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Short Cruise Report
RV SONNE Expedition SO315
CARNIVAL

Antofagasta – Balboa
08.10.2025 – 17.11.2025
Chief Scientist: Patrick Grunert
Captain: Oliver Meyer



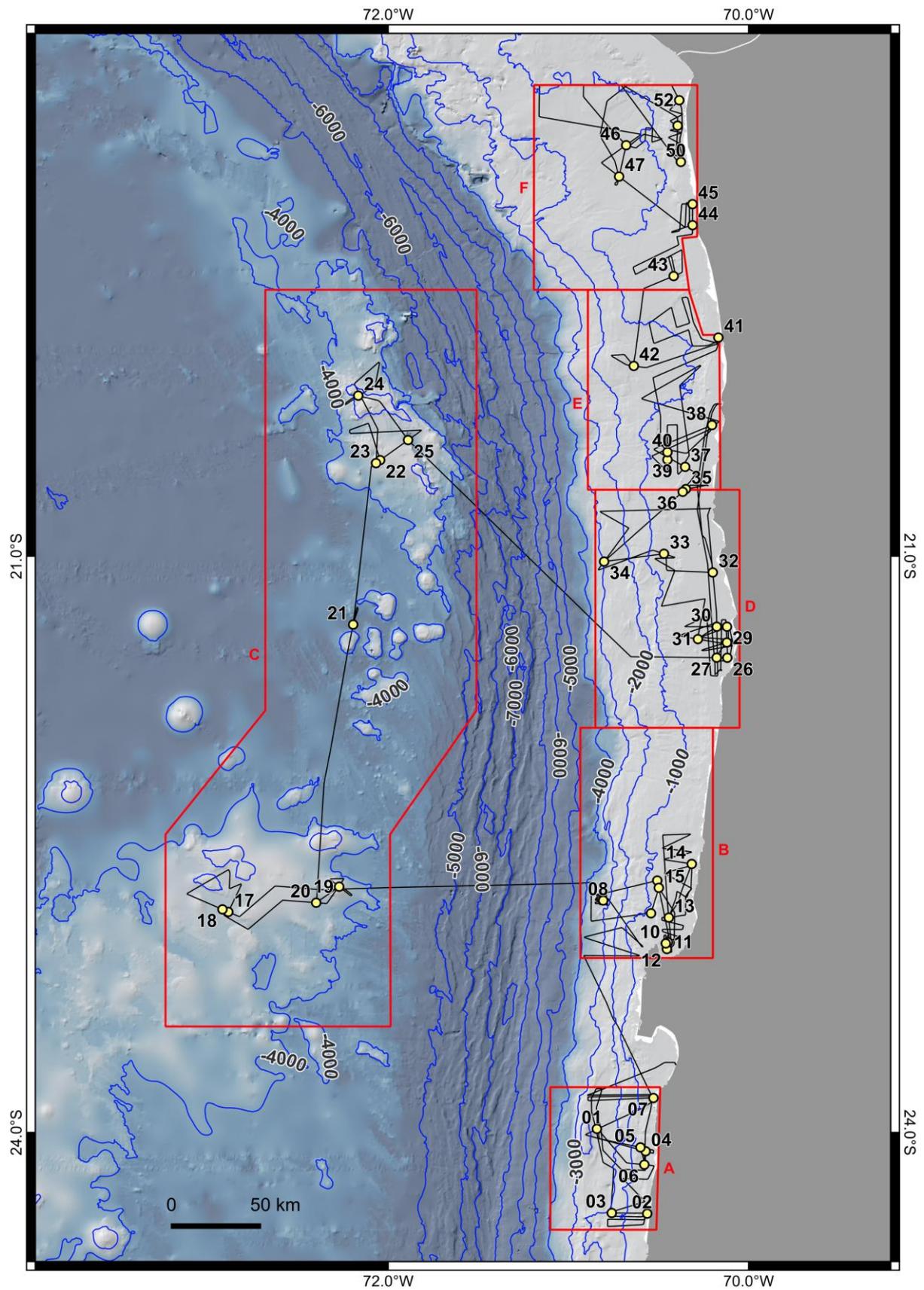


Fig. 1. Working areas A-F, cruise track and stations of RV SONNE Cruise SO315 off the coast of northern Chile.

Objectives

The overarching objective of the CARNIVAL project is to gain a sound understanding of the links between the paleoclimate of the Atacama Desert and the subtropical south-eastern Pacific and southern Atlantic on orbital and suborbital timescales in the late Quaternary (last c. 1 million years). Through integration with terrestrial records, the new marine archives gathered during RV SONNE Cruise SO315 will provide a unique perspective on how the coupling to different ocean basins has shaped the spatial and temporal dynamics of the paleoclimate in the hyperarid core of the Atacama Desert.

Three hypotheses will be tested based on the results of Cruise SO315:

Hypothesis 1: The variability of HCS transport and upwelling, both connected to changes in SST, determine moisture flux and precipitation in the hyperarid core of the Atacama Desert on orbital and suborbital time scales.

Hypothesis 2: The incision of the Río Loa, caused by rainfall-driven discharge from the Altiplano, occurred > 200 ka ago. The offshore sediments of this source-to-sink system reflect moisture flux from the Atlantic basin.

Hypothesis 3: Marine sediments off northern Chile show considerable variability in eolian dust flux. The eolian sediments originate from the adjacent hinterland and reflect precipitation patterns in the hyperarid core of the Atacama.

The hypotheses can only be tested by obtaining new sediment cores and water samples from the south-eastern Pacific off the hyperarid core of the Atacama Desert in northern Chile. The aim of Cruise SO315 was the collection of the most comprehensive sedimentary archive off northern Chile, spanning suborbital timescales in cores from the continental shelf and slope and up to 1 million years in cores from oceanic seamounts. A particular aim was the recovery of sediment cores and water samples at water depths shallower than 500 m which were largely missing from previous cruises. This will allow to address the Peru-Chile Undercurrent, the source waters of coastal upwelling; and the recovery of expanded Holocene sequences. The recovery of sediment cores and complementary sampling of the water column off northern Chile should 1) enable baseline studies on the regional oceanography and biogeochemical cycles in order to calibrate the proxy methods required for paleoclimatic and paleoceanographic reconstructions; and 2) establish new paleoceanographic and paleoclimatic records from late Quaternary marine archives offshore northern Chile.

The working area is located in the south-eastern Pacific off the coast of northern Chile (18°30' to 24°30'; Fig. 1). Coastal working areas follow the northern extension of the Atacama Desert, enabling high-resolution reconstruction of both, terrigenous input and coastal upwelling, and thus surface water temperature, productivity and oxygenation in this region. Distal to the coast, the low sedimentation rates on the oceanic seamounts allow the reconstruction of these parameters on longer, orbital time scales (up to one million years).

Narrative

While in port of Antofagasta, on 7 and 8 October 2025, Captain Meyer and members of the scientific party introduced 40 students from the Universidad de Antofagasta and the Universidad Católica del Norte to the scientific aims of Cruise SO315 followed by guided tours of the research vessel SONNE. On 8 October, all participants in Cruise SO315

boarded the RV SONNE. The containers were unloaded, the equipment was installed and serviced, and the laboratories were set up.

On the evening of 8 October, the RV SONNE left the port and headed directly for Working Area A south of Antofagasta. Due to the challenging topography of the northern Chilean continental margin, a detailed hydroacoustic survey of the seafloor was carried out in the working area from 9 October to identify suitable stations for sediment core sampling. Multicores (MUCs) and/or gravity cores (GCs) were obtained at a total of seven stations at water depths between 81 and 2,485 meters. In addition, sampling of the water column at various depths was carried out at one station using a CTD probe with a rosette sampler, marine snow catchers (MSCs), in-situ pumps (ISPs) and the multinet (MN). On the evening of 12 October, the station work in the first working area was completed.

On 13 October, RV SONNE arrived in Working Area B north of the Mejillones Peninsula, one of the strongest coastal upwelling areas in northern Chile. Here, interrupted by a stop to refuel the ship in the port of Mejillones on 14 October, sediment cores (MUCs and GCs) were obtained at a total of eight stations along depth transects between 92 and 3,001 meters water depth, including an almost 18-meter-long sediment core with laminated sediments from Mejillones Bay. Accompanying this, extensive sampling of the water column was carried out at one coastal and one offshore station using a CTD probe with a rosette sampler, MSCs, ISPs and the MN. On the morning of 18 October, the scientific program in the working area was completed.

After transiting to Working Area C on the Iquique Ridge west of the Peru-Chile Trench, the hydroacoustic survey was resumed, and the first station work was carried out on 19 October. RV SONNE operated in the working area from 19 to 24 October with the aim of collecting sediments up to one million years old from the seamount areas. After initial challenges with core sampling in the southern part of the working area, several sediment cores with a length of > 8 meters were successfully recovered further north. A total of nine stations were visited at water depths between 2,636 and 4,483 meters, with sediment cores (MUCs and GCs) successfully retrieved at eight stations. At four stations, hydrographic data and water samples were collected from the water column using the CTD probe and the rosette sampler. At one station in the northern part of the working area, water column sampling was complemented by the deployments of the MSCs, ISPs and the MN. Five Argo floats were also deployed across the working area. On 24 October, the scientific program in the working area was successfully completed.

This was followed by the transit to Working Area D off the river mouth of the Río Loa, where RV SONNE arrived early in the morning of 25 October. Here, hydroacoustic measurements were carried out on the shelf before the ship made an unscheduled departure for the port of Iquique. On 27 October, operations in Working Area D continued. Following a dense hydroacoustic survey of the seafloor off the mouth of the Río Loa, sediment cores (MUCs and GCs) were successfully obtained at a total of six stations on the shelf. Sampling the continental slope proved challenging. Due to widespread sediment slides and submarine channels, MUCs and/or GCs were recovered only at three stations between 339 and 2,923 meters water depth. At six stations, hydrographic data and water samples were collected from the water column using the CTD probe and rosette sampler. MSCs, ISPs and the MN were deployed at one coastal and one offshore station.

On 30 October, RV SONNE moved on to Working Area E. There, sediment cores and water samples were to be collected from an area of particularly strong coastal upwelling around Iquique. Conditions with respect to sediments were similar to those in the previous working area. Several sediment cores (MUCs and GCs) were successfully obtained at water depths down to c.150 meters, and hydrographic data and water samples were collected using a CTD probe, rosette sampler, MSCs and ISPs. Greater water depths

continued to be characterised by sediment slides. Sediment cores (MUCs and GCs) were obtained at three stations between 333 and 1,235 meters water depth. At the deepest station, hydrographic data and water samples were collected using a CTD probe, rosette sampler, MSCs, ISPs and the MN. On 3 November, the scientific program in the working area was completed.

RV SONNE then moved to the directly adjacent Working Area F. Here, sediment cores and water samples were to be collected from the coastal upwelling area south of Arica. Sediment cores (MUCs and GCs) were successfully recovered at five stations on the shelf. Similar to previous working areas, finding suitable stations on the continental slope proved challenging due to mass wasting deposits and submarine channels, despite intensive mapping of the seafloor. Nevertheless, several sediment cores (MUCs and GCs) were successfully taken from water depths between 624 and 1,440 meters. Hydrographic data and samples from the water column were also collected at several stations using the CTD probe and the rosette sampler, and MSCs, ISPs and the MN were used at one coastal and one offshore station.

On the evening of 8 November, the station work and thus the work program of Cruise SO315 was completed. RV SONNE started the transit to its final destination, the port of Balboa (Panama). The transit time was used to organize sample material, to pack the containers, to clear the labs and to prepare the reports. RV SONNE arrived in Balboa as scheduled in the morning of 17 November.

Acknowledgements

The scientific party of RV SONNE Cruise SO315 is grateful to the outstanding work of Captain Meyer and his crew even under challenging conditions. Without their support, flexibility, and patience also with decisions at short notice the scientific success of the cruise would not have been possible. We also deeply appreciate the competent technical assistance, e.g., with broken equipment, which substantially contributed to the success of the cruise. We greatly appreciate the highly competent support with the research permits by the Leitstelle Deutsche Forschungsschiffe (German Research Fleet Coordination Centre) at the University of Hamburg, the German embassy in Chile, and the Universidad Católica de la Santísima Concepción. The cruise was funded by the BMFTR (Bundesministerium für Forschung, Technologie und Raumfahrt).

List of participants

Name	Discipline	Institution
Grunert, Patrick	Chief Scientist	UoC
Aracena Pérez, Claudia Mileni	National observer of Chile	SHOA, UACH
Arndt, Hartmut	Microbiology	UoC
Arz, Helge	Sedimentology	IOW
Bazhenova, Evgenia	Hydroacoustics	MARUM
Contreras Quintana, Sergio Hernan	Biogeochemistry	UCSC
Da Costa Portilho Ramos, Rodrigo	Paleoceanography	MARUM
Diekamp, Volker	Core curation	MARUM
Dogan, Aysegül	Porewater geochemistry	UB
Flores, Edgart	Biogeochemistry	UCB
Jaeschke, Andrea	Biogeochemistry / Co-chief Scientist	UB
Karallus, Martin	Multicorer, Gravity corer	IOW
Karas, Cyrus	Paleoceanography	USC
Klick, Alina Helene	Sedimentology	AWI
Koukousioura, Olga	Micropaleontology	AUT
Lamy, Frank	Paleoceanography / Co-chief scientist	AWI
Lavik, Gaute	Biogeochemistry	MPI
Hannah, Marchant	Biogeochemistry	MPI
Martin, Janis	Porewater geochemistry	UoC
Neher, Ronja	Micropaleontology	UoC
Nitsche, Frank	Microbiology	UoC
Overbeck, Nils	Hydroacoustics	MARUM
Prohens Baraquí, Daniela Paola	Oceanography	UC
Reyes Macaya, Dharma Andrea	Paleoceanography	UoC
Rigalleau, Vincent	Sedimentology	AWI
Schneider, Laura	Micropalaeontology	UoC
Schulze, Marius	Multicorer, Gravity corer	MARUM
Schumacher, Valéa	Core curation, multinet	AWI
Schwenk, Tilmann	Hydroacoustics	MARUM
Sepúlveda, Julio	Biogeochemistry	UCB
Szlachta, Sara Agnieszka	Hydroacoustics	MARUM
Theocharidis, Nikolaos	Micropaleontology	UoC
Toyos Simon, Maria	Sedimentology	MARUM
Weyh, Lorenz	Sedimentology	IOW
Wennrich, Volker	Sedimentology	UoC

AUT Aristotle University of Thessaloniki, Greece

AWI Alfred Wegener Institute, Bremerhaven, Germany

IOW Leibniz Institute for Baltic Sea Research Warnemünde, Germany

MARUM MARUM – Center for Marine Environmental Sciences, University of Bremen, Germany

MPI	Max-Planck-Institute for Marine Microbiology, Bremen, Germany
SHOA	Servicio Hidrográfico y Oceanográfico de la Armada, Chile
UACH	Universidad Austral de Chile, Chile
UB	University of Bonn, Germany
UC	Universidad de Concepción, Chile
UCSC	Universidad Católica de la Santísima Concepción, Chile
UCB	University of Colorado, Boulder, USA
UoC	University of Cologne, Germany
USC	Universidad de Santiago de Chile, Chile

List of stations

Station No.		Date	Gear	Time	Latitude	Longitude	Water Depth	Remarks/Recovery
SONNE	MARUM GeoB	2025		[UTC]	[°S]	[°W]	[m]	
SO315 1-1	27101-1	10.10.	CTD	03:35:39	23° 58,889'	070° 50,274'	2483.8	24 bottles
SO315 1-2	27101-2	10.10.	CTD	07:26:39	23° 58,889'	070° 50,268'	2480.0	24 bottles
SO315 1-3	27101-3	10.10.	CTD	08:30:03	23° 58,891'	070° 50,278'	2479.2	24 bottles
SO315 1-4	27101-4	10.10.	MSC	09:40:24	23° 58,893'	070° 50,274'	2483.8	depth: 155 m
SO315 1-5	27101-5	10.10.	MSC	10:15:55	23° 58,890'	070° 50,267'	2483.4	depth: 300 m
SO315_1-6	27101-6	10.10.	ISP	11:09:45	23° 58,887'	070° 50,268'	2481.1	depths: 155 m, 200 m, 300 m, 350 m, 750 m
SO315_1-7	27101-7	10.10.	MN	16:38:52	23° 58,892'	070° 50,264'	2485.1	depths: 0-60 m, 60-150 m, 150-400 m, 400-600 m, 600-700 m
SO315 1-8	27101-8	10.10.	GC	18:11:24	23° 58,886'	070° 50,273'	2481.5	347 cm
SO315 1-9	27101-9	10.10.	MUC	19:59:43	23° 58,888'	070° 50,278'	2481.7	average recovery: 26 cm
SO315 2-1	27102-1	11.10.	CTD	14:14:59	24° 25,011'	070° 33,786'	84.1	10 bottles
SO315_2-2	27102-2	11.10.	MUC	14:34:53	24° 25,027'	070° 33,771'	81.1	2 tubes empty; average recovery: 17 cm
SO315 2-3	27102-3	11.10.	GC	14:56:30	24° 25,034'	070° 33,751'	80.7	no recovery
SO315_3-1	27103-1	11.10.	CTD	17:38:02	24° 24,827'	070° 45,562'	1450.0	10 bottles
SO315 3-2	27103-2	11.10.	MUC	18:45:54	24° 24,834'	070° 45,561'	1450.7	average recovery: 11 cm
SO315 3-3	27103-3	11.10.	GC	20:03:22	24° 24,833'	070° 45,564'	1450.9	no recovery
SO315 4-1	27104-1	12.10.	CTD	11:32:21	24° 05,845'	070° 34,329'	352.9	24 bottles
SO315 4-2	27104-2	12.10.	MUC	12:36:29	24° 05,865'	070° 34,346'	353.0	average recovery: 2 cm
SO315 5-1	27105-1	12.10.	CTD	13:31:49	24° 04,647'	070° 35,994'	529.9	10 bottles
SO315 5-2	27105-2	12.10.	MUC	14:19:48	24° 04,611'	070° 36,010'	534.2	average recovery: 19 cm
SO315 5-3	27105-3	12.10.	GC	14:50:35	24° 04,607'	070° 36,013'	534.5	no recovery
SO315_6-1	27106-1	12.10.	MUC	16:30:06	24° 09,943'	070° 34,701'	348.5	4 tubes empty; average recovery: 8 cm
SO315 7-1	27107-1	12.10.	CTD	19:18:22	23° 49,346'	070° 31,685'	112.6	6 bottles
SO315 7-2	27107-2	12.10.	MUC	19:37:14	23° 49,343'	070° 31,676'	111.7	average recovery: 35 cm
SO315 7-3	27107-3	12.10.	GC	19:56:48	23° 49,353'	070° 31,677'	111.8	333 cm
SO315 7-4	27107-4	12.10.	GC	20:42:45	23° 49,349'	070° 31,679'	111.4	184 cm
SO315 8-1	27108-1	13.10.	MUC	15:12:26	22° 48,008'	070° 48,392'	2998.3	average recovery: 29 cm
SO315 8-2	27108-2	13.10.	GC	17:30:28	22° 48,008'	070° 48,397'	3000.8	412 cm
SO315 8-3	27108-3	13.10.	CTD	19:32:07	22° 48,011'	070° 48,399'	3001.3	13 bottles
SO315 9-1	27109-1	14.10.	CTD	05:44:05	22° 41,796'	070° 30,402'	692.7	8 bottles
SO315 10-1	27110-1	15.10.	CTD	06:28:45	23° 01,397'	070° 27,567'	111.4	21 bottles
SO315 10-2	27110-2	15.10.	CTD	08:09:25	23° 01,395'	070° 27,566'	111.6	24 bottles
SO315 10-3	27110-3	15.10.	CTD	09:27:38	23° 01,391'	070° 27,566'	109.7	16 bottles
SO315 10-4	27110-4	15.10.	MSC	10:00:39	23° 01,399'	070° 27,566'	112.0	depth: 73 m
SO315 10-5	27110-5	15.10.	MSC	10:27:40	23° 01,398'	070° 27,564'	110.4	depth: 93 m
SO315_10-6	27110-6	15.10.	ISP	11:06:01	23° 01,398'	070° 27,564'	110.4	depths: 5 m, 63 m, 73 m, 93 m, 105 m
SO315_10-7	27110-7	15.10.	MN	14:05:19	23° 01,398'	070° 27,564'	110.4	depths: 0-10 m, 10-20 m, 20-

								30 m, 30-67 m, 67-90 m
SO315 10-8	27110-8	15.10.	MN	14:53:37	23° 01,393'	070° 27,561'	108.5	technical problems
SO315 11-1	27111-1	15.10.	MUC	15:53:53	23° 01,018'	070° 26,840'	109.1	average recovery: 34 cm
SO315 11-2	27111-2	15.10.	GC	16:17:45	23° 01,020'	070° 26,844'	107.7	572 cm
SO315 11-3	27111-3	15.10.	GC	17:07:42	23° 01,018'	070° 26,844'	107.3	no recovery
SO315 12-1	27112-1	15.10.	CTD	17:55:08	23° 03,133'	070° 27,201'	95.2	technical problems
SO315 12-2	27112-1	15.10.	CTD	18:20:29	23° 03,136'	070° 27,204'	98.9	11 bottles
SO315 12-3	27112-2	15.10.	GC	18:44:45	23° 03,131'	070° 27,197'	96.4	1143 cm
SO315 12-4	27112-3	15.10.	GC	20:09:27	23° 03,128'	070° 27,202'	96.3	1706 cm
SO315 12-5	27112-4	15.10.	GC	21:27:00	23° 03,134'	070° 27,204'	95.5	422 cm; core barrel bent
SO315 12-6	27112-5	15.10.	MUC	21:48:23	23° 03,136'	070° 27,203'	91.5	average recovery: 42 cm
SO315 13-1	27113-1	16.10.	CTD	17:39:07	22° 53,351'	070° 26,565'	219.4	8 bottles
SO315 13-2	27113-2	16.10.	MUC	18:14:14	22° 53,352'	070° 26,560'	220.8	average recovery: 31 cm
SO315 13-3	27113-3	16.10.	GC	18:35:57	22° 53,352'	070° 26,555'	225.3	542 cm
SO315 14-1	27114-1	16.10.	CTD	21:34:38	22° 36,620'	070° 18,892'	119.7	2 bottles
SO315 14-2	27114-2	16.10.	MUC	21:55:42	22° 36,621'	070° 18,926'	119.8	average recovery: 31 cm
SO315 14-3	27114-3	16.10.	GC	22:18:44	22° 36,626'	070° 18,926'	121.6	374 cm
SO315 15-1	27115-1	17.10.	CTD	12:02:38	22° 44,069'	070° 29,835'	623.0	8 bottles
SO315 15-2	27115-2	17.10.	MUC	13:01:48	22° 44,091'	070° 29,950'	624.9	average recovery: 30 cm
SO315 15-3	27115-3	17.10.	GC	13:40:59	22° 44,070'	070° 29,880'	623.0	563 cm
SO315 15-4	27115-4	17.10.	GC	14:46:24	22° 44,067'	070° 29,882'	626.5	272 cm
SO315 16-1	27116-1	17.10.	CTD	17:16:38	22° 52,010'	070° 32,490'	875.7	12 bottles
SO315_16-2	27116-2	17.10.	MN	18:05:35	22° 52,012'	070° 32,492'	880.8	depths: 0-50 m, 50-120 m, 120-350 m, 350-500 m, 500-600 m
SO315 16-3	27116-3	17.10.	MUC	20:16:07	22° 52,010'	070° 32,496'	874.8	average recovery: 34 cm
SO315 16-4	27116-4	17.10.	GC	21:06:53	22° 52,010'	070° 32,489'	874.4	507 cm
SO315 16-5	27116-5	17.10.	CTD	22:42:02	22° 51,618'	070° 32,669'	898.0	24 bottles
SO315 16-6	27116-6	18.10.	CTD	00:10:53	22° 51,620'	070° 32,669'	898.6	18 bottles
SO315 16-7	27116-7	18.10.	MSC	01:39:06	22° 51,620'	070° 32,670'	898.9	depth: 146 m
SO315_16-8	27116-8	18.10.	ISP	02:31:06	22° 51,622'	070° 32,667'	897.3	depths: 120 m, 146 m, 220 m, 420 m, 750 m
SO315_16-9	27116-9	18.10.	MSC	07:27:11	22° 51,622'	070° 32,667'	897.3	depth: 146 m; repeat due to sealing issue
SO315 16-10	27116-10	18.10.	MSC	07:58:18	22° 51,618'	070° 32,671'	898.0	depth: 220 m
	AI2632-25DE006	18.10.	Argof loat	20:07:00	22° 43,800'	071° 59,400'	4250.0	WMO ID: 2904001 manually deployed
SO315 17-1	27117-1	19.10.	MUC	13:19:02	22° 51,548'	072° 53,227'	3342.6	average recovery: 31 cm
SO315 17-2	27117-2	19.10.	GC	15:59:48	22° 51,578'	072° 53,221'	3342.3	163 cm; core barrel bent
SO315 17-3	27117-3	19.10.	GC	18:13:28	22° 51,583'	072° 53,224'	3343.4	226 cm
SO315 18-1	27118-1	19.10.	GC	20:32:44	22° 50,778'	072° 55,174'	3467.8	500 cm
SO315 18-2	27118-2	19.10.	CTD	23:03:00	22° 50,958'	072° 55,145'	3457.8	24 bottles
SO315 19-1	27119-1	20.10.	MUC	12:24:00	22° 43,723'	072° 16,318'	2634.7	average recovery: 1 cm
SO315 19-2	27119-2	20.10.	GC	14:30:45	22° 43,718'	072° 16,320'	2636.1	no recovery
SO315 20-1	27120-1	20.10.	MUC	17:16:24	22° 48,709'	072° 23,971'	3886.9	average recovery: 29 cm
SO315 20-2	27120-2	20.10.	GC	19:59:48	22° 48,712'	072° 23,978'	3898.1	565 cm
SO315 20-3	27120-3	20.10.	GC	22:35:45	22° 48,713'	072° 23,980'	3899.9	678 cm
SO315 20-4	27120-4	21.10.	CTD	01:22:15	22° 48,618'	072° 24,054'	3897.4	21 bottles
	AI2632-25DE007	21.10.	Argof loat	10:02:00	21° 39,000'	072° 15,000'	4450.0	WMO ID: 4903889 manually deployed
	AI2632-25DE008	21.10.	Argof loat	11:11:00	21° 28,200'	072° 13,200'	3200.0	WMO ID: 7902293 manually deployed
SO315 21-1	27121-1	21.10.	MUC	13:09:39	21° 21,254'	072° 11,601'	4454.6	average recovery: 41 cm
SO315 21-2	27121-2	21.10.	GC	16:24:46	21° 21,263'	072° 11,577'	4452.4	823 cm
SO315 21-3	27121-3	21.10.	CTD	19:28:02	21° 21,555'	072° 11,654'	4482.9	12 bottles
	AI2632-25DE009	21.10.	Argof loat	22:28:00	21° 21,000'	072° 11,400'	4460.0	WMO ID: 3902671 manually deployed
SO315 22-1	27122-1	22.10.	MUC	13:01:22	20° 29,595'	072° 02,698'	3772.9	average recovery: 32 cm
SO315 22-2	27122-2	22.10.	GC	15:42:22	20° 29,624'	072° 02,672'	3770.8	824 cm
SO315 23-1	27123-1	22.10.	GC	18:34:02	20° 30,561'	072° 04,563'	3770.0	840 cm
SO315 23-2	27123-2	22.10.	GC	21:44:41	20° 30,563'	072° 04,055'	3783.2	950 cm
SO315 23-3	27123-3	23.10.	CTD	00:35:58	20° 30,576'	072° 04,060'	3780.5	13 bottles
SO315 24-1	27124-1	23.10.	MUC	13:37:24	20° 09,206'	072° 09,710'	2962.2	average recovery: 34 cm
SO315 24-2	27124-2	23.10.	GC	15:59:30	20° 09,191'	072° 09,683'	2961.9	505 cm
SO315_24-3	27124-3	23.10.	MN	18:28:49	20° 09,190'	072° 09,968'	2969.0	depths: 0-50 m, 50-200 m, 200-400 m, 400-500 m, 500-

								700 m
SO315_24-4	27124-4	23.10.	CTD	20:04:16	20° 09,190'	072° 09,974'	2966.1	24 bottles
SO315_24-5	27124-5	23.10.	CTD	23:24:55	20° 09,193'	072° 09,966'	2966.9	24 bottles
SO315_24-6	27124-6	24.10.	CTD	00:50:58	20° 09,194'	072° 09,969'	2961.1	9 bottles
SO315_24-7	27124-7	24.10.	MSC	01:12:46	20° 09,196'	072° 09,967'	2975.6	depth: 120 m
SO315_24-8	27124-8	24.10.	MSC	01:44:05	20° 09,196'	072° 09,971'	2966.8	depth: 306 m
SO315_24-9	27124-9	24.10.	ISP	02:28:20	20° 09,189'	072° 09,974'	2969.5	depths: 85 m, 125 m, 200 m, 445 m, 750 m
SO315_25-1	27125-1	24.10.	MUC	11:51:03	20° 23,244'	071° 53,368'	3413.7	average recovery: 31 cm
SO315_25-2	27125-2	24.10.	GC	14:14:25	20° 23,241'	071° 53,335'	3412.9	870 cm
SO315_25-3	27125-3	24.10.	GC	16:45:50	20° 23,244'	071° 53,349'	3411.5	891 cm
	A12632-25DE010	24.10.	Argof loat	18:45:00	20° 23,400'	071° 53,400'	3410.0	WMO ID: 6990720 manually deployed
SO315_26-1	27126-1	27.10.	MUC	11:56:13	21° 31,965'	070° 07,103'	87.4	average recovery: 39 cm
SO315_26-2	27126-2	27.10.	GC	12:21:21	21° 31,978'	070° 07,096'	81.5	overshot, discarded
SO315_26-3	27126-3	27.10.	GC	13:21:09	21° 31,979'	070° 07,096'	86.0	972 cm
SO315_27-1	27127-1	27.10.	CTD	14:37:55	21° 31,938'	070° 10,620'	110.2	8 bottles
SO315_27-2	27127-2	27.10.	GC	14:57:42	21° 31,954'	070° 10,620'	110.2	297 cm
SO315_27-3	27127-3	27.10.	MUC	15:23:54	21° 31,975'	070° 10,618'	112.5	average recovery: 38 cm
SO315_28-1	27128-1	27.10.	MUC	16:43:47	21° 27,195'	070° 07,250'	76.7	average recovery: 38 cm
SO315_28-2	27128-2	27.10.	GC	16:59:11	21° 27,197'	070° 07,237'	78.2	no recovery
SO315_28-3	27128-3	27.10.	GC	17:28:21	21° 27,201'	070° 07,230'	76.5	30 cm, stored in bag
SO315_29-1	27129-1	27.10.	CTD	18:53:06	21° 22,212'	070° 07,147'	69.1	9 bottles
SO315_29-2	27129-2	27.10.	GC	19:17:06	21° 22,227'	070° 07,193'	69.4	324 cm
SO315_29-3	27129-3	27.10.	MUC	19:37:20	21° 22,231'	070° 07,197'	72.4	average recovery: 31 cm
SO315_30-1	27130-1	28.10.	CTD	05:08:17	21° 22,206'	070° 10,618'	102.8	24 bottles
SO315_30-2	27130-2	28.10.	CTD	06:21:12	21° 22,225'	070° 10,595'	103.2	24 bottles
SO315_30-3	27130-3	28.10.	MSC	06:54:27	21° 22,227'	070° 10,598'	104.9	depth: 63 m
SO315_30-4	27130-4	28.10.	MSC	07:41:38	21° 22,224'	070° 10,599'	105.3	depth: 88 m
SO315_30-5	27130-5	28.10.	ISP	08:23:15	21° 22,225'	070° 10,600'	105.8	depths: 33 m, 55 m, 63 m, 78 m, 88 m
SO315_30-6	27130-6	28.10.	MN	11:52:44	21° 22,226'	070° 10,588'	103.4	depths: 0-20 m, 20-30 m, 30-45 m, 45-65 m, 65-90 m
SO315_30-7	27130-7	28.10.	MUC	12:16:50	21° 22,229'	070° 10,594'	104.5	average recovery: 42 cm
SO315_30-8	27130-8	28.10.	GC	12:35:01	21° 22,228'	070° 10,594'	102.3	219 cm
SO315_31-1	27131-1	28.10.	CTD	14:01:45	21° 26,135'	070° 16,894'	349.7	9 bottles
SO315_31-2	27131-2	28.10.	MUC	15:04:46	21° 26,129'	070° 16,854'	339.4	average recovery: 12 cm
SO315_32-1	27132-1	29.10.	MUC	16:20:11	21° 05,097'	070° 11,930'	80.2	average recovery: 27 cm
SO315_32-2	27132-2	29.10.	GC	16:35:58	21° 05,118'	070° 11,917'	78.7	254 cm
SO315_32-3	27132-3	29.10.	GC	17:01:27	21° 05,129'	070° 11,922'	80.6	299 cm
SO315_33-1	27133-1	29.10.	CTD	20:17:38	20° 59,273'	070° 28,169'	681.6	20 bottles
SO315_33-2	27133-2	29.10.	MUC	21:04:05	20° 59,229'	070° 28,168'	686.6	average recovery: 25 cm
SO315_33-3	27133-3	29.10.	GC	21:48:34	20° 59,223'	070° 28,169'	681.7	538 cm
SO315_33-4	27133-4	29.10.	GC	23:01:22	20° 59,226'	070° 28,171'	680.3	441 cm
SO315_34-1	27134-1	30.10.	CTD	01:24:28	21° 01,659'	070° 48,107'	2923.0	24 bottles
SO315_34-2	27134-2	30.10.	CTD	04:41:17	21° 01,687'	070° 48,102'	2922.3	24 bottles
SO315_34-3	27134-3	30.10.	CTD	06:06:04	21° 01,685'	070° 48,097'	2919.2	11 bottles
SO315_34-4	27134-4	30.10.	MSC	06:53:34	21° 01,685'	070° 48,100'	2922.7	depth: 157 m
SO315_34-5	27134-5	30.10.	MSC	07:26:22	21° 01,687'	070° 48,100'	2921.9	depth: 332 m
SO315_34-6	27134-6	30.10.	ISP	08:10:16	21° 01,689'	070° 48,092'	2920.4	depths: 104 m, 150 m, 240 m, 435 m, 750 m
SO315_34-7	27134-7	30.10.	MN	14:00:44	21° 01,687'	070° 48,092'	2919.6	depths: 0-76 m, 76-150 m, 150-380 m, 380-600 m, 600-920 m
SO315_34-8	27134-8	30.10.	MUC	15:41:09	21° 01,682'	070° 48,093'	2919.5	average recovery: 17 cm
SO315_35-1	27135-1	30.10.	CTD	23:22:33	20° 38,719'	070° 20,898'	155.5	8 bottles
SO315_35-2	27135-2	30.10.	MUC	23:44:25	20° 38,764'	070° 20,901'	152.9	average recovery: 28 cm
SO315_35-3	27135-3	31.10.	MUC	00:05:28	20° 38,770'	070° 20,890'	153.0	average recovery: 14 cm
SO315_35-4	27135-4	31.10.	GC	00:24:42	20° 38,773'	070° 20,888'	151.2	828 cm
SO315_36-1	27136-1	31.10.	GC	01:33:01	20° 39,624'	070° 21,906'	162.4	433 cm
SO315_37-1	27137-1	31.10.	CTD	18:12:45	20° 31,737'	070° 21,126'	336.6	12 bottles
SO315_37-2	27137-2	31.10.	MUC	18:39:45	20° 31,741'	070° 21,120'	345.2	average recovery: 18 cm
SO315_37-3	27137-3	31.10.	GC	19:06:54	20° 31,742'	070° 21,125'	332.6	764 cm
SO315_38-1	27138-1	01.11.	CTD	05:14:04	20° 18,499'	070° 12,222'	104.4	24 bottles
SO315_38-2	27138-2	01.11.	CTD	06:34:32	20° 18,502'	070° 12,183'	105.2	24 bottles
SO315_38-3	27138-3	01.11.	MSC	07:47:16	20° 18,503'	070° 12,179'	103.1	depth: 55 m

SO315_38-4	27138-4	01.11.	MSC	08:25:35	20° 18,496'	070° 12,177'	101.9	depth: 87 m
SO315_38-5	27138-5	01.11.	ISP	08:46:39	20° 18,499'	070° 12,182'	106.1	depths: 27 m, 44 m, 57 m, 72 m, 87 m
SO315_38-6	27138-6	01.11.	MUC	13:27:43	20° 18,501'	070° 12,178'	103.2	average recovery: 44 cm
SO315_38-7	27138-7	01.11.	GC	13:44:40	20° 18,497'	070° 12,179'	103.2	821 cm
SO315_39-1	27139-1	01.11.	MUC	16:32:09	20° 29,502'	070° 27,037'	654.1	average recovery: 26 cm
SO315_39-2	27139-2	01.11.	GC	17:06:51	20° 29,470'	070° 27,009'	651.0	159 cm
SO315_40-1	27140-1	01.11.	CTD	18:23:11	20° 27,091'	070° 26,996'	662.4	22 bottles
SO315_40-2	27140-2	01.11.	MUC	19:06:48	20° 27,087'	070° 27,016'	665.1	average recovery: 23 cm
SO315_40-3	27140-3	01.11.	GC	19:47:26	20° 27,085'	070° 27,021'	667.2	90 cm, core barrel bent
SO315_41-1	27141-1	02.11.	MUC	14:13:58	19° 52,676'	070° 10,051'	63.4	average recovery: 19 cm
SO315_41-2	27141-2	02.11.	GC	14:25:26	19° 52,694'	070° 10,050'	63.6	285 cm
SO315_42-1	27142-1	02.11.	CTD	21:32:12	19° 59,743'	070° 38,178'	1235.3	24 bottles
SO315_42-2	27142-2	02.11.	CTD	23:52:01	19° 59,734'	070° 38,210'	1234.1	24 bottles
SO315_42-3	27142-3	03.11.	CTD	01:34:45	19° 59,730'	070° 38,206'	1233.2	24 bottles
SO315_42-4	27142-4	03.11.	MSC	01:50:18	19° 59,733'	070° 38,211'	1234.0	depth: 107 m
SO315_42-5	27142-5	03.11.	MSC	02:12:59	19° 59,729'	070° 38,216'	1232.6	depth: 343 m
SO315_42-6	27142-6	03.11.	ISP	02:59:30	19° 59,737'	070° 38,211'	1234.1	depths: 90 m, 100 m, 240 m, 440 m, 750 m
SO315_42-7	27142-7	03.11.	MSC	10:52:13	19° 59,726'	070° 38,209'	1233.9	depth: 50 m
SO315_42-8	27142-8	03.11.	MN	11:21:34	19° 59,729'	070° 38,216'	1231.8	depths: 0-50 m, 50-80 m, 80-400 m, 400-700 m, 700-900 m
SO315_42-9	27142-9	03.11.	MUC	13:04:09	19° 59,726'	070° 38,214'	1236.8	average recovery: 22 cm
SO315_42-10	27142-10	03.11.	GC	14:18:13	19° 59,729'	070° 38,211'	1235.5	105 cm, core barrel bent
SO315_43-1	27143-1	03.11.	MUC	22:05:33	19° 31,104'	070° 24,975'	626.6	average recovery: 29 cm
SO315_43-2	27143-2	03.11.	GC	22:45:27	19° 31,112'	070° 24,950'	624.2	576 cm
SO315_43-3	27143-3	03.11.	GC	23:54:42	19° 31,118'	070° 24,947'	625.8	914 cm
SO315_44-1	27144-1	04.11.	CTD	12:13:26	19° 14,884'	070° 18,706'	109.0	11 bottles
SO315_44-2	27144-2	04.11.	MUC	12:34:05	19° 14,881'	070° 18,655'	107.1	average recovery: 33 cm
SO315_44-3	27144-3	04.11.	GC	12:47:06	19° 14,881'	070° 18,650'	102.4	overshot, discarded
SO315_44-4	27144-4	04.11.	GC	13:23:40	19° 14,885'	070° 18,655'	107.1	1069 cm
SO315_45-1	27145-1	04.11.	CTD	15:37:38	19° 08,191'	070° 18,716'	87.2	9 bottles
SO315_45-2	27145-2	04.11.	MUC	16:01:34	19° 08,156'	070° 18,669'	90.9	average recovery: 31 cm
SO315_45-3	27145-3	04.11.	GC	16:16:10	19° 08,154'	070° 18,676'	85.9	1125 cm
SO315_46-1	27146-1	05.11.	MUC	13:31:21	18° 49,282'	070° 40,749'	1351.6	average recovery: 27 cm
SO315_46-2	27146-2	05.11.	GC	15:22:54	18° 49,285'	070° 40,783'	1349.0	743 cm
SO315_46-3	27146-3	05.11.	CTD	16:25:25	18° 49,296'	070° 40,791'	1350.4	6 bottles
SO315_46-4	27146-4	05.11.	CTD	22:06:05	18° 49,311'	070° 40,816'	1349.7	24 bottles
SO315_46-5	27146-5	06.11.	CTD	00:33:06	18° 49,296'	070° 40,788'	1348.0	24 bottles
SO315_46-6	27146-6	06.11.	CTD	02:27:50	18° 49,299'	070° 40,785'	1348.7	12 bottles
SO315_46-7	27146-7	06.11.	MSC	02:41:40	18° 49,294'	070° 40,786'	1344.2	depth: 353 m
SO315_46-8	27146-8	06.11.	MSC	03:22:50	18° 49,298'	070° 40,787'	1347.7	depth: 88 m
SO315_46-9	27146-9	06.11.	ISP	03:42:26	18° 49,300'	070° 40,783'	1348.7	depths: 68 m, 88 m, 243 m, 493 m, 753 m
SO315_46-10	27146-10	06.11.	MSC	11:30:50	18° 49,295'	070° 40,788'	1349.0	depth: 43 m
SO315_46-11	27146-11	06.11.	MN	11:54:06	18° 49,292'	070° 40,787'	1348.7	depths: 0-40 m, 40-90 m, 90-400 m, 400-600 m, 600-900 m
SO315_47-1	27147-1	06.11.	MUC	16:24:53	18° 59,348'	070° 43,070'	1439.4	average recovery: 30 cm
SO315_47-2	27147-2	06.11.	GC	17:30:12	18° 59,346'	070° 43,101'	1439.5	568 cm; top 5 cm stored in bag
SO315_50-1	27150-1	08.11.	CTD	02:38:59	18° 54,626'	070° 22,602'	122.2	24 bottles
SO315_50-2	27150-2	08.11.	CTD	03:13:33	18° 54,664'	070° 22,550'	121.2	24 bottles
SO315_50-3	27150-3	08.11.	CTD	04:02:29	18° 54,664'	070° 22,553'	118.4	19 bottles
SO315_50-4	27150-4	08.11.	MSC	04:59:28	18° 54,660'	070° 22,556'	119.1	depth: 100 m
SO315_50-5	27150-5	08.11.	MSC	06:03:22	18° 54,663'	070° 22,555'	120.9	depth: 30 m
SO315_50-6	27150-6	08.11.	ISP	06:23:31	18° 54,663'	070° 22,548'	121.2	depths: 12 m, 22 m, 30 m, 55 m, 100 m
SO315_50-7	27150-7	08.11.	MUC	10:47:02	18° 54,662'	070° 22,549'	120.3	average recovery: 41 cm
SO315_50-8	27150-8	08.11.	GC	11:08:38	18° 54,660'	070° 22,549'	117.6	833 cm
SO315_51-1	27151-1	08.11.	CTD	16:54:24	18° 43,030'	070° 23,646'	117.4	9 bottles
SO315_51-2	27151-2	08.11.	MUC	17:15:38	18° 43,040'	070° 23,631'	117.2	average recovery: 33 cm
SO315_51-3	27151-3	08.11.	GC	17:33:30	18° 43,042'	070° 23,631'	118.1	759 cm
SO315_52-1	27152-1	08.11.	MUC	20:29:46	18° 34,882'	070° 23,004'	100.6	average recovery: 58 cm
SO315_52-2	27152-2	08.11.	GC	20:48:04	18° 34,899'	070° 23,069'	99.0	1423 cm

CTD	CTD with rosette sampler and UVP
ISP	In situ pumps
GC	Gravity corer
MN	Multinet
MSC	Marine Snow Catcher
MUC	Multicorer