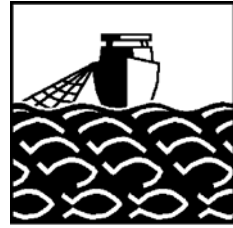


**Federal Research Centre for Fisheries  
Institute for Fishery Technology and Fishery Economics**



**Cruise Report**

**International Acoustic Survey for Pelagic Fish Stocks in the North Sea**

**FRV "SOLEA"  
29.06. - 18.07.2006**

**Cruise No. 559**

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## **International Acoustic Survey for Pelagic Fish Stocks in the North Sea**

### **Cruise 559 FRV "SOLEA"**

**Date: 29.06. - 18.07.2006**

#### **Participants:**

E. Bethke	Inst. for Fishery Technology, Hamburg
M. Drenckow	Inst. for Fishery Technology, Hamburg
G. Gentschow	Inst. for Sea Fishery, Hamburg
C. Konrad	University Aberdeen
D. Risch	FTZ/University Kiel
N. Rohlf	Inst. for Sea Fishery, Hamburg
J. Ulleweit	Inst. for Sea Fishery, Hamburg

#### **Objective**

The 559th 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**

FRV "Solea" left the port of Cuxhaven on 29th June 2006. The investigation area covered the southern part of the North Sea from 52°N to 55°30'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 transducer ES38B and ES120-7c were calibrated under good conditions in the open sea close to the White Bank at a distance between transducer and calibration sphere of about 14 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 3.10. 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' (ver. 3.1, ICES CM 2003/G:03, Appendix 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 trawl haul or after about 30 NM sailed hydrographical conditions were investigated with a CTD probe. The survey ended on 17th July 2006 in Cuxhaven.

## Results

The cruise track (Figure 1) reached in total a length of 3064 nautical miles. 31 trawl hauls were carried out and hydrographical parameters were measured on 64 stations.

Catch compositions of the conducted hauls are presented in Table 1. 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.

A handwritten signature in black ink, appearing to read 'E. Bethke', is positioned to the left of a vertical red line.

Eckhard Bethke  
(cruise leader)

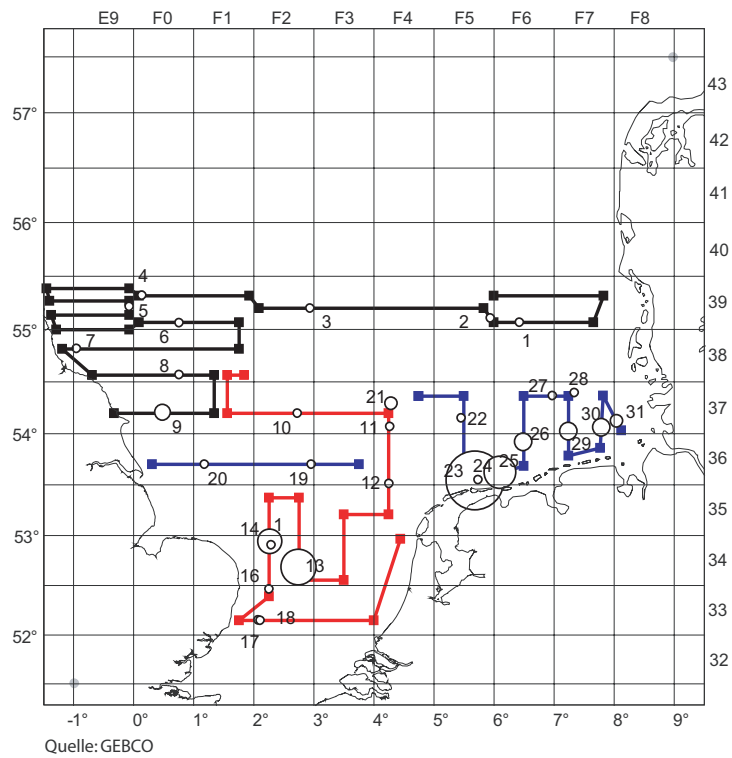


Figure 1: 559. Cruise of FRV “Solea“ – cruise track and fishery stations (large bubbles show large catches if larger than a minimum size).

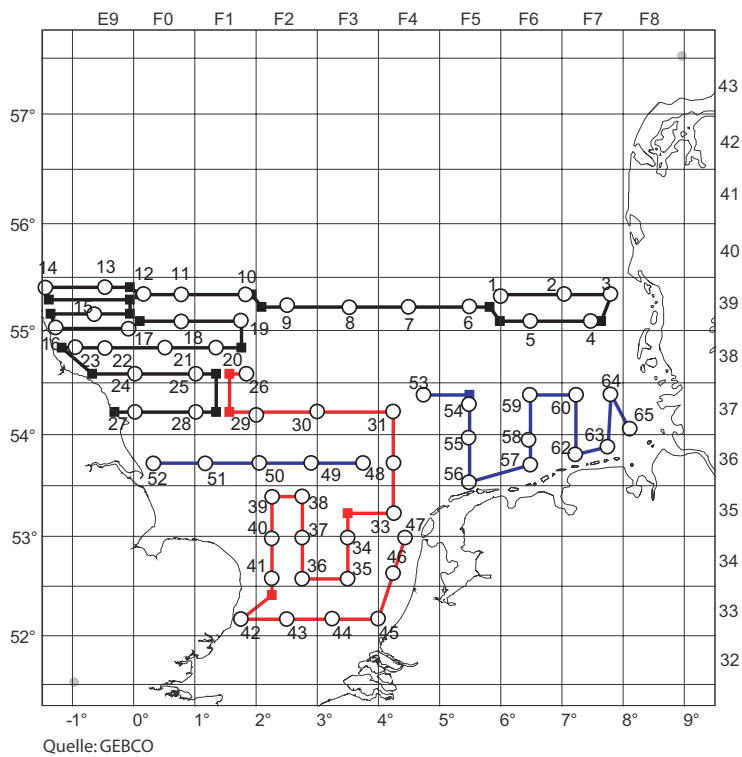


Figure 2: 559. Cruise of FRV “Solea“ – Hydrographical stations.

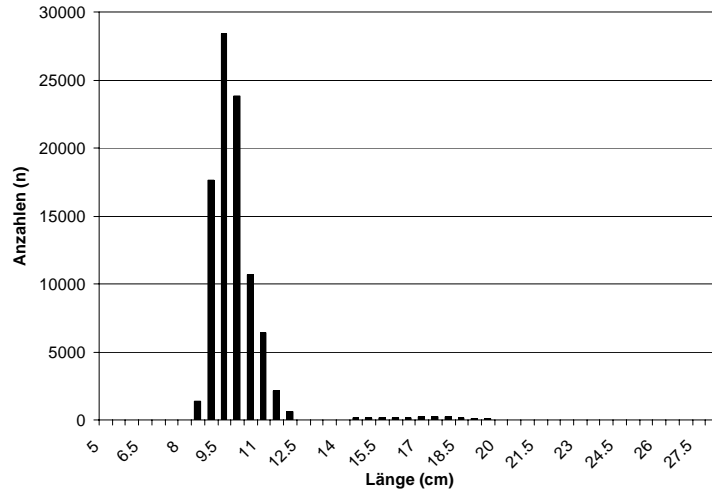


Figure 3: 559. Cruise of FRV "Solea" – Herring – total length distribution.

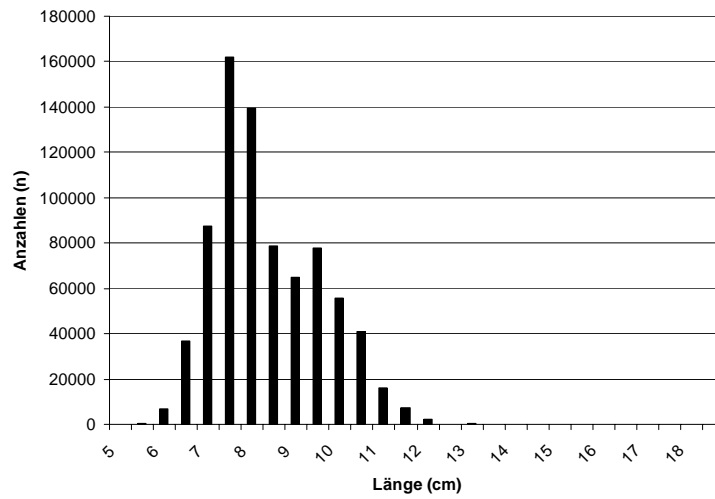


Figure 4: 559. Cruise of FRV "Solea" – Spratt – total length distribution.

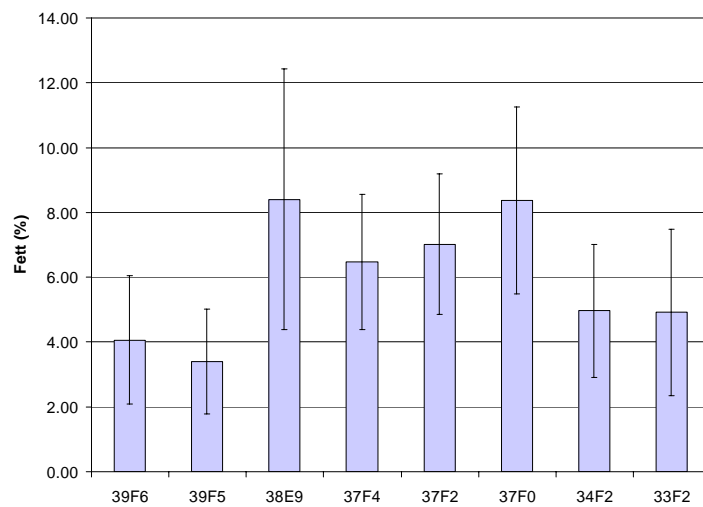


Figure 5: Mean fat content of Herring (% of fish mass) within the investigated ICES-Rectangles.

rectangle	station	kg total	ALOSA FALLAX	AMMODYTES MARINUS	BELONE BELONE	CLUPEA HARENGUS	CLUPEIDAE	ECHIICHTHYS VIPERA	ENTELURUS AEQUOREUS	EUTRIGLA GURNARDUS	GLYPTOCEPHALUS CYNOGLOSSUS	HYPEROPLUS LANCEOLATUS	MELANOGRAMMUS AEGLEFINUS	SARDINA PILCHARDUS	SCOMBER SCOMBERUS	SPRATTUS SPRATTUS	TRACHURUS TRACHURUS	TRISOPTERUS ESMARKI	number of species
39F6	495	26.358				21.57			0.01	0.946						3.83			4
39F5	496	4.424				3.702				0.71									2
39F2	500	0.646							0.04	0.606									2
39F0	504	0.266							0.044	0.222									2
39E9	508	0.56							0.088	0.472									2
39F0	512	0.26							0.016	0.244									2
38E9	518	12.545				0.69			0.77				1.78			1.456		0.104	5
38F0	521	4.405							0.04	4.126						0.041			3
37F0	524	328.926				24.3		0.024	0.024	0.878						303.7			5
37F2	528	23.23				0.16			0.028	0.92						22.12			4
37F4	531	124.056				8.27				0.056						115.73			3
36F4	533	51.442								0.042					0.2	51.2			3
34F2	538	2308.754				0.886		0.028							0.44	2307.4			4
34F2	543	54.74					54.74												1
34F2	544	1100.842	1.36			0.046		0.402				0.03				1099			5
33F2	546	77.659				5.346		0.072							0.194	71.867			4
33F2	548	3.228				0.062		2.136				0.05			0.974				4
33F2	549	58.104				0.48		2.776								54.6			3
36F2	556	121.056													0.256	120.8			2
36F1	559	0.079									0.001	0.076							2
37F4	562	162.899	0.7			6.915			0.02	0.364						154.9			5
37F5	565	52.848						0.206	0.004	0.19					1.848	7.9	42.7		6
36F5	568	1136.8				307.15						0.028			0.314	827.45	1.858		5
36F5	569	8.343							0.004			0.236		0.148	6.325		1.63		5
36F6	570	626.244				260.51						0.14			0.704	364.89			4
36F6	572	487.598				33.5						0.892			0.406	452.8			4
37F6	575	52.74				2.716				1.068				0.136	42.2	0.79	5.83		6
37F7	577	77.467		0.014						0.59		0.462			70.2		6.195		5
37F7	579	312.186			0.296	4.91				0.366					0.524	306.09			5
37F7	582	219.357				106.99				0.372					6.985	105.01			4
37F8	584	104.51				5.87				0.064		0.076			1.47	97.03			5
<b>total</b>		7542.572	2.060	0.014	0.296	794.07	54.74	5.644	1.088	12.24	0.001	1.990	1.780	0.284	133.04	6468.60	58.21	0.104	
<b>portion (%)</b>			0.03	0.00	0.00	10.53	0.73	0.07	0.01	0.16	0.00	0.03	0.02	0.00	1.76	85.77	0.77	0.00	
<b>number of catches</b>			2	1	1	19	1	7	12	18	1	9	1	2	15	21	5	1	
<b>presence (%)</b>			6.45	3.23	3.23	61.29	3.23	22.58	38.71	58.06	3.23	29.03	3.23	6.45	48.39	67.74	16.13	3.23	

Table 1: Catch compositions of the conducted hauls - 559. Cruise of FRV "Solea"

Haul	Date	Station	Position		Depth m	total k	Herring			Sprat			Clupeids	Herring	Sprat
			Lat	Lon			k	n	mean cm	k	n	mean cm	k	%	%
1	20060701	495	550695N	0062595E	44	26.358	21.57	530	17.78	3.83	519	9.79	25.4	85	15
2	20060701	496	550788N	0055902E	40	4.424	3.702	89	17.78	115.73	18966	9.28	119.432	3	97
3	20060702	500	551504N	0025621E	28	0.646				51.2	3823	11.95	51.2	0	100
4	20060703	504	552201N	0000469E	72	0.266				2307.4	216820	11.16	2307.4	0	100
5	20060704	508	551429N	0000476W	71	0.56				1099	183899	9.25	1099	0	100
6	20060705	512	550695N	0004215E	73	0.26							0		
7	20060706	518	545190N	0005456W	66	12.545	0.69	5	24.25	1.456	132	11.34	2.146	32	68
8	20060707	521	543718N	0004118E	65	4.405				0.041	3	11.92	0.041	0	100
9	20060707	524	541499N	0002469E	56	328.926	24.3	673	17.61	303.7	22600	11.81	328	7	93
10	20060708	528	541508N	0024060E	38	23.23	0.16	5	15.85	22.12	1536	12.31	22.28	1	99
11	20060709	531	540535N	0041559E	45	124.056	8.27	260	15.98				8.27	100	0
12	20060709	533	533553N	0041591E	29	51.442							0		
13	20060710	538	524058N	0024482E	39	2308.754	0.886	31	15.07				0.886	100	0
14	20060711	543	525968N	0021520E	42	54.74							54.74*		
15	20060711	544	525879N	0021569E	40	1100.842	0.046	2	15.00				0.046	100	0
16	20060711	546	522690N	0021522E	38	77.659	5.346	28	13.08	71.86	7141	11.49	77.213	7	93
17	20060712	548	521012N	0020209E	36	3.228	0.062	1	19.75				0.062	100	0
18	20060712	549	520997N	0020329E	35	58.104	0.4	11	16.80	54.6	9005	9.01	55.08	1	99
19	20060713	556	534498N	0025999E	42	121.056				120.8	1592	10.10	120.8	0	10
20	20060713	559	534518N	0011184E	28	0.079							0		
21	20060714	562	542111N	0041928E	47	162.899	6.915	18	16.87	154.9	2639	9.07	161.815	4	96
22	20060714	565	541452N	0052899E	36	52.84				7.9	536	12.03	7.9	0	10
23	20060715	568	533530N	0054086E	20	1136.8	307.15	38444	10.05	827.45	118485	9.42	1134.6	27	73
24	20060715	569	533562N	0054290E	20	8.343							0		
25	20060715	570	533974N	0060528E	21	626.244	260.51	30828	10.30	364.89	45743	9.77	625.4	42	58
26	20060715	572	535613N	0062994E	25	487.598	33.5	3350	11.23	452.8	39535	11.17	486.3	7	93
27	20060716	575	542502N	0065309E	33	52.74	2.716	72	16.77	0.79	53	12.34	3.506	77	23
28	20060716	577	542538N	0071486E	29	77.467							0		
29	20060716	579	540309N	0071523E	31	312.186	4.91	581	10.16	306.09	39925	9.87	311	2	98
30	20060717	582	540750N	0074793E	38	219.357	106.99	16777	9.40	105.01	14949	9.53	212	50	50
31	20060717	584	541084N	0080207E	22	104.51	5.87	1025	9.58	97.03	11381	10.03	102.9	6	94

\* juvenile sprat and herring to be identified

Table 2: Frequency, mass, mean length and percentage of herring or sprat of the total catch. 559. Cruise of FRV "Solea"

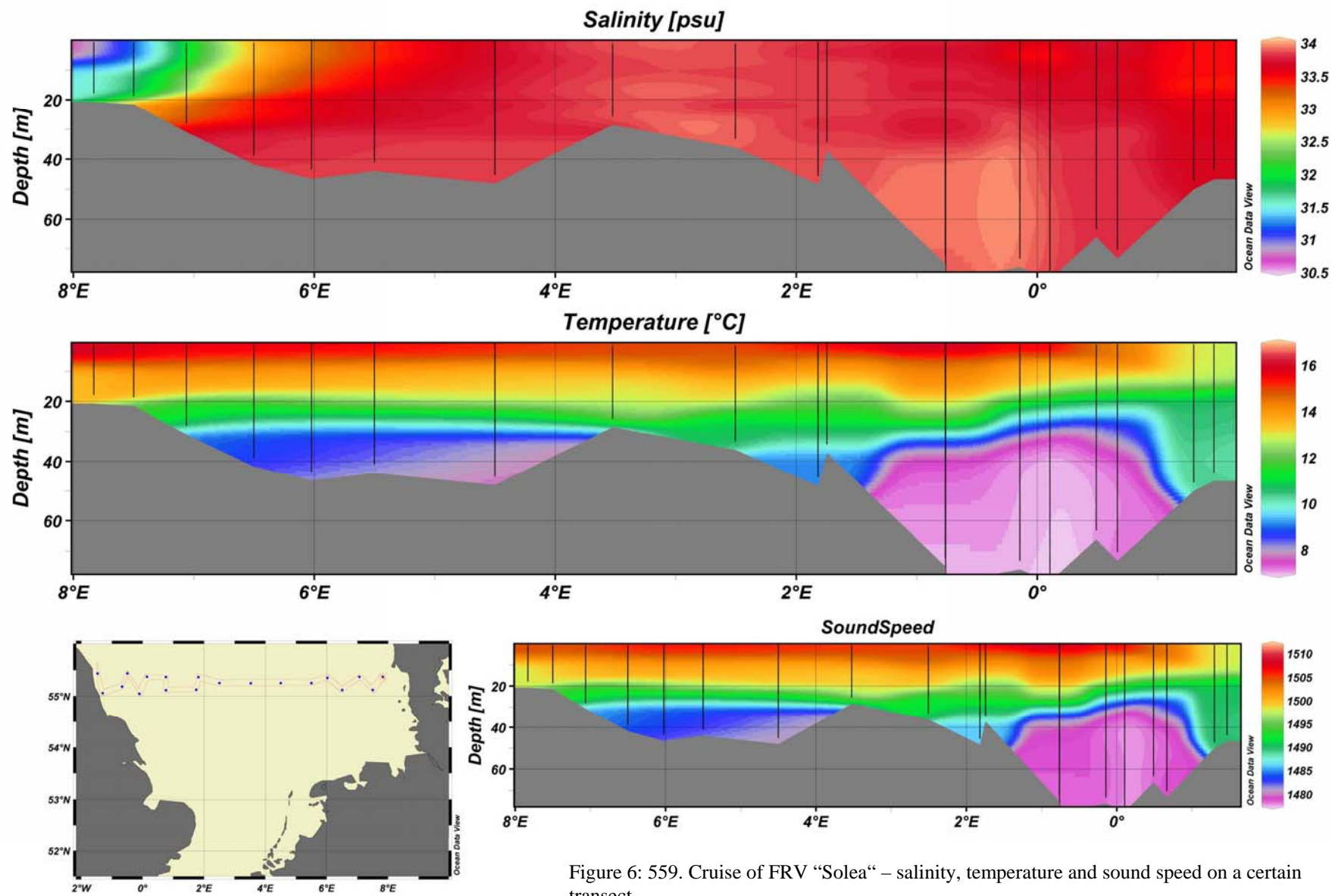


Figure 6: 559. Cruise of FRV "Solea" – salinity, temperature and sound speed on a certain transect.