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Cruise report FRV "Walther Herwig III" Cruise 378 22.09. – 02.10.2014

International Herring Larvae Survey in the North Sea

Scientist in charge: Dr. Norbert Rohlf

Summary

The cruise was part of the German contribution to the international herring larvae surveys in the North Sea (IHLS). These surveys are conducted during the autumn and winter herring spawning activity. The studies monitor the spatial distribution and abundance of herring larvae on an annual basis. They are coordinated by ICES. The survey time series dates back to 1972. Almost all countries surrounding the North Sea have participated in the history of the IHLS, while in recent years the Netherlands and Germany contribute most to the surveys. The resulting 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.

While the Buchan area was surveyed as scheduled, not all stations could be done within the Orkney/Shetland region due to unfavourable weather conditions.

The spatial distribution of herring larvae east of the Orkneys was comparable to those in former years, while in the Buchan area, larvae were found more widely distributed compared to the most recent years.

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 2015.

Verteiler:

TI - Institut für Seefischerei
Saßnitzer Seefischerei e. G.
DFFU

per e-mail:

Bundesanstalt für Landwirtschaft und Ernährung, Hamburg
Schiffsführung FFS "Walther Herwig"
BMEL, Ref. 614
BMEL, Ref. 613
TI – Präsidialbüro (Michael Welling)
TI – Verwaltung Hamburg
TI - Institut für Fischereiökologie
TI - Institut für Ostseefischerei Rostock
TI – FIZ-Fischerei
TI - PR
MRI - BFEL HH, FB Fischqualität
N. Rohlf, SF - Reiseplanung Forschungsschiffe
Fahrtteilnehmer
Bundesamt für Seeschifffahrt und Hydrographie, Hamburg

Mecklenburger Hochseefischerei GmbH, Rostock
Doggerbank Seefischerei GmbH, Bremerhaven
Deutscher Fischerei - Verband e. V., Hamburg
Leibniz-Institut für Meereswissenschaften IFM-GEOMAR
H. Cammann-Oehne, BSH
Deutscher Hochseefischerei-Verband e.V.

2. Research programme

The cruise was a component of the international herring larvae surveys. Parts of ICES area IVa should be sampled by double oblique tows with the "Nackthai" (modified GULF III sampler), resulting in herring larval abundance estimates and spatial distribution.

In total, 115 plankton tows were done within the IHLS framework. Physical measurements, e.g. temperature, salinity and conductivity, were conducted via a CTD mounted directly onto the gulf sampler. Sampling was achieved according to the manual of the herring larvae surveys.

3. Narrative

FRV "Walther Herwig III" left Bremerhaven on Monday, 09/22/14, at noon. The area under investigation was reached just after midnight on Wednesday, 09/24/14. The weather conditions were adequate and plankton tows were done around the Orkneys within the next two days. At that time, the wind strength increased considerably up to 10 Beaufort. Field work had to be stopped, awaiting the latest weather forecast. Soon it became obvious that the overall situation for the north-western part of the area under investigation would not change. High waves and strong westerly winds had to be expected as persistent for the next days and thus sampling north-west of the Orkneys would be impossible. Therefore it was decided to skip the remaining stations around the Islands and to steam southwards into the Buchan area, where field work seemed to be much more likely, given the shelter of the Scottish coastline.

We continued with plankton tows on Saturday at noon. All stations in the Buchan area could be sampled as scheduled. The IHLS programme was finished on Friday, 09/30/14 and FRV "Walther Herwig III" was back in Bremerhaven on Saturday evening. The vessel was disembarked the day after.

4. Preliminary results

Fish eggs and larvae were sorted from the plankton samples after the end of the cruise. Herring larvae were counted and their abundance per square metre estimated. Length measurements are still in progress and thus length-frequency plots cannot be shown yet.

In the Orkney/Shetland area, only 50 % of the stations could be sampled. However, herring larval spatial distribution is comparable to those in former years, while in the Buchan area, larvae have been found more widely distributed compared to the last year. The cruise track and the spatial distribution of herring larvae are given in Figure 1. Figure 2 depicts the distribution of near-bottom water temperature and salinity. Abundance estimates and available physical water parameters are listed in Table 1.

5. Participants

Name	Institution	Function
1. Norbert Rohlf	TI-SF	Cruise leader
2. Birgit Suer	TI-SF	Technician
3. Michael Sasse	TI-SF	Technician
4. Inken Rottgardt	TI-SF	Student
5. Heike Schwermer	TI-SF	Student
6. Peggy Weist	Uni Oldenburg	Volunteer
7. Lydia Kohlmorgen	Uni Oldenburg	Volunteer
8. Michael Winter	BMEL	Volunteer

6. Acknowledgement

Thanks to Captain Jürgen Vandrei and FRV "Walther Herwig III" crew members for their great support and hospitality and to all participants for their reliable and responsible teamwork.

7. Tables and Figures

Table 1: Main data of Ichthyoplankton hauls made during WH 378. Hauls 1-46 were done around the Orkneys, while 47-115 were conducted in the Buchan area.

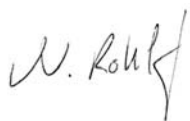
Stat. Nr.	Haul Nr.	Lat. (° N)	Long.	E/W	Date (UTC)	Time (UTC)	Duration (min)	Water depth (m)	Catch depth (m)	Flow (m³)	Hela (n/m²)	Surface		Bottom	
												T (°C)	Sal (psu)	T (°C)	Sal (psu)
719	1	58°04.53	001°09.06	W	24.09.14	00:17	18.12	103	99	98.2	121	13.14	35.03	11.94	35.19
720	2	58°04.95	001°28.33	W	24.09.14	01:24	12.29	84	81	70.2	151	13.05	35.05	11.91	35.23
721	3	58°03.54	001°52.23	W	24.09.14	02:38	15.20	83	80	86.7	272	13.01	34.95	12.04	35.17
722	4	58°04.97	002°09.66	W	24.09.14	03:36	10.24	66	63	58.9	489	13.18	34.94	12.81	34.98
723	5	58°05.01	002°29.34	W	24.09.14	04:36	8.58	62	59	49.9	321	13.11	34.93	12.73	35.02
724	6	58°05.11	002°49.54	W	24.09.14	05:35	6.12	45	42	34.6	87	13.13	34.93	13.10	34.94
725	7	58°04.64	003°09.55	W	24.09.14	06:32	6.07	49	45	35.3	29	13.40	34.83	13.13	34.88
726	8	58°04.99	003°29.44	W	24.09.14	07:30	5.29	44	40	31.4	1	13.42	34.75	13.24	34.80
727	9	58°14.79	003°10.30	W	24.09.14	08:53	9.07	63	59	53.6	31	13.13	34.86	13.06	34.92
728	10	58°14.92	002°50.86	W	24.09.14	09:53	5.45	44	41	31.4	22	13.25	34.88	13.25	34.88
729	11	58°15.05	002°30.63	W	24.09.14	10:50	7.51	57	54	44.0	154	13.07	34.93	13.01	34.95
730	12	58°15.16	002°10.83	W	24.09.14	11:46	9.58	63	60	59.6	365	12.97	35.02	11.92	35.25
731	13	58°15.04	001°51.71	W	24.09.14	12:44	18.08	100	97	107.3	207	12.98	35.08	10.67	35.36
732	14	58°15.09	001°31.30	W	24.09.14	13:45	22.35	133	120	131.5	103	12.75	35.15	9.74	35.38
733	15	58°14.96	001°11.25	W	24.09.14	14:51	19.58	106	103	125.0	89	13.01	35.10	10.57	35.34
734	16	58°24.23	001°09.72	W	24.09.14	16:00	16.12	100	97	91.5	122	13.00	35.16	9.42	35.39
735	17	58°25.14	001°28.37	W	24.09.14	17:07	16.47	105	102	96.2	476	12.84	35.11	10.08	35.38
736	18	58°25.01	001°49.24	W	24.09.14	18:14	16.48	100	96	93.0	371	12.76	35.07	10.38	35.38
737	19	58°24.96	002°09.24	W	24.09.14	19:18	13.38	82	78	77.7	940	12.86	35.05	12.12	35.22
738	20	58°25.02	002°29.15	W	24.09.14	20:21	9.28	64	60	55.6	652	12.86	34.99	12.87	34.99
739	21	58°24.97	002°49.19	W	24.09.14	21:22	10.10	67	63	58.5	187	12.94	34.97	12.93	34.98
740	22	58°34.36	002°49.77	W	24.09.14	22:29	9.32	68	65	51.7	1072	12.85	34.97	12.86	34.98
741	23	58°35.01	002°30.60	W	24.09.14	23:26	12.24	78	75	70.0	690	12.79	35.00	12.81	35.00
742	24	58°35.01	002°10.70	W	25.09.14	00:26	12.56	79	76	79.0	954	12.78	35.01	12.19	35.19
743	25	58°35.01	001°50.91	W	25.09.14	01:25	17.48	98	95	109.3	321	12.84	35.11	10.34	35.39
744	26	58°35.07	001°31.02	W	25.09.14	02:28	20.00	112	109	117.1	165	13.20	35.15	9.35	35.41
745	27	58°34.56	001°11.25	W	25.09.14	03:32	18.70	107	104	103.0	232	13.09	35.15	9.19	35.40
746	28	58°44.30	001°09.34	W	25.09.14	04:33	18.22	110	107	96.0	13	13.27	35.12	8.93	35.43
747	29	58°45.13	001°27.94	W	25.09.14	05:44	18.42	111	107	102.6	97	13.07	35.12	9.22	35.40
748	30	58°45.00	001°49.00	W	25.09.14	06:57	14.44	91	87	79.5	321	12.76	35.14	11.06	35.35
749	31	58°45.01	002°09.04	W	25.09.14	08:05	12.39	80	77	72.2	1148	12.78	35.01	12.33	35.18
750	32	58°44.97	002°29.15	W	25.09.14	09:11	11.02	76	72	62.7	662	12.84	35.01	12.15	35.22
751	33	58°44.97	002°44.04	W	25.09.14	10:00	11.56	75	72	71.1	665	12.94	34.94	12.20	35.21
752	34	58°54.55	002°30.29	W	25.09.14	11:22	12.50	79	76	66.3	367	12.82	34.99	12.45	35.10
753	35	58°55.03	002°10.94	W	25.09.14	12:26	12.22	81	78	66.6	632	12.73	35.06	12.08	35.19
754	36	58°54.96	001°50.93	W	25.09.14	13:29	15.13	93	90	83.4	639	12.53	35.08	11.45	35.32
755	37	58°54.98	001°31.57	W	25.09.14	14:31	16.24	106	103	85.1	44	13.52	35.10	8.74	35.45
756	38	58°54.63	001°12.58	W	25.09.14	15:32	18.11	115	112	98.8	190	13.43	35.10	8.60	35.46
757	39	59°04.42	001°10.23	W	25.09.14	16:36	21.29	120	117	126.7	428	12.83	35.16	8.33	35.45
758	40	59°05.33	001°27.88	W	25.09.14	17:42	17.21	101	98	99.8	96	12.57	35.18	9.64	35.43
759	41	59°14.67	001°30.11	W	25.09.14	18:47	16.49	98	94	94.1	329	12.04	35.26	11.08	35.38
760	42	59°15.00	001°49.02	W	25.09.14	19:59	12.15	78	74	66.8	1143	12.31	35.15	12.31	35.15
761	43	59°05.48	001°49.83	W	25.09.14	21:02	13.45	84	81	76.5	936	12.55	35.08	12.25	35.17
762	44	59°04.91	002°08.84	W	25.09.14	22:11	13.25	84	81	69.7	1021	12.74	35.03	12.38	35.13
763	45	59°14.41	002°10.20	W	25.09.14	23:22	12.59	81	78	65.9	4377	12.87	34.97	12.75	35.01
764	46	59°05.37	002°24.35	W	26.09.14	00:34	11.26	71	68	66.7	3832	12.94	34.95	12.92	34.96
765	47	57°55.24	002°50.74	W	27.09.14	10:49	15.17	93	90	85.7	65	13.00	35.01	12.72	35.08

Table 1 continued

Stat. Nr.	Haul Nr.	Lat. (° N)	Long.	E/ W	Date (UTC)	Time (UTC)	Duration (min)	Water depth (m)	Catch depth (m)	Flow (m ³)	Hela (n/m ²)	T (°C)	Sal (psu)	T (°C)	Sal (psu)
766	48	57°47.29	002°49.90	W	27.09.14	11:42	5.34	44	41	32.0	8	13.30	34.83	13.08	34.97
767	49	57°45.51	002°31.04	W	27.09.14	12:37	21.09	120	115	125.1	54	13.36	34.88	12.74	35.01
768	50	57°54.52	002°30.08	W	27.09.14	13:44	9.51	64	61	55.8	29	13.16	34.93	12.93	34.99
769	51	57°55.18	002°10.97	W	27.09.14	14:41	12.57	82	79	74.9	108	12.94	35.03	12.64	35.09
770	52	57°45.26	002°09.70	W	27.09.14	15:42	22.90	168	120	137.1	116	13.46	34.48	12.88	35.01
771	53	57°44.96	001°50.67	W	27.09.14	16:44	5.15	42	42	30.9	106	13.37	34.71	13.18	34.82
772	54	57°54.70	000°01.51	W	27.09.14	17:37	11.30	76	73	73.2	136	12.97	34.95	12.05	35.22
773	55	57°56.74	001°03.80	W	27.09.14	18:39	17.30	101	99	112.0	234	12.83	35.19	11.85	35.26
774	56	57°45.34	001°31.02	W	27.09.14	19:53	11.01	73	69	65.0	1202	13.14	34.86	13.09	34.88
775	57	57°44.78	001°10.66	W	27.09.14	20:56	13.40	91	88	74.9	185	13.05	34.91	12.72	35.04
776	58	57°54.41	001°10.09	W	27.09.14	22:05	17.53	103	100	100.9	117	12.80	35.09	10.66	35.35
777	59	57°52.83	000°51.27	W	27.09.14	23:13	15.04	93	90	82.2	123	12.91	35.12	10.09	35.36
778	60	57°45.76	000°49.74	W	28.09.14	00:07	18.25	113	110	97.1	102	12.96	35.15	9.92	35.34
779	61	57°35.68	000°50.01	W	28.09.14	01:10	17.39	106	102	98.4	70	13.11	35.13	10.16	35.31
780	62	57°35.00	001°09.04	W	28.09.14	02:22	15.54	99	96	87.4	139	12.98	35.02	10.68	35.31
781	63	57°34.83	001°27.72	W	28.09.14	03:25	12.08	76	73	67.2	211	13.06	34.91	12.65	35.07
782	64	57°24.87	001°28.86	W	28.09.14	04:24	14.47	94	91	84.7	344	13.01	34.90	12.39	35.10
783	65	57°25.03	001°10.75	W	28.09.14	05:21	11.47	79	79	77.7	156	13.12	34.99	12.21	35.06
784	66	57°25.07	000°50.58	W	28.09.14	06:28	10.36	71	68	64.9	0	13.12	35.01	12.72	34.97
785	67	57°24.92	000°30.63	W	28.09.14	07:22	14.19	84	80	86.0	145	13.01	35.05	11.31	35.20
786	68	57°25.13	000°10.70	W	28.09.14	08:23	11.45	77	74	66.5	1447	13.30	35.15	10.71	35.24
787	69	57°15.57	000°09.62	W	28.09.14	09:28	12.55	80	77	75.0	743	13.22	35.02	10.94	35.18
788	70	57°15.10	000°28.90	W	28.09.14	10:35	12.36	78	75	74.3	2405	13.10	34.97	11.75	35.13
789	71	57°15.01	000°48.95	W	28.09.14	11:40	11.16	73	70	61.3	1391	12.93	34.92	12.82	34.95
790	72	57°15.00	001°08.96	W	28.09.14	12:42	13.19	81	78	75.6	518	13.12	34.82	12.91	34.90
791	73	57°14.99	001°29.05	W	28.09.14	13:45	11.49	75	72	67.4	356	13.17	34.84	12.94	34.88
792	74	57°15.28	001°49.27	W	28.09.14	14:46	9.26	61	58	58.3	398	13.26	34.67	13.09	34.77
793	75	57°05.50	001°50.99	W	28.09.14	15:37	14.50	85	82	84.1	210	13.21	34.65	13.10	34.69
794	76	57°04.98	001°30.99	W	28.09.14	16:42	11.54	80	77	68.7	256	13.06	34.82	12.99	34.85
795	77	57°04.92	001°11.07	W	28.09.14	17:44	8.57	62	59	51.7	186	13.08	34.79	13.06	34.80
796	78	57°05.07	000°50.60	W	28.09.14	18:45	10.36	73	69	60.7	704	13.11	34.97	12.77	34.99
797	79	57°05.03	000°30.60	W	28.09.14	19:45	12.21	80	76	71.4	2603	13.22	34.99	11.89	35.09
798	80	57°05.22	000°10.46	W	28.09.14	20:47	12.50	82	79	75.3	476	13.39	35.09	9.64	35.14
799	81	56°55.38	000°09.42	W	28.09.14	21:49	12.55	76	73	71.8	575	13.40	35.10	11.22	35.08
800	82	56°55.11	000°28.97	W	28.09.14	22:52	11.52	77	74	68.0	1670	12.96	34.95	11.48	35.10
801	83	56°55.02	000°49.09	W	28.09.14	23:54	10.00	65	62	56.7	1167	13.01	34.85	12.70	34.92
802	84	56°54.97	001°09.09	W	29.09.14	00:55	7.23	70	67	58.1	1077	12.91	34.82	12.91	34.82
803	85	56°54.87	001°28.78	W	29.09.14	01:55	10.18	69	66	57.5	750	12.98	34.70	12.99	34.70
804	86	56°55.30	001°50.35	W	29.09.14	02:59	13.36	83	80	82.7	212	13.09	34.63	13.02	34.69
805	87	56°44.95	002°10.28	W	29.09.14	04:15	10.02	65	62	57.2	202	13.21	34.52	13.20	34.55
806	88	56°44.98	001°50.70	W	29.09.14	05:16	8.52	64	61	49.8	308	13.06	34.65	13.05	34.65
807	89	56°45.00	001°30.44	W	29.09.14	06:16	7.25	57	54	40.4	312	13.04	34.63	13.05	34.65
808	90	56°44.99	001°10.57	W	29.09.14	07:14	10.34	70	67	58.7	587	12.99	34.73	12.86	34.77
809	91	56°45.08	000°50.58	W	29.09.14	08:14	9.09	67	64	48.1	1046	12.90	34.83	12.87	34.85
810	92	56°45.09	000°30.59	W	29.09.14	09:14	10.00	72	69	53.2	346	13.20	34.98	12.03	34.95
811	93	56°45.08	000°10.87	W	29.09.14	10:13	11.33	75	72	63.9	330	13.18	35.04	11.24	35.01
812	94	56°35.78	000°10.00	W	29.09.14	11:11	14.26	84	81	81.3	79	12.94	34.95	12.92	34.96
813	95	56°35.06	000°28.96	W	29.09.14	12:17	11.17	74	71	62.5	309	13.00	35.01	12.72	35.08
814	96	56°34.95	000°48.15	W	29.09.14	13:19	11.10	70	67	64.5	480	13.49	34.94	11.05	35.00
815	97	56°34.95	001°09.11	W	29.09.14	14:21	8.59	68	65	50.5	451	13.10	34.88	11.87	34.93

Table 1 continued

Stat. Nr.	Haul Nr.	Lat. (° N)	Long.	E/W	Date (UTC)	Time (UTC)	Duration (min)	Water depth (m)	Catch depth (m)	Flow (m ³)	Hela (n/m ²)	T (°C)	Sal (psu)	T (°C)	Sal (psu)
816	98	56°34.93	001°29.30	W	29.09.14	15:22	8.11	61	58	45.9	315	13.28	34.77	12.42	34.87
817	99	56°34.90	001°49.35	W	29.09.14	16:21	8.02	57	54	47.3	83	13.28	34.72	12.86	34.75
818	100	56°35.23	002°09.37	W	29.09.14	17:20	6.24	50	47	38.5	9	13.70	34.60	13.18	34.62
819	101	56°25.60	002°09.90	W	29.09.14	18:10	7.46	56	53	45.0	24	13.51	34.57	13.29	34.57
820	102	56°25.05	001°50.60	W	29.09.14	19:13	7.25	58	55	42.4	93	13.30	34.55	13.28	34.54
821	103	56°25.12	001°30.61	W	29.09.14	20:12	7.40	57	54	40.7	286	13.76	34.52	13.34	34.53
822	104	56°25.08	001°10.55	W	29.09.14	21:11	9.03	66	63	47.0	687	13.48	34.58	13.24	34.59
823	105	56°25.07	000°50.94	W	29.09.14	22:11	10.24	72	69	57.5	492	13.42	34.63	13.20	34.63
824	106	56°15.52	000°49.99	W	29.09.14	23:11	10.40	70	67	59.9	262	13.35	34.66	13.03	34.69
825	107	56°15.08	001°09.17	W	30.09.14	00:13	9.53	65	61	56.8	386	13.25	34.75	12.38	34.79
826	108	56°15.01	001°29.24	W	30.09.14	01:13	8.45	58	55	46.6	67	13.46	34.73	12.05	34.79
827	109	56°14.92	001°49.66	W	30.09.14	02:14	7.25	56	53	40.8	na	13.32	34.71	12.69	34.72
828	110	56°14.77	002°09.39	W	30.09.14	03:13	7.16	54	51	39.2	0	13.44	34.61	13.18	34.61
829	111	56°05.85	002°10.68	W	30.09.14	04:03	9.32	66	63	53.9	0	13.63	34.51	13.34	34.50
830	112	56°04.95	001°50.64	W	30.09.14	05:05	9.06	62	59	46.3	17	13.89	34.10	12.80	34.55
831	113	56°04.97	001°30.48	W	30.09.14	06:05	11.53	75	72	60.5	733	13.68	34.52	12.82	34.65
832	114	56°04.94	001°10.56	W	30.09.14	07:06	9.56	66	63	55.2	1124	13.57	34.55	12.52	34.67
833	115	56°05.05	000°50.48	W	30.09.14	08:06	9.28	67	64	46.7	132	13.33	34.69	12.60	34.68



(Dr. Norbert Rohl)

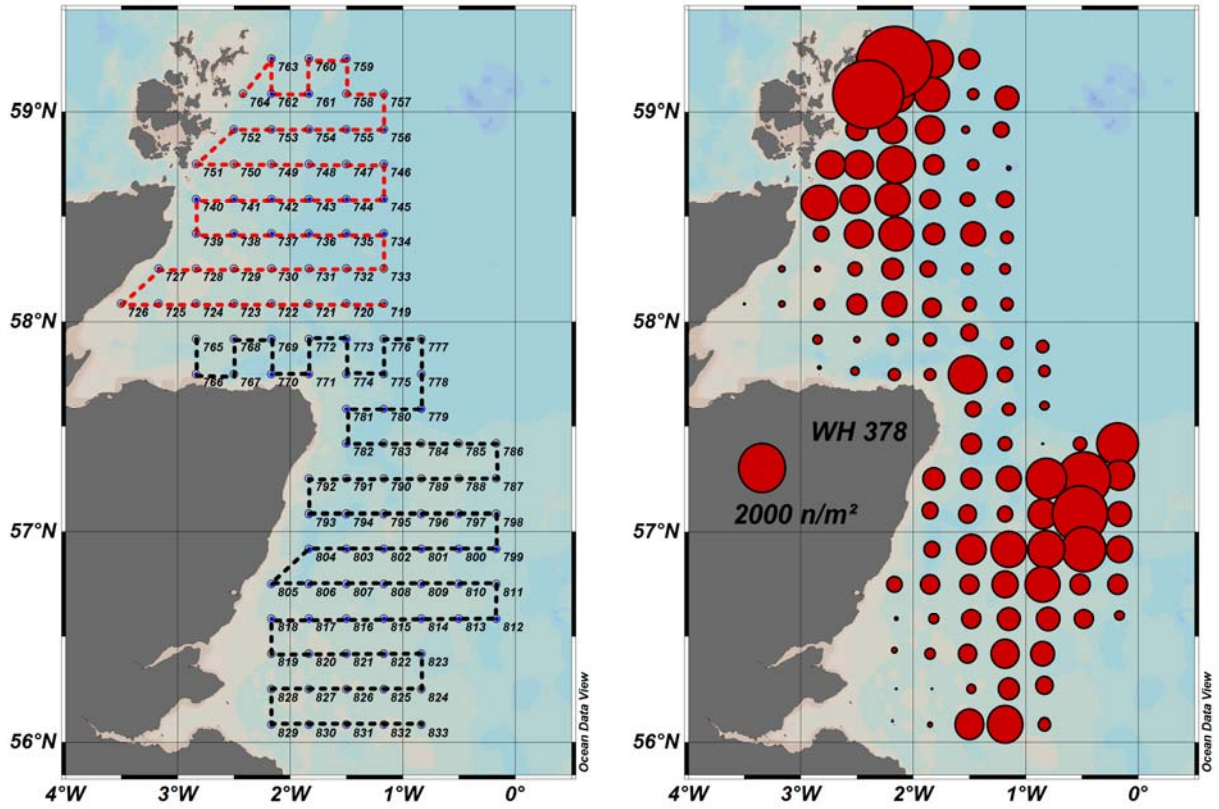


Figure 1: Cruise track in Orkney/Shetlands (dotted red line) and the Buchan area (dotted blue), (by station number, left panel) and corresponding abundance of herring larvae in the Orkney/Shetland and Buchan area (n/m^2 , right panel). The symbol size corresponding to 2000 larvae per square metre is indicated in the figure.

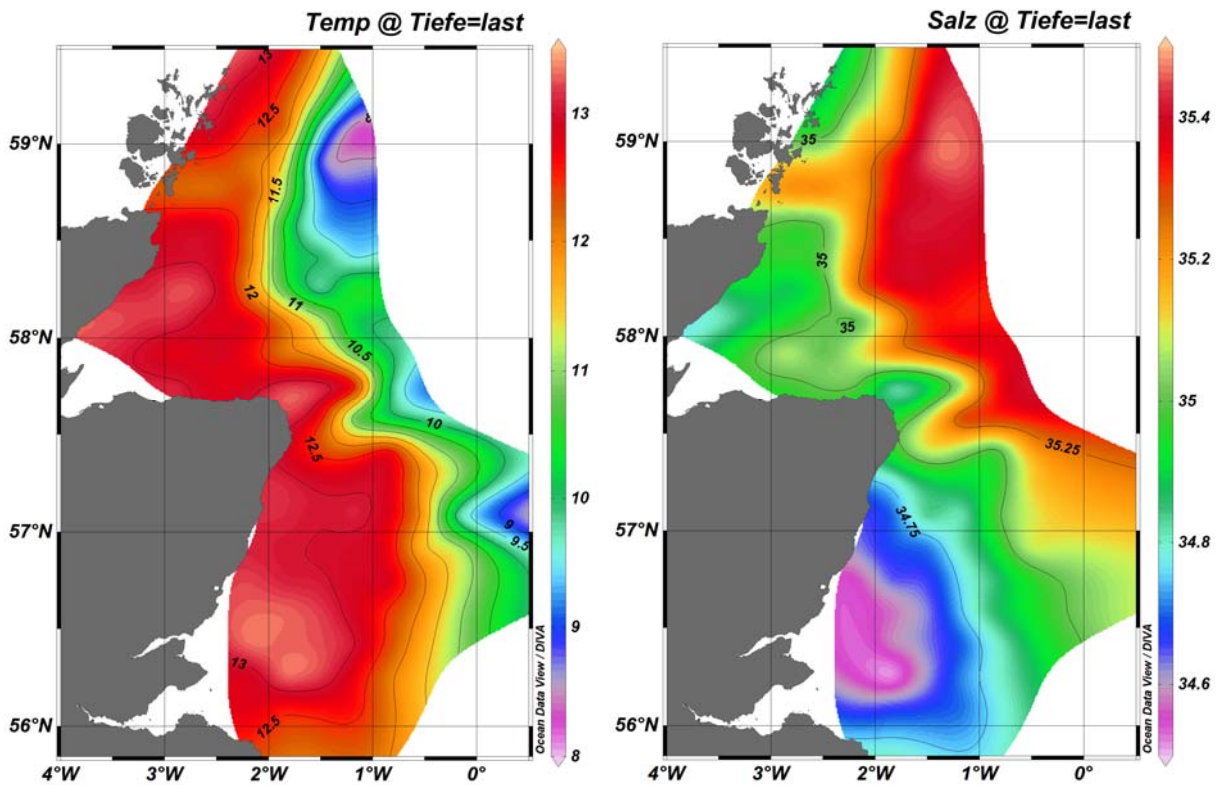


Figure 2: Distribution of near-bottom temperature ($^{\circ}C$, left panel) and salinity (psu, right panel) in the area under investigation