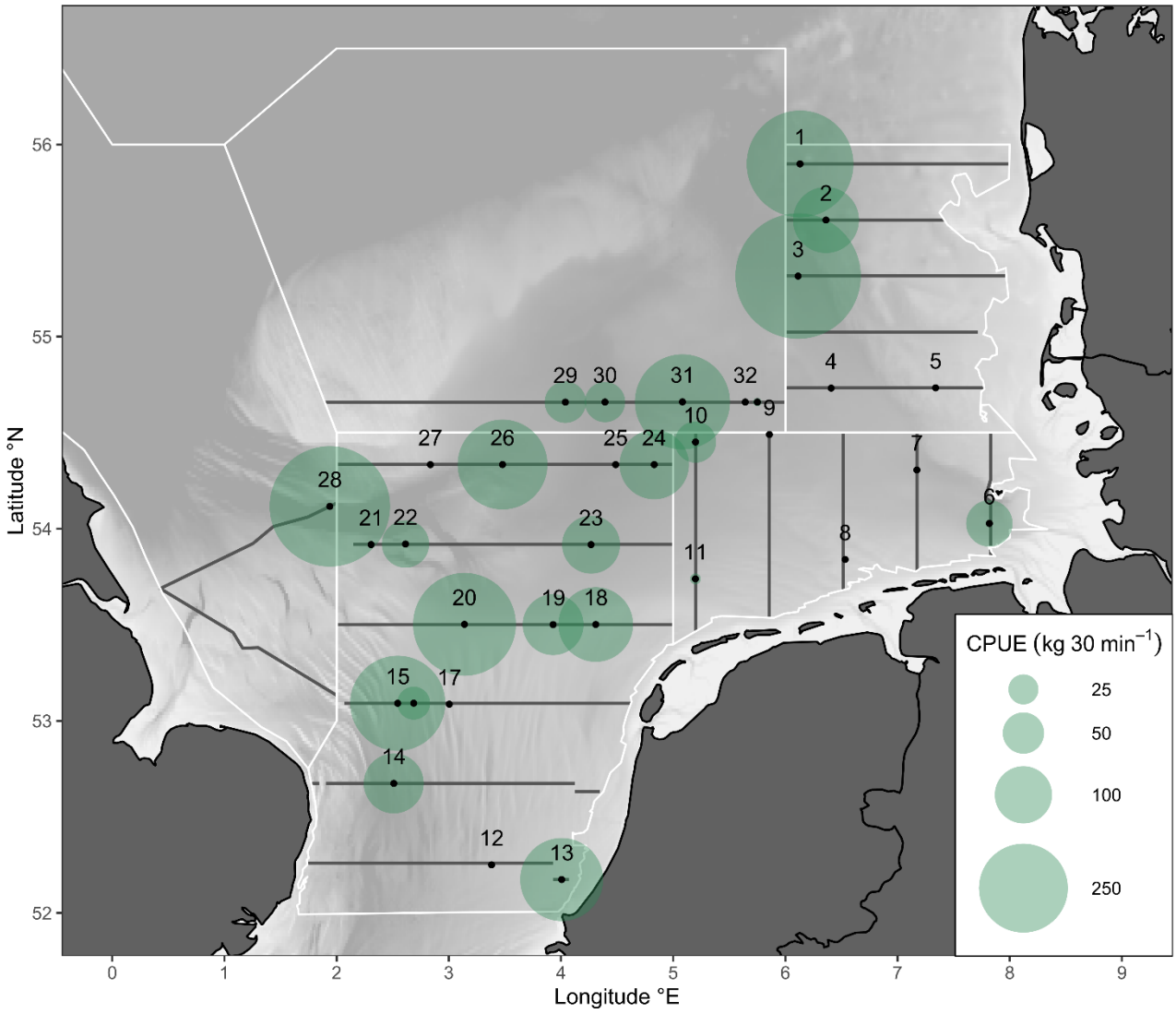

Figure 4: FRV "Solea" cruise 851/2025. Combined standardized clupeid (herring *Clupea harengus*, sprat *Sprattus sprattus*, sardine *Sardina pilchardus*, and anchovy *Engraulis encrasicolus*) catches (kg 30min^{-1}). Numbers indicate haul/station number. Survey area/strata outlined in white. Accomplished transects depicted as black lines.

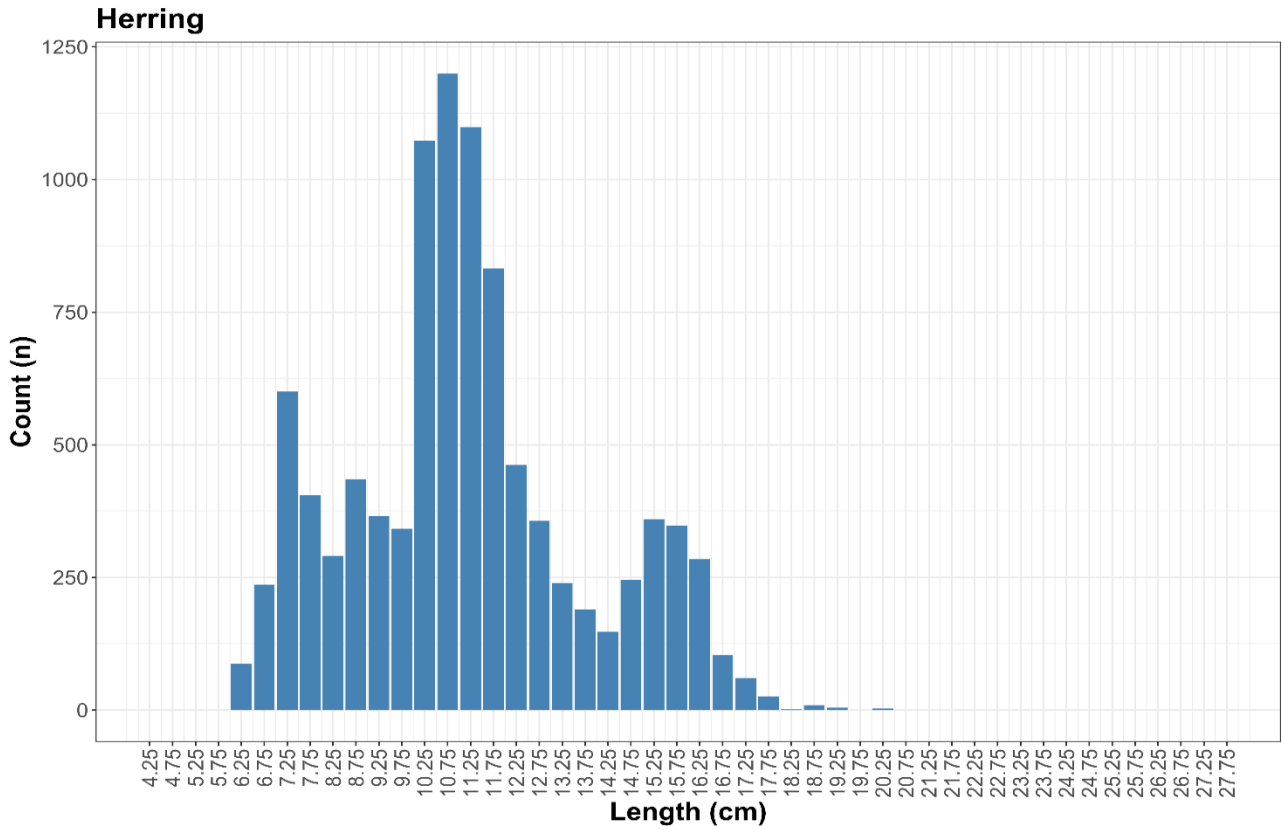

Figure 5: FRV "Solea" cruise 851/2025. Herring (*Clupea harengus*) combined/normalzied length-frequency distribution.

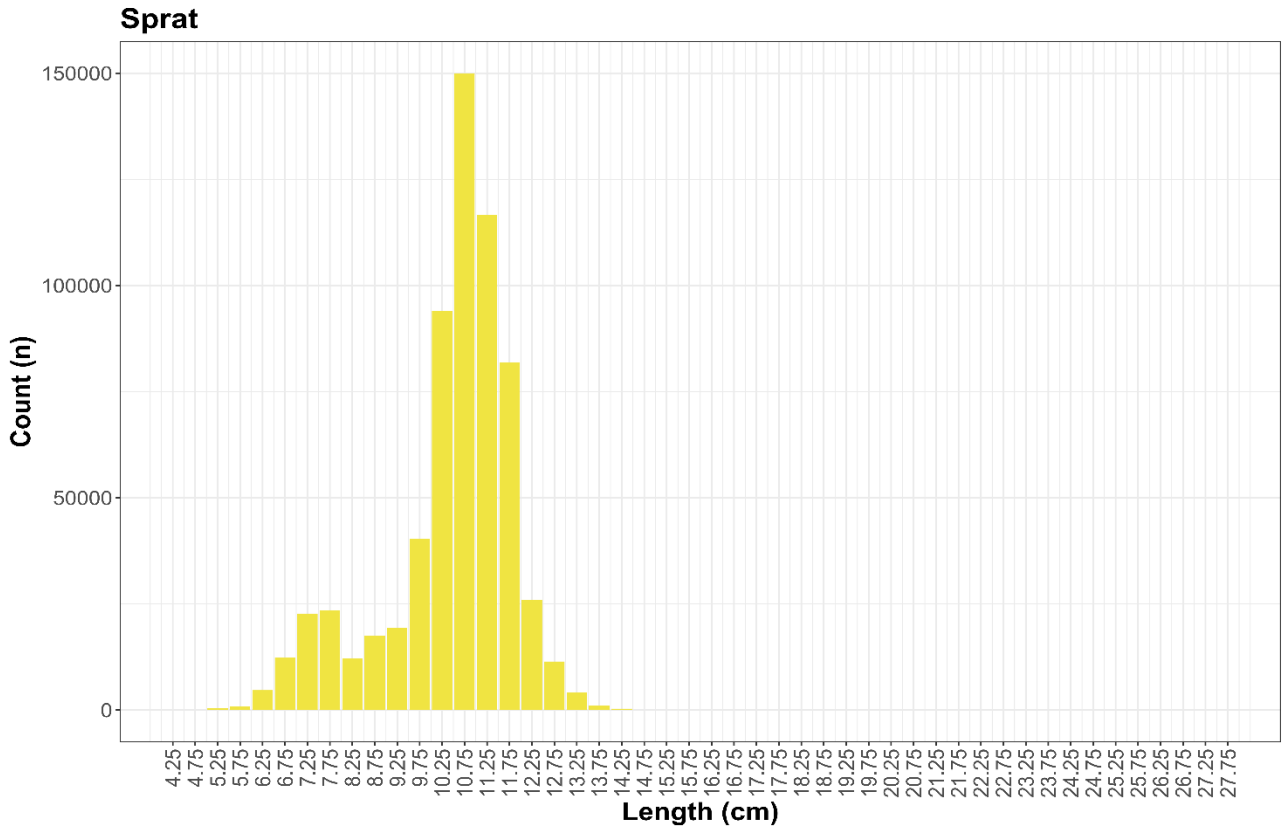

Figure 6: FRV "Solea" cruise 851/2025. Sprat (*Sprattus sprattus*) combined/normalized length-frequency distribution.

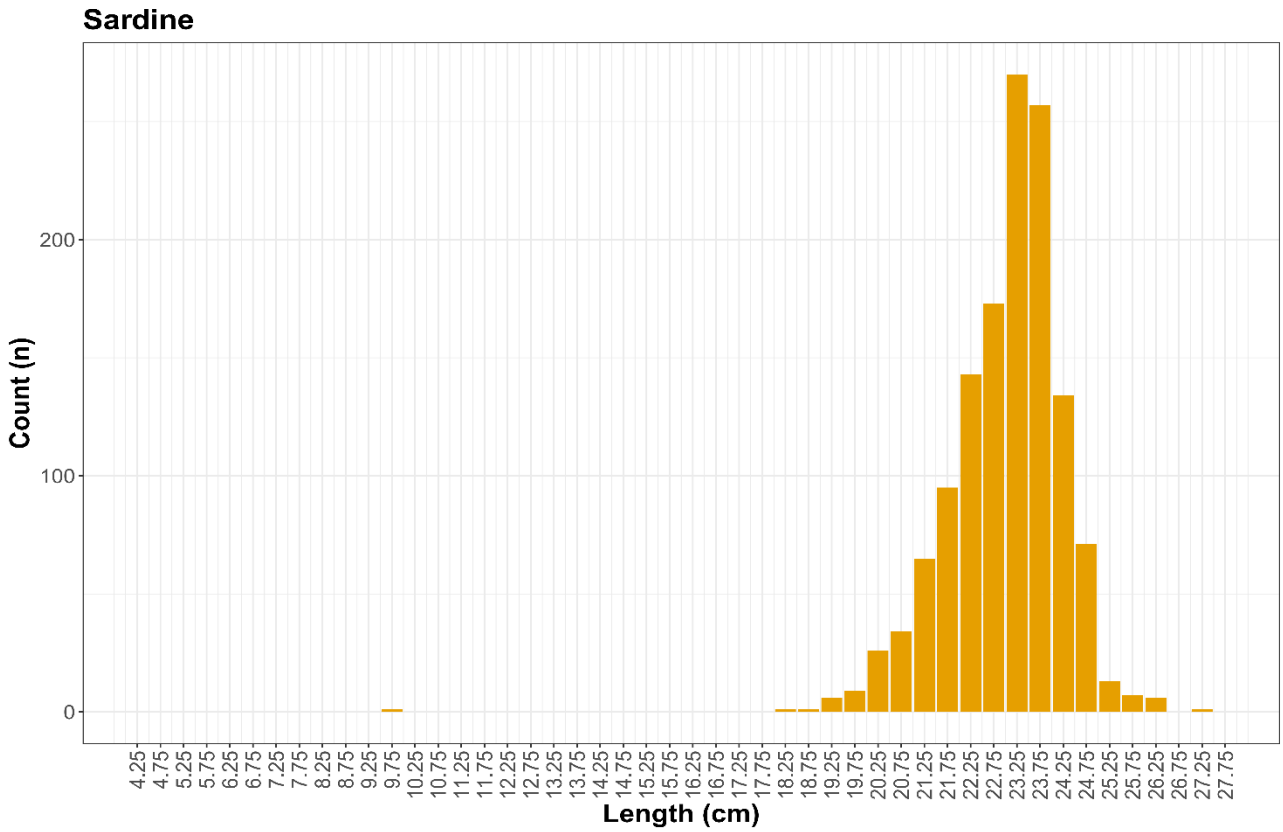

Figure 7: FRV "Solea" cruise 851/2025. Sardine (*Sardina pilchardus*) combined/normalized length-frequency distribution.

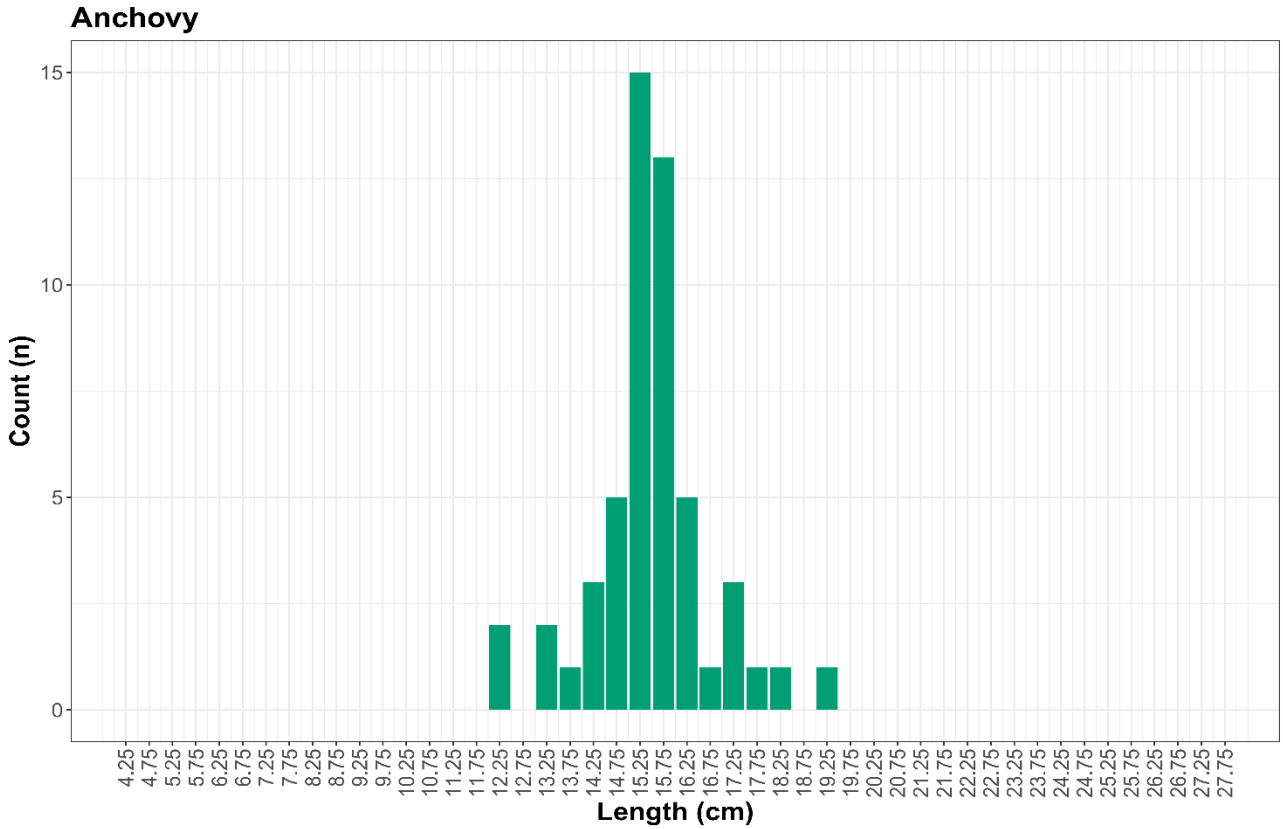

Figure 8: FRV "Solea" cruise 837/2024. Anchovy (*Engraulis encrasicolus*) combined/normalized length-frequency distribution.

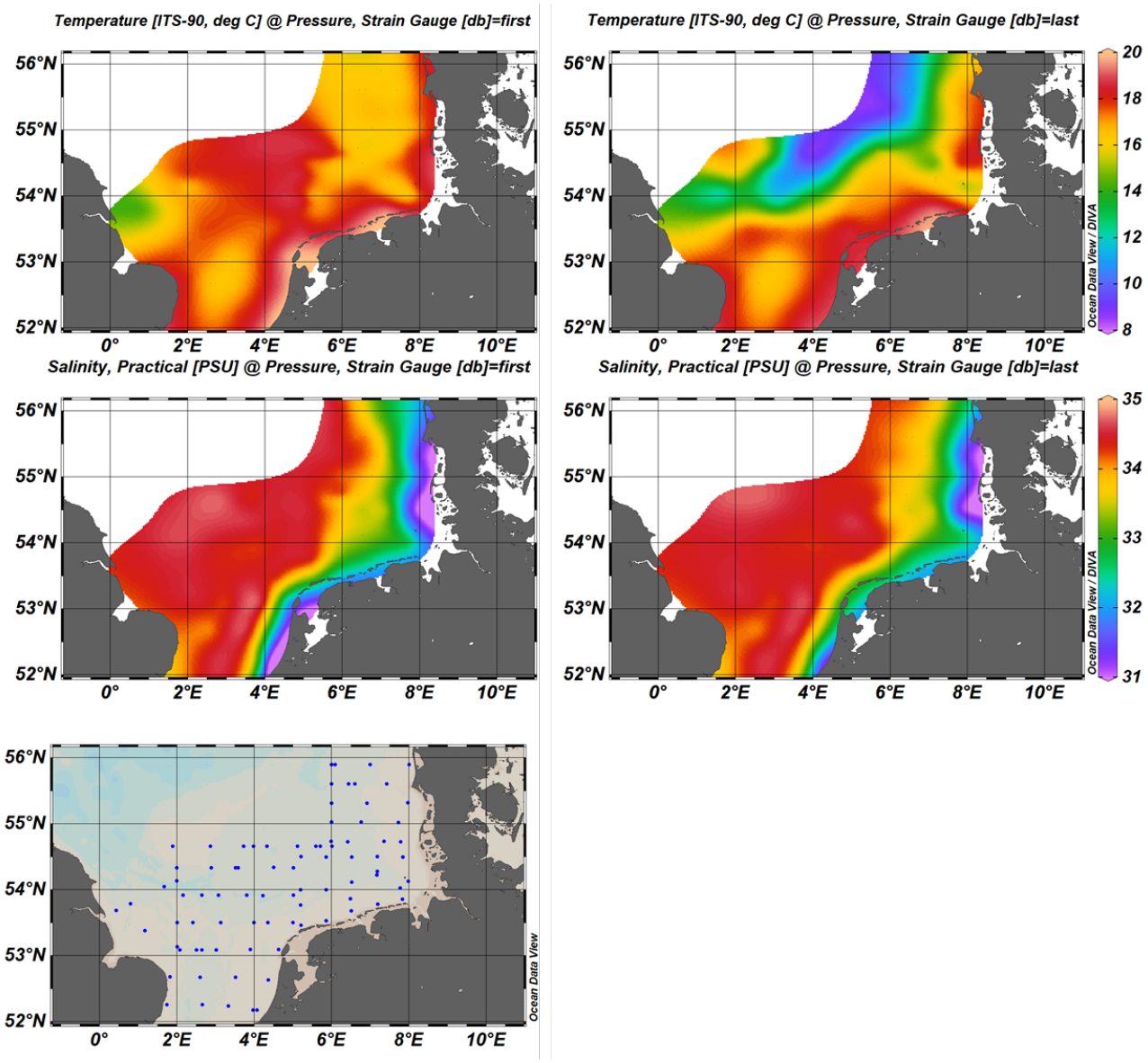

Figure 9: FRV “Solea” cruise 851/2025. Hydrography. Stations are depicted as blue dots in the area map (lower panel). Temperature (°C) (upper panels) and Salinity (PSU) (middle panels) near the surface (left) and near the seafloor (right).

Tables

Table 1: FRV "Solea" cruise 851/2025. Catch composition (CPUE in kg) standardized to 30 minutes tow duration (valid hauls).

HAUL	STATION	TOTAL (kg/30 min)	*ALLOTEUTHIS SUBULATA*	*AMMODYTES*	*CALLIONYMUS LYRA*	*CLUPEA HARENGUS*	*ECHIICHTHYS VIPERA*	*ENGRAULIS ENCRASICOLUS*	*EUTRIGLA GURNARDUS*	*HYPEROPLUS LANCEOLATUS*	*LIMANDA LIMANDA*	*MELANOGRAMMUS AEGLEFINUS*	*MERLANGIUS MERLANGUS*	*PLEURONECTES PLATESSA*	*SARDINA PILCHARDUS*	*SCOMBER SCOMBRUS*	*SPRATTUS SPRATTUS*	*TRACHURUS TRACHURUS*	*TRIGLA LUCERNA*	NUMBER OF SPECIES
1	3	365.06				22.94			0.47								341.7			3
2	8	138.08				10.42			2.59		0.06	0.3		0.33			124.4			6
3	10	530.93				2.96			0.17				22.696	0.41			504.7			5
4	17	4.65	0.01		0.048				0.25				4.0234			0.31				5
5	18	5.80		5.2			0.08		0.22	0.16	0.03			0.07		0.09				7
6	22	65.40				1.039			0.09				0.1742			0.91	63.2			5
7	25	10.01							0.05							9.96				2
8	29	22.68	0.01	0					0.11							22.54				4
9	33	6.49							0.32		0.09		0.04			5.85	0.2			5
10	34	60.19				0.218			1.06		0.09		0.528			8.94	49.4			6
11	36	239.42					0.13						0.004		2.18	234.28		2.83		5
12	40	0.12					0.01									0.11		0.004		3
13	41	221.99						1.45							194	4.85	21.7			4
14	45	113.56	0.01			2.613	0.74			0.04			1.32			1.02	107.8			7
15	48	292.27				24.02	3.31									1.58	263.4			4
16	49	31.36	0.00			0.304	0.54		0.2				0.112				30.2			6
17	50	1.52					0.08									1.44				2
18	54	192.27	0.02			6.92	0.03				0.57		0.004			17.32	167.2		0.168	8
19	55	114.05											0.072			0.38	113.6			3
20	56	344.30				0.287		0.04					1.0333			5.77	337.2			5
21	59	3.34					1.92		0.2				0.284			0.94				4
22	60	69.08	0.02				1.32		0.1	0.09			0.1462			0.43	67.0			7
23	63	104.44				2.362			0.04				0.7872			1.17	100.1			5
24	65	150.33				19.93			0.13				0.322			0.27	129.7			5
25	66	2257.89				12.21			0.35				45.5			0.67	2199.2			5
26	68	276.16				1.1			1.22			2.38	17.26				254.2			5
27	69	73.16							0.16							73.00				2
28	71	470.01				1.275							3.36				465.4			3
29	79	1.88							1.47			0.33	0.0825							3
30	80	50.61											0.3794				50.2			2
31	81	48.15				0.868			0.42				0.322				46.5			4
32	82	288.83				9.308			1.11				0.34				278.1			4
33	83	2.40							0.17				0.048			2.19				3
34	84	21.15							0.22				18.93			0.97	1.0			4
total (kg)		**6577.6**	0.1	5.2	0.0	118.8	8.2	1.5	11.1	0.3	0.8	3.0	117.8	0.8	196.2	395.0	5715.9	2.8	0.2	
proportion (%)			0.0	0.1	0.0	1.8	0.1	0.0	0.2	0.0	0.0	0.0	1.8	0.0	3.0	6.0	86.9	0.0	0.0	
number of catches			6	2	1	17	10	2	23	3	5	3	24	3	2	24	23	2	1	
presence (%)			18	6	3	50	29	6	68	9	15	9	71	9	6	71	68	6	3	

Table 2a: FRV "Solea" cruise 851/2025. Numbers, weights and mean lengths of **herring** (*Clupea harengus*) and according proportion of total clupeid catch (normalized to 30 minutes tow duration), if clupeid catch >0.

		Total	clupeid	clupeid	herring					herring
		Catch	Catch	portion	catch	count	range (cm)			(% clups)
Haul	Stat	(kg)	(kg)	(%)	(kg)	(n)	min	max	mean	
1	3	365.06	364.6	100%	22.9	873	12.75	19.25	15.3	6%
2	8	138.08	134.8	98%	10.4	339	12.75	20.25	15.7	8%
3	10	530.93	507.7	96%	3.0	228	10.25	17.25	12.3	1%
6	22	65.40	64.2	98%	1.0	77	8.75	16.25	11.7	2%
10	34	60.19	49.6	82%	0.2	8	12.75	17.75	14.8	0%
14	45	113.56	110.4	97%	2.6	229	8.75	16.75	11.0	2%
15	48	292.27	287.4	98%	24.0	1619	8.25	18.75	11.9	8%
16	49	31.36	30.5	97%	0.3	56	7.25	12.25	8.9	1%
18	54	192.27	174.2	91%	6.9	1954	6.25	10.25	7.8	4%
20	56	344.30	337.5	98%	0.3	10	11.25	17.25	14.8	0%
23	63	104.44	102.4	98%	2.4	211	7.75	18.25	11.3	2%
24	65	150.33	149.6	100%	19.9	2146	9.25	15.25	10.9	13%
25	66	2257.89	2211.4	98%	12.2	1230	6.75	16.25	10.4	1%
26	68	276.16	255.3	92%	1.1	30	15.75	17.75	16.7	0%
28	71	470.01	466.7	99%	1.3	41	15.25	16.75	15.8	0%
31	81	48.15	47.4	98%	0.9	29	13.75	17.75	15.7	2%
32	82	288.83	287.4	99%	9.3	721	9.25	15.75	12.3	3%

Table 2b: FRV "Solea" cruise 851/2025. Numbers, weights and mean lengths of **sprat** (*Sprattus sprattus*) and according proportion of total clupeid catch (normalized to 30 minutes tow duration), if clupeid catch >0.

		Total	clupeid	clupeid	sprat					sprat
		Catch	catch	portion	catch	count	range (cm)			(% clups)
Haul	Stat	(kg)	(kg)	(%)	(kg)	(n)	min	max	mean	
1	3	365.1	364.6	100%	341.7	31092	10.25	12.75	11.3	94%
2	8	138.1	134.8	98%	124.4	11742	9.75	12.75	11.3	92%
3	10	530.9	507.7	96%	504.7	60190	9.75	12.25	10.4	99%
6	22	65.4	64.2	98%	63.2	7147	9.25	13.25	10.5	98%
9	33	6.5	0.2	3%	0.2	12	7.25	13.25	11.9	100%
10	34	60.2	49.6	82%	49.4	4233	9.25	13.75	11.4	100%
13	41	222.0	217.1	98%	21.7	6911	7.25	11.75	8.4	10%
14	45	113.6	110.4	97%	107.8	23187	5.75	14.25	8.4	98%
15	48	292.3	287.4	98%	263.4	53471	6.25	13.75	8.9	92%
16	49	31.4	30.5	97%	30.2	12356	4.75	7.75	7.0	99%
18	54	192.3	174.2	91%	167.2	40880	5.75	11.75	8.0	96%
19	55	114.1	113.6	100%	113.6	12275	6.75	13.75	10.8	100%
20	56	344.3	337.5	98%	337.2	27637	10.75	13.75	11.7	100%
22	60	69.1	67.0	97%	67.0	6296	9.25	13.75	11.3	100%
23	63	104.4	102.4	98%	100.1	10886	6.75	12.75	10.6	98%
24	65	150.3	149.6	100%	129.7	9441	9.25	12.25	10.7	87%
25	66	2257.9	2211.4	98%	2199.2	224208	9.75	13.25	10.9	99%
26	68	276.2	255.3	92%	254.2	19646	10.25	13.75	12.1	100%
28	71	470.0	466.7	99%	465.4	42716	9.75	14.25	11.3	100%
30	80	50.6	50.2	99%	50.2	3421	10.75	14.25	12.6	100%
31	81	48.2	47.4	98%	46.5	4798	9.75	12.75	10.9	98%
32	82	288.8	287.4	99%	278.1	26448	9.25	14.25	11.1	97%
34	84	21.1	1.0	5%	1.0	84	7.75	13.75	11.6	100%

Table 2c: FRV "Solea" cruise 851/2025. Numbers, weights and mean lengths of **sardine** (*Sardina pilchardus*) and according proportion of total clupeid catch (normalized to 30 minutes tow duration).

					pilchard					
		total catch	clupeid catch	clupeid portion	catch	count	range (cm)			pilchard (% clups)
Haul	Stat	(kg)	(kg)	(%)	(kg)	(n)	min	max	mean	
11	36	239.42	2.2	1%	2.18	23	9.75	27.25	21.6	100%
13	41	222.0	217.1	98%	194	1291	19.25	26.25	23.0	89%

Table 2d: FRV "Solea" cruise 851/2025. Numbers, weights and mean lengths of **anchovy** (*Engraulis encrasicolus*) and according proportion of total clupeid catch (normalized to 30 minutes tow duration).

					Anchovy					
		total catch	clupeid catch	clupeid portion	catch	count	range (cm)			anchovy (% clups)
Haul	Stat	(kg)	(kg)	(%)	(kg)	(n)	min	max	mean	
13	41	222.0	217.1	98%	1.45	49	13.75	19.25	15.7	0.67%
20	56	344.3	337.5	98%	0.04	2	12.25	13.25	12.8	0.01%