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# Cruise report RV "Alkor" Cruise 488-1 06.01. – 17.01.2017

## German Small-scale Bottom Trawl Survey and International Herring Larvae Survey in the North Sea

Scientist in charge: Dr. Norbert Rohlf

### Summary

The international herring larvae surveys in the North Sea (IHLS) are conducted annually during the autumn and winter herring spawning activity and monitor the spatial distribution and abundance of herring larvae. The survey index is used as an important estimator of herring spawning stock biomass and provides valuable information for herring stock assessment and the fixation of fishing quotas. Quantities of newly hatched larvae were in the same order of magnitude as in 2016, but much lower compared to the historic high estimates found in the English Channel in 2014 and 2013. However, conclusions for North Sea herring stock spawning biomass can only be drawn when information of larvae abundance from all spawning areas become available prior to the herring assessment working group meeting in March 2017.

The German Small-scale Bottom Trawl Survey (GSBTS) continued the long-term investigation of the standard area "Box A" in the German Bight. Within the 10-by-10 nautical mile area in the Box, the benthic epifauna was monitored with a 2-m beam trawl. High abundances of *Ophiura ophiura* re-occurred after low values in 2016. Abundances of the shrimps *Crangon crangon* and *Crangon allmanni* decreased remarkably compared to previous years. The non-indigenous Angular crab *Goneplax rhomboides* was found for the first time in Box A indicating a further spread and successful establishment of this species in the southern North Sea since its first appearance in 2008.

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FIZ-Fischerei  
TI - PR  
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Fahrtteilnehmer  
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## **2. Research programme**

### **2.1 Herring larvae survey**

One aim of the cruise was the German contribution to the international herring larvae surveys in the North Sea in January. Parts of ICES area IVc and VIIId should be sampled by double oblique tows with the "Nackthai" (modified GULF III sampler), resulting in herring larval abundance estimates and spatial distribution. In the survey area in the southern North Sea and the English Channel, 44 plankton tows were done in total. Sampling was achieved according to the manual of the herring larvae surveys. Physical measurements, e.g. temperature, salinity and conductivity, were conducted via a CTD mounted directly onto the gulf sampler. No technical malfunctions occurred during any station work.

### **2.2 Epibenthos (Senckenberg Research Institute)**

Epibenthos sampling was done by 2-m beam trawl hauls in order to monitor the benthic invertebrates and bottom fish assemblage (Table 2). The 2-m beam trawl had a mesh size of 20 x 20 mm in the main net and 4 x 4 mm in the cod end and was applied with 5-min towing duration at 1.5 knots. Samples were sieved over 5 mm and 2 mm mesh. The 5 mm fraction was analysed aboard, the 2 mm fraction was preserved in 70% alcohol for analysis in the laboratory ashore.

## **3. Narrative**

RV "Alkor" left the port of Kiel on Friday, 01/06/17, at noon. The vessel steamed into the English Channel, where the herring larvae survey started on Sunday, 01/08/17. Station work could be conducted until Wednesday, 01/11/17, when wind stress increased. With regard to some depressions forecasted for the southern North Sea and wind force up to 10-11 Beaufort, the vessels steamed into the port of Scheveningen getting some shelter. The vessel was in port, awaiting better weather conditions, until early Sunday morning, 01/15/17. The day was used to finalise as much of the remaining IHLS stations as possible. In total, 44 stations were covered during the IHLS programme.

On Monday, 01/16/17, the research programme continued with benthos sampling in Box A in the German Bight. Here, eight hauls with the 2m beam trawl were conducted. The research programme was terminated the same afternoon and RV "Alkor" steamed back to the port of Kiel, where the cruise ended at noon the next day (01/17/17).

## **4. Preliminary results**

### **4.1 Ichthyoplankton (TI-SF)**

Fish eggs and larvae were sorted from the plankton samples in the institute in Hamburg. Herring larvae were counted and length measured to millimetre below and their abundance per square metre estimated.

The samples yielded in total 3,063 herring larvae, almost the same as in 2016 (3,235), when the area was fully covered, but much lower when compared to the period 2010 to 2014 (12,000-30,000 larvae). Fish larvae of other taxa amounted to 95 and 940 fish eggs were caught, too. Species identification of the remaining fish eggs and larvae is not finished yet. However, conclusions for North Sea herring stock spawning biomass can only be drawn when information of larvae abundance from all spawning areas become available prior to the herring assessment working group meeting in March 2017.

The cruise track by station number is given in Figure 1 and the spatial distribution of herring larvae in Figure 2. In Figure 3 the length frequency distribution of herring larvae is shown. Figure 4 depicts the distribution of near-bottom water temperature and salinity. Abundance estimates and available physical parameters are listed in Table 1.

### 4.3 Epibenthos (Senckenberg Research Institute)

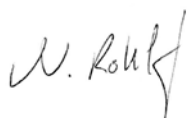
Eight beam trawl samples were taken in Box A. Epifauna assemblages were dominated by high numbers of the starfish *Asterias rubens*, the brittle star *Ophiura ophiura* and the dab *Limanda limanda*. High abundances of *Ophiura ophiura* re-occurred after low values in 2016. Abundances of the shrimps *Crangon crangon* and *Crangon allmanni* decreased remarkably compared to previous years. Additionally, the goby *Pomatoschistus minutus* was less abundant this year. In contrast, abundance of the star fish *Astropecten irregularis* continued to increase in Box A. The non-indigenous Angular crab *Goneplax rhomboides* was found for the first time in Box A indicating a further spread and successful establishment of this species in the southern North Sea since its first appearance in 2008.

## 5. Participants

Name	Institution	Function
1. Norbert Rohlf	TI-SF	Cruise leader
2. Birgit Suer	TI-SF	Technician
3. Sakis Kroupis	TI-SF	Technician
4. Michael Sasse	TI-SF	Technician
5. Inken Rottgardt	TI-SF	Student
6. Dr. Hermann Neumann	Senckenberg	Scientist
7. Dominik Cramer	Senckenberg	Scientist

## 6. Acknowledgement

Thanks to Captain Jan Lass and RV "Alkor" crew members for their great support and hospitality, to crew and Geomar for helping out on short notice, and to all participants for their reliable and responsible teamwork.



(Dr. Norbert Rohlf)

## 7. Tables and Figures

Table 1: Main data of Ichthyoplankton hauls made during AL 488-1

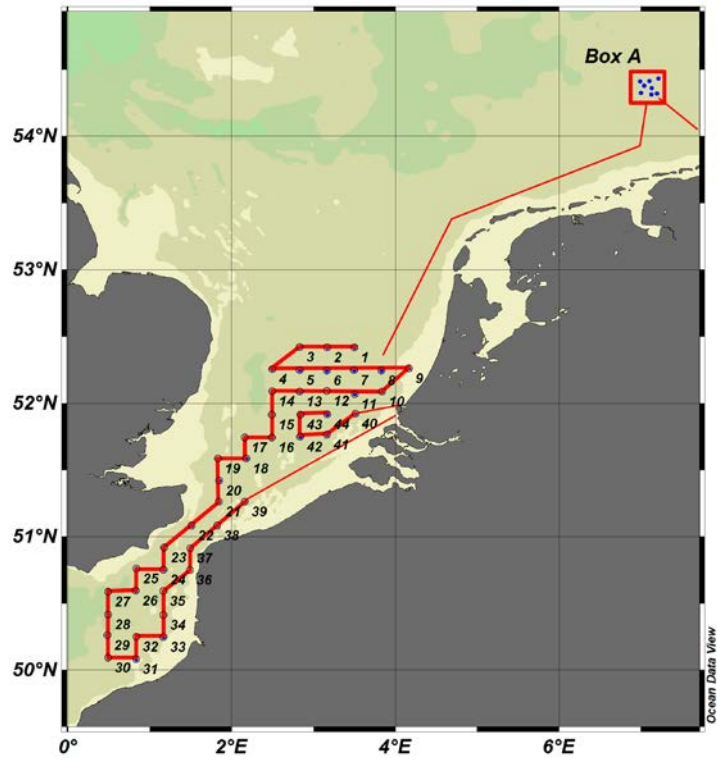
Stat. No.	Haul No.	Lat. (° N)	Long.	E/W	Date (UTC)	Time (UTC)	Duration (min)	Water depth (m)	Catch depth (m)	Flow (m <sup>3</sup> )	Hela (n/m <sup>2</sup> )	Surface		Bottom	
												T (°C)	Sal (psu)	T (°C)	Sal (psu)
1	1	52°25.15	003°29.97	E	08.01.17	08:40	3.32	30	26	20.3	0	8.60	34.89	8.60	34.88
2	2	52°25.12	003°09.98	E	08.01.17	09:57	6.53	44	40	48.8	0	9.21	34.98	9.22	34.94
3	3	52°25.21	002°49.93	E	08.01.17	11:13	7.45	42	39	57.7	0	9.58	35.00	9.58	34.99
4	4	52°15.53	002°29.70	E	08.01.17	12:59	6.50	44	41	44.2	0	9.52	34.95	9.52	34.60
5	5	52°14.80	002°49.98	E	08.01.17	14:15	5.18	39	36	30.0	3	9.32	34.97	9.33	34.69
6	6	52°14.72	003°09.70	E	08.01.17	15:27	4.15	34	31	26.0	0	8.84	34.92	8.85	34.66
7	7	52°14.75	003°29.79	E	08.01.17	16:49	3.20	26	23	18.8	0	8.37	34.81	8.38	34.64
8	8	52°14.68	003°49.69	E	08.01.17	18:02	2.41	24	21	15.6	0	7.31	33.67	7.50	33.98
9	9	52°15.07	004°09.96	E	08.01.17	19:24	1.53	20	17	10.5	0	6.63	30.71	6.94	31.77
10	10	52°05.14	003°50.29	E	08.01.17	20:58	2.34	23	20	15.5	0	7.37	33.35	7.49	33.67
11	11	52°04.60	003°30.10	E	08.01.17	22:17	2.41	30	27	11.2	0	8.13	34.69	8.14	34.62
12	12	52°05.55	003°09.89	E	08.01.17	23:36	4.23	32	29	32.3	0	8.62	34.90	8.62	34.75

Tab.1 continued

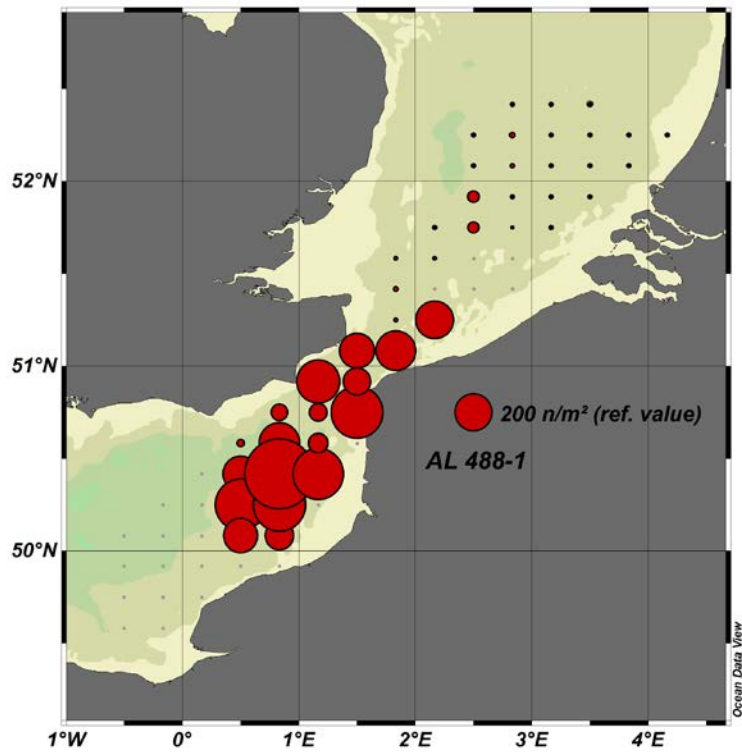
Stat. No.	Haul No.	Lat. (° N)	Long.	E/W	Date (UTC)	Time (UTC)	Duration (min)	Water depth (m)	Catch depth (m)	Flow (m <sup>3</sup> )	Hela (n/m <sup>2</sup> )	Surface		Bottom	
												T (°C)	Sal (psu)	T (°C)	Sal (psu)
13	13	52°05.24	002°49.85	E	09.01.17	00:52	6.13	36	33	44.0	3	8.93	34.90	8.93	34.83
14	14	52°05.42	002°29.79	E	09.01.17	02:10	6.06	39	36	39.0	0	9.46	34.97	9.47	34.55
15	15	51°54.90	002°29.40	E	09.01.17	03:12	6.02	39	36	40.2	19	9.25	34.99	9.26	34.69
16	16	51°44.52	002°29.46	E	09.01.17	04:15	5.12	34	31	39.7	20	9.08	35.07	9.09	34.90
17	17	51°44.54	002°09.68	E	09.01.17	05:30	6.38	48	45	35.5	0	9.43	35.07	9.44	34.49
18	18	51°35.14	002°10.59	E	09.01.17	06:29	5.06	42	39	25.8	1	9.36	35.08	9.37	34.93
19	19	51°35.01	001°49.99	E	09.01.17	07:45	4.37	41	38	23.2	1	9.06	35.07	9.06	35.04
20	20	51°25.15	001°50.07	E	09.01.17	08:48	5.02	44	41	29.2	2	8.78	34.95	8.82	34.88
21	21	51°15.71	001°50.05	E	09.01.17	09:55	6.20	43	40	42.2	2	9.04	35.03	9.09	35.03
22	22	51°05.12	001°30.05	E	09.01.17	11:56	10.55	52	49	81.8	279	8.10	34.52	8.28	34.76
23	23	50°55.15	001°10.43	E	09.01.17	13:38	3.46	33	30	19.0	156	9.13	35.01	9.14	34.72
24	24	50°45.24	001°09.96	E	09.01.17	14:39	2.57	26	24	12.5	22	9.46	35.04	9.46	34.10
25	25	50°45.68	000°49.98	E	10.01.17	05:56	5.11	39	36	26.7	27	9.59	35.04	9.49	35.02
26	26	50°35.71	000°49.55	E	10.01.17	07:18	6.00	46	43	33.8	179	9.47	34.95	9.47	34.88
27	27	50°35.26	000°29.34	E	10.01.17	09:23	7.06	58	54	37.6	5	10.19	35.16	10.20	33.88
28	28	50°24.99	000°29.42	E	10.01.17	10:36	6.08	44	41	39.6	166	10.47	35.21	10.47	33.73
29	29	50°15.07	000°28.90	E	10.01.17	11:41	7.00	42	39	50.7	468	10.39	35.14	10.38	34.19
30	30	50°05.06	000°29.34	E	10.01.17	12:44	5.59	35	32	44.2	219	10.13	35.02	10.13	34.86
31	31	50°04.92	000°49.84	E	10.01.17	14:13	2.03	28	25	9.7	42	9.19	34.92	9.21	34.84
32	32	50°14.97	000°49.92	E	10.01.17	15:17	4.48	35	32	28.9	342	9.85	35.13	9.86	35.07
33	33	50°14.91	001°09.89	E	10.01.17	16:35	3.22	28	25	18.1	463	8.00	34.77	8.02	34.68
34	34	50°24.79	001°09.89	E	10.01.17	17:39	3.40	34	31	19.4	218	8.74	34.90	8.76	34.90
35	35	50°35.49	001°09.87	E	10.01.17	18:42	7.24	58	55	36.3	35	8.87	34.80	8.89	34.80
36	36	50°44.95	001°29.27	E	10.01.17	20:08	2.56	33	30	13.3	159	8.20	34.45	8.19	34.44
37	37	50°54.71	001°29.55	E	10.01.17	21:06	6.12	60	57	23.2	42	8.68	34.71	8.70	34.69
38	38	51°04.98	001°49.35	E	10.01.17	22:19	2.56	33	30	13.0	90	8.03	34.47	8.04	34.45
39	39	51°15.07	002°09.70	E	10.01.17	23:41	3.59	41	38	19.7	99	8.35	34.62	8.35	34.61
40	40	51°55.03	003°30.61	E	15.01.17	09:44	2.01	24	21	10.0	0	7.11	34.16	7.12	34.14
41	41	51°45.08	003°09.91	E	15.01.17	11:09	2.08	21	18	9.0	0	7.19	34.08	7.19	34.07
42	42	51°44.81	002°50.15	E	15.01.17	12:20	4.00	28	25	26.6	1	7.77	34.63	7.79	34.52
43	43	51°54.90	002°50.27	E	15.01.17	13:28	3.35	37	34	16.7	0	8.00	34.80	8.03	34.79
44	44	51°54.94	003°09.99	E	15.01.17	14:34	2.33	33	30	9.0	0	7.69	34.67	7.69	34.53

Table 2: Boundaries of Box A in the German EEZ

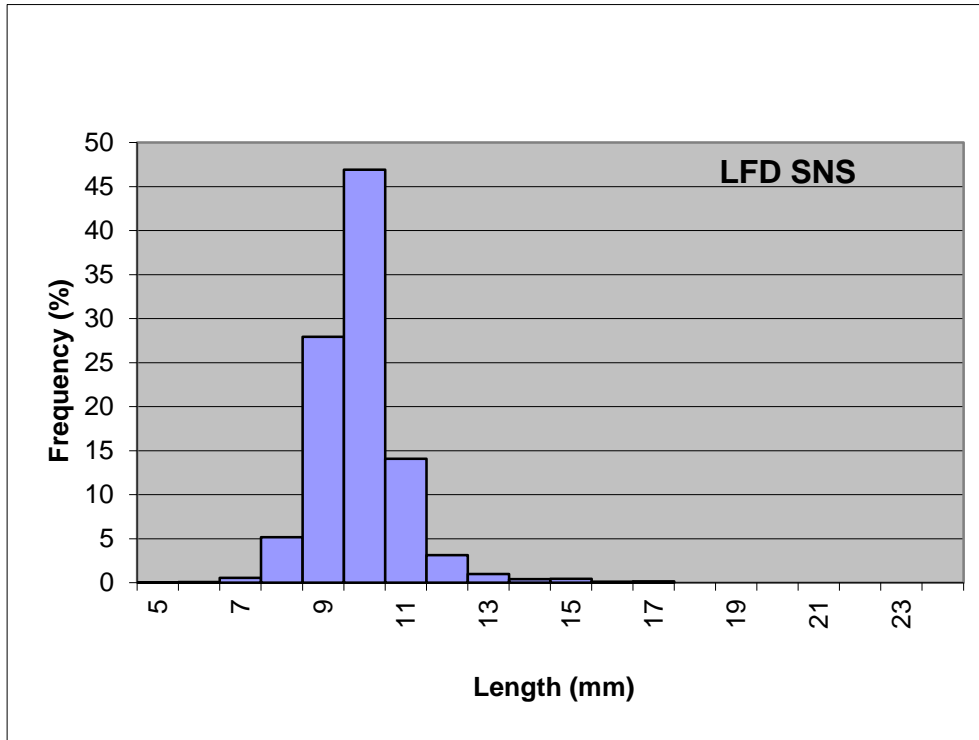
LAT		LON		Center	
From	To	From	to		
54°17.00' N	54°27.00' N	006°58.00' E	007°15.00' E	54°22.00' N	007°06.50' E



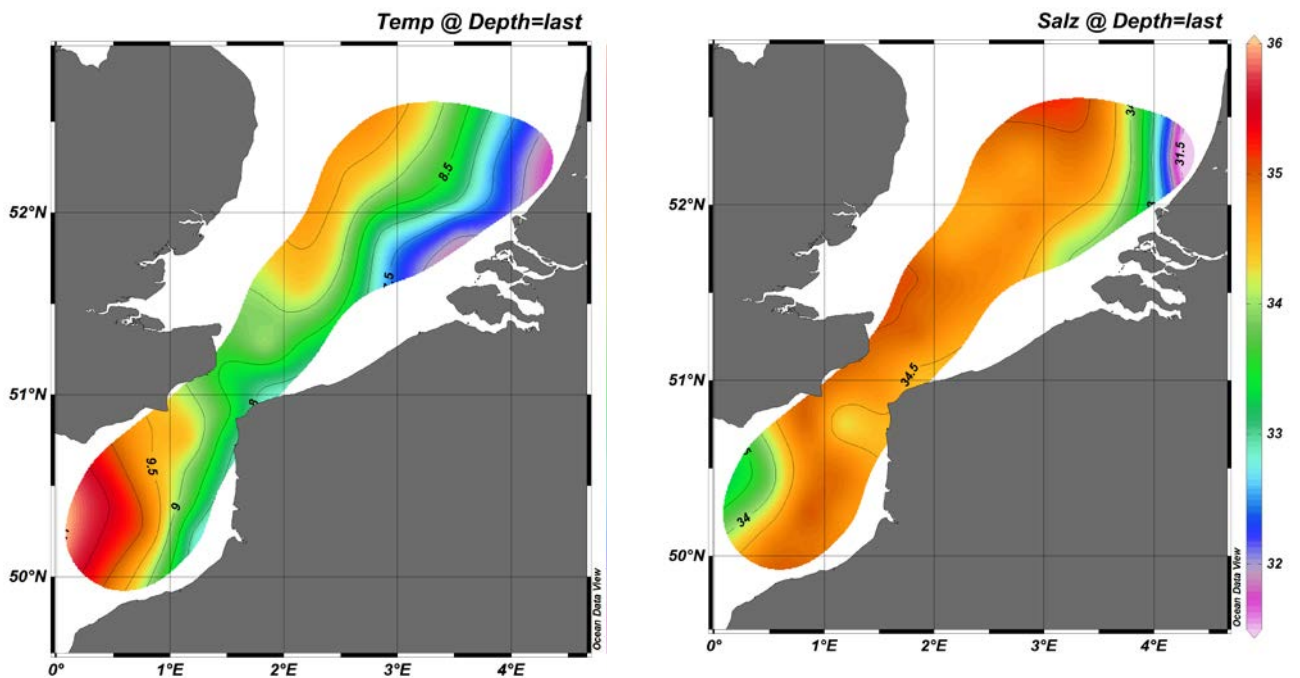
**Figure 1:** Location of Box A in the German Bight and positions of herring larvae stations in the southern North Sea and the English Channel.



**Figure 2:** Distribution and abundance of herring larvae (n/m<sup>2</sup>, all length classes) in the southern North Sea and the English Channel. The circle size equivalent to 200 larvae per square metre is indicated.



**Figure 3:** Length frequency distribution of herring larvae (mm) obtained during cruise AL 488-1



**Figure 4:** Distribution of near-bottom temperature ( $^{\circ}\text{C}$ , left panel) and salinity (psu, right panel) in the southern North Sea.