

Cruise Report
FRV "SOLEA" Cruise No. 658
29.06. - 19.07.2012

International Acoustic Survey for Pelagic Fish Stocks in the North Sea

Participants:

Eckhard Bethke (cruise leader)	Inst. of Sea Fishery, Hamburg	
Sahar Fahmy Mehanna	Guest scientist	
Jens Ulleweit	Inst. of Sea Fishery	
Gitta Hemken	Inst. of Sea Fishery	
Alexander Lubsch	Temporary student helper	SF
Ulrike Bräuer	Temporary student helper	SF
Linda Olmos-Pino	Temporary student helper	SF

Objective

The 658th survey of the FRV "Solea" was conducted in the framework of the international hydroacoustic survey on pelagic fish in the North Sea, which is co-ordinated by the ICES Planning Group for Herring Surveys (PGHERS). The main objective was to assess clupeoid resources, mainly herring and sprat, in the North Sea.

The reported acoustic survey is conducted every year to supply to ICES the most important fishery independent data (i.e. biomass estimate) for the assessment of herring and sprat stocks in the area.

Narrative

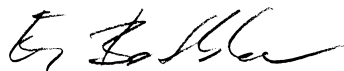
The intention was to leave the port of Cuxhaven on 29th June 2012. However due to an error in the computer system the departure of FRV "Solea" was delayed to the 02 of July. The investigation area covered the southern part of the North Sea from 52°N to 56°N. The acoustic survey was performed during day time. The acoustic equipment was an echosounder EK60 working on 38 kHz and 120 kHz. The hull mounted 38 kHz-transducer and the 120 kHz-transducer was calibrated in the open sea close to the Danish coast at a distance between transducer and calibration sphere of between 18 and 20 m. The echo integration, i.e. the allocation of the area backscattering strength, s_A , to the species was done by the post-processing system EchoView 4. The specific settings of the hydroacoustic equipment were used as described in the 'Manual for Herring Acoustic Surveys in ICES Divisions III, IV and VI' (ICES C.M. 2005/G:04, Annex 4).

Pelagic trawl hauls were carried out to identify the target species. From each haul sub-samples were taken to determine length and weight of fish. Further sub-samples of herring and sprat were examined for sex, maturity and age. After each 30 NM sailed hydrographical conditions were investigated with a CTD probe. The survey ended on 19th July 2012 at Cuxhaven.

Results

The measured cruise track (Figures 1 and 2) reached in total a length of 1709 nautical miles. 38 trawl hauls were carried out and hydrographical parameters were measured on 55 stations.

Catch compositions of the conducted hauls are presented in Table 1 and 2. Length distributions of herring and sprat are shown in figures 3 and 4. Abundance estimates of the pelagic fish species will be presented after further analysis of the data in combining s_A values, and species and size distribution of the fish on ICES statistical rectangle basis.



Eckhard Bethke
(cruise leader)

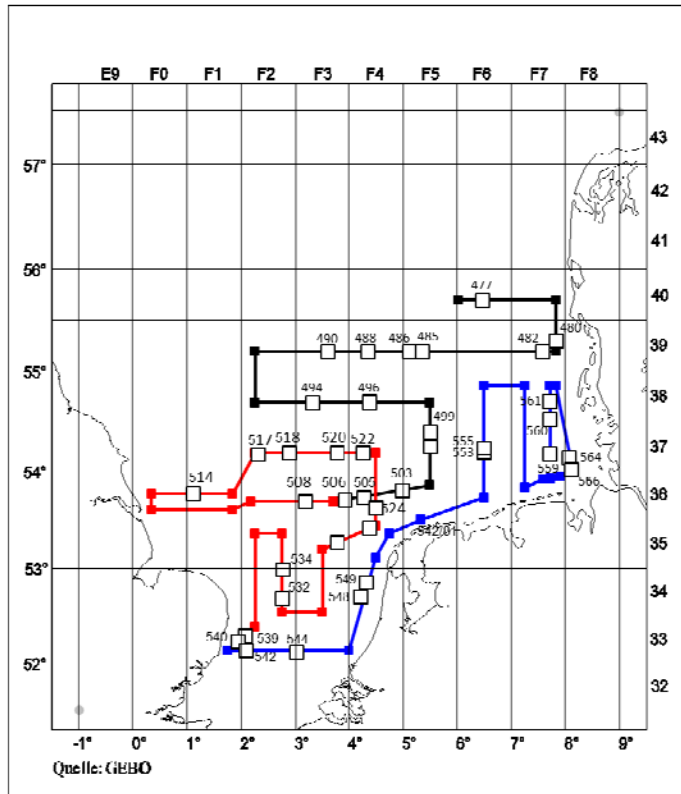


Figure 1: 658. Cruise of FRV "Solea" – cruise track and fishery stations

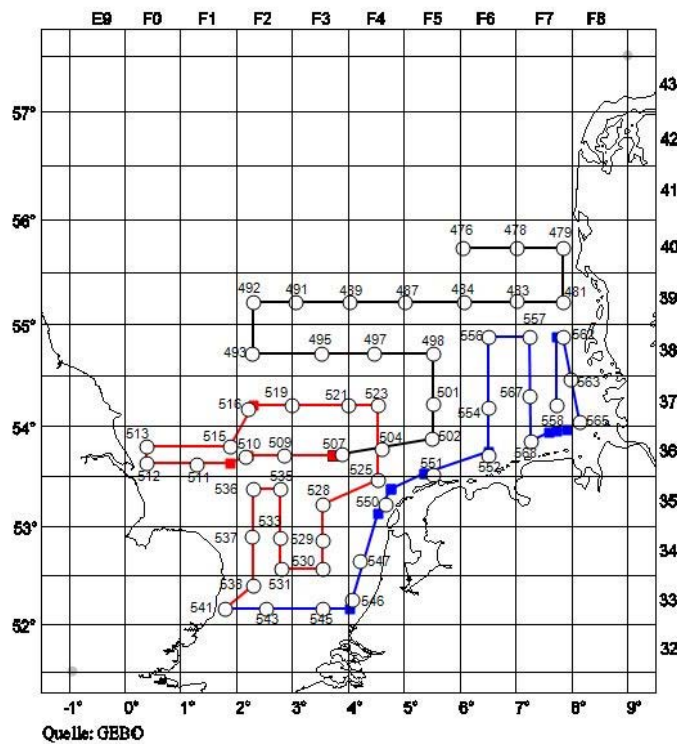


Figure 2: 658. Cruise of FRV "Solea" – Hydrographical stations.

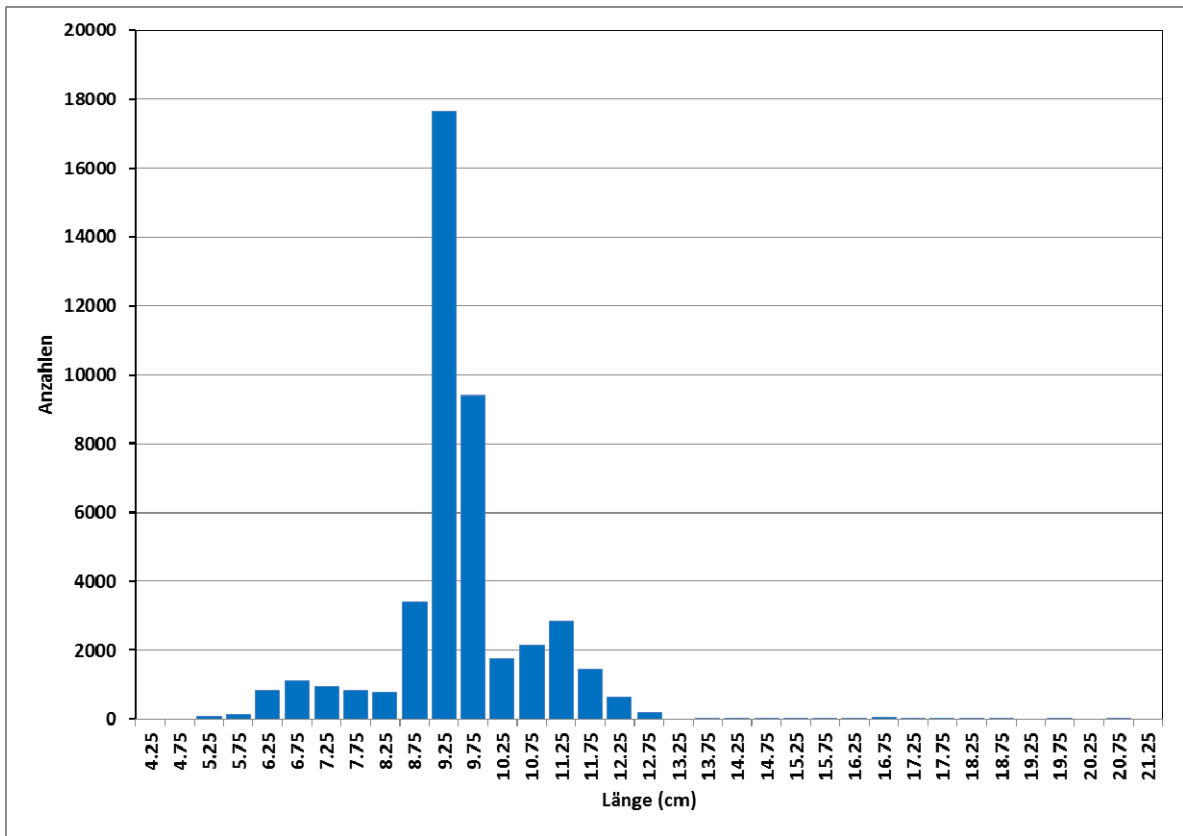


Figure 3: 658. Cruise of FRV "Solea" – Herring – total length distribution.

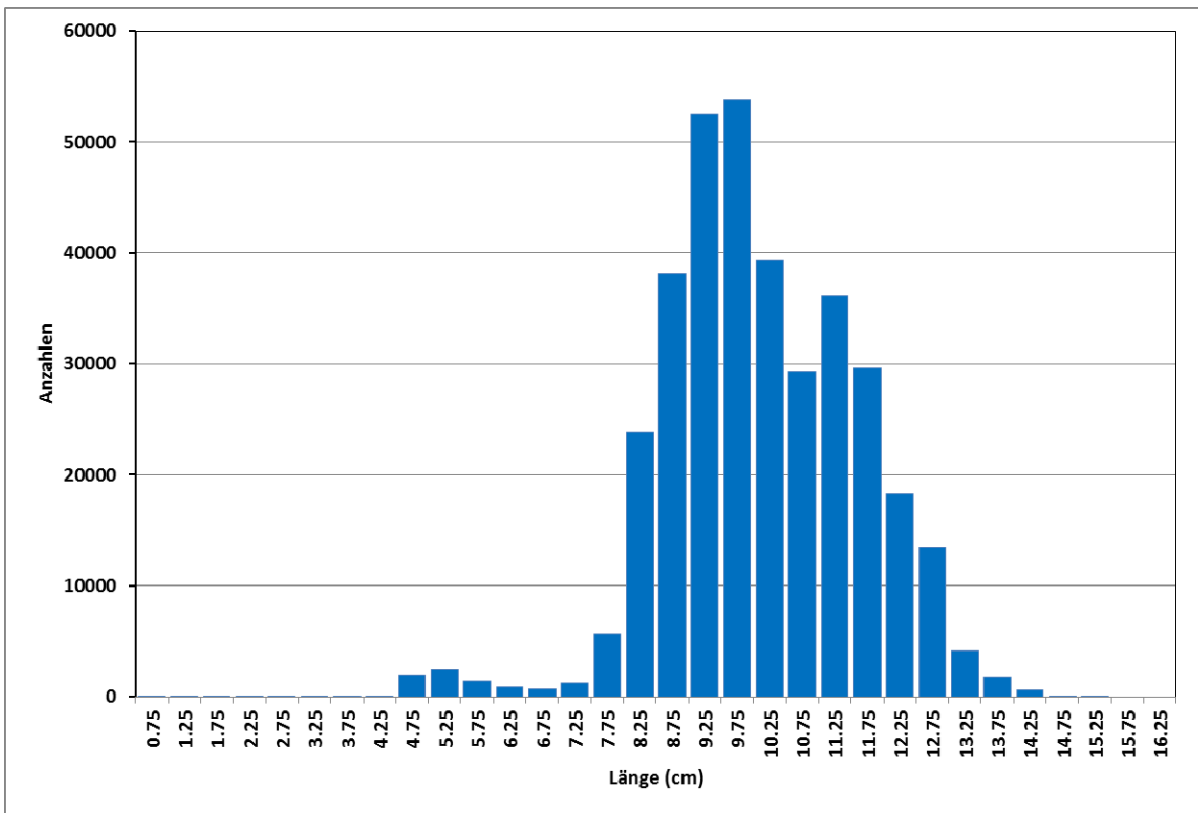


Figure 4: 658. Cruise of FRV "Solea" – Spratt – total length distribution.

Table 1: Catch compositions of the conducted hauls - 658. Cruise of FRV "Solea" (all results normalized on 30 min.)

RECTANGLE	STATION	HAUL DURATION (min)	TOTAL (kg)	ALLOTEUTHIS SUBULATA	ALOSA FALLAX	AMMODYTES MARINUS	BELONE BELONE	CALLIONYMUS LYRA	CLUPEA HARENGUS	ECHIICHTHYS VIPERA	ENGRAULIS ENCRASICOLUS	EUTRIGLA GURNARDUS	GALEORHINUS GALEUS	HYPEROPLUS LANCEOLATUS	LAMPETRA FLUVIATILIS	LIMANDA LIMANDA	LOLIGO FORBESI	MERLANGIUS MERLANGUS	MICROSTOMUS KITT	MULLUS SURMULETUS	PLEURONECTES PLATYSSA	SALMO SALAR	SARDINA PILCHARDUS	SCOMBER SCOMBRUS	SPRATTUS SPRATTUS	SYNGNATHUS ROSTELLATUS	TRACHURUS TRACHURUS	NUMBER OF SPECIES
40F6	477	30	5.34	0	0	0	0	0	0	0	0	4.858	0	0	0	0	0	0.002	0	0	0	0	0	0.482	0	0	0	3
39F7	480	30	32.53	0	0	0	0	0	0	0	0	1.912	0	0.062	0	0	0	0	0	0	0	0	0	30.56	0	0	0	3
39F7	482	30	52.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50.9	0	0	1.44	2
39F5	485	15	8.36	0	0	0	0	0	4.296	0	0	3.624	0	0	0	0.188	0	0.012	0	0	0	0	0	0	0.236	0	0	5
39F5	486	30	4.49	0	0	0	0	0	0	0	0	4.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
39F4	488	30	5.20	0	0	0	0	0	0	0	0	5.2	0	0	0	0	0	0.002	0	0	0	0	0	0	0	0	0	2
39F3	490	30	27.37	1.056	0	0.14	0	0	0.01	0.056	0	19.8	0	0.098	0	3.946	0	0.3	0.472	0	0.354	0	0	0	1.142	0	0	11
38F3	494	30	1.86	0.004	0	0.012	0	0	0	0	0	0.982	0	0	0	0.07	0	0.056	0	0	0	0	0	0.698	0.042	0	0	7
38F4	496	30	33.24	0	0	0	0	0	0.129	0	0	1.7	0	0	0	0	0	0.168	0	0	0	0	0	0.968	30.271	0	0	5
37F5	499	30	15.72	0.094	0	0	0	0	0.176	0	0	0.436	0	0.03	0	0	0	0.312	0	0	0	0	0	1.746	12.93	0	0	7
37F5	500	30	21.62	0.436	0	0	0	0.068	0.038	0	0	0.706	0	0.084	0	1.098	0.044	1.134	0	0	0	0	0	0.714	17.3	0	0	10
36F4	503	22	376.12	0.16091	0	0	0	0	0.10636	0	0	0	0	0	0.15818	0	0.01364	0	0.62455	1.42364	0	0	0	0.81273	372.81818	0	0	8
36F4	505	30	94.35	0.534	0	0	0	0	0.036	0	0	0	0	0.028	0.126	0	0.174	0	0	0	0	0	0	0.152	93.3	0	0	7
36F3	506	30	17.63	0.076	0	0	0	0	0	0	0	0.228	0	0	0.078	0	0	0	0	0	0	1.164	0	0	16.08	0	0	5
36F3	508	32	100.47	0.00188	0	0	0	0	0.07688	0	0	0.26063	0	0	0.07313	0.21938	0	0.15	0	0	0	0	0	0.41063	99.28125	0	0	8
36F1	514	30	173.03	0	0	0	0	0	0.15	0.21	0	0.1	0	0	0	0.054	0	0	0	0	0	0	0	2.72	169.8	0	0	6
37F2	518	30	30.87	0.008	0	0	0	0	0.964	0	0	0.42	0	0.022	0	0	0	0.006	0	0	0	0	0	0	29.454	0	0	6
37F3	520	10	165.04	0.012	0	0	0	0	0	0	0	0.744	0	0	0	0.48	0	0.006	0	0	0	0	0	0	163.8	0	0	5
37F4	522	30	89.54	0.002	0	0	0	0	5.747	0	0	0.108	0	0	0.088	0	0.118	0	0	0	0	0	0	0	83.473	0	0	6
36F4	524	15	394.72	0.272	0	0	0	0	0.212	0	0	0.1	0	0	0	0.144	0	0	0	0	0.264	0	0	1.324	392.4	0	0	7
35F4	526	7	375.14	0.02571	0	0	0	0	0	0	0	0	0	0.11143	0	0	0	0	0	0	0	0	0	0	375	0	0	3
35F3	527	30	845.32	0.444	0	0	0	0	0.072	0	0	0	0	0.058	0	0.998	0	0.148	0	0	0	0	0	7.195	836.4	0	0	7
34F2	532	30	8.65	0.032	0	0	0	0	0	0.05	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0.672	7.51	0	0	5
35F2	534	30	244.69	0.352	0.29	0	0	0	8.698	0.1	0	0	0	1.26	0	0	0	0.175	0	0	0	0	0	7.27	226.5	0	0.04	9
33F2	539	30	69.38	0.002	0	0	0	0	9.942	1.454	0	0	0	0.01	0	0	0	0.19	0	0	0	0	0	19.5	38.282	0	0	7
33F1	540	5	195.25	0.048	0	0	0	0	3.372	1.2	0.036	0	0	0	0	0	0	0	0	0	0	0	0	112.2	78.39	0	0	6
33F2	542	30	104.14	0	0	0	0	0	6.701	0.84	0.01	0	0	0.78	0	0	0	0	0	0	0	0	0	1.744	94.061	0	0	6
33F3	544	30	12.05	0	0	0	1.32	0	0	0.016	0	0	0	0	0	0	0	0	0	0	0	0	0	10.71	0	0	0	3
34F4	548	30	74.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65.4	2.254	0	0	6.565	3
34F4	549	30	44.45	0	0	0	0	0	0	0	0	0	0	3.55	0	0	0	0	0	0	0	0	28.2	5.1	0	0	7.6	4
37F6	553	30	140.15	0.052	0	0	0	0	1.451	0	0	0	0.112	0	0	0	0	0	0	0	0	0	0	3.682	134.849	0	0	5
37F6	555	20	4.26	0.021	0	0	0	0	0	0	0	0.12	0	0	0	0	0	0	0	0	0	0	0	4.116	0	0	0	3
37F7	559	15	155.11	0	0	0	0	0	137.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17.894	0	0	2
38F7	560	30	2.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.004	0	0	0	0	0	2.78	0	0	0	2
38F7	561	30	0.36	0.006	0	0	0	0	0	0	0	0	0	0	0	0	0	0.002	0	0	0	0	0	0.26	0	0	0.09	4
37F8	564	15	283.64	0.132	0	0	0	0	219.256	0	0	0	0	0	0.124	0	0	0.084	0	0	0	0	0	1.896	62.144	0.002	0	7
37F8	566	15	394.38	0.06	0	0	0	0	94.374	0	0	0	0	0	0.124	0	0	0	0	0	0	0	0	0	299.826	0	0	4
TOTAL			4209.41	3.831	0.290	0.152	1.320	0.068	493.027	3.926	0.046	45.789	0.112	6.065	0.427	7.570	0.044	3.307	0.472	0.625	2.042	1.164	93.600	270.866	3653.183	0.002	15.735	24
NUMBER OF CATCHES				23	1	2	1	1	21	8	2	18	1	11	5	12	1	21	1	1	3	1	2	26	26	1	5	
PRESENCE (%)				62.2	2.7	5.4	2.7	2.7	56.8	21.6	5.4	48.6	2.7	29.7	13.5	32.4	2.7	56.8	2.7	2.7	8.1	2.7	5.4	70.3	70.3	2.7	13.5	

Table.2a: Frequency, mass, mean length and percentage of herring of the total catch of Cruise 658. of FRV "Solea" (all results normalized on 30 min.)

Haul	Rect.	Stat.	total	clupeid	clupeid	Herring				Herring	
			catch	catch	portion	catch	count	range (cm)			(% clups)
			(kg)	(kg)	(%)	(kg)	(n)	min	max	mean	
1	40F6	477	5.34	0	0						
2	39F7	480	32.53	0	0						
3	39F7	482	52.34	0	0						
4	39F5	485	8.36	4.53	54.2	4.30	112	15.25	19.75	16.94	94.8%
5	39F5	486	4.49	0	0						
6	39F4	488	5.20	0	0						
7	39F3	490	27.37	1.15	4.2	0.01	3	12.25	12.75	12.58	0.9%
8	38F3	494	1.86	0.04	2.3						
9	38F4	496	33.24	30.40	91.5	0.13	18	10.25	10.25	10.25	0.4%
10	37F5	499	15.72	13.11	83.4	0.18	6	14.25	17.25	15.92	1.3%
11	37F5	500	21.62	17.34	80.2	0.04	1	16.25	16.25	16.25	0.2%
12	36F4	503	376.12	372.92	99.2	0.11	5	10.75	15.75	13.92	0.0%
13	36F4	505	94.35	93.34	98.9	0.04	1	14.75	14.75	14.75	0.0%
14	36F3	506	17.63	16.08	91.2						
15	36F3	508	100.47	99.36	98.9	0.08	4	10.25	15.75	13.75	0.1%
16	36F1	514	173.03	169.95	98.2	0.15	3	15.25	19.75	18.25	0.1%
17	37F2	518	30.87	30.42	98.5	0.96	126	7.25	17.75	9.52	3.2%
18	37F3	520	165.04	163.80	99.2						
19	37F4	522	89.54	89.22	99.6	5.75	2025	5.25	16.25	7.88	6.4%
20	36F4	524	394.72	392.61	99.5	0.21	8	14.25	15.25	14.88	0.1%
21	35F4	526	375.14	375.00	100.0						
22	35F3	527	845.32	836.47	99.0	0.07	1	20.75	20.75	20.75	0.0%
23	34F2	532	8.65	7.51	86.8						
24	35F2	534	244.69	235.49	96.2	8.70	3491	5.25	10.25	7.30	3.7%
25	33F2	539	69.38	48.22	69.5	9.94	1801	7.75	11.75	9.72	20.6%
26	33F1	540	195.25	81.76	41.9	3.37	846	6.75	11.25	8.35	4.1%
27	33F2	542	104.14	100.76	96.8	6.70	772	8.75	12.25	10.45	6.7%
28	33F3	544	12.05	0	0						
29	34F4	548	74.22	65.40	88.1						
30	34F4	549	44.45	28.20	63.4						
31	37F6	553	140.15	136.30	97.3	1.45	87	10.25	16.75	12.75	1.1%
32	37F6	555	4.26	0	0						
33	37F7	559	155.11	155.11	100	137.22	14306	9.75	12.75	11.24	88.5%
34	38F7	560	2.78	0	0						
35	38F7	561	0.36	0	0						
36	37F8	564	283.64	281.40	99.2	219.26	39152	8.75	10.25	9.36	77.9%
37	37F8	566	394.38	394.20	100	94.37	18062	8.75	10.25	9.39	23.9%

Table.2b: Frequency, mass, mean length and percentage of sprat of the total catch of Cruise 658. of FRV "Solea" (all results normalized on 30 min.)

Haul	Rect.	Stat.	total	clupeid	clupeid	Sprat					Sprat	
			catch	catch	portion	catch	count	range (cm)			Sprat (%)	
			(kg)	(kg)	(%)			(kg)	(n)	min		max
1	40F6	477	5.34	0	0							
2	39F7	480	32.53	0	0							
3	39F7	482	52.34	0	0							
4	39F5	485	8.36	4.53	54.2	0.24	16	9.25	14.25	12.50	5.2%	
5	39F5	486	4.49	0	0							
6	39F4	488	5.20	0	0							
7	39F3	490	27.37	1.15	4.2	1.14	98	0.75	4.75	2.88	99.1%	
8	38F3	494	1.86	0.04	2.3	0.04	3	10.75	11.75	11.08	100%	
9	38F4	496	33.24	30.40	91.5	30.27	3253	9.25	13.25	10.94	99.6%	
10	37F5	499	15.72	13.11	83.4	12.93	1127	8.75	13.75	11.50	98.7%	
11	37F5	500	21.62	17.34	80.2	17.30	1828	8.25	13.25	10.95	99.8%	
12	36F4	503	376.12	372.92	99.2	372.82	51656	8.75	10.75	9.86	100%	
13	36F4	505	94.35	93.34	98.9	93.30	12854	5.75	13.25	9.97	100%	
14	36F3	506	17.63	16.08	91.2	16.08	1491	10.25	14.25	11.50	100%	
15	36F3	508	100.47	99.36	98.9	99.28	18615	7.75	12.75	9.21	99.9%	
16	36F1	514	173.03	169.95	98.2	169.80	11287	10.25	14.25	12.07	99.9%	
17	37F2	518	30.87	30.42	98.5	29.45	3690	8.25	14.25	10.35	96.8%	
18	37F3	520	165.04	163.80	99.2	163.80	15036	10.75	14.25	11.60	100%	
19	37F4	522	89.54	89.22	99.6	83.47	42535	6.75	10.75	8.84	93.6%	
20	36F4	524	394.72	392.61	99.5	392.40	45410	9.25	14.25	10.52	99.9%	
21	35F4	526	375.14	375.00	100.0	375.00	31984	9.25	13.75	11.50	100%	
22	35F3	527	845.32	836.47	99.0	836.40	71600	10.25	14.25	11.70	100%	
23	34F2	532	8.65	7.51	86.8	7.51	452	11.75	15.25	13.10	100%	
24	35F2	534	244.69	235.49	96.2	226.50	35734	5.75	13.25	9.49	96.2%	
25	33F2	539	69.38	48.22	69.5	38.28	9596	5.75	9.75	8.41	79.4%	
26	33F1	540	195.25	81.76	41.9	78.39	48576	4.25	9.75	6.11	95.9%	
27	33F2	542	104.14	100.76	96.8	94.06	17344	5.75	11.75	8.96	93.3%	
28	33F3	544	12.05	0	0							
29	34F4	548	74.22	65.40	88.1							
30	34F4	549	44.45	28.20	63.4							
31	37F6	553	140.15	136.30	97.3	134.85	11721	9.25	13.75	11.53	98.9%	
32	37F6	555	4.26	0	0							
33	37F7	559	155.11	155.11	100	17.89	1608	9.75	13.75	11.39	11.5%	
34	38F7	560	2.78	0	0							
35	38F7	561	0.36	0	0							
36	37F8	564	283.64	281.40	99.2	62.14	9282	8.75	11.25	9.78	22.1%	
37	37F8	566	394.38	394.20	100	299.83	48502	7.25	10.75	9.41	76.1%	

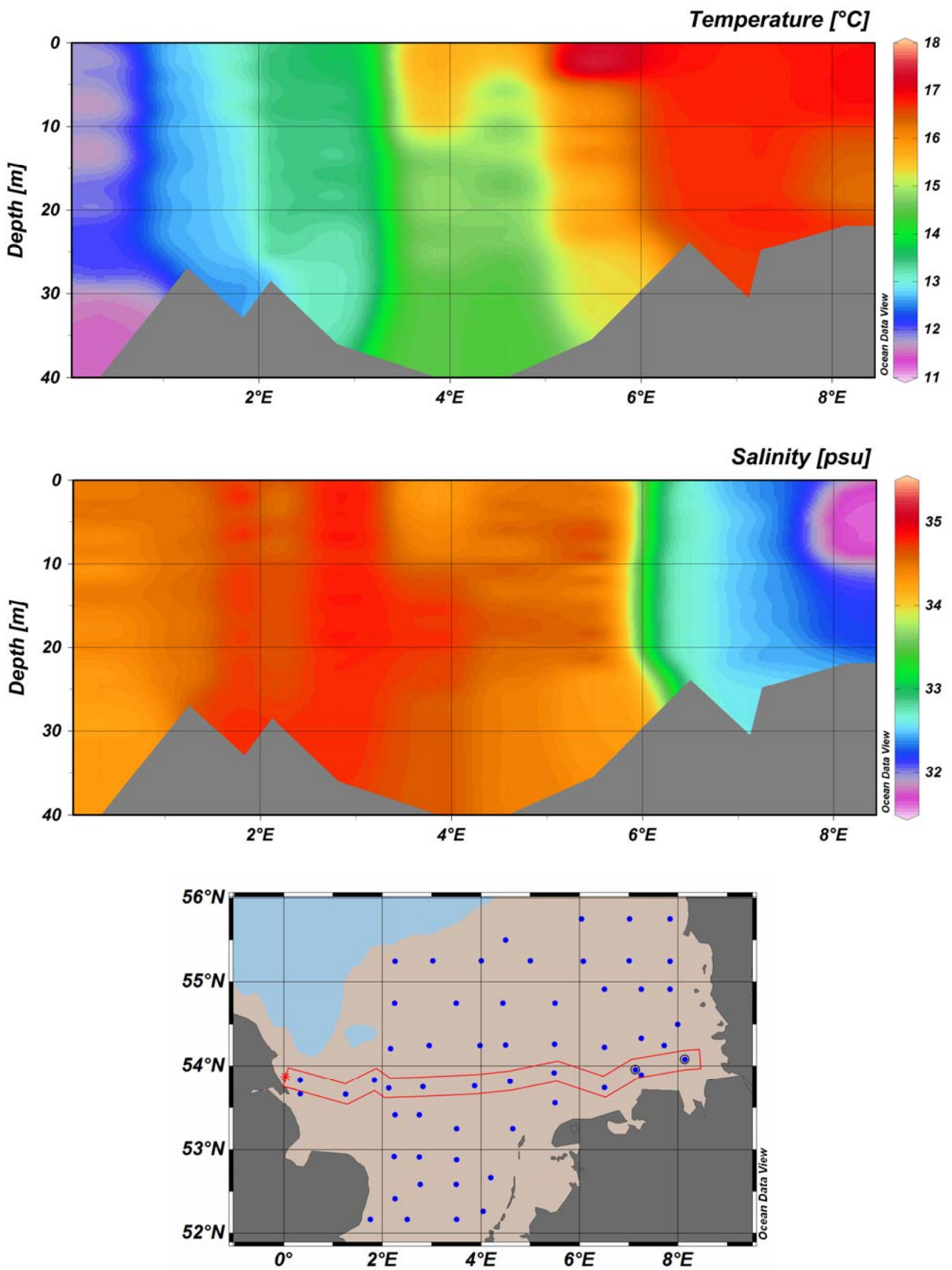


Figure 5: 658. Cruise of FRV "Solea" – temperature and salinity at a transect at 54° E (presented with ODV).