



Cruise Report

FRV „Clupea“ Cruise 338

planned dates: 09.10.2019 – 01.11.2019

realized dates: 15.10.2019-01.11.2019

Hydroacoustic survey in the Sound (SD23) and Gear technology investigations in German waters

Scientists in charge: Dr. Daniel Stepputtis (TI-OF) and Dr. Matthias Schaber (TI-SF)

1. In a nutshell

Leg one: The main aim of the first part of the cruise was hydroacoustic monitoring of clupeid distribution in the Sound and adjacent areas: Estimation of distribution and stock size parameters of small pelagics (herring and sprat) contributing to concurrent investigations (FRV "Solea") in the framework of an international, ICES-coordinated hydroacoustic survey.

Due to several reasons, the investigations in the Sound-area had to be shortened both in time and sampling effort. Nevertheless, it was possible to collect hydroacoustic data to investigate the distribution of clupeid fishes in the area in support of the Baltic International Acoustic Survey (BIAS). A preliminary analysis revealed differences in abundance and distribution between day and night, as well as inhomogeneous distribution of clupeids in the Sound with relative high abundances also occurring in shallower areas, currently not covered by the BIAS.

The results of the cruise will help to discuss methodological questions in relation to BIAS, especially day/night effects in the Sound and distribution of clupeid fishes in shallower areas.

Leg two: During the second part of the cruise, new selectivity devices for trawls were developed and tested in German waters (off the coast of Rostock). The background for these efforts are the current poor stock status of the Eastern Baltic cod stock and the resulting implications for fisheries in the Eastern Baltic Sea as well as in SD24. The aim was to develop selectivity devices, which allow cod to escape, while keeping the catch of flatfish high. These investigations were conducted via underwater video observation of the selectivity devices and their modifications. It was possible to develop escapement devices/concepts and prepare for further tests on commercial vessels and later research cruises.

The cruise was conducted in the framework of the CODEX-project, funded as EMFF-project by the EU and the 'Ministerium für Landwirtschaft und Umwelt Mecklenburg-Vorpommern'.

Distribution list:

BLE, Hamburg
Schiffsführung FFS „Clupea“
BMEL, Ref. 614
Thünen-Institut - Pressestelle (M. Welling)
Thünen-Institut – Präsidialbüro
Thünen-Institut – Fischereiökologie
Thünen-Institut – Ostseefischerei
Thünen-Institut – Seefischerei
Thünen-Institut – Zentrum für Informationsmanagem.
BSH Hamburg
Max-Rubner-Institut, AG Fischqualität, Hamburg
GEOMAR Helmholtz-Zentrum für Ozeanforschung, Kiel
Institut für Fischerei der Landesforschungsanstalt MV
LA für Landwirtschaft, Lebensmittels. u. Fischerei

Deutscher Fischerei-Verband e. V., Hamburg
Leibniz Institut für Ostseeforschung Warnemünde
Fahrtteilnehmer
Mecklenburger Hochseefischerei Sassnitz
Kutter- und Küstenfisch Sassnitz
Landesverband der Kutter- und Küstenfischer
Sassnitzer Seefischer
Thünen-Seeinsatzplanung, Herr Dr. Rohlf
Euro-Baltic Mukran

2. Cruise objectives

Leg one: Hydroacoustic survey in Øresund (the Sound, SD23)

The main task of the first leg of the cruise was a hydroacoustic monitoring of clupeid distribution and abundance in the Sound, mainly that of Western Baltic Spring Spawning Herring (WBSSH, *Clupea harengus*). This investigation was conducted in support of the concurrent Baltic International Autumn Acoustic Survey (BIAS) carried out on board FRV "Solea" (cruise SB768). The investigation included the comparison of diurnal distribution patterns and shallow water distribution within the Sound area. In addition to the parallel recording of hydroacoustic data, other sampling was planned: reference fishing on selected fishery stations using a pelagic trawl, sampling of fish for length, weight and age determination, hydrographic water sampling. As precondition for hydroacoustic sampling, the calibration of the ship-mounted EK60-echosounder was required during the cruise.

Background: The German part of BIAS in September/October is traditionally co-ordinated under the auspices of ICES (International Council for the Exploration of the Sea) through the ICES Working Group of International Pelagic Surveys (WGIPS) and the Baltic International Fish Survey Working Group (WGBIFS). The main objective of this acoustic survey is to assess the clupeid resources in the Baltic Sea. Most coastal countries of the Baltic Sea take part in this joint survey to get a fishery independent estimate of the actual status of the pelagic fish stocks (mainly herring and sprat) in this area. Due to the importance within the present assessment process, this survey is classified as an EU-"priority 1 survey" according to the „Regulation (EC) No. 1639/2001 of the EU-Commission“.

Within recent years, a drastic decline in abundance and biomass of aggregations of overwintering WBSSH in the Sound area was registered during the BIAS survey. Therefore, it is essential to reassess the assumptions made for the standard acoustic survey including survey design. This is mainly related to the questions, a) whether the survey area in the Sound (the standard transects) is sufficiently covered to allow stock containment in this important area, and b) whether the standard survey operations during nighttime can still be considered the best option to representatively sample WBSSH in this area.

Therefore, the survey comprised concurrent investigations with the regular BIAS survey (SB768), including sampling in shallower areas and during a different daytime in order to

- identify possible spatial distribution and aggregation shifts of clupeids between day and night
- assess and investigate the magnitude of that shifts
- identify possible diurnal patterns not resolved in the "regular survey"
- extend the sample and area coverage in the area
- assess catchability of herring with identical gear during day- and nighttime

Leg two: Bottom trawl fishing in German waters / Fishing gear research

In the waters off Rostock, fishery hauls were conducted (using bottom trawl) to

- obtain live fish (flatfish) for experiments and
- conduct gear research experiments

Given the most recent developments in Baltic Fisheries Management, it was necessary to conduct gear technology experiments to develop and test sorting devices to avoid the catch of cod, while maintaining the catch of flatfish. This part of the cruise aimed at the technical development of these escapement devices. Underwater video observations were taken to evaluate the physical performance of these gear modifications, as well as the reaction of different fish species.

3. Cruise narrative and preliminary results

General

Originally, it was planned to start the cruise at 09.10.2019 sailing to Copenhagen to start the scientific work in the Sound at the morning of the 14.10.2019. Due to delays in the preceding maintenance of FRV "Clupea" in the shipyard, the vessel arrived in Rostock at 10.10.2019. After preparation of the cruise the vessel sailed to Copenhagen at 15.10.2019, where the scientific crew (Daniel Stepputtis and Thomas Møller) arrived in the evening. The scientific work started at 16.10.2019 (Table 1 and Table 2).

Table 1: FRV "Clupea" cruise 338/2019. Station list.

Station	Device	start			end		
		Date and time (UTC)	Latitude	Longitude	Date and time (UTC)	Latitude	Longitude
CL338_1-1	CTD	16.10.2019 05:42	55° 39.943' N	012° 56.073' E	16.10.2019 05:45	55° 39.959' N	012° 56.054' E
CL338_2-1	PSN388 Krake	16.10.2019 07:03	55° 41.841' N	012° 52.530' E	16.10.2019 07:23	55° 41.098' N	012° 54.036' E
CL338_3-1	PSN388 Krake	16.10.2019 10:19	55° 55.451' N	012° 43.231' E	16.10.2019 10:36	55° 54.761' N	012° 44.141' E
CL338_4-1	CTD	16.10.2019 10:54	55° 54.391' N	012° 44.502' E	16.10.2019 10:57	55° 54.420' N	012° 44.506' E
CL338_5-1	CTD	16.10.2019 13:24	55° 52.549' N	012° 34.241' E	16.10.2019 13:25	55° 52.552' N	012° 34.233' E
CL338_6-1	CTD	16.10.2019 14:02	55° 52.488' N	012° 44.384' E	16.10.2019 14:06	55° 52.487' N	012° 44.440' E
CL338_7-1	CTD	16.10.2019 15:05	55° 47.499' N	012° 54.410' E	16.10.2019 15:07	55° 47.481' N	012° 54.422' E
CL338_8-1	CTD	16.10.2019 15:41	55° 47.499' N	012° 44.490' E	16.10.2019 15:44	55° 47.490' N	012° 44.457' E
CL338_9-1	CTD	16.10.2019 16:09	55° 47.495' N	012° 37.951' E	16.10.2019 16:10	55° 47.493' N	012° 37.939' E
CL338_10-1	CTD	17.10.2019 07:02	55° 22.700' N	012° 26.248' E	17.10.2019 07:05	55° 22.744' N	012° 26.233' E
CL338_11-1	CTD	17.10.2019 08:02	55° 22.538' N	012° 42.776' E	17.10.2019 08:04	55° 22.570' N	012° 42.772' E
CL338_12-1	CTD	17.10.2019 08:28	55° 25.905' N	012° 43.071' E	17.10.2019 08:30	55° 25.936' N	012° 43.084' E
CL338_13-1	CTD	17.10.2019 09:16	55° 25.980' N	012° 30.521' E	17.10.2019 09:18	55° 26.015' N	012° 30.517' E
CL338_14-1	CTD	17.10.2019 10:11	55° 26.081' N	012° 17.383' E	17.10.2019 10:13	55° 26.108' N	012° 17.378' E
CL338_15-1	CTD	17.10.2019 10:52	55° 29.956' N	012° 16.829' E	17.10.2019 10:57	55° 30.032' N	012° 16.892' E
CL338_16-1	CTD	17.10.2019 11:42	55° 29.999' N	012° 28.618' E	17.10.2019 11:45	55° 30.048' N	012° 28.665' E
CL338_17-1	CTD	17.10.2019 12:49	55° 30.069' N	012° 42.976' E	17.10.2019 12:51	55° 30.114' N	012° 43.026' E
CL338_18-1	CTD	17.10.2019 14:18	55° 43.911' N	012° 40.226' E	17.10.2019 14:28	55° 44.017' N	012° 40.384' E
CL338_19-1	CTD	18.10.2019 06:59	55° 30.027' N	012° 43.079' E	18.10.2019 07:01	55° 30.076' N	012° 43.086' E
CL338_20-1	CTD	18.10.2019 08:09	55° 37.562' N	012° 53.682' E	18.10.2019 08:12	55° 37.619' N	012° 53.685' E
CL338_21-1	CTD	18.10.2019 08:34	55° 37.567' N	012° 58.192' E	18.10.2019 08:37	55° 37.600' N	012° 58.191' E
CL338_22-1	CTD	18.10.2019 08:59	55° 40.413' N	013° 01.542' E	18.10.2019 09:11	55° 40.564' N	013° 02.133' E
CL338_23-1	CTD	18.10.2019 09:22	55° 41.043' N	013° 01.241' E	18.10.2019 09:27	55° 41.086' N	013° 01.273' E
CL338_24-1	CTD	18.10.2019 09:44	55° 42.515' N	012° 57.981' E	18.10.2019 09:47	55° 42.550' N	012° 57.979' E
CL338_25-1	CTD	18.10.2019 10:13	55° 42.436' N	012° 51.785' E	18.10.2019 10:20	55° 42.570' N	012° 51.739' E
CL338_26-1	CTD	18.10.2019 10:43	55° 43.958' N	012° 46.822' E	18.10.2019 10:45	55° 43.999' N	012° 46.815' E
CL338_27-1	CTD	18.10.2019 11:07	55° 44.070' N	012° 41.981' E	18.10.2019 11:09	55° 44.125' N	012° 41.993' E
CL338_28-1	CTD	18.10.2019 11:24	55° 44.021' N	012° 39.209' E	18.10.2019 11:27	55° 44.073' N	012° 39.222' E
CL338_29-1	BottomTrawl_TV300/60 Single	24.10.2019 07:46	54° 12.114' N	011° 59.595' E	24.10.2019 08:01	54° 11.936' N	011° 58.176' E
CL338_30-1	CTD	24.10.2019 09:29	54° 11.802' N	011° 56.932' E	24.10.2019 09:33	54° 11.826' N	011° 56.874' E
CL338_31-1	BottomTrawl_TV300/60 Single	24.10.2019 10:41	54° 11.987' N	011° 52.854' E	24.10.2019 10:52	54° 11.896' N	011° 51.887' E
CL338_32-1	CTD	24.10.2019 11:35	54° 12.064' N	011° 49.965' E	24.10.2019 11:36	54° 12.068' N	011° 49.945' E
CL338_33-1	BottomTrawl_TV300/60 Single	24.10.2019 12:32	54° 11.796' N	011° 56.381' E	24.10.2019 12:42	54° 11.883' N	011° 57.372' E
CL338_34-1	BottomTrawl_TV300/60 Single	25.10.2019 07:54	54° 12.042' N	011° 59.068' E	25.10.2019 08:05	54° 11.956' N	011° 58.109' E
CL338_35-1	BottomTrawl_TV300/60 Single	25.10.2019 09:23	54° 11.979' N	011° 58.592' E	25.10.2019 09:44	54° 12.307' N	012° 00.437' E
CL338_36-1	BottomTrawl_TV300/60 Single	25.10.2019 11:25	54° 12.208' N	012° 00.265' E	25.10.2019 11:45	54° 12.819' N	012° 01.904' E
CL338_37-1	CTD	28.10.2019 10:21	54° 09.331' N	012° 07.230' E	28.10.2019 10:25	54° 09.331' N	012° 07.230' E
CL338_38-1	BottomTrawl_TV300/60 Single	29.10.2019 08:18	54° 12.175' N	012° 00.076' E	29.10.2019 08:33	54° 11.997' N	011° 58.643' E
CL338_39-1	BottomTrawl_TV300/60 Single	29.10.2019 09:47	54° 12.307' N	012° 00.374' E	29.10.2019 10:02	54° 11.930' N	011° 59.084' E
CL338_40-1	BottomTrawl_TV300/60 Single	29.10.2019 11:51	54° 12.357' N	012° 00.572' E	29.10.2019 12:06	54° 11.990' N	011° 59.296' E
CL338_41-1	BottomTrawl_TV300/60 Single	29.10.2019 12:55	54° 12.079' N	011° 59.226' E	29.10.2019 13:00	54° 12.019' N	011° 58.744' E
CL338_42-1	BottomTrawl_TV300/60 Single	29.10.2019 13:22	54° 11.847' N	011° 57.010' E	29.10.2019 13:27	54° 11.819' N	011° 56.547' E
CL338_43-1	BottomTrawl_TV300/60 Single	29.10.2019 14:33	54° 12.099' N	011° 59.546' E	29.10.2019 14:38	54° 11.981' N	011° 59.091' E
CL338_44-1	BottomTrawl_TV300/60 Single	30.10.2019 09:06	54° 12.101' N	011° 59.577' E	30.10.2019 09:16	54° 11.999' N	011° 58.668' E
CL338_45-1	BottomTrawl_TV300/60 Single	30.10.2019 10:27	54° 12.132' N	011° 59.798' E	30.10.2019 10:37	54° 12.032' N	011° 58.953' E
CL338_46-1	BottomTrawl_TV300/60 Single	30.10.2019 12:37	54° 12.160' N	011° 59.906' E	30.10.2019 12:47	54° 12.047' N	011° 59.094' E
CL338_47-1	BottomTrawl_TV300/60 Single	30.10.2019 14:06	54° 12.152' N	011° 59.995' E	30.10.2019 14:16	54° 12.048' N	011° 59.153' E

Table 2: FRV “Clupea” cruise 338/2019. Station overview

Total survey time	8 days
Fishery hauls (pelagic)	2
Fishery hauls (demersal)	16
CTD-casts	29
Hydroacoustic transect (nm)	170

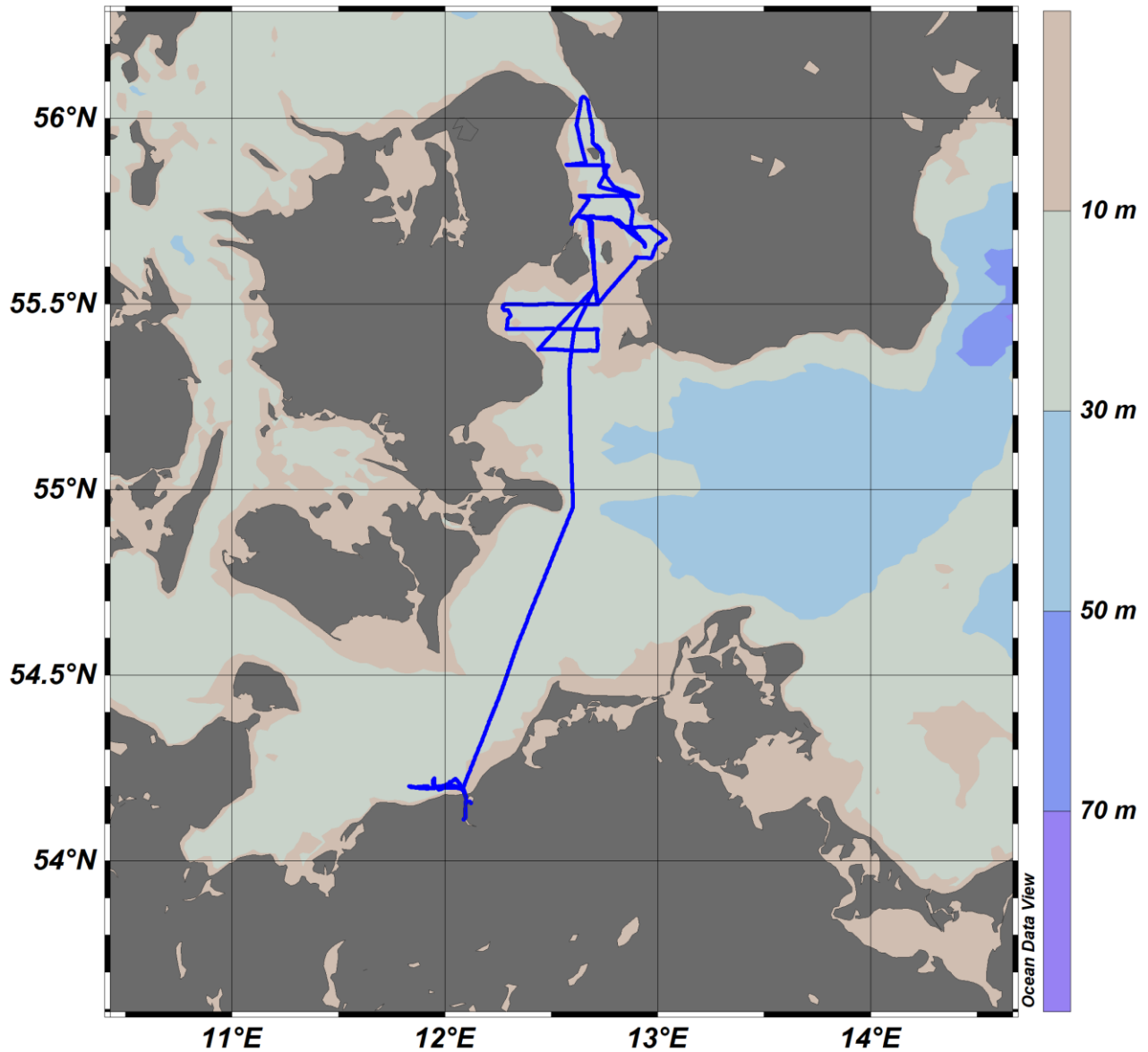


Figure 1: CLU338. Cruise track (overall cruise)

Leg one: Hydroacoustic survey in Øresund

Due to the temporal, the scientific work (hydroacoustic survey) in the Sound was shortened to three sampling days (16.10.-18.10.2019). During the first day, FRV "Clupea" and FRV "Solea" conducted a parallel daytime sampling (hydroacoustic recording) on a regular BIAS transect in SD23/the Sound which had been sampled by FRV "Solea" the night before and which showed somewhat increased registrations of clupeids. The aim was to collect hydroacoustic data (both vessels) and biological samples (FRV "Clupea") for a comparison of day-night distributions and catchability of herring in the Sound. After two pelagic hauls conducted with FRV "Clupea", fishing activities in the Sound had to be stopped following instructions from the Danish authorities. Therefore, only hydroacoustic and hydrography (CTD) sampling was conducted during the rest of the scientific work in the Sound.

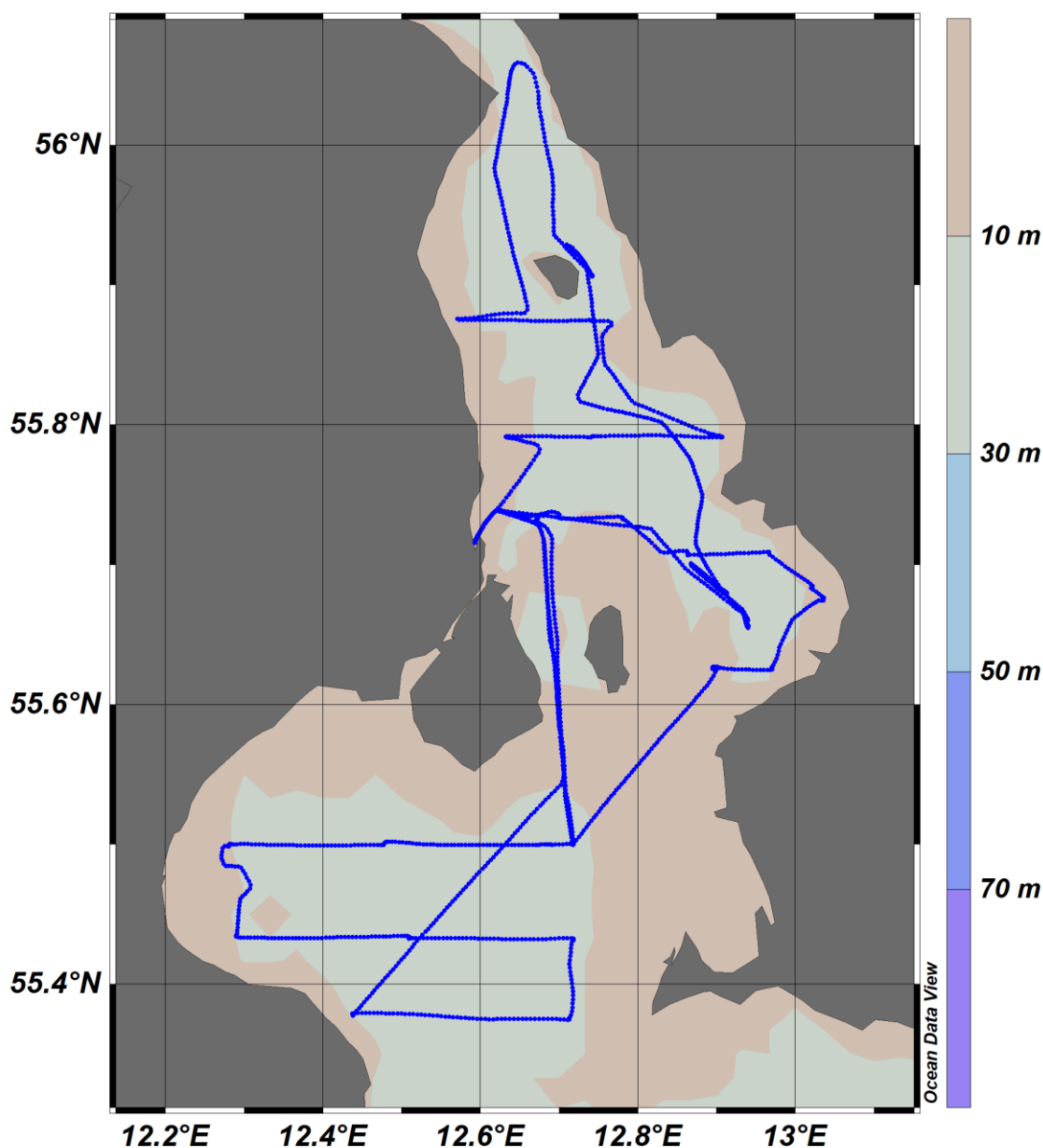


Figure 2: FRV "Clupea" cruise 338/2019. Cruise track in the Sound (16.-18.10.2019) (Hydroacoustic transects and steaming)

As in the last few years, the large aggregations of big herring that usually could be observed in SD 23 in the Sound during BIAS were not present in autumn 2019. Mean NASCs were again distinctly lower than those measured in 2018 in the relevant rectangles (FRV "Solea"). They also were well below the long-term survey mean. Although clupeid aggregations were registered, they were not comparable to earlier survey years and were among the lowest levels recorded in the previous years of BIAS. The daytime replicate hydroacoustic measurement of the inner Sound parallel with FRV "Clupea" and FRV "Solea" (hydroacoustics and fishing operations) showed differing but consistent distribution patterns with somewhat increased NASCs as compared to the regular nighttime transect coverage. This comparison will be fully evaluated in later steps.

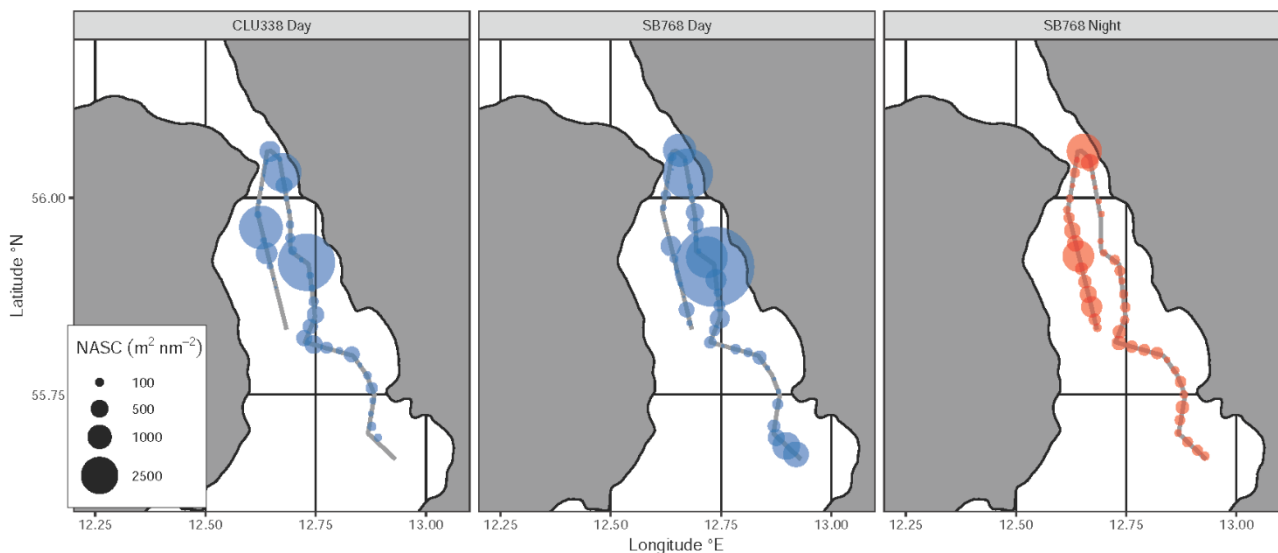


Figure 3: FRV "Solea" cruise 768/2019 and FRV "Clupea" cruise 338/2019: Comparison of clupeid distribution and abundance in the inner Sound (SD 23) 15.-16.10.2019. Cruise tracks (thin grey lines) and mean NASC (1 nmi intervals, dots) measured during daytime (blue dots, left and middle panel) and nighttime (red dots, right panel).

The second research question was the more detailed investigation of herring distribution in the Sound. Therefore, the area coverage in the Sound was extended. This included an extension of the length of hydroacoustic transects in the area, as well as an extension towards shallower areas (min. water depth around 10m). This fine scale coverage revealed that a substantial fraction of clupeids could be found in shallow areas, with focus on the slopes (10m-depth contour) close to the coast (Figure 4). These areas are not covered during the regular transects sampled during BIAS. Nevertheless, highest abundances were found along the standard hydroacoustic transect covered by FRV "Solea". A more detailed analysis in the following years will have to be conducted to assess whether this observed distribution originates from shifts or whether a certain fraction of clupeids is always distributed in these otherwise and regularly unsurveyed areas

Calibration of the echo-sounder onboard FRV "Clupea" was carried out at 28.10.2019 in deeper parts of Rostock port.



Figure 4: FRV “Clupea” cruise 338/2019. Clupeid distribution and abundance in the Sound (SD 23) 16.-18.10.2019, as measured during day time transects. Green dots represent mean NASC (1 nmi intervals, dots) as proxy for clupeid abundance and distribution.

Leg two: Bottom trawl fishing in German waters / Fishing gear research

During the second part of the cruise, new selectivity devices for trawls were developed and tested in German waters (off the coast of Rostock). The background for these efforts is the current poor stock status of the Baltic cod stocks (especially Eastern Baltic cod) and the resulting implications for Baltic fisheries. The aim was to develop selectivity devices, which allow cod to escape, while keeping the catch of flatfish high. These investigations were conducted via underwater video observation of the selectivity devices and their modifications. It was possible to develop escapement devices/concepts and prepare further tests on commercial vessels and later research cruises.

As in previous selectivity concepts for the trawl fishery, developed at the Thünen Institute, the current development was based on the understanding and the stimulation of behavior of different species. Therefore, in addition to standard selectivity concepts focusing on codend selectivity, additional selectivity devices will be deployed in parts of the trawl ahead of the codend. Therefore, the basic gear design used for the gear development during CLU338 was the four-selvedge extension (NEMOS; Figure 5), which was already used for other concepts (e.g. FLEX and SORTEX).

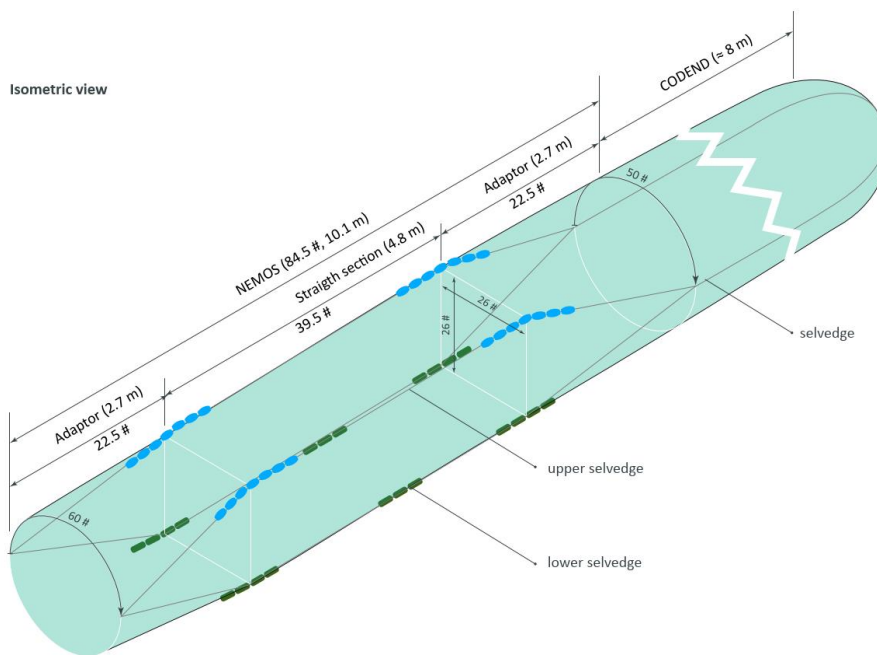


Figure 5: FRV “Clupea” cruise 338/2019. Isometric view of the four-selvedge extension, used as basis for gear development

The idea to be further developed during CU338 was to cut off the “roof” of the 4-selvedge-extension (NEMOS) to give cod as much escapement opportunity as possible (Figure 6, Figure 7).

It was planned to conduct catch-comparison experiments of the newly developed concept during the later cruise CLU340 (12/2019). Therefore, the main task during the cruise CLU338 was to test different configurations of the concept and evaluate the hydrodynamic performance and the response of different fish species to the device. We have used underwater video observations to evaluate the different iterative development steps.

An overview about the different development iterations can be found in the Annex.

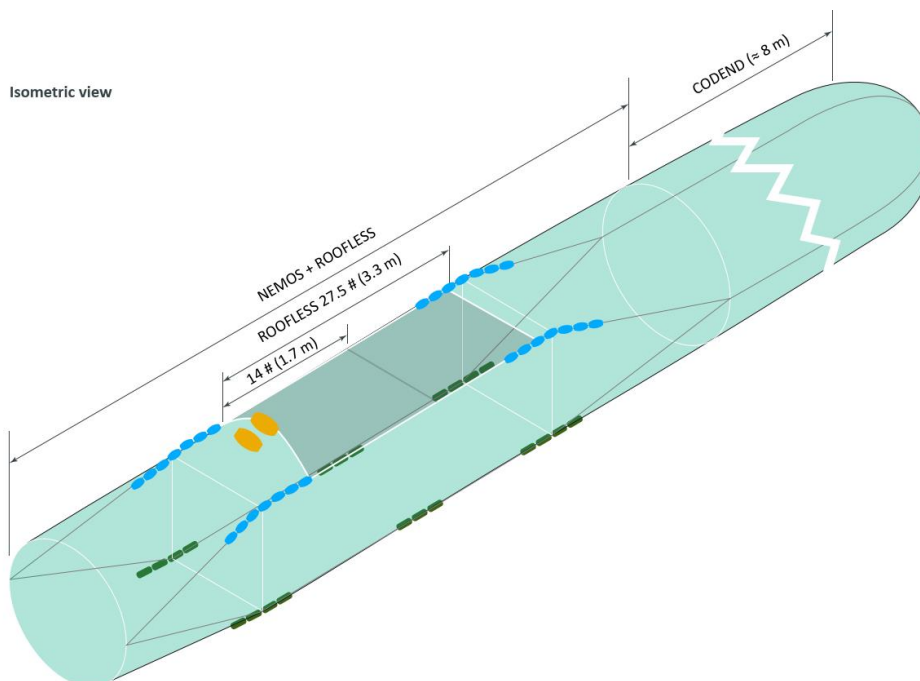


Figure 6: FRV “Clupea” cruise 338/2019. Isometric view of the four-selvedge extension, with some modification tested during the cruise (roof-less and lifted front part)

je 2 Knoten in die Laschen



4. Cruise Participants

Name	Function	Institute	Dates
Dr. Daniel Stepputtis	Scientist in charge	Thünen Institute (OF)	15.-18.10.2019 24., 25., 28., 30.10.2019
Thomas Møller	Technician / Observer	DTU-Aqua	15.-18.10.2019
Juan Santos	Scientist	Thünen Institute (OF)	25., 29.10.2019
Fanny Barz	Scientist	Thünen Institute (OF)	29.10.2019

5. Acknowledgments

We hereby thank all participants, the crew of FRV "Clupea" and Captain Stumpp for their outstanding cooperation and commitment.

Especially, we thank our colleagues from DTU-Aqua, who supported the cruise with logistics and participation.

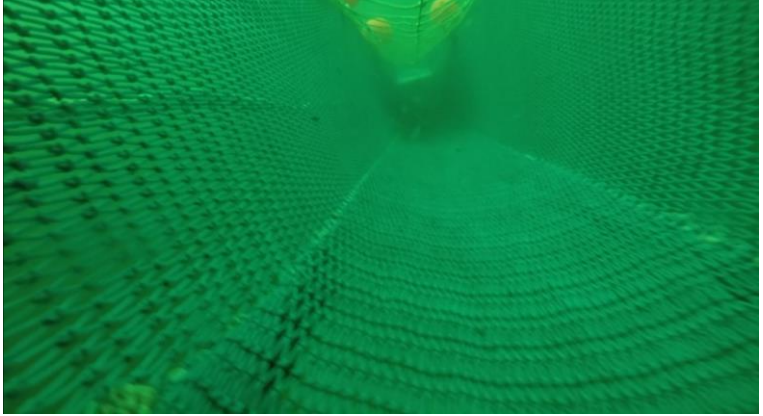

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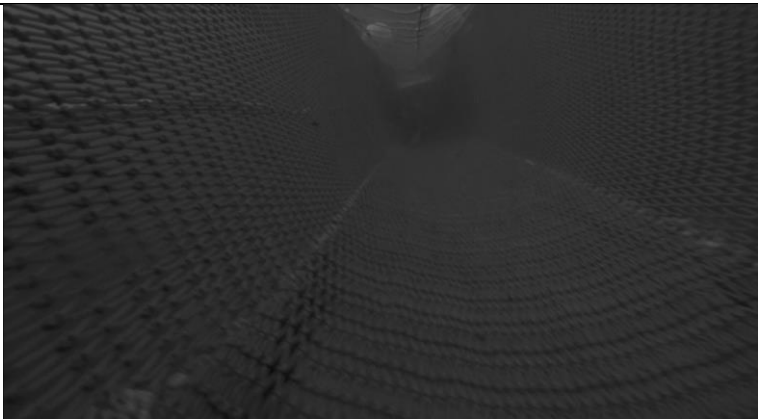
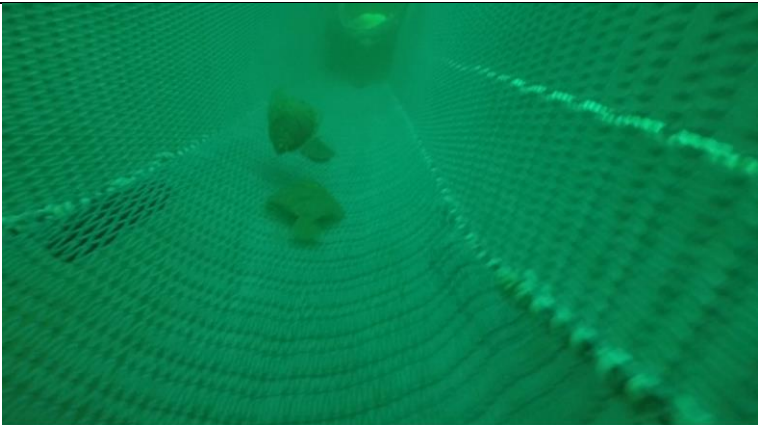


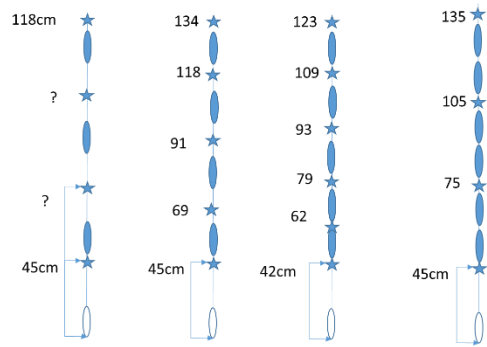
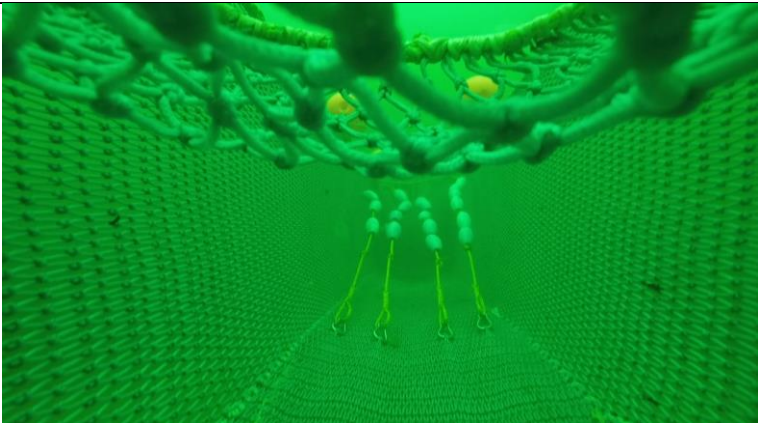

Dr. Daniel Stepputtis (TI-OF)
(Scientist in charge)

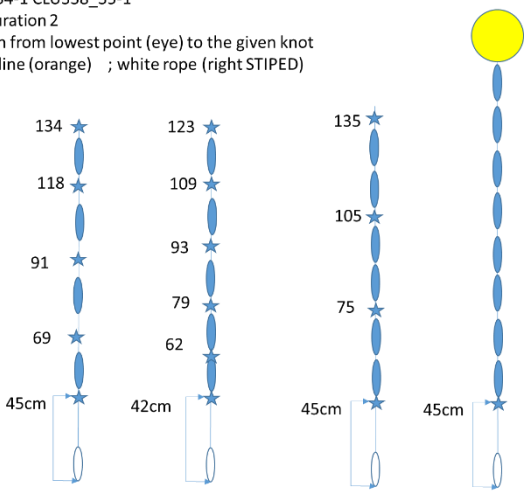


Dr. Matthias Schaber (TI-SF)
(Scientist in charge)

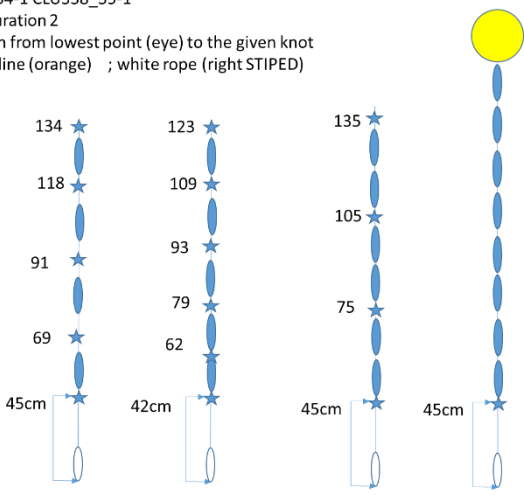
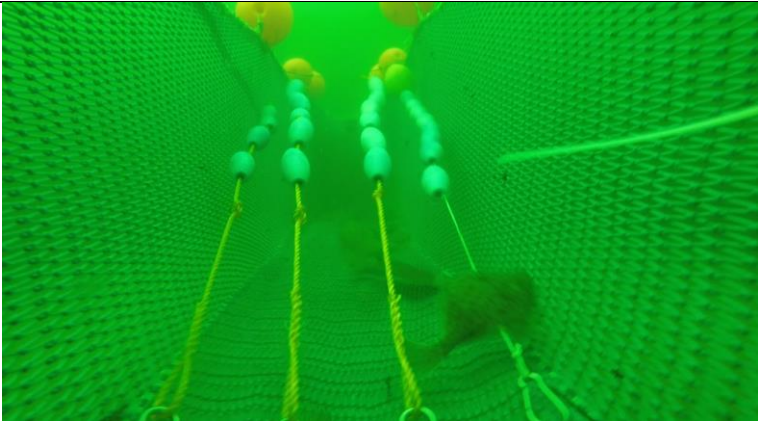
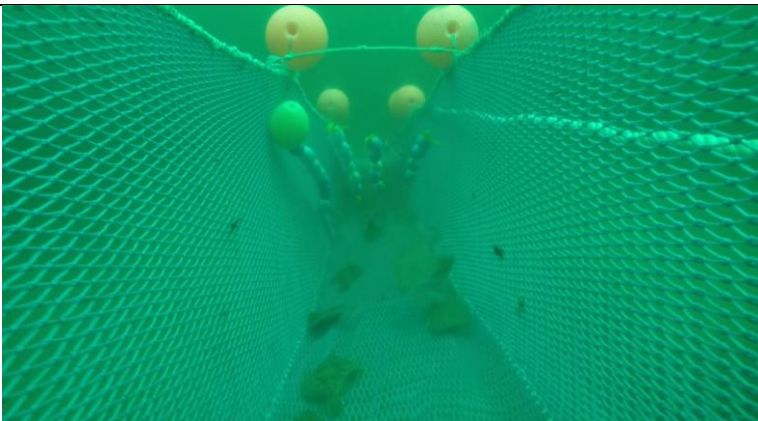
Annex (Gear technology – hauls)

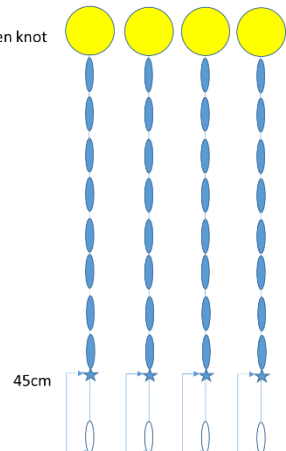


Date	24.10.2019
Haul / Station	CLU338_29-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - 400mm T45-netting in top panel - STIPED: no 	
Camera 1: <ul style="list-style-type: none"> - Front of window - mounted in top panel 	
Camera 2: <ul style="list-style-type: none"> - Rear of window - mounted in top panel 	
Comments: <ul style="list-style-type: none"> - Many flatfish caught (mostly on the lower panel) - Most of the flatfish were plaice, some dab and few flounder - Camera position very deep - Catch of live fish for experiments in Warnemünde 	

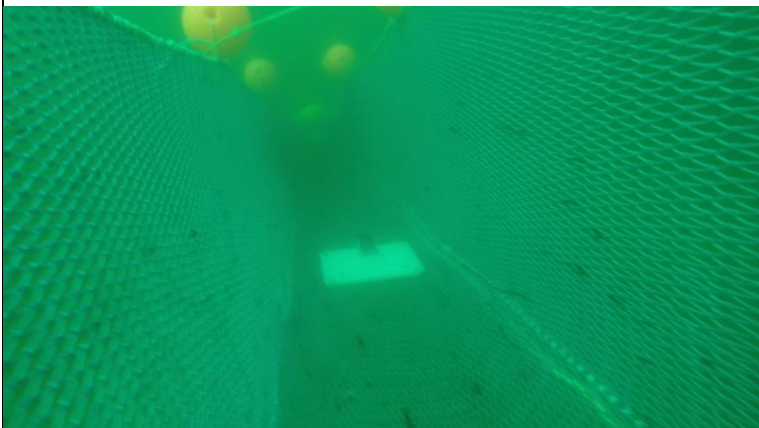
Date	24.10.2019
Haul / Station	CLU338_31-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: no 	
Camera 1: <ul style="list-style-type: none"> - Front of window - mounted in top panel - video very dark, not usable 	
Camera 2: <ul style="list-style-type: none"> - Rear of window - mounted in top panel 	
Comments: <ul style="list-style-type: none"> - few flatfish caught (mostly on the lower panel) - Most of the flatfish were dab and flounder - Cameras very deep (also seen clearly in the rear camera) 	

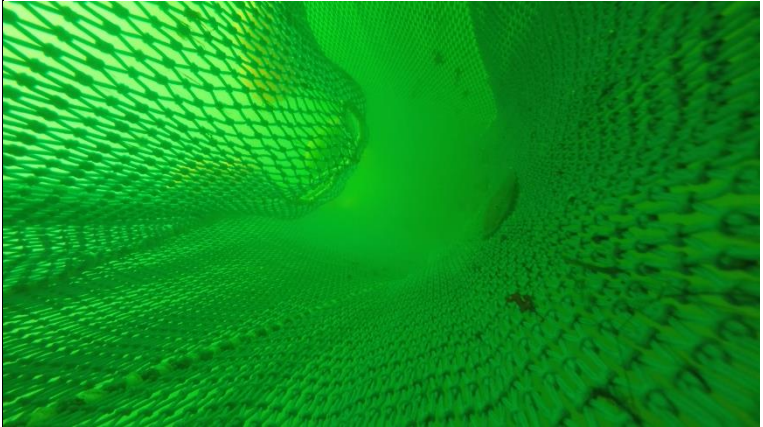
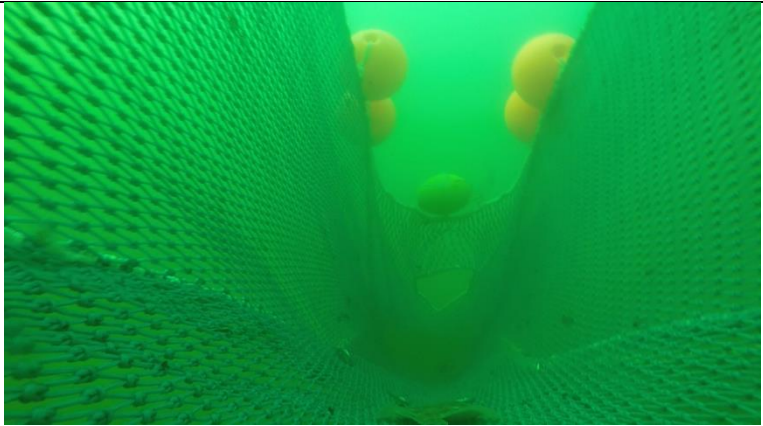
Date	24.10.2019
Haul / Station	CLU338_33-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: <ul style="list-style-type: none"> o configuration 1 o upper part not attached 	CLU338 Haul CLU338_33-1 STIPED configuration 1 Distances given from lowest point (eye) to the given knot Material: floatline (orange) 
Camera 1: <ul style="list-style-type: none"> - Front of window - mounted in top panel - camera very deep 	
Camera 2: <ul style="list-style-type: none"> - Rear of window - mounted in top panel 	
Comments: <ul style="list-style-type: none"> - Codend open - Front Camera very deep (also seen clearly in the rear camera), upper panel with much netting - STIPED-ropes with different length and number of floats, but behave rather similar.3 	

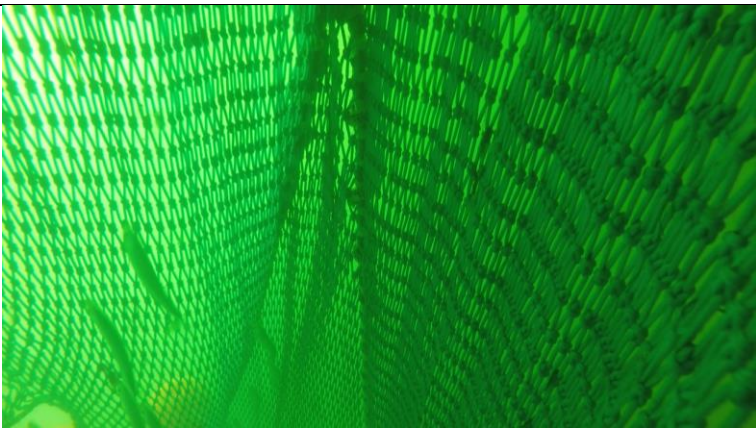
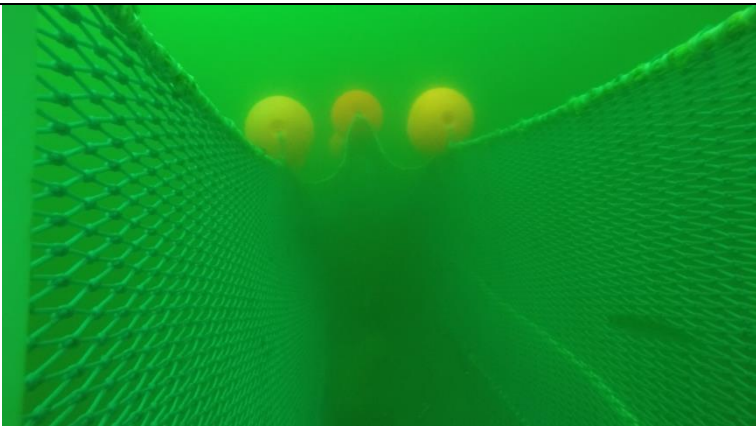
Date	25.10.2019
Haul / Station	CLU338_34-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: <ul style="list-style-type: none"> o configuration 2 o upper part not attached 	CLU338 Haul CLU338_34-1 CLU338_35-1 STIPED configuration 2 Distances given from lowest point (eye) to the given knot Material: floatline (orange) ; white rope (right STIPED) 
Camera 1: <ul style="list-style-type: none"> - Front of window - mounted in top panel - camera very deep 	
Camera 2: <ul style="list-style-type: none"> - Rear of window - mounted in top panel 	
Comments: <ul style="list-style-type: none"> - Codend open - Front Camera very deep (also seen clearly in the rear camera), upper panel with much netting - STIPED-ropes entangled in transversal ropes 	


Date	25.10.2019
Haul / Station	CLU338_35-1
Gear configuration: <ul style="list-style-type: none"> - same as CLU338_34-1 (but STIPED moved to avoid entangling) - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: <ul style="list-style-type: none"> o configuration 2 o upper part not attached 	CLU338 Haul CLU338_34-1 CLU338_35-1 STIPED configuration 2 Distances given from lowest point (eye) to the given knot Material: floatline (orange) ; white rope (right STIPED) 
Camera 1: <ul style="list-style-type: none"> - Front of window - mounted in top panel - camera very deep 	
Camera 2: <ul style="list-style-type: none"> - Rear of window - mounted in top panel 	
Comments: <ul style="list-style-type: none"> - Codend open - Front Camera very deep (also seen clearly in the rear camera), upper panel with much netting 	


Date	25.10.2019
Haul / Station	CLU338_36-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: <ul style="list-style-type: none"> o configuration 3 o upper part not attached 	CLU338 Haul CLU338_36-1 STIPED configuration 3 Distances given from lowest point (eye) to the given knot Material: white rope 
Camera 1: <ul style="list-style-type: none"> - Front of window - mounted in top panel - camera very deep 	
Camera 2: <ul style="list-style-type: none"> - Rear of window - mounted in top panel 	
Comments: <ul style="list-style-type: none"> - Codend open - Front Camera very deep (also seen clearly in the rear camera), upper panel with much netting - GOPR8547.MP4 13:00-14:00 cod. 2 approaches 	

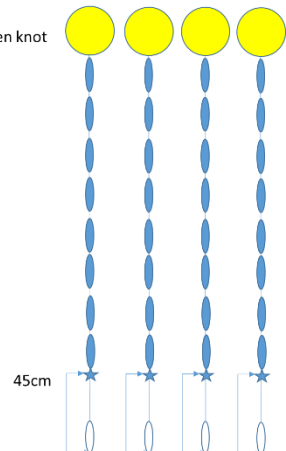
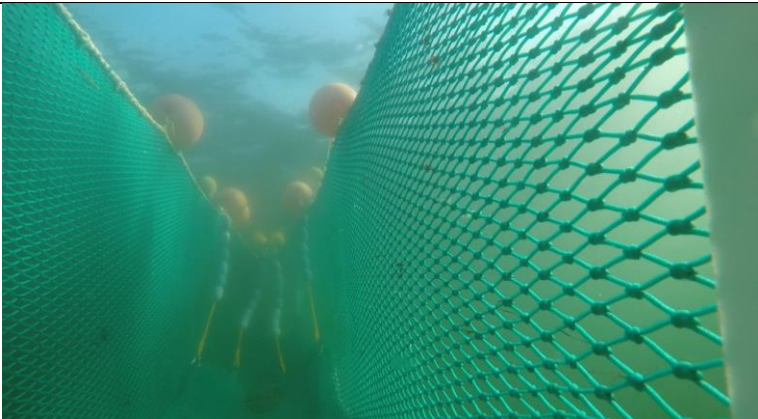
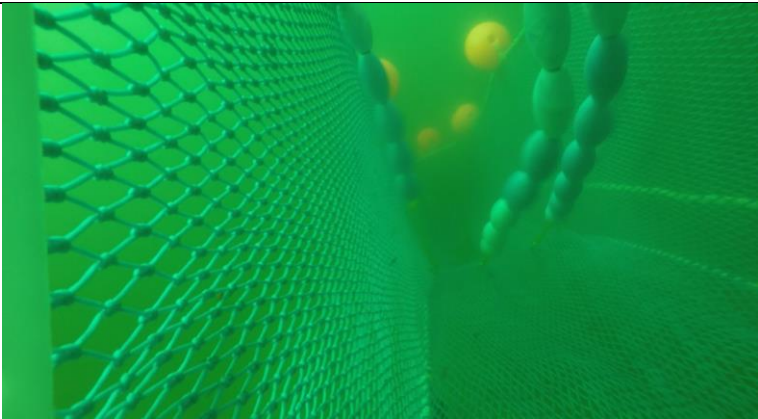
Date	29.10.2019
Haul / Station	CLU338_38-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: No 	
Camera 1: <ul style="list-style-type: none"> - In area of window - mounted in bottom panel - aim: to observe front part of the window - problems with camera (no video footage) 	
Camera 2: <ul style="list-style-type: none"> - Rear of window - mounted in top panel - poor visibility (compared to previous days) 	
Comments: <ul style="list-style-type: none"> - Codend open 	

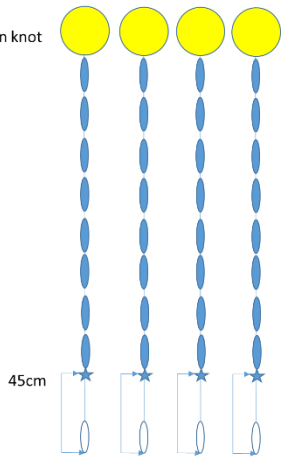

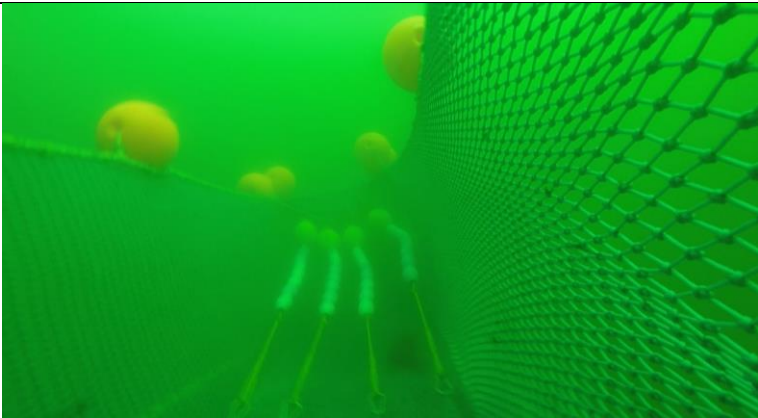
Date	29.10.2019
Haul / Station	CLU338_39-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: No - Update: <ul style="list-style-type: none"> o Width of top panel in front of the window reduced by 6 meshes (3 on each side) 	
Camera 1: <ul style="list-style-type: none"> - Front of window (close to the connection between trawl body and extension) - mounted in bottom panel (lower selvedge) - new camera holder (pipe) - camera view tilted - good information about <ul style="list-style-type: none"> o fish path in front of the window o bending of upper panel 	
Camera 2: <ul style="list-style-type: none"> - in the middle of window-section - mounted in bottom panel 	
Comments: <ul style="list-style-type: none"> - Codend open 	

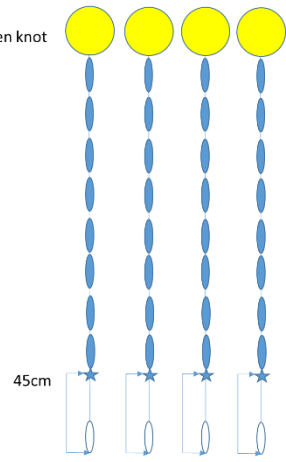


Date	29.10.2019
Haul / Station	CLU338_40-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: No - Update: <ul style="list-style-type: none"> o two floats (same type as the main ones used to raise the tunnel) to raise the upper-front panel of the extension. One was placed in between the original net-hole to place a camera, and the rear edge of the panel. The second float was placed 7 meshes forward to the front of the net-hole 	
Camera 1: <ul style="list-style-type: none"> - Front of window - Wrong mounted - No usable video footage 	
Camera 2: <ul style="list-style-type: none"> - in the middle of window-section - mounted in side panel (just below the float) 	
Comments: <ul style="list-style-type: none"> - Codend open - Very good view from the side panel. - The upper-front panel of the extension got raised finally. The intended “n” shape was not achieved, instead we got a “w” shape. 	

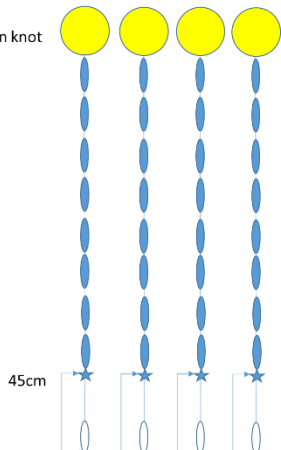


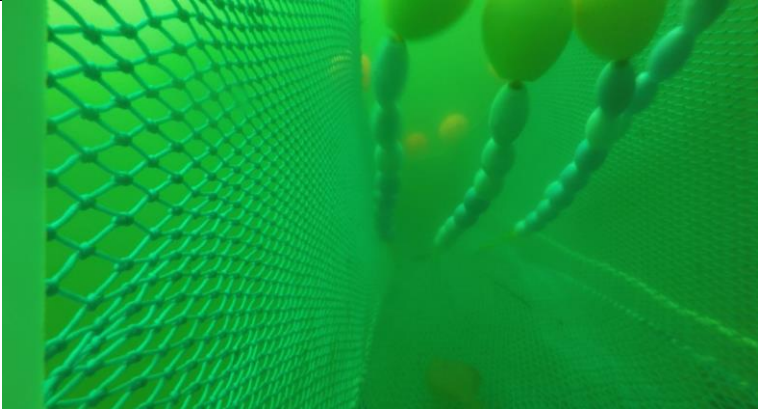
Date	29.10.2019
Haul / Station	CLU338_41-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: No - Update: <ul style="list-style-type: none"> o Aiming to stablish a “n” shape in the rear edge of the upper-front panel of the extension o a PVC bar added to the edge of the front panel o The combined effect of this bar and the float should raise the panel uniformly 	
Camera 1: <ul style="list-style-type: none"> - No camera used 	
Camera 2: <ul style="list-style-type: none"> - in the middle of window-section - mounted in side panel (just below the float) 	
Comments: <ul style="list-style-type: none"> - Codend open - The video shows the edge of the upper-front panel of the extension lower than the selvedge. This is probably caused by bar, too large to allow some freedom for the edge to raise up, at least as the float that can be seen in the background. - For the next haul we reduced the bar width and relaxed the connections of the float 	

Date	29.10.2019
Haul / Station	CLU338_43-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - Transversal ropes for stabilization - STIPED: No - Update: <ul style="list-style-type: none"> o PVC bar reduced in length 	
Camera 1: <ul style="list-style-type: none"> - No camera used 	
Camera 2: <ul style="list-style-type: none"> - in the middle of window-section - mounted in side panel (just below the float) 	
Comments: <ul style="list-style-type: none"> - Codend open - The panel was raised as intended. - The floats mounted on the panel got even higher than those attached to the selvedges. - Reducing the length of the bar was a critical step to achieve the intended shape. 	

Date	30.10.2019
Haul / Station	CLU338_44-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - STIPED: <ul style="list-style-type: none"> o configuration 3 o upper part not attached - Update: <ul style="list-style-type: none"> o Transversal ropes cutted 	CLU338 Haul CLU338_36-1 STIPED configuration 3 Distances given from lowest point (eye) to the given knot Material: white rope 
Camera 1: <ul style="list-style-type: none"> - At the beginning of window-section - mounted in side panel 	
Camera 2: <ul style="list-style-type: none"> - behind the window-section (ca. 50cm) - mounted in side panel 	
Comments: <ul style="list-style-type: none"> - Codend open - Camera positions OK; front camera could be moved towards STIPED-ropes - Ropes entangled in buoyancy at end of window. Need to be fixed or moved 	

Date	30.10.2019
Haul / Station	CLU338_45-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - STIPED: <ul style="list-style-type: none"> o configuration 3 o upper part attached at transversal rope (10cm in front of end of window) - Update: <ul style="list-style-type: none"> o STIPED attached 	CLU338 Haul CLU338_36-1 STIPED configuration 3 Distances given from lowest point (eye) to the given knot Material: white rope  
Camera 1: <ul style="list-style-type: none"> - At the beginning of window-section - mounted in side panel 	
Camera 2: <ul style="list-style-type: none"> - Problems with camera - No video footage available 	
Comments: <ul style="list-style-type: none"> - Codend open - Camera positions OK - Attachment at additional transversal rope not optimal (rope bending down) - STIPED-ropes do not move freely (maybe too tightly attached) 	

Date	30.10.2019
Haul / Station	CLU338_46-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - STIPED: <ul style="list-style-type: none"> o configuration 3 o upper part attached at transversal rope (10cm in front of end of window) - Update: <ul style="list-style-type: none"> o Lower fixation of STIPED-ropes moved 5 meshes to the codend 	CLU338 Haul CLU338_36-1 STIPED configuration 3 Distances given from lowest point (eye) to the given knot Material: white rope 
Camera 1: <ul style="list-style-type: none"> - At the beginning of window-section - mounted in side panel 	
Camera 2: <ul style="list-style-type: none"> - behind the window-section (ca. 50cm) - mounted in side panel 	
Comments: <ul style="list-style-type: none"> - Codend open - Camera positions OK (camera1 point too high) - Attachment at additional transversal rope not optimal (rope bending down) 	

Date	30.10.2019
Haul / Station	CLU338_47-1
Gear configuration: <ul style="list-style-type: none"> - 4-panel-extension (NEMOS) - Top panel removed (3m) - STIPED: <ul style="list-style-type: none"> o configuration 3 o upper part attached at the end of the window - Update: <ul style="list-style-type: none"> o Lower fixation of STIPED-ropes moved 4 meshes to the codend o STIPED attached to end of window-section 	CLU338 Haul CLU338_36-1 STIPED configuration 3 Distances given from lowest point (eye) to the given knot Material: white rope  
Camera 1: <ul style="list-style-type: none"> - At the beginning of window-section - mounted in side panel 	
Camera 2: <ul style="list-style-type: none"> - behind the window-section (ca. 50cm) - mounted in side panel 	
Comments: <ul style="list-style-type: none"> - Codend open - CL_47-1 GP018093.MP4; Dorsch @ 2:10min - CL_47-1 GOPR8093.MP4; Dorsch @ 10:19min (entering the codend) 	