

Cruise Report: 12.05. – 25.05.2011

R.V. Alkor

Cruise No.:AL 373

General subject of research: Physical, chemical, biological and fishery oceanography

Port calls: Stettin, Poland, 15.05.2011 – 16.05.2011

Leibniz-Institute-Department/CAU-Institute: Marine Ecology, Evolutionary Ecology of Marine Fishes/ Leibniz-Institute of Marine Sciences

Chief Scientist: Holger Haslob

Number of Scientists: 11 during 1st cruise leg Kiel - Stettin, 12 during 2nd cruise leg Stettin – Kiel.

Projects: CAVIAR, EPOCA, CALMARO, AQUASHIFT, FEBEC, DFG-Menmiopsis, DTU-AQUA

Research programme

This multidisciplinary cruise was conducted within the framework of several ongoing research projects and to maintain a monitoring time series which is conducted in the Bornholm Basin since 1987 by the IFM-GEOMAR. Research activities were also conducted in the Arkona Basin, Gdansk Deep and Southern Gotland Basin (Fig. 1). Investigations considered hydrographic measurements, ichthyo- and zooplankton distributions, and the distribution and abundance of pelagic clupeid and gadoid fish species. The physical measurements conducted in the Bornholm Basin were designed to investigate the quasi-synoptic three-dimensional distribution of temperature, salinity and oxygen (CAVIAR). Further, a pH-sensor was attached to the CTD to address acidification of the water column (EPOCA/CALMARO). An 8 x 10 nm station grid was covered with CTD casts. On the same stations Bongo-casts were conducted in order to assess the abundance, biomass, production and nutritional condition of zoo- and ichthyoplankton. Further emphasis was given on the meso- to small-scale horizontal distribution of their main vertebrate and invertebrate predators (DFG-Mnemiopsis/DTU-AQUA). Stations within the central Basin (> 60 m) were covered with Bongo-Net casts during night time. The same stations were covered with pelagic fishery hauls during daytime to collect clupeid stomachs and cod single fish data (DTU-AQUA). Stock structure, gonadal maturation and egg production of sprat and cod was investigated (AQUASHIFT). Further, mature female and male cod were caught for artificial fertilization to conduct experiments (FEBEC, EPOCA, CALMARO).

Gears used

Hydrography: ADM-CTD with pH and O₂ sensor, Hydrobios Water Sampler with CTD

Zooplankton: Babybongo-Net (150 µm), Multinets (50µm vertical tows, and 335µm horizontal tows), WP2 (200µm), Apstein (50µ).

Ichthyoplankton: Bongo-Net (335µm and 500 µm), IKS80 (500µm), Helgoländer Larvennetz (500µm)

Fish: Jungfisch Trawl

Hydroacoustic: 38, 70, 120 and 200 kHz-echosounder

Scientific crew:

- Holger Haslob	(Chief Scientist)	IfM-GEOMAR Kiel	whole cruise
- Svend Mees		IfM-GEOMAR Kiel	whole cruise
- Christoph Petereit		IfM-GEOMAR Kiel	whole cruise
- Andrea Franke		IfM-GEOMAR Kiel	whole cruise
- Viola Neumann		DTU-Aqua, Kopenhagen	whole cruise
- Kathrin Beining		IfM-GEOMAR, Kiel	whole cruise
- Mei-Yu Chang		University of Bergen	whole cruise
- Burkhard von Dewitz		IfM-GEOMAR, Kiel	whole cruise
- Gregor Steffen		IfM-GEOMAR, Kiel	whole cruise
- Hans-Harald Hinrichsen		IfM-GEOMAR, Kiel	Kiel – Stettin
- Maike Blankartz		IfM-GEOMAR, Kiel	Kiel – Stettin
- Jörn Schmidt		CAU University of Kiel	Stettin – Kiel
- Lorena Gola		CAU University of Kiel	Stettin – Kiel
- Skadi Lange		IfM-GEOMAR, Kiel	Stettin – Kiel

Summary of cruise

The cruise started as scheduled and RV Alkor left Kiel on the morning 0830 a.m. of the 12th May. After one hour the cruise was already interrupted because problems with the cooling laboratory made technical support ashore necessary. Alkor left Kiel again at noon heading to the Arkona Basin. Unfortunately the cooling laboratory again failed on the way to the investigation area. Three stations in the Arkona Basin were covered before the pelagic fishery in this area started in the morning of 13th May. After this first day with pelagic fishery the cruise was continued in the Bornholm Basin and station work progressed as planned until the working program was interrupted in the early morning hours on the 15th May because of a port call in Stettin. Besides the exchange of scientific crew the stop in Stettin was used to fix again the cooling laboratory by an external technician. On Monday 16th May RV Alkor left Stettin again in the afternoon. Unfortunately, the cooling laboratory again was out of order after a few hours. The research program was continued in the early morning hours of the 17th May in the Bornholm Basin. From then on plankton stations of the regular station grid were covered during the night, while pelagic fishery hauls were conducted during day time. When the regular Bornholm Basin station grid was finished in the afternoon of 20th May, a small scale survey of ichthyoplankton, zooplankton and adult clupeids was performed on a station in the central Bornholm Basin. For this purpose seven bongo net casts during day time and seven during night time were performed within a radius of 3nm (Fig. 2). On the same positions 7 pelagic fishery hauls were conducted. The area was covered by hydro acoustic transects during day, night and during twilight in the morning as well as in the evening. Finally, vertical and horizontal multinet casts were performed in the centre of the surveyed area. The working program in the Bornholm Basin ended on the 22th May in the late evening and the work was continued in the Slupsk Furrow and the Gdansk Deep on 23th May. In this area pelagic fishery hauls and plankton net casts were conducted. On 24th May the last working day was performed in the Southern Gotland Basin, again with pelagic fishery hauls and plankton nets. The working program ended in the early afternoon on 24th May and RV Alkor steamed back to Kiel. On Wednesday 25th May the cruise ended at 19:30 p.m. at the IFM-GEOMAR pier in Kiel.

In conclusion the cruise was very successful. Due to good weather conditions and an efficient functioning of all gears and facilities in use, except from the cooling laboratory, the whole work plan of the cruise was accomplished. A cruise track (Fig. 1), an overview of gear deployments (Tab. 1) and a detailed station list (Tab. 2) is given below. Thanks to Captain Lass and his crew of RV Alkor for the outstanding support during the whole cruise!

Tab. 1: Overview of gear deployment

Gear	Number of deployments
ADM-CTD	76
Watersampler	25
Bongo- Babybongo	68
Helgoländer Larvennetz	21
WP2	5
Apstein	3
Multinet vertical (50 μ)	6
Multinet horizontal (335 μ)	6
IKS80	17
Mini Corer	1
pelagic trawl (Jungfischtrawl)	44

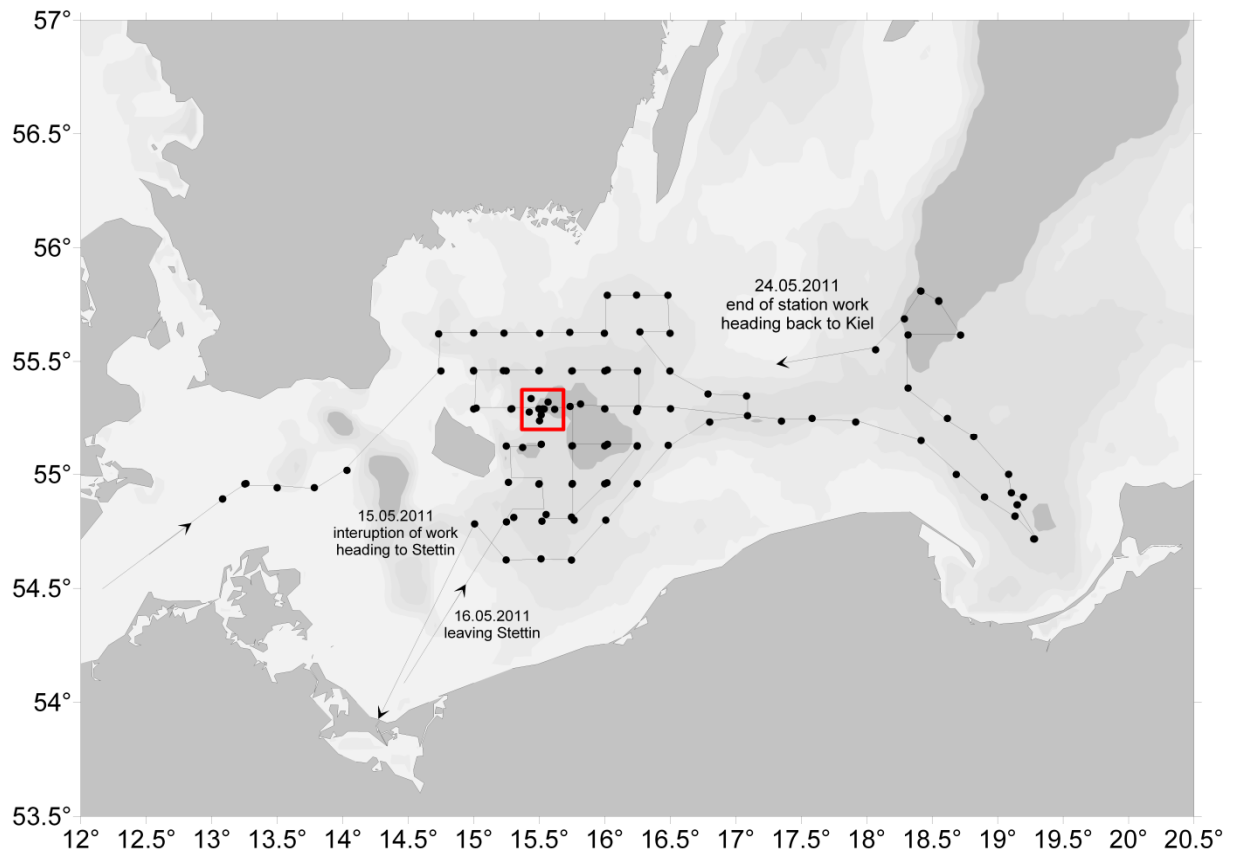


Fig. 1: Cruise track AL373. The red rectangle denotes the station with a small scale survey; details are given in Fig. 8.

Hydrography

CTD casts were performed on 76 stations. Preliminary results showed the typical hydrographic conditions in the investigation area which can be observed here during spring time. Temperature profiles revealed a warming of surface water layers up to 10 °C (Fig. 2). The intermediate water layer (30 m – 65 m) showed temperatures down to 2 °C, with cooler water masses in the eastern parts of the investigation area. Below the halocline temperatures reached 6 °C in the central Bornholm Basin and the Gdansk Deep. The permanent halocline was located in 60 m water depth in the western parts of the Bornholm Basin and at 70 m in the eastern parts of the basin (Fig. 3). Maximum salinity values near the bottom reached 14.8 psu and 10.7 psu in the Bornholm Basin and the Gdansk Deep, respectively. Oxygen decreased below the halocline to anoxic conditions near the bottom in the central Basins (Fig. 4).

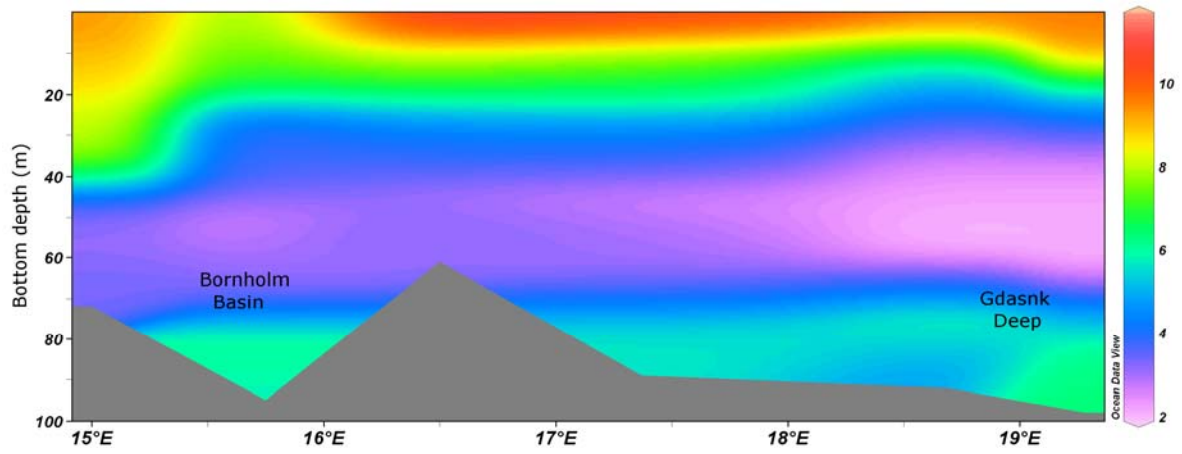


Fig. 2: Water temperature ($^{\circ}\text{C}$) on a transect from west to east in the southern Baltic.

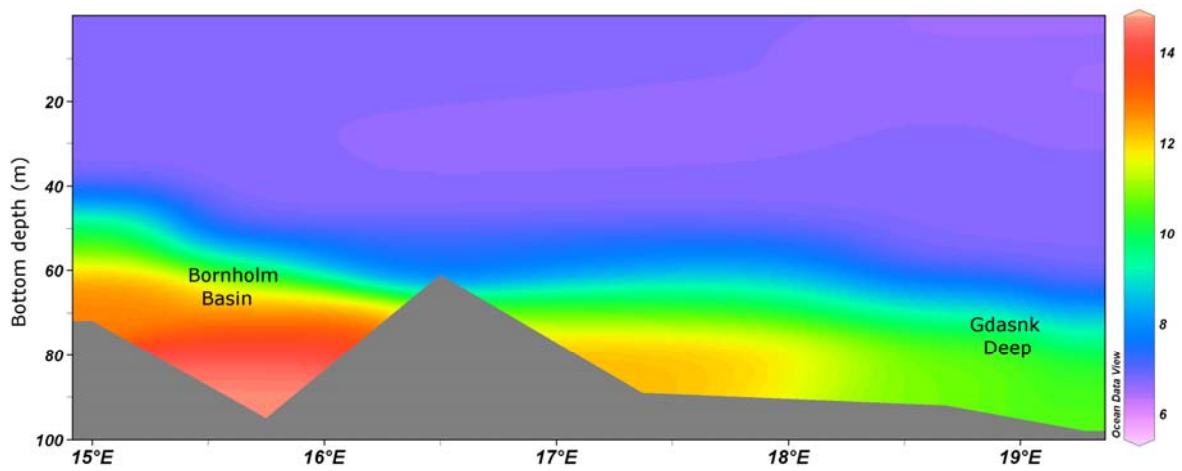


Fig. 3: Salinity (psu) on a transect from west to east in the southern Baltic.

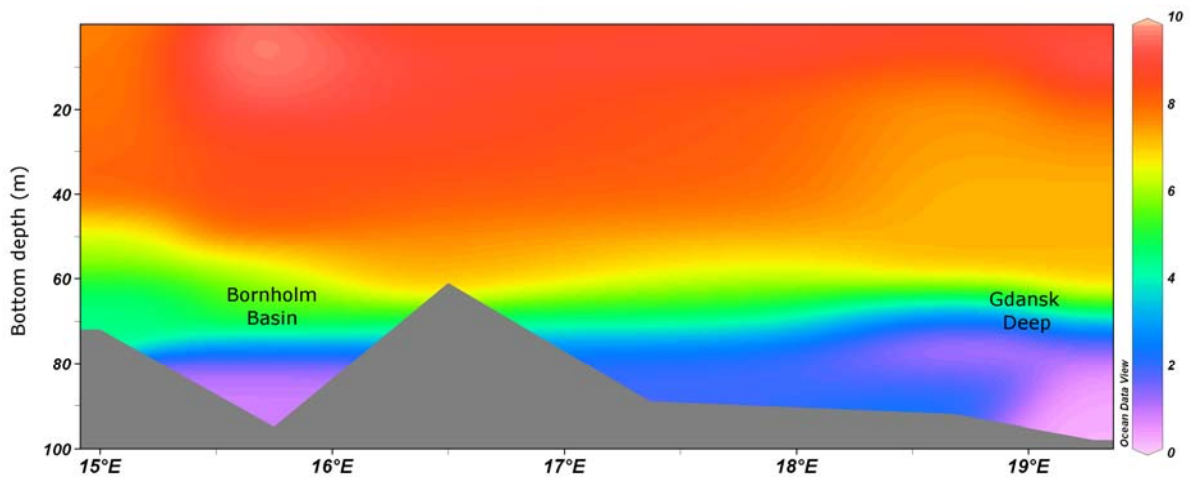


Fig. 4: Oxygen content (ml l^{-1}) on a transect from west to east in the southern Baltic (preliminary results).

Ichthyo- and zooplankton sampling

Bongo- and Babybongo casts were performed in the Arkona Basin (3 hauls), on a standard station grid in the Bornholm Basin (45 hauls) and in the western part of the Slupsk Furrow (4 hauls) (Fig. 5). All Bongo samples were immediately checked for the presence of *Mnemiopsis leidyi*, but no specimens of this invasive ctenophore were found during the whole cruise. Larvae of cod (*Gadus morhua*), sprat (*Sprattus sprattus*), and flounder (*Plathichthys flesus*) were picked from the 500 μ bongo-samples for subsequent RNA/DNA analysis. The 335 μ bongo-samples will be used for abundance determination of ichthyoplankton. Additionally, on one station in the central Bornholm Basin Bongo casts were performed on a small scale during day (7 hauls) and night time (7 hauls) in parallel to acoustic transects and pelagic fishery hauls (see details in Fig. 8). These samples will be analysed with special emphasis on predation by clupeids on ichthyoplankton and the spawning frequency of sprat. On this central station also multinet casts were performed to reveal the vertical distribution of ichthyoplankton (335 μ multinet horizontal tows) and their prey organisms (50 μ multinet vertical tows). The eastern parts of the Slupsk Furrow, the Gdansk Deep and the Southern Gotland Basin were covered with IKS80 casts (Fig. 5). These samples were taken in cooperation with Latvian Fish Resources Agency (LATFRA). In order to catch fish eggs alive for experimental purposes several casts with the Helgoländer Larvennetz were performed on selected stations in all investigation areas (Fig. 6). WP2 (200 μ) and Apstein (50 μ) nets were deployed on selected stations to get additional zooplankton samples (Fig. 6).

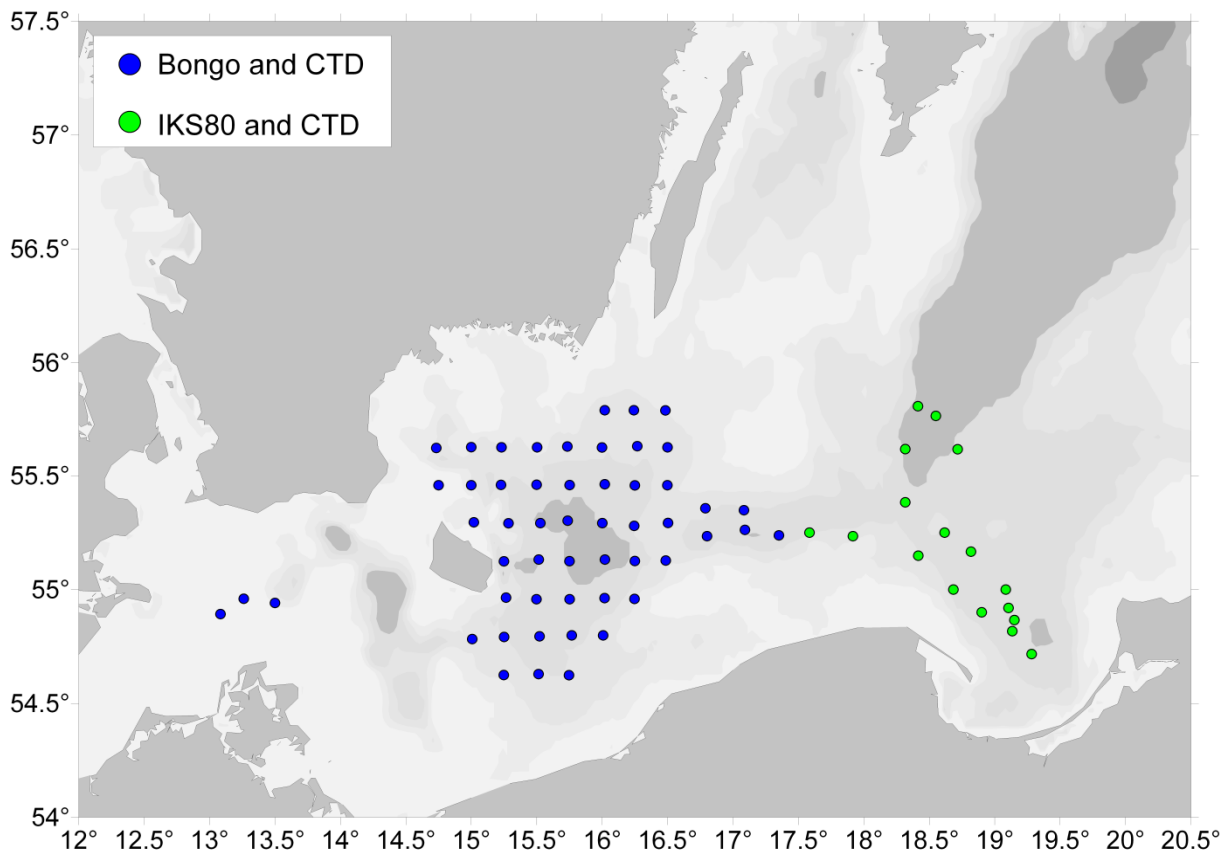


Fig. 5: CTD, Bongo- and IKS80 stations.

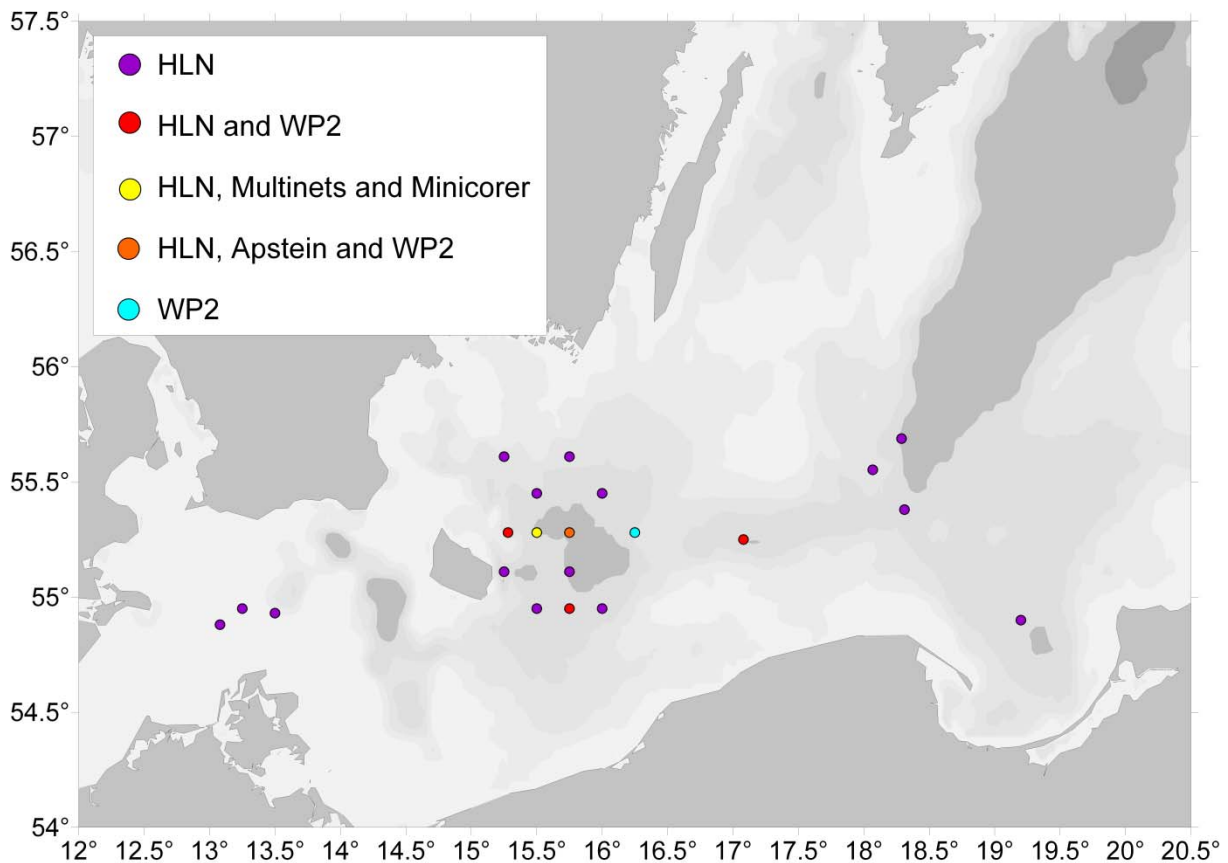


Fig. 6: Miscellaneous gears in use during AL373.

Fishery

During the cruise pelagic fishery was conducted in the Arkona Basin (5 hauls), the Bornholm Basin (30 hauls), the Gdansk Deep (5 hauls) and the Southern Gotland Basin (4 hauls). Catches in the Arkona Basin were dominated by a mixture of sprat (*Sprattus sprattus*) and herring (*Clupea harengus*). Also whiting (*Merlangius merlangus*) occurred regularly in the hauls conducted in this area while numbers of cod (*Gadus morhua*) were in general low. In the Bornholm Basin sprat was the most abundant fish species followed by cod. Herring was caught regularly but in relatively low numbers. Sporadically also whiting, flounder (*Platichthys flesus*) and rockling (*Rhinonemus cimbrius*) occurred in the catches. With the exception of two flounders and one stickleback (*Gasterosteus aculeatus*), catches in the Gdansk Deep and Southern Gotland Basin comprised of cod, sprat and herring. The numbers of sprat in the single hauls were considerably lower in this eastern parts of the investigation area.

From all hauls species composition, catch weight and length frequencies of all species were taken. Stomach samples were taken from sprat (min 10 per 1cm length class) and herring (min 10 per 2 cm length class). For cod single fish data, otoliths, one fin clip for genetic analysis were taken from each individual. Additionally, ovaries of female cod and whole sprat were sampled for maturation and fecundity analyses. To investigate clupeid predation on a small scale seven fishery hauls were performed on one central station in the Bornholm Basin in parallel to several bongo casts and hydro acoustic transects (see Fig. 8 for details).

Otoliths from herring were sampled in four different areas during the cruise by a colleague from the University of Bergen. Baltic herring otoliths will be used as out groups for

population classification of Norwegian herrings. In addition, the population structure of herring within the Baltic will be addressed to investigate if different Baltic herring populations can be identified by means of otolith micro-chemistry.

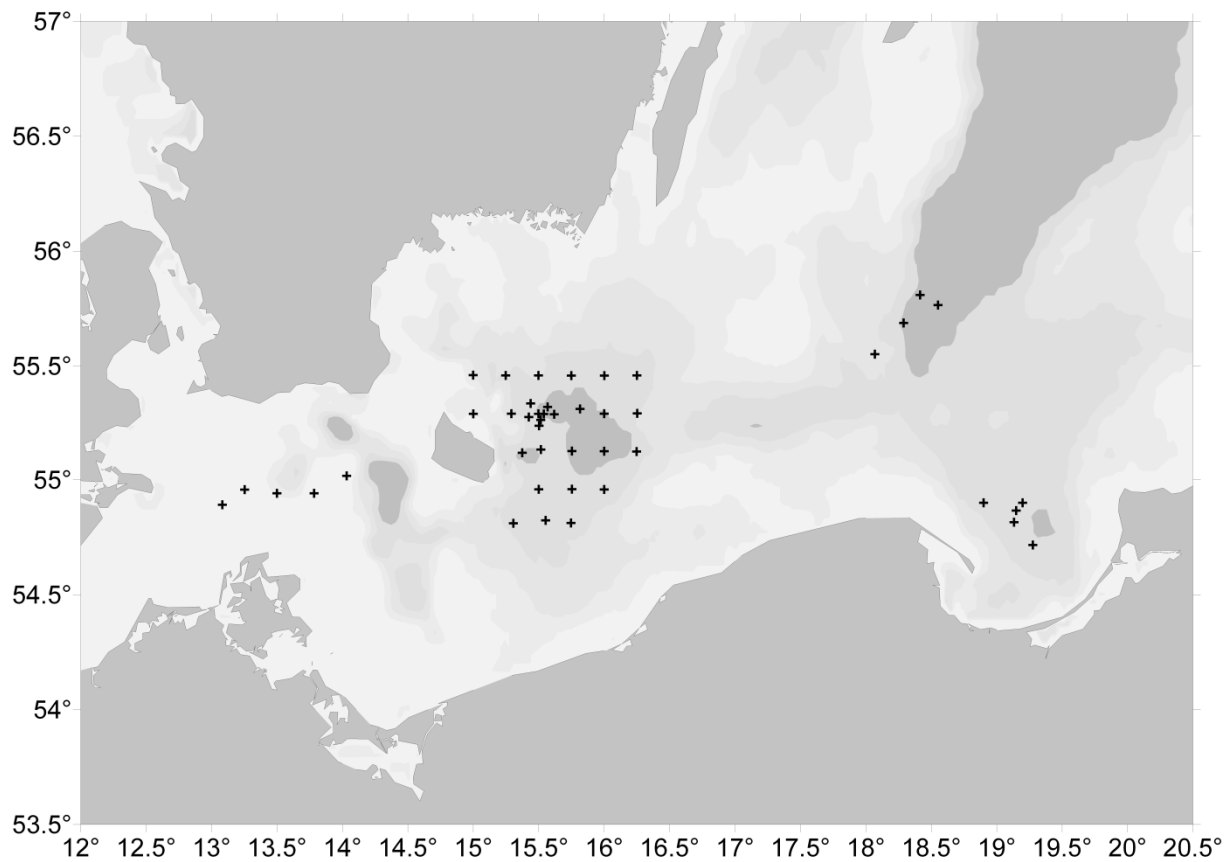


Fig. 7: Fishery stations covered during AL373 with the Jungfisch-Trawl.

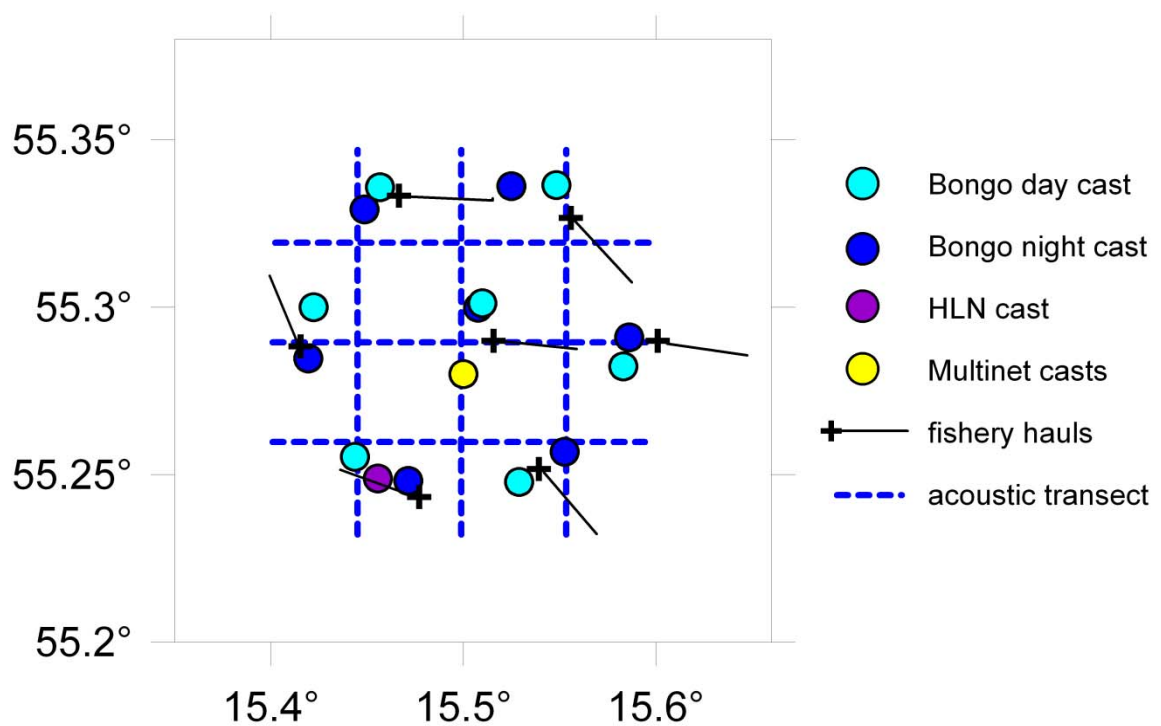


Fig. 8: Stations and transects covered for a small scale survey in the central Bornholm Basin.

Experiments

One major task of the experimental work during the cruise was the investigation of spatial differences in the specific gravity of fish eggs (FEBEC). For this purpose two methods were applied. The first method utilized vertical Helgoländer Larvennetz (HLN) casts to integrate the whole water column and to catch alive, unharmed fish eggs. These were picked out of the samples, determined to species level, staged and size measured under a stereo microscope. The eggs were inserted into freshly prepared density gradient columns in order to determine their specific gravity. Almost 900 eggs from four species, cod (*Gadus morhua*), sprat (*Sprattus sprattus*), flounder (*Platichthys flesus*) and rockling (*Rhinonemus cimbrius*), have been measured in the different investigation areas. The by far largest data set could be gained for sprat with 650 individual measured eggs on 12 selected stations in the Bornholm Basin. The second method to determine egg buoyancy was by strip spawning. Running ripe cod and flounder were stripped and eggs were fertilized artificially. Fertilized eggs were decanted in order to separate dead from alive material. After 30 min incubation time the fertilized eggs were kept cool and dark for about 20 hours. Afterwards, subsamples were checked for normal developmental progress, staged, size measured and put into previously prepared gradient columns. 60 min past insertion, the specific gravity of the single egg batch could be determined. All in all 17 cod egg batches and one flounder batch could be measured successfully during the cruise. The majority of measurements were made in the Bornholm Basin, followed by some batches in the Southern Gotland Basin and a single batch in the Gdansk Deep.

A second experimental approach was used to investigate the development success of cod eggs in relation to ocean acidification. Fertilized cod eggs were incubated at different levels of CO₂ in the range of predicted future scenarios of ocean acidification. The goal of this study was to determine the effects of low pH due to elevated CO₂ concentrations on the development of cod eggs. This study was conducted within the projects EPOCA and CALMARO with the goal of advancing the understanding of biological implications of ocean acidification.

Report of cruise AL373 with technical details

Thursday	12/05/2011	0830	leaving IfM-pier, heading with direction Arkona Basin. 0930 heading back to Kiel in order to get technical support to fix the cooling laboratory.
		1200	leaving Kiel again, heading to the first station in the Arkona Basin.
Friday	13/05/2011	0003	beginning station work in the Arkona Basin
		0600	beginning pelagic fishery in the Arkona Basin, 5 hauls.
		1600	end of fishery in the Arkona Basin, heading to first station of Bornholm Basin.
		1934	beginning with station work in the Bornholm Basin and Stolper Trench.
Sunday	15/05/2011	0619	End of station work in Bornholm Basin, heading with direction Stettin.
		1600	Stettin.
Monday	16/05/2011	1530	Change of scientific crew. Two persons from board, three person on board.
		1600	Leaving Stettin, heading with direction Bornholm Basin.
Tuesday	17/05/2011	0103	Continuing station work in the Bornholm Basin
		0943	Beginning with pelagic fishery, 5 hauls
		1915	Continuing station work
Wednesday	18/05/2011	0558	Beginning pelagic fishery, 6 hauls
		1853	Continuing station work
Thursday	19/05/2011	0556	Beginning pelagic fishery, 6 hauls
		1631	Continuing station work
Friday	20/05/2011	0558	Beginning with pelagic fishery, 6 hauls
		1646	Beginning with small scale Bongo sampling
		2032	1 st small scale acoustic transect
Saturday	21/05/2011	0049	2 nd small scale acoustic transect
		0601	Beginning with small scale pelagic fishery, 7 hauls.
		1625	station work
		1726	3 rd small scale acoustic transect
		2125	2 nd small scale Bongo sampling
Sunday	22/05/2011	0558	Beginning with multi net station
		1434	end of multi net casts, deployment of mini corer
		1459	Continuing station work Bornholm Basin, Stolper Trench, Gdansk Deep.
Monday	23/05/2011	0757	Beginning pelagic fishery and station work in Gdansk Deep, 5 pelagic fishery hauls.
		1800	Continuing station work in Gdansk Deep and Southern Gotland Basin.
Tuesday	24/05/2011	0600	Beginning pelagic fishery and station work in Southern Gotland Basin.
		1400	end of station work, heading back to Kiel
Wednesday	25/05/2011	1800	Kiel Seefischmarkt, debarkation of equipment and samples.
		1930	Kiel IFM pier west shore, end of cruise.

Tab. 2: Detailed station list of AL373 12.05. – 25.05.2011. Date and time in UTC.

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
368	12/05/2011	CTD	22:03:00	surface	43	54° 53.49' N	013° 5.02' E
			22:08:59	on deck	43	54° 53.48' N	013° 5.00' E
		CTD / water sampler	22:12:00	surface	43	54° 53.48' N	013° 5.01' E
			22:20:59	on deck	43	54° 53.49' N	013° 5.00' E
		CTD / water sampler	22:33:00	surface	43	54° 53.52' N	013° 5.01' E
			22:38:59	on deck	43	54° 53.54' N	013° 4.99' E
		CTD / water sampler	22:43:00	surface	43	54° 53.55' N	013° 5.00' E
			22:48:59	on deck	43	54° 53.53' N	013° 5.00' E
		Helgoländer Larvennetz	22:56:00	surface	43	54° 53.52' N	013° 4.97' E
			23:05:59	on deck	43	54° 53.52' N	013° 4.97' E
Bongo net	23:09:00	surface	43	54° 53.52' N	013° 4.98' E		
	23:15:59	on deck	43	54° 53.46' N	013° 4.53' E		
369	13/05/2011	Bongo net	00:07:00	surface	46	54° 57.57' N	013° 15.67' E
			00:14:59	on deck	46	54° 57.49' N	013° 15.15' E
		Helgoländer Larvennetz	00:19:00	surface	46	54° 57.49' N	013° 15.06' E
			00:28:59	on deck	46	54° 57.50' N	013° 15.07' E
CTD	00:32:00	surface	46	54° 57.49' N	013° 15.02' E		
	00:37:59	on deck	46	54° 57.47' N	013° 15.03' E		
370	13/05/2011	CTD	01:34:00	surface	52	54° 56.47' N	013° 30.04' E
			01:38:59	on deck	46	54° 56.47' N	013° 30.03' E
		Helgoländer Larvennetz	01:42:00	surface	52	54° 56.48' N	013° 30.01' E
			01:50:59	on deck	46	54° 56.47' N	013° 30.01' E
		Bongo net	01:55:00	surface	46	54° 56.44' N	013° 29.95' E
			02:03:59	on deck	46	54° 56.45' N	013° 29.28' E
371	13/05/2011	Jungfischtrawl	03:59:00	surface	43	54° 53.50' N	013° 4.96' E
			04:31:00	start fishing	42	54° 53.93' N	013° 2.14' E
			05:01:00	end fishing	41	54° 54.25' N	012° 59.82' E
			05:10:59	on deck	40	54° 54.29' N	012° 59.23' E
372	13/05/2011	Jungfischtrawl	06:12:00	surface	46	54° 57.44' N	013° 15.14' E
			06:26:00	start fishing	46	54° 57.60' N	013° 13.92' E
			06:56:00	end fishing	44	54° 57.91' N	013° 11.47' E
			07:05:59	on deck	44	54° 57.89' N	013° 10.86' E
			08:11:00	surface	51	54° 56.51' N	013° 30.01' E
373	13/05/2011	CTD / water sampler	08:18:59	on deck	50	54° 56.50' N	013° 29.96' E
			08:20:00	surface	46	54° 56.50' N	013° 29.94' E
		Jungfischtrawl	08:34:00	start fishing	46	54° 56.43' N	013° 28.76' E
			09:04:00	end fishing	51	54° 56.40' N	013° 26.35' E
			09:12:59	on deck	46	54° 56.41' N	013° 25.87' E
			10:27:00	surface	47	54° 56.51' N	013° 47.03' E
374	13/05/2011	CTD	10:31:59	start fishing	50	54° 56.49' N	013° 47.03' E
			10:38:00	surface	50	54° 56.50' N	013° 47.00' E
		Jungfischtrawl	10:53:00	start fishing	49	54° 56.25' N	013° 45.89' E
			11:23:00	end fishing	50	54° 55.83' N	013° 43.76' E
			11:31:59	on deck	51	54° 55.74' N	013° 43.36' E
			12:49:00	surface	47	55° 1.05' N	014° 2.02' E
375	13/05/2011	CTD	12:54:59	on deck	47	55° 1.02' N	014° 2.04' E
			12:55:00	surface	47	55° 1.02' N	014° 2.03' E
		CTD	12:59:59	on deck	47	55° 1.03' N	014° 2.01' E
			13:01:00	surface	47	55° 1.03' N	014° 1.95' E
		Jungfischtrawl	13:14:00	start fishing	47	55° 0.78' N	014° 0.96' E
			13:45:00	end fishing	49	55° 0.22' N	013° 58.81' E
376	13/05/2011	CTD	13:54:59	on deck	48	55° 0.08' N	013° 58.37' E
			17:34:00	surface	69	55° 27.49' N	014° 45.02' E
			17:40:59	on deck	69	55° 27.48' N	014° 44.98' E
		Bongo net	17:53:00	surface	69	55° 27.48' N	014° 44.97' E
			18:06:59	on deck	69	55° 27.14' N	014° 44.13' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
377	13/05/2011	Bongo net	19:06:00	surface	69	55° 37.28' N	014° 43.94' E
			19:19:59	on deck	68	55° 37.46' N	014° 44.87' E
		CTD	19:24:00	surface	68	55° 37.51' N	014° 44.95' E
			19:29:59	on deck	67	55° 37.54' N	014° 44.92' E
378	13/05/2011	CTD	20:20:00	surface	80	55° 37.49' N	014° 59.99' E
			20:26:59	on deck	79	55° 37.51' N	014° 59.94' E
		Bongo net	20:30:00	surface	75	55° 37.50' N	014° 59.98' E
			20:44:59	on deck	79	55° 37.57' N	015° 1.25' E
379	13/05/2011	Bongo net	21:25:00	surface	74	55° 37.46' N	015° 13.84' E
			21:37:59	on deck	76	55° 37.47' N	015° 14.80' E
		Helgoländer Larvennetz	21:41:00	surface	75	55° 37.50' N	015° 14.99' E
			21:55:59	on deck	75	55° 37.46' N	015° 14.96' E
		CTD	22:00:00	surface	72	55° 37.47' N	015° 14.92' E
			22:05:59	on deck	72	55° 37.47' N	015° 14.93' E
380	13/05/2011	CTD	23:03:00	surface	67	55° 37.46' N	015° 29.98' E
			23:08:59	on deck	67	55° 37.46' N	015° 29.98' E
		Bongo net	23:14:00	surface	67	55° 37.45' N	015° 30.20' E
			23:26:59	on deck	67	55° 37.29' N	015° 31.15' E
381	14/05/2011	Bongo net	00:13:00	surface	68	55° 37.67' N	015° 44.05' E
			00:24:59	on deck	68	55° 37.50' N	015° 44.93' E
		Helgoländer Larvennetz	00:30:00	surface	68	55° 37.54' N	015° 45.01' E
			00:46:59	on deck	70	55° 37.50' N	015° 44.96' E
		CTD / water sampler	01:12:00	surface	68	55° 37.54' N	015° 44.88' E
			01:19:59	on deck	68	55° 37.52' N	015° 44.86' E
		CTD	01:40:00	surface	68	55° 37.51' N	015° 44.91' E
			01:47:59	on deck	70	55° 37.53' N	015° 44.88' E
382	14/05/2011	CTD	02:42:00	surface	74	55° 37.52' N	015° 59.98' E
			02:47:59	on deck	74	55° 37.46' N	015° 59.99' E
		Bongo net	02:50:00	surface	74	55° 37.44' N	015° 59.90' E
			03:04:59	on deck	74	55° 37.36' N	015° 58.65' E
383	14/05/2011	Bongo net	04:08:00	surface	61	55° 47.48' N	016° 1.22' E
			04:17:59	on deck	61	55° 47.46' N	016° 0.37' E
		CTD	04:21:00	surface	62	55° 47.53' N	015° 59.97' E
			04:48:59	on deck	62	55° 47.34' N	016° 0.26' E
384	14/05/2011	CTD	05:41:00	surface	60	55° 47.51' N	016° 15.05' E
			05:46:59	on deck	61	55° 47.49' N	016° 14.99' E
		Bongo net	06:00:00	surface	60	55° 47.51' N	016° 14.57' E
			06:11:59	on deck	59	55° 47.65' N	016° 15.56' E
385	14/05/2011	Bongo net	06:53:00	surface	57	55° 47.47' N	016° 28.98' E
			07:03:59	on deck	56	55° 47.51' N	016° 29.85' E
		CTD	07:06:00	surface	56	55° 47.51' N	016° 30.00' E
			07:12:59	on deck	56	55° 47.50' N	016° 30.00' E
386	14/05/2011	CTD	08:11:00	surface	62	55° 37.47' N	016° 30.03' E
			08:17:59	on deck	62	55° 37.45' N	016° 30.02' E
		Bongo net	08:20:00	surface	62	55° 37.45' N	016° 29.94' E
			08:30:59	on deck	63	55° 37.27' N	016° 29.21' E
387	14/05/2011	Bongo net	09:14:00	surface	72	55° 37.78' N	016° 16.11' E
			09:25:59	on deck	74	55° 37.50' N	016° 15.38' E
		CTD / water sampler	09:33:00	surface	74	55° 37.50' N	016° 14.96' E
			09:41:59	on deck	74	55° 37.51' N	016° 14.97' E
		CTD / water sampler	09:49:00	surface	74	55° 37.49' N	016° 14.95' E
			09:58:59	on deck	74	55° 37.50' N	016° 14.95' E
		CTD / water sampler	10:04:00	surface	74	55° 37.50' N	016° 14.95' E
			10:18:59	on deck	74	55° 37.48' N	016° 15.00' E
CTD	10:26:00	surface	74	55° 37.46' N	016° 14.95' E		
	10:31:59	on deck	74	55° 37.45' N	016° 14.94' E		

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
388	14/05/2011	CTD	11:49:00	surface	58	55° 27.49' N	016° 30.00' E
			11:53:59	on deck	58	55° 27.49' N	016° 29.97' E
		Bongo net	11:57:00	surface	58	55° 27.47' N	016° 29.88' E
			12:05:59	on deck	57	55° 27.22' N	016° 29.33' E
389	14/05/2011	Bongo net	13:19:00	surface	65	55° 21.42' N	016° 47.32' E
			13:28:59	on deck	66	55° 21.13' N	016° 47.90' E
		CTD	13:32:00	surface	66	55° 21.02' N	016° 48.05' E
			13:36:59	on deck	66	55° 21.01' N	016° 48.02' E
390	14/05/2011	CTD	14:37:00	surface	67	55° 21.01' N	017° 4.96' E
			14:43:59	on deck	67	55° 20.96' N	017° 5.01' E
		Bongo net	14:45:00	surface	67	55° 20.91' N	017° 5.01' E
			14:57:59	on deck	68	55° 20.29' N	017° 4.81' E
391	14/05/2011	Bongo net	15:29:00	surface	81	55° 15.70' N	017° 5.44' E
			15:41:59	on deck	82	55° 15.14' N	017° 4.97' E
		Helgoländer Larvennetz	15:45:00	surface	83	55° 15.00' N	017° 4.97' E
			16:05:59	on deck	83	55° 15.03' N	017° 5.03' E
		Helgoländer Larvennetz	16:07:00	surface	83	55° 15.03' N	017° 5.02' E
			16:25:59	on deck	83	55° 15.03' N	017° 5.03' E
		WP 2	16:28:00	surface	83	55° 15.03' N	017° 5.04' E
			16:39:59	on deck	83	55° 15.00' N	017° 5.01' E
		CTD	16:45:00	surface	83	55° 15.00' N	017° 5.01' E
			16:52:59	on deck	83	55° 15.00' N	017° 5.02' E
392	14/05/2011	CTD	17:51:00	surface	79	55° 14.01' N	016° 47.99' E
			17:58:59	on deck	79	55° 14.02' N	016° 47.99' E
		Bongo net	18:02:00	surface	79	55° 14.03' N	016° 48.12' E
			18:12:59	on deck	80	55° 13.92' N	016° 48.85' E
393	14/05/2011	Bongo net	19:27:00	surface	51	55° 7.63' N	016° 29.12' E
			19:34:59	on deck	51	55° 7.59' N	016° 29.67' E
		CTD	19:39:00	surface	51	55° 7.48' N	016° 29.96' E
			19:43:59	on deck	51	55° 7.53' N	016° 30.00' E
394	14/05/2011	CTD	21:04:00	surface	49	54° 57.48' N	016° 14.99' E
			21:08:59	on deck	49	54° 57.49' N	016° 14.95' E
		Bongo net	21:11:00	surface	50	54° 57.52' N	016° 14.87' E
			21:19:59	on deck	52	54° 57.58' N	016° 14.28' E
395	14/05/2011	Bongo net	22:34:00	surface	52	54° 47.92' N	016° 0.47' E
			22:42:59	on deck	52	54° 47.62' N	016° 0.03' E
		CTD	22:47:00	surface	51	54° 47.53' N	016° 0.03' E
			22:51:59	on deck	51	54° 47.54' N	016° 0.04' E
396	15/05/2011	CTD	00:16:00	surface	59	54° 37.45' N	015° 44.98' E
			00:20:59	on deck	59	54° 37.43' N	015° 44.96' E
		Bongo net	00:24:00	surface	59	54° 37.42' N	015° 44.82' E
			00:33:59	on deck	60	54° 37.42' N	015° 44.07' E
397	15/05/2011	Bongo net	01:22:00	surface	63	54° 37.74' N	015° 30.81' E
			01:31:59	on deck	63	54° 37.53' N	015° 30.19' E
		CTD	01:35:00	surface	63	54° 37.50' N	015° 30.04' E
			01:40:59	on deck	63	54° 37.50' N	015° 30.03' E
398	15/05/2011	CTD	02:34:00	surface	58	54° 37.51' N	015° 15.03' E
			02:39:59	on deck	58	54° 37.48' N	015° 15.01' E
		Bongo net	02:42:00	surface	58	54° 37.48' N	015° 14.85' E
			02:51:59	on deck	58	54° 37.50' N	015° 14.03' E
399	15/05/2011	Bongo net	04:06:00	surface	60	54° 46.94' N	015° 0.40' E
			04:15:59	on deck	60	54° 47.36' N	015° 0.04' E
		CTD	04:19:00	surface	60	54° 47.52' N	014° 59.98' E
			04:24:59	on deck	60	54° 47.54' N	014° 59.97' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
400	16/05/2011	CTD	23:03:00	surface	71	54° 47.50' N	015° 15.03' E
			23:07:59	on deck	68	54° 47.49' N	015° 15.02' E
		Bongo net	23:11:00	surface	68	54° 47.48' N	015° 15.00' E
			23:21:59	on deck	69	54° 47.25' N	015° 14.27' E
401	17/05/2011	Bongo net	00:24:00	surface	77	54° 47.68' N	015° 31.28' E
			00:36:59	on deck	76	54° 47.49' N	015° 30.29' E
		CTD / water sampler	00:43:00	surface	76	54° 47.48' N	015° 30.07' E
			00:53:59	on deck	78	54° 47.48' N	015° 30.05' E
		CTD / water sampler	00:59:00	surface	76	54° 47.49' N	015° 30.05' E
			01:07:59	on deck	77	54° 47.48' N	015° 30.04' E
		CTD / water sampler	01:13:00	surface	79	54° 47.49' N	015° 30.04' E
			01:21:59	on deck	76	54° 47.47' N	015° 30.04' E
		CTD	01:25:00	surface	77	54° 47.47' N	015° 30.04' E
			01:30:59	on deck	77	54° 47.46' N	015° 30.03' E
402	17/05/2011	CTD	02:36:00	surface	79	54° 57.51' N	015° 29.97' E
			02:42:59	on deck	80	54° 57.53' N	015° 29.99' E
		Helgoländer Larvennetz	02:47:00	surface	80	54° 57.51' N	015° 30.00' E
			03:03:59	on deck	80	54° 57.45' N	015° 29.93' E
		Bongo net	03:06:00	surface	77	54° 57.42' N	015° 29.88' E
			03:19:59	on deck	77	54° 56.99' N	015° 28.92' E
403	17/05/2011	Bongo net	04:10:00	surface	45	54° 57.88' N	015° 15.91' E
			04:19:59	on deck	44	54° 57.60' N	015° 15.27' E
		CTD	04:23:00	surface	43	54° 57.51' N	015° 15.03' E
			04:27:59	on deck	43	54° 57.49' N	015° 14.97' E
404	17/05/2011	CTD	05:30:00	surface	62	55° 7.54' N	015° 14.99' E
			05:36:59	on deck	62	55° 7.50' N	015° 14.98' E
		Helgoländer Larvennetz	05:39:00	surface	62	55° 7.50' N	015° 14.95' E
			05:52:59	on deck	61	55° 7.43' N	015° 14.94' E
		Bongo net	05:57:00	surface	62	55° 7.44' N	015° 14.93' E
			06:07:59	on deck	62	55° 7.47' N	015° 15.77' E
405	17/05/2011	Bongo net	06:59:00	surface	69	55° 7.87' N	015° 30.91' E
			07:10:59	on deck	68	55° 7.50' N	015° 30.25' E
		CTD	07:14:00	surface	68	55° 7.55' N	015° 30.03' E
			07:19:59	on deck	67	55° 7.53' N	015° 30.01' E
		CTD / water sampler	07:24:00	surface	67	55° 7.50' N	015° 30.00' E
406	17/05/2011	Jungfischtrawl	07:33:59	on deck	67	55° 7.48' N	015° 29.98' E
			07:43:00	surface	69	55° 7.92' N	015° 30.95' E
			08:01:00	start fishing	68	55° 7.33' N	015° 29.93' E
			08:31:00	end fishing	72	55° 6.33' N	015° 28.26' E
407	17/05/2011	Jungfischtrawl	08:41:59	on deck	73	55° 6.04' N	015° 27.94' E
			09:06:00	surface	77	55° 7.08' N	015° 22.42' E
			09:19:00	start fishing	73	55° 6.43' N	015° 21.94' E
			09:49:00	end fishing	72	55° 5.26' N	015° 20.47' E
408	17/05/2011	Jungfischtrawl	09:58:59	on deck	79	55° 5.03' N	015° 20.17' E
			11:07:00	surface	79	54° 57.51' N	015° 29.98' E
			11:19:00	start fishing	78	54° 57.13' N	015° 29.34' E
			11:49:00	end fishing	77	54° 56.09' N	015° 27.65' E
409	17/05/2011	Jungfischtrawl	12:00:59	on deck	76	54° 55.76' N	015° 27.42' E
			12:53:00	surface	79	54° 49.40' N	015° 33.14' E
			13:07:00	start fishing	75	54° 49.04' N	015° 32.26' E
			13:37:00	end fishing	74	54° 48.39' N	015° 30.13' E
410	17/05/2011	Jungfischtrawl	13:46:59	on deck	74	54° 48.27' N	015° 29.67' E
			14:33:00	surface	68	54° 48.65' N	015° 18.33' E
			14:48:00	start fishing	69	54° 48.13' N	015° 17.17' E
			15:19:00	end fishing	68	54° 47.21' N	015° 15.04' E
			15:28:59	on deck	68	54° 46.99' N	015° 14.66' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
411	17/05/2011	Bongo net	17:15:00	surface	71	54° 47.93' N	015° 46.02' E
			17:28:59	on deck	71	54° 47.56' N	015° 45.24' E
		CTD	17:31:00	surface	74	54° 47.50' N	015° 45.06' E
			17:36:59	on deck	71	54° 47.46' N	015° 45.05' E
412	17/05/2011	CTD	18:40:00	surface	82	54° 57.51' N	015° 45.01' E
			18:46:59	on deck	83	54° 57.47' N	015° 45.00' E
		Helgoländer Larvennetz	18:49:00	surface	81	54° 57.46' N	015° 45.00' E
			19:06:59	on deck	81	54° 57.41' N	015° 44.99' E
		WP 2	19:10:00	surface	80	54° 57.47' N	015° 44.99' E
			19:20:59	on deck	83	54° 57.43' N	015° 45.02' E
		Bongo net	19:23:00	surface	81	54° 57.42' N	015° 45.07' E
			19:34:59	on deck	83	54° 57.16' N	015° 44.35' E
413	17/05/2011	Bongo net	20:34:00	surface	74	54° 57.75' N	016° 1.08' E
			20:46:59	on deck	74	54° 57.48' N	016° 0.20' E
		Helgoländer Larvennetz	20:49:00	surface	74	54° 57.50' N	016° 0.07' E
			21:06:59	on deck	74	54° 57.47' N	016° 0.12' E
		CTD	21:10:00	surface	76	54° 57.47' N	016° 0.10' E
			21:15:59	on deck	74	54° 57.48' N	016° 0.10' E
414	17/05/2011	CTD	22:36:00	surface	80	55° 7.52' N	016° 14.98' E
			22:41:59	on deck	79	55° 7.53' N	016° 14.97' E
		Bongo net	22:44:00	surface	82	55° 7.51' N	016° 14.95' E
			22:57:59	on deck	83	55° 7.25' N	016° 13.98' E
415	17/05/2011	Bongo net	23:49:00	surface	90	55° 7.91' N	016° 1.30' E
			00:01:59	on deck	88	55° 7.63' N	016° 0.38' E
		CTD	00:06:00	surface	87	55° 7.52' N	016° 0.04' E
			00:12:59	on deck	90	55° 7.48' N	016° 0.05' E
416	18/05/2011	CTD	01:19:00	surface	89	55° 7.50' N	015° 45.07' E
			01:25:59	on deck	91	55° 7.49' N	015° 45.07' E
		Helgoländer Larvennetz	01:28:00	surface	89	55° 7.49' N	015° 45.08' E
			01:45:59	on deck	90	55° 7.48' N	015° 45.02' E
		Bongo net	01:49:00	surface	90	55° 7.47' N	015° 45.00' E
			02:03:59	on deck	90	55° 7.14' N	015° 43.89' E
417	18/05/2011	Jungfischtrawl	03:58:00	surface	89	55° 7.52' N	015° 45.25' E
			04:12:00	start fishing	90	55° 7.18' N	015° 43.87' E
			04:42:00	end fishing	87	55° 6.60' N	015° 41.53' E
			04:52:59	on deck	86	55° 6.43' N	015° 41.00' E
418	18/05/2011	Jungfischtrawl	05:52:00	surface	81	54° 57.57' N	015° 45.25' E
			06:06:00	start fishing	80	54° 57.27' N	015° 43.90' E
			06:36:00	end fishing	79	54° 56.74' N	015° 41.49' E
			06:47:59	on deck	79	54° 56.48' N	015° 40.69' E
419	18/05/2011	Jungfischtrawl	07:40:00	surface	73	54° 48.73' N	015° 44.78' E
			07:52:00	start fishing	76	54° 48.41' N	015° 43.79' E
			08:22:00	end fishing	76	54° 47.92' N	015° 41.43' E
			08:31:59	on deck	74	54° 47.79' N	015° 40.94' E
420	18/05/2011	CTD / water sampler	10:05:00	surface	75	54° 57.50' N	016° 0.01' E
			10:14:59	on deck	74	54° 57.48' N	016° 0.02' E
		CTD / water sampler	10:28:00	surface	76	54° 57.51' N	016° 0.02' E
			10:33:59	on deck	75	54° 57.49' N	016° 0.00' E
		Jungfischtrawl	10:35:00	surface	74	54° 57.48' N	015° 59.98' E
			10:52:00	start fishing	73	54° 56.83' N	015° 59.04' E
421	18/05/2011	Jungfischtrawl	11:23:00	end fishing	72	54° 55.71' N	015° 57.58' E
			11:32:59	on deck	72	54° 55.41' N	015° 57.33' E
			12:48:00	surface	87	55° 7.48' N	016° 0.02' E
			13:03:00	start fishing	89	55° 6.75' N	015° 59.29' E
			13:33:00	end fishing	90	55° 5.54' N	015° 57.94' E
			13:41:59	on deck	85	55° 5.22' N	015° 57.64' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
422	18/05/2011	Jungfischtrawl	14:47:00	surface	82	55° 7.40' N	016° 14.88' E
			15:05:00	start fishing	83	55° 6.83' N	016° 13.28' E
			15:35:00	end fishing	83	55° 6.21' N	016° 11.01' E
			15:44:59	on deck	84	55° 6.10' N	016° 10.45' E
423	18/05/2011	Bongo net	16:53:00	surface	74	55° 16.77' N	016° 14.68' E
			17:05:59	on deck	74	55° 17.36' N	016° 15.00' E
		WP 2	17:10:00	surface	74	55° 17.51' N	016° 15.00' E
			17:19:59	on deck	74	55° 17.49' N	016° 15.01' E
		CTD / water sampler	17:25:00	surface	74	55° 17.50' N	016° 15.07' E
			17:34:59	on deck	74	55° 17.50' N	016° 14.97' E
		CTD	17:39:00	surface	74	55° 17.50' N	016° 14.93' E
			17:45:59	on deck	74	55° 17.51' N	016° 15.00' E
424	18/05/2011	CTD	18:45:00	surface	75	55° 27.50' N	016° 15.03' E
			18:51:59	on deck	75	55° 27.48' N	016° 15.03' E
		Bongo net	18:54:00	surface	75	55° 27.45' N	016° 15.02' E
			19:06:59	on deck	75	55° 27.31' N	016° 14.14' E
425	18/05/2011	Bongo net	19:51:00	surface	82	55° 27.75' N	016° 1.21' E
			20:05:59	on deck	83	55° 27.40' N	016° 0.58' E
		Helgoläder Larvennetz	20:09:00	surface	83	55° 27.54' N	016° 0.01' E
			20:27:59	on deck	83	55° 27.53' N	016° 0.14' E
		CTD	20:34:00	surface	83	55° 27.49' N	016° 0.10' E
			20:41:59	on deck	83	55° 27.49' N	016° 0.09' E
426	18/05/2011	CTD	21:41:00	surface	90	55° 17.48' N	015° 59.94' E
			21:47:59	on deck	89	55° 17.50' N	016° 0.02' E
		Bongo net	21:50:00	surface	91	55° 17.50' N	016° 0.05' E
			22:03:59	on deck	89	55° 16.98' N	016° 0.66' E
427	18/05/2011	Bongo net	23:05:00	surface	102	55° 18.13' N	015° 44.18' E
			23:19:59	on deck	99	55° 17.61' N	015° 44.85' E
		Helgoläder Larvennetz	23:23:00	surface	96	55° 17.53' N	015° 44.99' E
			23:39:59	on deck	96	55° 17.50' N	015° 45.05' E
		CTD	23:43:00	surface	101	55° 17.50' N	015° 45.04' E
			23:49:59	on deck	96	55° 17.49' N	015° 45.04' E
428	19/05/2011	CTD	00:52:00	surface	85	55° 27.54' N	015° 45.08' E
			00:58:59	on deck	85	55° 27.54' N	015° 45.12' E
		Bongo net	01:01:00	surface	86	55° 27.51' N	015° 45.12' E
			01:14:59	on deck	86	55° 26.98' N	015° 45.63' E
429	19/05/2011	Jungfischtrawl	03:56:00	surface	85	55° 27.47' N	015° 44.96' E
			04:15:00	start fishing	87	55° 26.48' N	015° 43.89' E
			04:45:00	end fishing	91	55° 25.27' N	015° 42.59' E
			04:56:59	on deck	93	55° 24.94' N	015° 42.32' E
430	19/05/2011	Jungfischtrawl	05:57:00	surface	83	55° 27.48' N	016° 0.07' E
			06:08:00	start fishing	84	55° 27.32' N	015° 59.08' E
			06:38:00	end fishing	85	55° 26.95' N	015° 56.52' E
			06:49:59	on deck	86	55° 26.85' N	015° 55.83' E
431	19/05/2011	Jungfischtrawl	07:52:00	surface	74	55° 27.51' N	016° 15.01' E
			08:09:00	start fishing	76	55° 26.98' N	016° 13.59' E
			08:39:00	end fishing	77	55° 26.14' N	016° 11.54' E
			08:49:59	on deck	78	55° 25.89' N	016° 10.98' E
432	19/05/2011	Jungfischtrawl	10:04:00	surface	74	55° 17.62' N	016° 15.14' E
			10:20:00	start fishing	76	55° 17.40' N	016° 13.64' E
			10:50:00	end fishing	84	55° 17.14' N	016° 11.35' E
			10:59:59	on deck	85	55° 17.07' N	016° 10.71' E
433	19/05/2011	Jungfischtrawl	11:46:00	surface	89	55° 17.53' N	016° 0.03' E
			11:59:00	start fishing	91	55° 17.19' N	015° 58.88' E
			12:29:00	end fishing	91	55° 16.61' N	015° 56.74' E
			12:38:59	on deck	92	55° 16.44' N	015° 56.18' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
434	19/05/2011	CTD / water sampler	13:16:00	surface	98	55° 18.77' N	015° 48.93' E
			13:28:59	on deck	95	55° 18.77' N	015° 48.96' E
		Jungfischtrawl	13:30:00	surface	97	55° 18.77' N	015° 48.93' E
			13:44:00	start fishing	96	55° 18.41' N	015° 47.85' E
			14:14:00	end fishing	95	55° 17.76' N	015° 45.81' E
			14:23:59	on deck	101	55° 17.61' N	015° 45.37' E
435	19/05/2011	Apstein net	14:31:00	surface	99	55° 17.52' N	015° 44.99' E
			14:54:00	on deck	99	55° 17.46' N	015° 44.99' E
		Apstein net	14:54:59	surface	99	55° 17.46' N	015° 44.99' E
			15:16:59	on deck	97	55° 17.48' N	015° 44.98' E
		Apstein net	15:17:00	surface	96	55° 17.48' N	015° 44.97' E
			15:38:59	on deck	96	55° 17.49' N	015° 44.96' E
WP 2	15:40:00	surface	98	55° 17.49' N	015° 44.96' E		
	15:51:59	on deck	96	55° 17.50' N	015° 44.92' E		
436	19/05/2011	Bongo net	16:40:00	surface	94	55° 17.51' N	015° 31.66' E
			16:56:59	on deck	93	55° 17.49' N	015° 30.22' E
		CTD	16:59:00	surface	93	55° 17.49' N	015° 30.03' E
			17:06:59	on deck	93	55° 17.47' N	015° 30.00' E
437	19/05/2011	CTD	17:53:00	surface	89	55° 17.51' N	015° 17.02' E
			18:00:59	on deck	89	55° 17.52' N	015° 16.99' E
		Helgoläder Larvennetz	18:05:00	surface	88	55° 17.48' N	015° 17.02' E
			18:25:59	on deck	88	55° 17.36' N	015° 17.13' E
		WP 2	18:28:00	surface	89	55° 17.48' N	015° 17.04' E
			18:40:59	on deck	89	55° 17.47' N	015° 17.06' E
		Bongo net	18:43:00	surface	88	55° 17.45' N	015° 17.07' E
			18:58:59	on deck	77	55° 17.09' N	015° 15.99' E
438	19/05/2011	Bongo net	19:49:00	surface	72	55° 17.70' N	015° 1.14' E
			19:59:59	on deck	72	55° 17.50' N	015° 0.45' E
		CTD	20:03:00	surface	72	55° 17.50' N	015° 0.04' E
			20:09:59	on deck	72	55° 17.46' N	015° 0.03' E
439	19/05/2011	CTD	21:08:00	surface	78	55° 27.51' N	015° 0.03' E
			21:14:59	on deck	78	55° 27.49' N	015° 0.03' E
		Bongo net	21:17:00	surface	78	55° 27.48' N	015° 0.01' E
			21:30:59	on deck	79	55° 27.52' N	015° 1.09' E
440	19/05/2011	Bongo net	22:13:00	surface	92	55° 27.55' N	015° 13.61' E
			22:26:59	on deck	91	55° 27.49' N	015° 14.78' E
		CTD	22:30:00	surface	94	55° 27.51' N	015° 15.00' E
			22:35:59	on deck	94	55° 27.52' N	015° 14.98' E
441	19/05/2011	CTD	23:34:00	surface	85	55° 27.49' N	015° 30.03' E
			23:39:59	on deck	90	55° 27.52' N	015° 30.05' E
		Helgoläder Larvennetz	23:43:00	surface	85	55° 27.55' N	015° 30.07' E
			23:58:59	on deck	85	55° 27.58' N	015° 30.05' E
		Bongo net	00:01:00	surface	85	55° 27.59' N	015° 29.97' E
			00:13:59	on deck	88	55° 27.64' N	015° 28.99' E
442	20/05/2011	Jungfischtrawl	03:58:00	surface	89	55° 27.54' N	015° 29.89' E
			04:13:00	start fishing	86	55° 27.01' N	015° 28.54' E
			04:44:00	end fishing	88	55° 26.16' N	015° 26.32' E
			04:53:59	on deck	90	55° 25.99' N	015° 25.84' E
443	20/05/2011	Jungfischtrawl	05:34:00	surface	90	55° 27.51' N	015° 14.88' E
			05:48:00	start fishing	93	55° 27.47' N	015° 13.38' E
			06:18:00	end fishing	84	55° 27.42' N	015° 10.82' E
			06:27:59	on deck	82	55° 27.37' N	015° 10.12' E
444	20/05/2011	Jungfischtrawl	07:04:00	surface	79	55° 27.60' N	014° 59.89' E
			07:16:00	start fishing	75	55° 26.95' N	015° 0.23' E
			07:46:00	end fishing	73	55° 25.57' N	015° 1.06' E
			07:54:59	on deck	73	55° 25.26' N	015° 1.25' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
445	20/05/2011	Jungfischtrawl	08:43:00	surface	72	55° 17.48' N	014° 60.00' E
			08:55:00	start fishing	72	55° 17.46' N	015° 1.25' E
			09:25:00	end fishing	74	55° 17.40' N	015° 3.93' E
			09:34:59	on deck	78	55° 17.40' N	015° 4.65' E
446	20/05/2011	CTD / water sampler	10:18:00	surface	89	55° 17.52' N	015° 16.99' E
			10:30:59	on deck	89	55° 17.53' N	015° 17.04' E
		Jungfischtrawl	10:36:00	surface	91	55° 17.53' N	015° 17.44' E
			10:51:00	start fishing	91	55° 17.53' N	015° 19.01' E
			11:21:00	end fishing	89	55° 17.56' N	015° 21.48' E
			11:32:59	on deck	89	55° 17.60' N	015° 22.31' E
447	20/05/2011	Jungfischtrawl	12:04:00	surface	93	55° 17.51' N	015° 29.89' E
			12:21:00	start fishing	94	55° 17.40' N	015° 31.62' E
			12:51:00	end fishing	106	55° 17.25' N	015° 34.05' E
			13:01:59	on deck	101	55° 17.25' N	015° 34.78' E
448	20/05/2011	Bongo net	14:46:00	surface	96	55° 17.46' N	015° 35.17' E
			15:02:59	on deck	95	55° 16.80' N	015° 34.40' E
449	20/05/2011	Bongo net	15:15:00	surface	94	55° 15.41' N	015° 33.16' E
			15:29:59	on deck	94	55° 14.84' N	015° 32.56' E
450	20/05/2011	Bongo net	15:48:00	surface	92	55° 14.89' N	015° 28.28' E
			16:02:59	on deck	96	55° 15.04' N	015° 27.19' E
451	20/05/2011	Bongo net	16:19:00	surface	90	55° 17.08' N	015° 25.16' E
			16:35:59	on deck	90	55° 17.81' N	015° 24.51' E
452	20/05/2011	Bongo net	16:52:00	surface	93	55° 19.75' N	015° 26.92' E
			17:07:59	on deck	101	55° 20.34' N	015° 27.78' E
453	20/05/2011	Bongo net	17:23:00	surface	100	55° 20.17' N	015° 31.50' E
			17:38:59	on deck	98	55° 20.09' N	015° 32.77' E
454	20/05/2011	Bongo net	17:57:00	surface	94	55° 17.99' N	015° 30.46' E
			18:13:59	on deck	93	55° 17.37' N	015° 29.90' E
455	20/05/2011	hydro acoustic transec	18:32:00	start	97	55° 14.89' N	015° 27.40' E
			22:16:59	end	90	55° 16.26' N	015° 25.94' E
456	20/05/2011	hydro acoustic transec	22:49:00	start	93	55° 14.77' N	015° 27.32' E
			03:54:59	end	90	55° 16.24' N	015° 26.12' E
457	21/05/2011	Jungfischtrawl	04:01:00	surface	90	55° 16.65' N	015° 25.41' E
			04:14:00	start fishing	90	55° 17.37' N	015° 24.92' E
			04:44:00	end fishing	91	55° 18.69' N	015° 24.10' E
			04:55:59	on deck	92	55° 19.06' N	015° 23.90' E
458	21/05/2011	Jungfischtrawl	05:41:00	surface	93	55° 20.21' N	015° 26.30' E
			05:59:00	start fishing	100	55° 20.08' N	015° 27.99' E
			06:29:00	end fishing	94	55° 19.96' N	015° 30.64' E
			06:42:59	on deck	99	55° 20.09' N	015° 31.77' E
459	21/05/2011	Jungfischtrawl	06:58:00	surface	99	55° 19.31' N	015° 34.07' E
			07:08:00	start fishing	100	55° 19.68' N	015° 33.35' E
			07:38:00	end fishing	99	55° 20.77' N	015° 31.52' E
			07:48:59	on deck	99	55° 20.98' N	015° 30.83' E
460	21/05/2011	Jungfischtrawl	08:23:00	surface	96	55° 17.39' N	015° 37.11' E
			08:34:00	start fishing	96	55° 17.47' N	015° 36.06' E
			09:04:00	end fishing	95	55° 17.66' N	015° 33.60' E
			09:13:59	on deck	95	55° 17.69' N	015° 32.94' E
461	21/05/2011	Jungfischtrawl	10:00:00	surface	94	55° 17.47' N	015° 32.31' E
			10:14:00	start fishing	94	55° 17.46' N	015° 30.94' E
			10:44:00	end fishing	92	55° 17.57' N	015° 28.55' E
			10:54:59	on deck	92	55° 17.54' N	015° 27.84' E
462	21/05/2011	Jungfischtrawl	11:19:00	surface	93	55° 15.89' N	015° 30.91' E
			11:38:00	start fishing	94	55° 15.12' N	015° 32.35' E
			12:08:00	end fishing	94	55° 14.08' N	015° 33.96' E
			12:19:59	on deck	94	55° 13.75' N	015° 34.46' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
463	21/05/2011	Jungfischtrawl	12:45:00	surface	93	55° 14.36' N	015° 30.11' E
			13:00:00	start fishing	93	55° 14.66' N	015° 28.62' E
			13:30:00	end fishing	97	55° 15.13' N	015° 26.42' E
			13:40:59	on deck	97	55° 15.26' N	015° 25.78' E
464	21/05/2011	CTD / water sampler	14:25:00	surface	98	55° 14.90' N	015° 27.39' E
			14:34:59	on deck	96	55° 14.91' N	015° 27.32' E
			14:38:00	surface	98	55° 14.93' N	015° 27.29' E
			14:47:59	on deck	97	55° 14.91' N	015° 27.38' E
			14:52:00	surface	97	55° 14.89' N	015° 27.39' E
			15:01:59	on deck	97	55° 14.92' N	015° 27.35' E
			15:04:00	surface	92	55° 14.93' N	015° 27.33' E
			15:22:59	on deck	97	55° 14.88' N	015° 27.37' E
465	21/05/2011	hydro acoustic transec	15:26:00	start	94	55° 14.86' N	015° 27.41' E
			19:14:59	end	90	55° 16.26' N	015° 26.29' E
466	21/05/2011	Bongo net	19:25:00	surface	92	55° 15.32' N	015° 26.62' E
			19:39:59	on deck	94	55° 14.89' N	015° 27.57' E
467	21/05/2011	Bongo net	19:54:00	surface	93	55° 14.87' N	015° 31.74' E
			20:08:59	on deck	94	55° 14.94' N	015° 32.89' E
468	21/05/2011	Bongo net	20:23:00	surface	95	55° 16.94' N	015° 34.99' E
			20:37:59	on deck	96	55° 17.55' N	015° 35.26' E
469	21/05/2011	Bongo net	20:55:00	surface	95	55° 20.19' N	015° 32.90' E
			21:09:59	on deck	99	55° 19.65' N	015° 32.34' E
470	21/05/2011	Bongo net	21:22:00	surface	94	55° 18.07' N	015° 30.59' E
			21:35:59	on deck	93	55° 17.57' N	015° 30.09' E
471	21/05/2011	Bongo net	21:54:00	surface	93	55° 20.14' N	015° 27.43' E
			22:16:59	on deck	92	55° 19.32' N	015° 26.53' E
			22:39:00	surface	93	55° 20.15' N	015° 27.40' E
			22:52:59	on deck	93	55° 19.59' N	015° 26.99' E
472	21/05/2011	Bongo net	23:19:00	surface	91	55° 18.00' N	015° 25.33' E
			23:31:59	on deck	90	55° 17.52' N	015° 24.79' E
473	22/05/2011	towed multinet 335µ	03:58:00	surface	93	55° 17.48' N	015° 30.02' E
			04:40:59	on deck	94	55° 16.17' N	015° 32.51' E
		towed multinet 335µ	04:58:00	surface	94	55° 16.25' N	015° 32.57' E
			05:38:59	on deck	93	55° 17.50' N	015° 30.06' E
		vertical multinet 50µ	05:52:00	surface	93	55° 17.48' N	015° 30.01' E
			06:07:59	on deck	93	55° 17.46' N	015° 30.02' E
		vertical multinet 50µ	06:18:00	surface	93	55° 17.45' N	015° 29.97' E
			06:27:59	on deck	93	55° 17.46' N	015° 30.00' E
		towed multinet 335µ	06:41:00	surface	93	55° 17.52' N	015° 30.00' E
			07:23:59	on deck	94	55° 16.31' N	015° 32.65' E
		towed multinet 335µ	07:42:00	surface	93	55° 17.54' N	015° 30.02' E
			08:19:59	on deck	94	55° 16.60' N	015° 32.55' E
		vertical multinet 50µ	08:37:00	surface	93	55° 17.52' N	015° 29.99' E
			08:52:59	on deck	93	55° 17.51' N	015° 30.04' E
		vertical multinet 50µ	09:00:00	surface	93	55° 17.49' N	015° 30.07' E
			09:11:59	on deck	93	55° 17.51' N	015° 30.11' E
		towed multinet 335µ	10:01:00	surface	93	55° 17.57' N	015° 29.93' E
			10:40:59	on deck	94	55° 16.46' N	015° 32.35' E
		towed multinet 335µ	11:01:00	surface	93	55° 17.60' N	015° 29.95' E
			11:35:59	on deck	94	55° 16.59' N	015° 32.11' E
vertical multinet 50µ	11:55:00	surface	93	55° 17.50' N	015° 29.98' E		
	12:09:59	on deck	93	55° 17.47' N	015° 29.99' E		
vertical multinet 50µ	12:17:00	surface	93	55° 17.46' N	015° 29.99' E		
	12:25:59	on deck	93	55° 17.48' N	015° 30.01' E		
	Mini corer	12:34:00	surface	93	55° 17.47' N	015° 30.05' E	
12:42:59		on deck	93	55° 17.48' N	015° 30.07' E		

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
473	22/05/2011	CTD / water sampler	12:59:00	surface	93	55° 17.48' N	015° 30.18' E
			13:07:59	on deck	93	55° 17.48' N	015° 30.14' E
		CTD / water sampler	13:16:00	surface	93	55° 17.49' N	015° 30.11' E
			13:35:59	on deck	93	55° 17.44' N	015° 30.26' E
		CTD	13:38:00	surface	93	55° 17.43' N	015° 30.32' E
			13:45:59	on deck	93	55° 17.42' N	015° 30.40' E
474	22/05/2011	CTD	17:06:00	surface	62	55° 17.52' N	016° 29.98' E
			17:11:59	on deck	62	55° 17.53' N	016° 30.01' E
		Bongo net	17:15:00	surface	64	55° 17.53' N	016° 30.16' E
			17:27:59	on deck	65	55° 17.40' N	016° 31.22' E
475	22/05/2011	Bongo net	20:11:00	surface	91	55° 14.26' N	017° 21.02' E
			20:25:59	on deck	89	55° 14.06' N	017° 21.99' E
		CTD	20:29:00	surface	90	55° 14.00' N	017° 21.99' E
			20:36:59	on deck	90	55° 14.02' N	017° 22.03' E
476	22/05/2011	CTD	21:22:00	surface	83	55° 15.01' N	017° 35.00' E
			21:28:59	on deck	82	55° 14.99' N	017° 35.02' E
		IKS 80	21:32:00	surface	83	55° 14.99' N	017° 35.03' E
			21:40:59	on deck	82	55° 15.00' N	017° 35.03' E
477	22/05/2011	IKS 80	22:51:00	surface	64	55° 14.04' N	017° 55.01' E
			22:57:59	on deck	64	55° 14.02' N	017° 54.97' E
		CTD	23:01:00	surface	64	55° 14.02' N	017° 54.99' E
			23:06:59	on deck	64	55° 14.01' N	017° 54.98' E
478	23/05/2011	CTD	00:49:00	surface	80	55° 8.97' N	018° 25.02' E
			00:55:59	on deck	80	55° 8.94' N	018° 24.95' E
		IKS 80	00:59:00	surface	80	55° 8.93' N	018° 24.96' E
			01:06:59	on deck	80	55° 8.92' N	018° 24.96' E
479	23/05/2011	IKS 80	02:23:00	surface	93	54° 59.98' N	018° 41.06' E
			02:32:59	on deck	93	54° 59.89' N	018° 40.98' E
		CTD	02:35:00	surface	92	54° 59.85' N	018° 40.95' E
			02:42:59	on deck	93	54° 59.78' N	018° 40.83' E
480	23/05/2011	CTD	05:31:00	surface	98	54° 54.00' N	018° 54.01' E
			05:38:59	on deck	98	54° 53.99' N	018° 54.01' E
		IKS 80	05:41:00	surface	98	54° 54.00' N	018° 54.02' E
			05:52:59	on deck	98	54° 53.97' N	018° 54.01' E
		Jungfischtrawl	05:57:00	surface	98	54° 54.02' N	018° 53.97' E
			06:14:00	start fishing	98	54° 53.95' N	018° 52.48' E
			06:44:00	end fishing	97	54° 54.05' N	018° 50.02' E
			06:56:59	on deck	95	54° 54.10' N	018° 49.31' E
481	23/05/2011	IKS 80	08:06:00	surface	104	54° 49.01' N	019° 8.01' E
			08:17:59	on deck	103	54° 48.95' N	019° 7.97' E
		CTD	08:19:00	surface	103	54° 48.99' N	019° 7.98' E
			08:26:59	on deck	104	54° 48.96' N	019° 7.95' E
		Jungfischtrawl	08:28:00	surface	103	54° 48.95' N	019° 7.91' E
			08:39:00	start fishing	103	54° 48.91' N	019° 6.91' E
			09:20:00	end fishing	101	54° 48.84' N	019° 3.54' E
			09:30:59	on deck	101	54° 48.90' N	019° 2.88' E
482	23/05/2011	CTD	10:34:00	surface	98	54° 42.95' N	019° 16.94' E
			10:42:59	on deck	98	54° 42.99' N	019° 16.90' E
		IKS 80	10:46:00	surface	98	54° 42.99' N	019° 16.89' E
			10:54:59	on deck	98	54° 42.96' N	019° 16.78' E
		Jungfischtrawl	11:01:00	surface	99	54° 42.99' N	019° 16.54' E
			11:14:00	start fishing	99	54° 43.23' N	019° 15.43' E
			11:44:00	end fishing	100	54° 43.74' N	019° 13.06' E
			11:56:59	on deck	99	54° 43.87' N	019° 12.22' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
483	23/05/2011	IKS 80	12:58:00	surface	105	54° 51.97' N	019° 9.02' E
			13:06:59	on deck	105	54° 51.96' N	019° 9.01' E
		CTD	13:09:00	surface	108	54° 51.96' N	019° 8.99' E
			13:17:59	on deck	105	54° 51.95' N	019° 8.96' E
		Jungfischtrawl	13:18:00	surface	105	54° 51.96' N	019° 8.94' E
			13:31:00	start fishing	104	54° 52.19' N	019° 7.99' E
			14:01:00	end fishing	103	54° 52.87' N	019° 5.96' E
484	23/05/2011	Jungfischtrawl	14:10:59	on deck	103	54° 53.04' N	019° 5.57' E
			14:40:00	surface	112	54° 54.01' N	019° 11.87' E
			14:56:00	start fishing	106	54° 54.27' N	019° 10.41' E
			15:36:00	end fishing	106	54° 54.94' N	019° 7.32' E
		CTD	15:47:59	on deck	108	54° 55.08' N	019° 6.67' E
			16:00:00	surface	107	54° 55.11' N	019° 6.43' E
		IKS 80	16:07:59	on deck	106	54° 55.14' N	019° 6.36' E
			16:10:00	surface	104	54° 55.14' N	019° 6.35' E
		CTD / water sampler	16:19:59	on deck	103	54° 55.14' N	019° 6.27' E
			16:25:00	surface	103	54° 55.14' N	019° 6.25' E
		CTD / water sampler	16:31:59	on deck	103	54° 55.16' N	019° 6.18' E
			16:39:00	surface	103	54° 55.14' N	019° 6.17' E
		Helgoläder Larvennetz	16:54:59	on deck	103	54° 55.19' N	019° 5.98' E
			17:00:00	surface	103	54° 55.19' N	019° 5.94' E
485	23/05/2011	IKS 80	17:24:59	on deck	104	54° 55.15' N	019° 5.70' E
			17:58:00	surface	101	55° 0.00' N	019° 5.03' E
		CTD	18:10:59	on deck	101	54° 59.96' N	019° 5.01' E
18:11:00	surface		101	54° 59.97' N	019° 5.00' E		
486	23/05/2011	CTD	18:19:59	on deck	101	54° 59.96' N	019° 4.98' E
			19:38:00	surface	92	55° 10.00' N	018° 49.03' E
		IKS 80	19:45:59	on deck	91	55° 9.99' N	018° 49.07' E
			19:48:00	surface	91	55° 9.97' N	018° 49.09' E
487	23/05/2011	IKS 80	19:56:59	on deck	91	55° 9.93' N	018° 49.10' E
			20:49:00	surface	75	55° 15.00' N	018° 37.04' E
		CTD	20:57:59	on deck	76	55° 14.96' N	018° 37.09' E
			21:01:00	surface	76	55° 14.97' N	018° 37.02' E
488	23/05/2011	CTD	21:07:59	on deck	77	55° 14.97' N	018° 37.03' E
			22:27:00	surface	84	55° 23.01' N	018° 18.95' E
		IKS 80	22:33:59	on deck	87	55° 22.98' N	018° 18.99' E
			22:36:00	surface	87	55° 22.98' N	018° 19.01' E
		Helgoläder Larvennetz	22:42:59	on deck	87	55° 22.96' N	018° 19.01' E
			22:46:00	surface	85	55° 22.95' N	018° 19.01' E
489	24/05/2011	IKS 80	23:01:59	on deck	83	55° 22.90' N	018° 19.06' E
			00:26:00	surface	93	55° 37.01' N	018° 19.01' E
		CTD	00:34:59	on deck	93	55° 37.00' N	018° 19.07' E
			00:37:00	surface	93	55° 36.99' N	018° 19.09' E
490	24/05/2011	CTD	00:43:59	on deck	93	55° 36.97' N	018° 19.10' E
			02:07:00	surface	85	55° 37.01' N	018° 43.02' E
		IKS 80	02:13:59	on deck	85	55° 36.96' N	018° 43.02' E
			02:16:00	surface	85	55° 36.95' N	018° 43.02' E
491	24/05/2011	IKS 80	02:23:59	on deck	85	55° 36.90' N	018° 43.08' E
			03:30:00	surface	109	55° 46.01' N	018° 32.99' E
		CTD	03:39:59	on deck	108	55° 45.95' N	018° 33.05' E
			03:42:00	surface	109	55° 45.95' N	018° 33.08' E
		Jungfischtrawl	03:50:59	on deck	109	55° 45.91' N	018° 33.08' E
			04:03:00	surface	109	55° 45.88' N	018° 33.10' E
			04:18:00	start fishing	107	55° 45.13' N	018° 33.28' E
491	24/05/2011	Jungfischtrawl	04:48:00	end fishing	101	55° 43.61' N	018° 33.69' E
			04:59:59	on deck	100	55° 43.21' N	018° 33.99' E

Tab. 2 continued

ship station	Date	Gear	Time	Action	bottom depth (m)	Latitude (°N)	Longitude (°E)
492	24/05/2011	CTD	05:51:00	surface	104	55° 48.63' N	018° 24.65' E
			05:58:59	on deck	104	55° 48.57' N	018° 24.72' E
		IKS 80	06:01:00	surface	104	55° 48.57' N	018° 24.77' E
			06:10:59	on deck	104	55° 48.58' N	018° 24.84' E
		Jungfischtrawl	06:12:00	surface	104	55° 48.55' N	018° 24.85' E
			06:22:00	start fishing	104	55° 48.00' N	018° 24.86' E
			06:52:00	end fishing	103	55° 46.50' N	018° 24.58' E
			07:02:59	on deck	102	55° 46.11' N	018° 24.44' E
493	24/05/2011	CTD / water sampler	07:43:00	surface	92	55° 41.35' N	018° 17.25' E
			07:55:59	on deck	95	55° 41.32' N	018° 17.31' E
		Helgoländer Larvennetz	07:59:00	surface	96	55° 41.31' N	018° 17.31' E
			08:18:59	on deck	92	55° 41.28' N	018° 17.33' E
		CTD	08:23:00	surface	95	55° 41.27' N	018° 17.27' E
			08:29:59	on deck	94	55° 41.25' N	018° 17.31' E
		Jungfischtrawl	08:32:00	surface	92	55° 41.22' N	018° 17.31' E
			08:41:00	start fishing	92	55° 40.68' N	018° 17.37' E
			09:11:00	end fishing	92	55° 39.23' N	018° 16.99' E
			09:21:59	on deck	91	55° 38.87' N	018° 16.77' E
494	24/05/2011	CTD	10:36:00	surface	72	55° 33.16' N	018° 4.10' E
			10:41:59	on deck	72	55° 33.15' N	018° 4.08' E
		Helgoländer Larvennetz	10:48:00	surface	72	55° 33.13' N	018° 3.97' E
			11:03:59	on deck	71	55° 33.07' N	018° 4.10' E
		Jungfischtrawl	11:05:00	surface	71	55° 33.07' N	018° 4.09' E
			11:20:00	start fishing	70	55° 32.65' N	018° 3.10' E
			11:50:00	end fishing	69	55° 31.71' N	018° 1.39' E
			11:59:59	on deck	70	55° 31.37' N	018° 1.13' E