

Institute of Sea Fisheries

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Cruise report FRV "Walther Herwig III" Cruise 358 13.09. – 24.09.2012

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.

All stations could be covered as scheduled and the coverage is adequate to describe the spatial extension on newly hatched larvae in the area. The spatial distribution was found to be comparable to previous years, and large quantities of newly hatched larvae were caught during the survey.

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 2013.

Verteiler:

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per e-mail:

Bundesanstalt für Landwirtschaft und Ernährung, Hamburg
Schiffsführung FFS "Walther Herwig"
BMELV, Ref. 614
BMELV, 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
Dr. Rohlf, SF - Reiseplanung Forschungsschiffe
Fahrtteilnehmer
Bundesamt für Seeschifffahrt und Hydrographie, Hamburg
Mecklenburger Hochseefischerei GmbH, Rostock

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, 93 plankton tows were done. 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" was ready to leave the port of Bremerhaven on Thursday, 09/13/12, but due to unfavourable weather conditions, sailing had to be postponed until Saturday noon, 09/15/12.

The area of investigation was reached on Monday, 09/17/12. As anticipated, the weather conditions had meanwhile improved, and the scientific programme started in the early morning. Plankton sampling could be conducted as scheduled. After station 81, the CTD had an irreparable breakdown. A conventional depth recorder was used instead, but no information on salinity and water temperature is available for stations 82 to 93. The field work was finished on 09/21/12 at midnight. FRV "Walther Herwig III" was back in the port of Bremerhaven on Sunday evening (09/23/12).

4. Preliminary results

Fish eggs and larvae were sorted from the plankton samples after the end of the cruise. Herring larvae were counted and length measured to millimetre below and their abundance per square metre estimated.

The samples yielded relatively high numbers of herring larvae, in total 53,933 larvae. Species identification of the remaining fish larvae is not finished yet as is the identification of eggs.

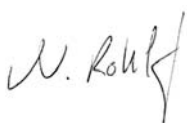
The cruise track by haul number is given in Figure 1 and the spatial distribution of herring larvae in Figure 2. Abundance estimates and available physical parameters are listed in Table 1. Herring larvae length-frequencies are plotted in Figure 3. Figure 4 depicts the distribution of near-bottom water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

5. Participants

Name	Institution	Function
1. Norbert Rohlf	vTI-SF	Cruise leader
2. Birgit Suer	vTI-SF	Technician
3. Michael Sasse	vTI-SF	Technician
4. Ulrike Bräuer	vTI-SF	Student
5. Szymon Urbanski	vTI-SF	Volunteer
6. Annabel Schuhn	vTI-SF	Volunteer
7. Birte Elkemann-Reusch	vTI-SF	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.



(Dr. Norbert Rohlf)

7. Tables and Figures

Table 1: Main data of Ichthyoplankton hauls made during WH 358

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)	Surface		Bottom	
												T (°C)	Sal (psu)	T (°C)	Sal (psu)
898	1	58°04.88	001°08.88	W	17.09.12	02:45	22.03	102	97	117.1	6	11.7	35.24	10.1	35.43
899	2	58°05.04	001°30.21	W	17.09.12	04:02	15.28	74	70	84.9	84	11.8	35.19	11.6	35.26
900	3	58°05.32	001°49.11	W	17.09.12	05:06	18.31	85	77	103.7	102	11.9	35.17	11.8	35.22
901	4	58°05.32	002°09.26	W	17.09.12	06:12	12.45	64	60	65.8	43	12.0	35.15	11.9	35.20
902	5	58°05.30	002°29.09	W	17.09.12	07:15	12.22	62	58	63.9	32	12.4	35.13	12.4	35.12
903	6	58°05.24	002°48.79	W	17.09.12	08:21	7.25	48	45	34.3	630	12.4	35.19	12.4	35.19
904	7	58°04.06	003°09.65	W	17.09.12	09:26	7.02	47	43	32.8	23	12.4	35.14	12.4	35.14
905	8	58°04.99	003°29.55	W	17.09.12	10:28	5.59	40	35	26.8	12	12.3	35.18	12.3	35.17
906	9	58°14.93	003°09.96	W	17.09.12	11:54	12.54	61	55	66.4	2448	12.4	35.12	12.3	35.08
907	10	58°14.66	002°49.64	W	17.09.12	13:08	7.27	45	40	38.5	127	12.4	35.10	12.3	35.10
908	11	58°14.73	002°29.69	W	17.09.12	14:11	9.28	54	50	47.8	44	12.3	35.09	12.3	35.09
909	12	58°14.85	002°10.85	W	17.09.12	15:14	10.29	58	53	53.8	44	12.0	35.17	12.0	35.19
910	13	58°15.67	001°50.06	W	17.09.12	16:15	21.43	98	94	116.3	328	12.1	35.11	11.9	35.19
911	14	58°15.38	001°32.10	W	17.09.12	17:16	27.13	135	120	145.2	80	11.9	35.17	10.4	35.41
912	15	58°14.77	001°11.25	W	17.09.12	18:29	17.38	93	88	75.4	36	11.8	35.14	10.6	35.39
913	16	58°24.08	001°08.78	W	17.09.12	19:27	20.39	98	93	84.6	19	11.7	35.22	10.3	35.42
914	17	58°24.63	001°28.41	W	17.09.12	20:34	21.25	102	97	99.9	138	11.8	35.17	10.5	35.41
915	18	58°25.14	001°48.08	W	17.09.12	21:40	21.25	101	96	105.4	249	12.1	35.10	11.6	35.27
916	19	58°25.10	002°08.44	W	17.09.12	22:48	17.17	82	77	87.2	269	12.1	35.12	12.1	35.14
917	20	58°25.20	002°29.07	W	17.09.12	23:57	12.10	65	60	59.5	315	12.4	35.02	12.4	35.03
918	21	58°24.70	002°49.44	W	18.09.12	01:02	12.29	63	58	66.0	514	12.4	35.01	12.4	35.01
919	22	58°34.41	002°50.30	W	18.09.12	02:01	13.15	68	64	69.3	706	12.4	35.03	12.4	35.03
920	23	58°34.68	002°30.61	W	18.09.12	03:20	13.30	73	69	66.5	192	12.0	35.12	12.1	35.14
921	24	58°34.76	002°10.65	W	18.09.12	04:24	13.20	75	71	61.3	392	12.2	35.09	12.2	35.10
922	25	58°34.95	001°49.66	W	18.09.12	06:03	17.08	93	88	82.4	146	12.1	35.12	12.1	35.12
923	26	58°34.41	001°31.25	W	18.09.12	07:17	20.42	108	103	97.1	133	12.0	35.12	11.0	35.33
924	27	58°34.28	001°10.79	W	18.09.12	08:27	21.02	104	99	97.6	40	11.7	35.21	10.5	35.38
925	28	58°44.12	001°08.98	W	18.09.12	09:32	23.35	105	100	129.3	70	11.7	35.20	10.4	35.39
926	29	58°44.15	001°29.68	W	18.09.12	10:51	28.16	109	104	165.3	62	11.9	34.93	11.7	35.24
927	30	58°44.17	001°48.89	W	18.09.12	12:12	19.12	89	84	109.7	224	12.2	35.16	12.1	35.15
928	31	58°44.57	002°09.19	W	18.09.12	13:24	16.07	79	74	88.3	350	12.2	35.08	12.2	35.10
929	32	58°44.35	002°28.95	W	18.09.12	14:28	13.55	73	68	67.6	449	12.4	35.10	12.4	35.06
930	33	58°44.54	002°44.20	W	18.09.12	15:17	13.26	70	66	66.9	5964	12.5	35.04	12.4	35.04
931	34	58°54.25	002°30.61	W	18.09.12	16:33	13.22	73	68	60.3	361	12.5	35.10	12.5	35.05
932	35	58°54.62	002°10.09	W	18.09.12	17:44	14.10	75	70	69.0	270	12.3	35.10	12.3	35.10
933	36	58°54.20	001°50.15	W	18.09.12	18:55	19.21	87	82	101.4	210	12.1	35.14	12.1	35.14
934	37	58°54.43	001°30.11	W	18.09.12	20:13	22.27	105	100	112.4	136	11.7	35.23	11.2	35.37
935	38	58°54.38	001°09.77	W	18.09.12	21:34	23.22	115	110	119.5	29	11.5	35.28	9.1	35.45
936	39	59°04.03	001°09.40	W	18.09.12	22:46	24.17	116	105	138.2	67	11.6	35.22	11.3	35.32
937	40	59°04.26	001°29.48	W	19.09.12	00:08	20.54	99	94	112.6	964	11.8	35.18	11.9	35.19
938	41	59°04.43	001°49.49	W	19.09.12	01:25	16.18	79	74	86.3	2205	12.2	35.08	12.2	35.11
939	42	59°04.27	002°09.27	W	19.09.12	02:33	14.42	81	76	73.1	10496	12.3	35.03	12.4	35.03
940	43	59°04.60	002°24.48	W	19.09.12	03:27	12.35	66	61	64.3	1489	12.4	34.98	12.5	34.98
941	44	59°14.62	002°09.56	W	19.09.12	04:40	12.36	79	75	57.6	6941	12.5	34.98	12.5	34.97
942	45	59°24.18	002°09.72	W	19.09.12	05:39	12.50	72	64	61.5	140	12.4	35.03	12.4	35.02
943	46	59°34.70	002°10.10	W	19.09.12	06:39	15.34	87	81	74.0	2469	12.0	35.20	12.0	35.21
944	47	59°34.19	001°49.76	W	19.09.12	08:04	16.30	88	84	85.7	592	11.8	35.28	11.8	35.25
945	48	59°24.55	001°49.88	W	19.09.12	09:25	14.30	92	78	69.9	2295	12.1	35.14	12.1	35.17

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)
946	49	59°14.29	001°49.25	W	19.09.12	10:41	13.52	74	68	71.7	2311	12.2	35.12	12.1	35.14
947	50	59°14.37	001°29.71	W	19.09.12	11:54	17.46	95	90	91.7	317	11.7	35.26	11.7	35.25
948	51	59°14.27	001°09.67	W	19.09.12	13:14	24.46	110	105	132.9	12	11.2	35.38	9.2	35.47
949	52	59°24.35	001°08.99	W	19.09.12	14:34	20.06	118	106	85.8	6	11.2	35.37	10.1	35.45
950	53	59°24.84	001°29.51	W	19.09.12	15:46	16.50	84	79	80.8	248	11.8	35.26	11.8	35.25
951	54	59°34.63	001°28.70	W	19.09.12	16:55	16.18	88	83	72.6	70	11.6	35.29	11.5	35.30
952	55	59°34.87	001°09.62	W	19.09.12	18:12	20.36	107	101	99.2	153	11.2	35.37	9.8	35.46
953	56	59°43.85	001°08.94	W	19.09.12	19:18	19.42	105	100	89.8	18	11.5	35.36	9.2	35.49
954	57	59°54.20	001°09.43	W	19.09.12	20:31	19.17	95	90	88.3	27	11.4	35.31	11.4	35.34
955	58	59°44.80	001°29.28	W	20.09.12	05:56	13.58	74	70	68.3	1054	11.1	35.37	11.1	35.38
956	59	59°54.40	001°28.96	W	20.09.12	06:56	21.37	102	98	103.5	398	11.3	35.23	11.2	35.36
957	60	59°54.44	001°48.69	W	20.09.12	08:10	18.38	94	89	90.9	2457	11.0	35.41	11.0	35.39
958	61	59°44.59	001°49.38	W	20.09.12	09:31	20.23	102	97	95.5	1254	11.5	35.33	10.9	35.39
959	62	59°44.38	002°09.17	W	20.09.12	10:49	20.29	100	95	106.8	378	11.9	35.31	11.9	35.27
960	63	59°54.73	002°08.87	W	20.09.12	12:06	18.54	94	89	95.0	91	11.8	35.35	11.8	35.31
961	64	59°54.39	002°29.01	W	20.09.12	13:20	18.10	88	82	89.0	430	12.0	35.12	12.0	35.24
962	65	59°44.33	002°29.30	W	20.09.12	14:35	19.11	86	78	94.6	143	12.0	35.20	12.0	35.20
963	66	59°34.48	002°28.87	W	20.09.12	15:51	13.00	82	62	63.6	810	12.1	35.18	12.1	35.18
964	67	59°25.33	002°30.59	W	20.09.12	16:57	5.02	42	38	19.8	308	12.4	34.94	12.5	34.95
965	68	59°25.19	002°49.38	W	20.09.12	17:45	7.30	49	46	35.8	146	12.4	34.97	12.4	34.99
966	69	59°34.43	002°49.93	W	20.09.12	18:40	12.05	71	66	56.1	199	12.3	35.04	12.3	35.05
967	70	59°44.24	002°49.81	W	20.09.12	19:39	12.37	72	68	61.0	15	12.1	35.17	12.1	35.19
968	71	59°54.26	002°49.96	W	20.09.12	20:39	14.34	75	71	69.3	9	12.0	35.21	12.0	35.22
969	72	59°54.50	003°09.46	W	20.09.12	21:49	16.18	85	80	79.7	66	12.0	35.21	11.9	35.25
970	73	59°54.27	003°28.98	W	20.09.12	23:00	24.21	114	109	118.5	6	11.6	35.29	10.3	35.47
971	74	59°54.22	003°48.63	W	21.09.12	00:15	27.57	149	120	125.9	1	11.8	35.44	10.1	35.52
972	75	59°45.46	003°50.77	W	21.09.12	01:37	24.27	138	120	94.5	13	11.6	35.35	10.5	35.43
973	76	59°44.97	003°30.51	W	21.09.12	02:42	17.35	88	83	77.2	1030	12.2	35.09	12.1	35.17
974	77	59°45.04	003°11.54	W	21.09.12	03:41	12.39	59	54	56.9	259	12.0	35.17	12.0	35.20
975	78	59°35.26	003°09.90	W	21.09.12	04:42	22.19	111	106	93.2	455	12.2	35.10	12.1	35.15
976	79	59°34.93	003°28.56	W	21.09.12	05:59	25.25	130	120	104.5	807	12.2	35.09	12.1	35.18
977	80	59°35.24	003°47.48	W	21.09.12	07:01	27.08	150	120	113.4	239	11.8	35.19	10.3	35.43
978	81	59°26.46	003°50.27	W	21.09.12	08:11	27.12	140	120	99.8	15	11.6	35.36	10.5	35.39
979	82	59°24.12	003°30.18	W	21.09.12	10:18	17.05	180	91	85.0	125	na	na	na	na
980	83	59°25.08	003°11.43	W	21.09.12	11:16	12.42	74	68	70.0	310	na	na	na	na
981	84	59°15.26	003°09.56	W	21.09.12	12:18	11.07	64	59	38.9	192	na	na	na	na
982	85	59°14.91	003°29.20	W	21.09.12	13:20	16.40	91	86	53.6	83	na	na	na	na
983	86	59°14.92	003°48.79	W	21.09.12	14:26	20.30	110	98	58.1	4	na	na	na	na
984	87	59°05.51	003°49.80	W	21.09.12	15:28	19.22	101	96	45.4	0	na	na	na	na
985	88	59°04.87	003°31.37	W	21.09.12	16:28	12.47	71	67	31.1	619	na	na	na	na
986	89	58°55.47	003°30.53	W	21.09.12	17:25	11.21	69	65	37.2	518	na	na	na	na
987	90	58°54.89	003°49.06	W	21.09.12	18:20	19.57	93	88	80.8	21	na	na	na	na
988	91	58°45.81	003°49.98	W	21.09.12	19:16	15.10	83	79	54.5	303	na	na	na	na
989	92	58°38.60	003°50.45	W	21.09.12	20:02	13.16	77	72	43.5	752	na	na	na	na
990	93	58°44.51	003°31.70	W	21.09.12	21:12	13.11	85	62	46.5	823	na	na	na	na

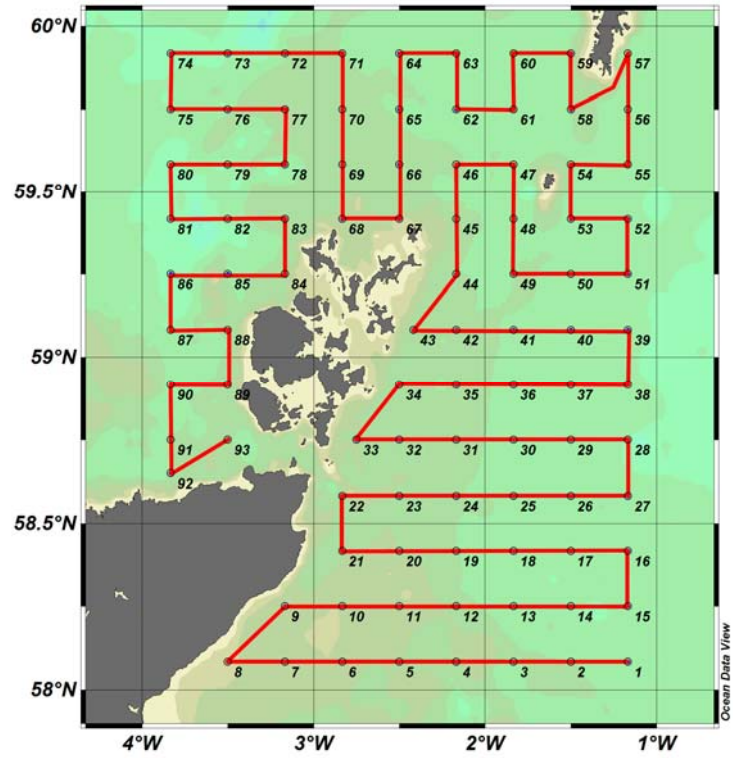


Figure 1: Cruise track (by haul number) in the Orkney/Shetland area.

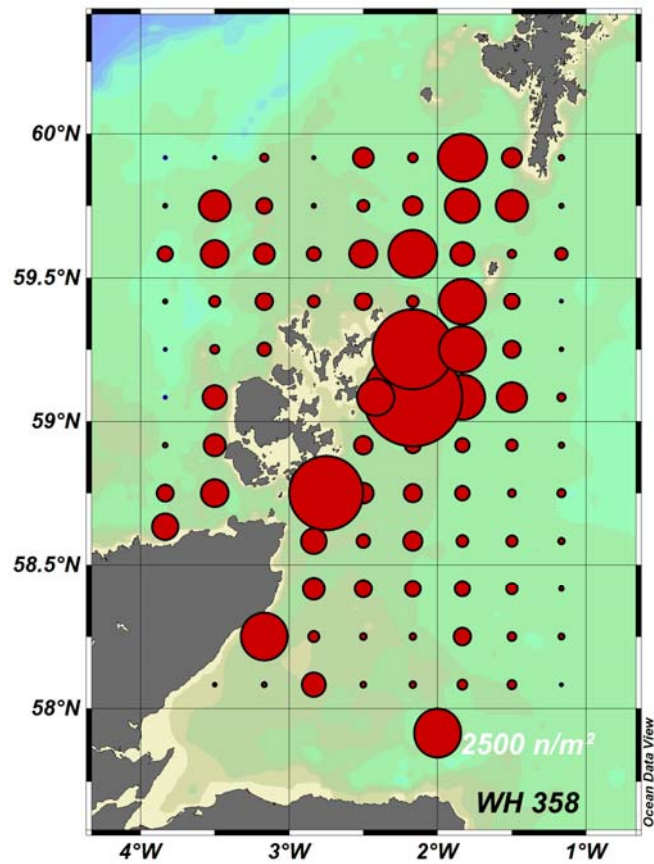


Figure 2: Corresponding abundance of herring larvae (n/m^2). The symbol size corresponding to 2500 larvae per square metre is indicated in the figure.

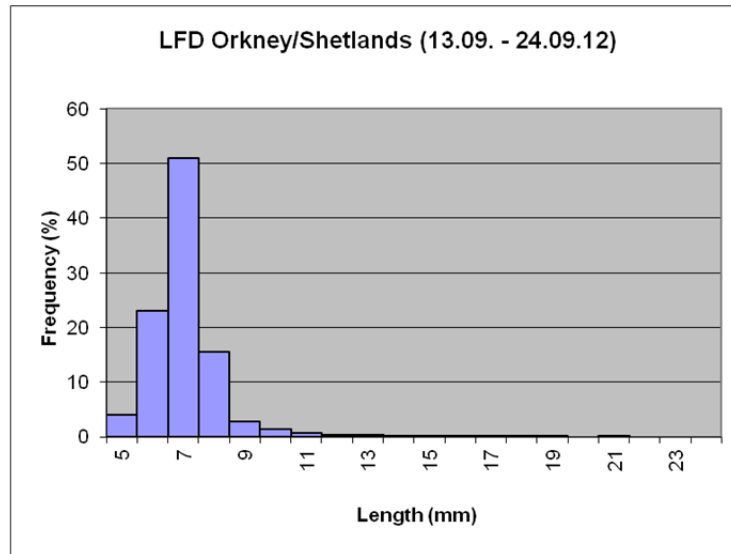


Figure 3: Length-frequency plot of herring larvae (mm) obtained by 93 plankton tows

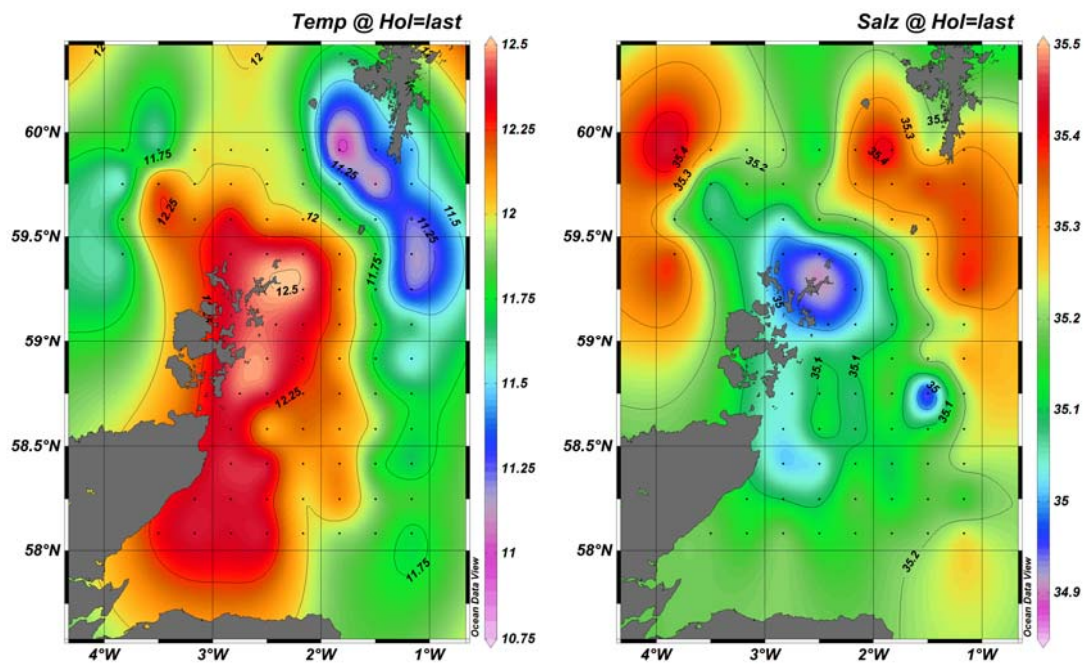


Figure 4: Distribution of near-bottom temperature ($^{\circ}\text{C}$, left panel) and salinity (psu, right panel) in the Orkney/Shetland area.