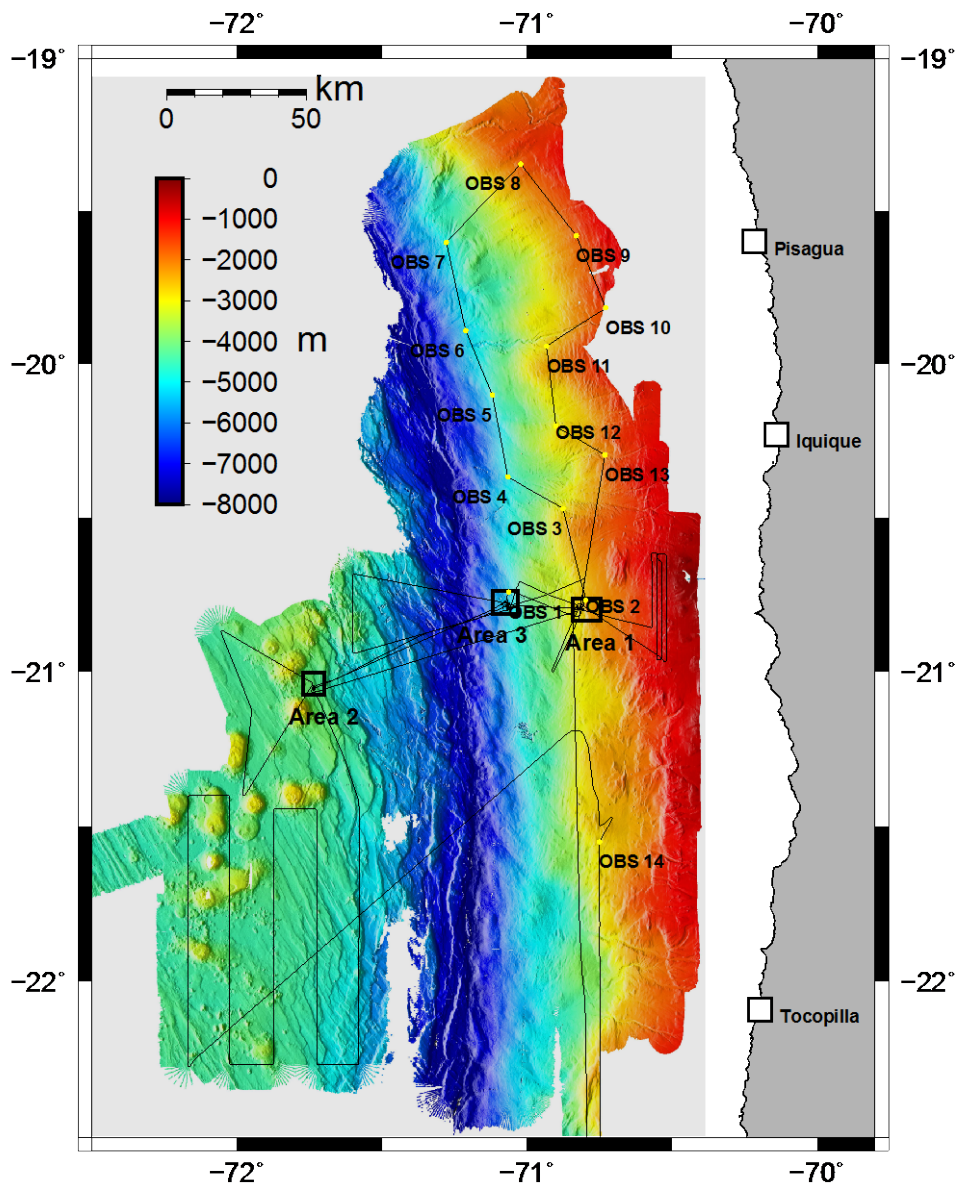


Prof. Dr. Heidrun Kopp
GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel
Wischhofstr. 1-3
24148 Kiel
Tel: +49-431-600-2334
Fax: +49-431-600-2922
hkopp@geomar.de

Short Cruise Report RV SONNE Cruise SO244-2

Antofagasta – Antofagasta
27. November – 13. December 2015
Chief Scientist: Heidrun Kopp
Captain: Lutz Mallon



GeoSEA Array Installation Areas

Objectives

RV SONNE cruise SO244-2 sailed offshore northern Chile from Nov. 27 to Dec. 13, 2015 on the marine forearc and outer rise of the South American subduction system around 21°S. This segment of the Nazca-South American plate boundary has last ruptured in a very strong earthquake in 1877 and was identified as a seismic gap prior to the 2014 Iquique/Pisagua earthquake ($M_w=8.1$). The southern portion of the segment remains unbroken by a recent earthquake and is currently in the latest stage of the interseismic phase of the seismic cycle. Seafloor geodetic measurements provide a way to monitor crustal deformation at high resolution comparable to the satellite-based GPS technique upon which terrestrial geodesy is largely based. We have chosen three areas on the middle and lower slope and the outer rise for the set-up of three sub-arrays.

In summary, the scientific goals of the cruise are to:

- install the seafloor geodetic network GeoSEA (**G**eodetic **E**arthquake **O**bservatory on the **SEA**floor) in three selected areas. Each array consists of autonomous seafloor transponders installed on 4 m high tripods, which were lowered to the seabed on the deep-sea cable of RV SONNE. The transponders within an array intercommunicate via acoustic signals for a period of up to 3.5 years. The array in Area 1 on the middle continental slope consists of 8 transponders located in pairs on four topographic ridges, which are surface expressions of faults at depth. Area 2 is located on the outer rise seaward of the trench where 5 stations monitor extension across plate-bending related normal faults. The third area is located at water depth >5000 m on the lower continental slope where an array of 10 stations measures diffuse strain build-up.
- test and implement GeoSURF, a self-steering autonomous surface vehicle (Wave Glider), which monitors system health and is capable to upload the seafloor data to the sea surface and to transfer it via satellite.
- upload test data from all 23 transponders to check the functionality.
- deploy a total of 14 ocean bottom seismometers (OBS) on the forearc between 19.2°-21.6°S. These instruments are planned to be recovered by RV LANGSETH in Spring/Summer 2016.

Narrative

Cruise SO244-2 commenced in Antofagasta, Chile, on November 27, 2015, where 24 scientists from Chile, Germany and Great Britain embarked on RV SONNE. The vessel left port at 09:30 h local time to start on the transit north to 21°S/71°W. The previous days in port as well as the transit were used to prepare our gear, in particular to set up the first eight 4 m high steel tripods on the aft working deck and to synthetically model the GeoSEA array layout and geometry for working area 1 based on the AUV seafloor bathymetry maps acquired during Leg I of SO244. We arrived at the first deployment site on Nov. 28, 2015 at 05:30 h to map a 2 nm short profile across the planned deployment sites with the EM122 multibeam system set to a beam width of 90°. This was followed by a CTD deployment to a water depth of 2500 m to compare the variations in time of the sound speed profile to the AUV-based CTD measurements conducted during Leg I. At 10:00h and 20°47,943'S/70°48,910'W, station A 301 was veered from the aft deck with the deep-sea cable to an initial water depth of 200 m when the cable was put on hold to deploy a HPT dunker modem over the starboard side of RV SONNE. While on hold, tension on the deep-sea cable suddenly decreased, indicating that the tripod was in a free-fall mode towards the seafloor at 2733 m water depth. Due to the quick response of the deck's crew and the scientific crew the hook of the heavy weight releaser to which the tripod is attached could be released and the instrument as well as the floats were rescued. With the dunker modem we could monitor the decent (~1 m/s with float vs. 2 m/s without) and touch down of the tripod on the seafloor. As the barycenter of the tripod is located at its base, the instrument landed upright and could be pinged immediately. It was released approximately 60 m away from its planned position and could later be included in the network as a full-scale node. After some modifications to the suspension bracket we continued with the deployment of station A102 at 16:00 h at 20°47,677'S/70°48,460'W in a water depth of 2603 m. At 19:30h we received confirmation that both beacons respond and communicate properly with each other.

On November 29 we deployed stations A103, A104, and A105 to water depths ranging from 2620 m to 2865 m. All five stations respond properly to the acoustic interrogation sent via dunker modem from RV SONNE. The line-of-sight between all instruments is clear. We left the first working area to return towards the end of the cruise for the deployment of the remaining three stations. On the transit to Area 2 on

the outer rise seaward of the trench we conducted an EM122 survey to increase the data quality of the existing map acquired during Leg I.

We arrived in working area 2 on November 30 and started to deploy station A201 at 06:00h at 21°03,370'S/71°43,846'W at a water depth of 4105 m. After sending the release command when the station had reached the seafloor, we did not receive an answer from the release unit and hence heaved the tripod by 30 m off the seafloor. After repeatedly sending release commands from the ship's Posidonia system as well as from IXSEA's release box and hydrophone, the station released and was safely installed on the seafloor. After swapping the IXSEA release unit for the following station A202, it was lowered into the water at 12:00h and reached the seafloor at 13:45h. We only succeeded to release it after several hours at 16:00h after conducting an acoustic reset of the release unit. We still did not receive a reply, but could see from the Posidonia tracker that the station had released. Both stations communicate with the dunker modem as well as with each other. We continued to deploy station A203, which was veered into the water column at 18:15h. However, we could not establish communication with this station once it was on the seafloor and hence heaved it back onto the working deck of RV SONNE where it was safely recovered on...

...December 1, 2015 at 04:00h. We exchanged the releaser for a heavy weight IXSEA RT8 unit and again lowered station A203. While veering, we deployed the wave glider GeoSURF at 07:30h and commanded it to sail above station A202 to establish a data connection with the station. Station A203 was released at a water depth of 4065 m at 10:20h, however, we only could confirm the release after heaving the cable by 30 m and confirming that the station remained on the seafloor. After the gear was safely recovered, we could see that the release unit was covered by sediment and hence must have fallen to the seafloor. This led us to test the capacity of the float, which turned out to be too low to keep the release unit floating in the water column. We added a second Benthos sphere to the system. At 13:10h we prepared the deployment of station A204, which however slipped from the heavy weight release and hence was deployed in free-fall mode to a water depth of 4034 m where it landed upright with a tilt of 2°. We continued with the deployment of station A205, which was lowered to the seafloor at 15:20h and released two hours later using the ship's Posidonia system. Communication to all stations and within the

network was confirmed. GeoSURF successfully uploaded data from stations A201, A202 and A204 before we had to recover it using the rescue boat of RV SONNE before night fell.

Over night we started our transit to working area 3, again mapping the transit path using the EM122 system. We arrived in our last working area in the morning of December 2, and started to deploy station A301 at 20°47,034'S/71°04.011'W at a depth of 5243 m. Due to the great water depth of >5000 m in this area, we could only achieve two deployments and installed station A302 at 20°47,561'S/71°04,945'W at a water depth of 5367 m in the afternoon.

Deployment continued the next day, December 3, 2015, with stations A303 in the morning at 20°46,853'S/71°03,520'W at a depth of 5200 m and station A304 in the afternoon at 20°46,565'S/71°04,635'W at a depth of 5336 m in the afternoon. Deployment of both stations went smoothly; both were released by Posidonia after confirming their line-of-sights to the neighboring stations. Each deployment lasts approximately 5 hours, which led us to deploy three stations on...

...December 4, 2015 after using the night hours to acquire additional bathymetry data in the deep-sea trench. Installation of stations A305 through A307 went without any problems from 06:00h to 20:30h. Communication between stations and with the dunker modem on board RV SONNE was trouble-free and the stations have free line-of-sight and a maximum tilt of 5°.

Deployment of the last stations in area 3 (A308 – A310) in water depth of 5095 m to 5220 m was successfully completed on December 5 at 21:00 h. During recovery of the releaser of station A310 the connecting line ripped apart above the Benthos spheres. Both floatation spheres as well as the heavy weight release unit got entangled in the portside propeller of RV SONNE, as could be verified by video. RV SONNE turned off the propellers as night fell and drifted slowly northwards carried by the Humboldt current.

On the morning of December 6 in the daylight we tried to free the propeller from the entangled material, however we did not succeed. We commenced our 12 nm long transit back to working area 1 to install the first of the remaining three stations (A106). This station immediately responded to the pings from the five

stations already deployed in the network as well as to RV SONNE. This success was a vague consolation for the fact that one or both of the Benthos spheres must have imploded during transit. Fortunately the heavy-weight release unit pulled both spheres as well as the remaining line to depth, setting the portside propeller free so that it could be utilized unconditionally. In the afternoon of December 6 we deployed station A107 before heading to shallower water depth for a high-resolution mapping survey in the area between 20°40'S/70°32'W and 21°01'S/70°39'W using Kongsberg's multibeam EM710 system, which is permanently installed on RV SONNE.

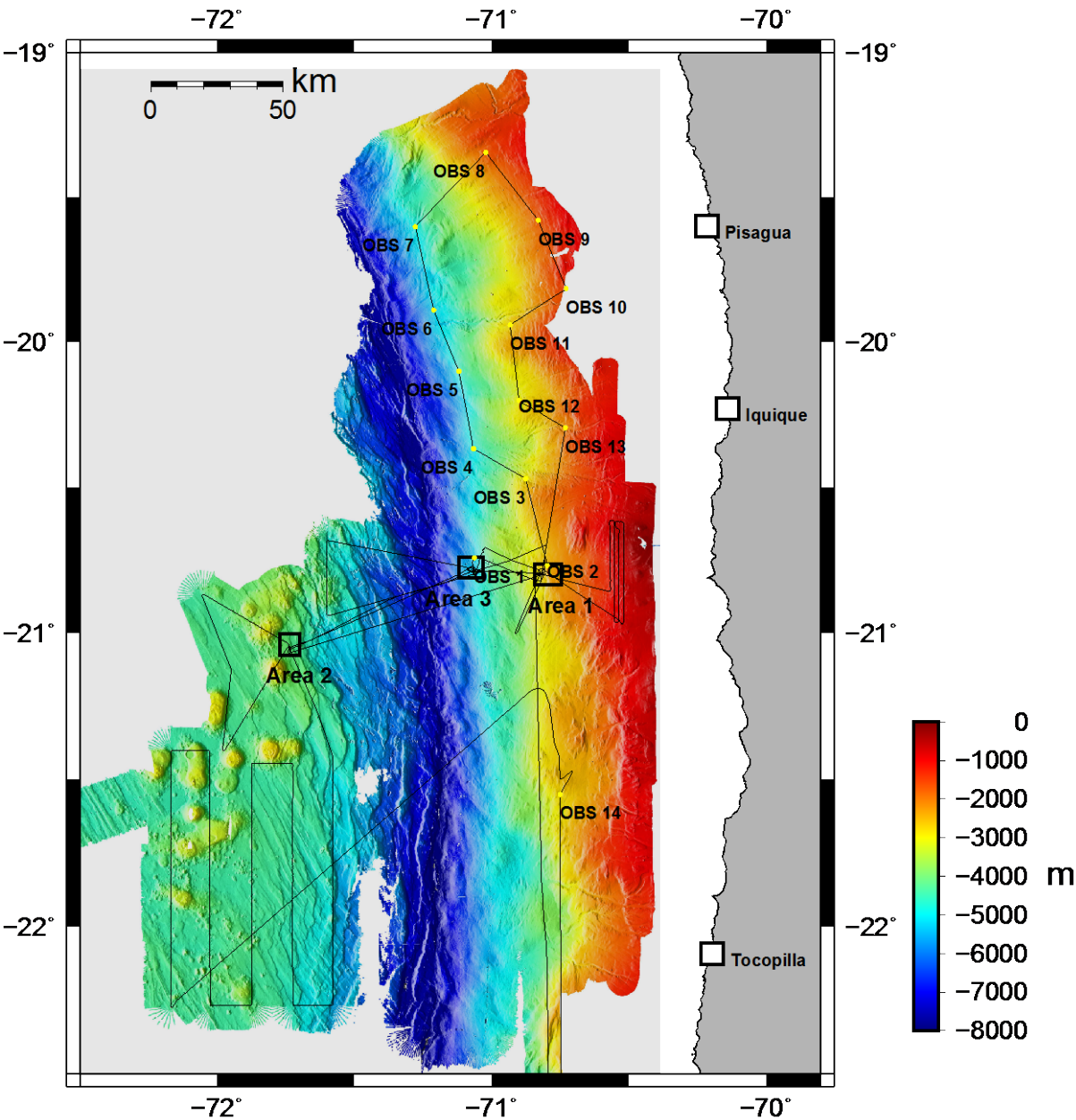
We returned to working area 1 on December 7 to deploy the last GeoSEA station A108 at 08:00h. At 14:30h we deployed the first of a total of 14 ocean bottom seismometers (OBS), which will record the seismic activity on the northern Chilean forearc until spring/summer 2016, when they will be recovered from RV LANGSETH. OBS deployment for stations OBS02-OBS13 continued until 08:45h the next day.

On December 8 we returned to working area 1 to deploy GeoSURF here, which will travel autonomously until the next day. After deployment of GeoSURF we continued to working area 3 where we deployed OBS01. In addition, we retrieved data from the GeoSEA stations using the HPT dunker modem and re-configured the logging settings for the sub array.

We recovered GeoSURF in the morning of December 9 after it successfully uploaded data from the GeoSEA stations in working area 1. At 13:00h we returned to working area 3 to verify that the re-configuration of the array has executed properly. We left here at 16:30 to begin our transit west to working area 2, where we arrived at 20:30h to again deploy GeoSURF for the night while RV SONNE mapped previously uncharted seafloor west of the trench.

By 09:00h on December 10, GeoSURF was safely back on deck and all data were uploaded and secured. We now headed on our final bathymetry grid south of working area 2. Mapping continued until 24:00h on Dec. 11, covering a total of xx nm in this area. RV SONNE then headed south to commence our transit towards the port of Antofagasta. During transit, we deployed our final OBS south of the Iquique/Pisagua earthquake aftershock region. RV SONNE safely reached the pilot station at Antofagasta harbor on Dec. 13 at 08:00h and berthed at 08:30h,

terminating cruise SO244-2. Throughout the cruise weather conditions were optimal, always calm seas and no rain.



Cruise track SO244 Leg II

Acknowledgements

We like to thank Captain Lutz Mallon, his officers and crew of RV SONNE for their support of our deployment and measurement programme and for creating a very friendly atmosphere on board. Their professional assistance at sea is kindly acknowledged.

The GeoSEA array and the GeoSURF wave glider were financed by the BMBF under grant 03F0658I. We are grateful for the continuous support of marine sciences with an outstanding platform such as RV SONNE.

The ship time of RV SONNE was provided by the Bundesministerium für Bildung und Forschung BMBF. We gratefully acknowledge the support.

The authors also wish to express their gratitude to the various colleagues who have supported the work prior and during the cruise. Particular thanks are directed to the director of the Chilean National Seismological Center (CSN) S. Barrientos, Univ. de Chile, Santiago. The Leitstelle Deutsche Forschungsschiffe in Hamburg, Germany and Briese Schifffahrts GmbH & Co. KG are acknowledged for their support and assistance.

Participants

Name		Institution
1. Prof. Dr. Heidrun Kopp	Chief Scientist	GEOMAR
2. Dr. Dietrich Lange	Co-Chief Scientist	GEOMAR
3. Katrin Hannemann	Geodesy	GEOMAR
4. Florian Petersen	Geodesy	CAU
5. Dr. Anne Krabbenhöft	Geodesy Array, OBS	GEOMAR
6. Darren Murphy	Telemetry	Sonardyne Ltd.
7. Henning Schröder	OBS	GEOMAR
8. Klaus-Peter Steffen	Transducer Deployment	GEOMAR
9. Torge Matthiesen	Transducer Deployment	GEOMAR
10. Patrick Schröder	Telemetry	GEOMAR
11. Lina Buchmann	Technician	GEOMAR
12. Margit Wieprich	OBS	GEOMAR
13. Ann-Marie Völsch	Watch keeper	GEOMAR
14. Florian Gausepohl	Watch keeper	GEOMAR
15. Manuel Moser	Watch keeper	CAU
16. Eduardo Contreras-Reyes	Seismology	Universidad de Chile
17. Jose Mieres	Seismology	Universidad de Chile
18. Prof. Dr. Jan Behrmann	Bathymetry	GEOMAR
19. Tanja-Anina Timmermann	Watch keeper	CAU
20. Jan Steffen	Watch keeper & PR	GEOMAR
21. Frank Benitsch	Watch keeper	GEOMAR
22. Jasna Haro Gomez	Observer	SHOA

Participating Institutions

GEOMAR

Helmholtz-Zentrum für Ozeanforschung Kiel

Wischhofstr .1-3

24148 Kiel, Germany

www.geomar.de

Universidad de Chile

Departamento de Geofísica

Santiago de Chile, Chile

www.uchile.cl

Servicio Hidrográfico y Oceanográfico de la Armada de Chile (SHOA)

Errázuriz 254, Playa Ancha

Valparaíso, Chile

www.shoa.mil.cl

Sonardyne International Ltd.

Blackbushe Business Park

Yateley, Hampshire

GU46 6GD United Kingdom

www.sonardyne.com

Christian-Albrechts-Universität zu Kiel (CAU)

Christian-Albrechts-Platz 4

24188 Kiel, Germany

www.uni-kiel.de

SO244-2		Station list													
Start Date	St. No.	Instrument	Time (UTC)				Begin / on seafloor		End / off seafloor		Water depth (m)	Recovery Remarks	Supervisor		
			Begin	Program	End Sci.	End	Duration	Latitude	Longitude	Latitude				Longitude	
2015	SO244-2		Begin	Program	Program	End	hh:mm	S	W	S	W				
28.11.2015	244/2_1-1	CTD	09:13:08	09:16:18	11:24:27	11:25:09	02:12	20° 47,938' S	70° 48,932' W	20° 47,977' S	70° 48,936' W	2738,9	maxSL: 2723m	WTD	
28.11.2015	244/2_2-1	Acoustic Geodetic Seafloor Station	12:00:42	15:48:11	16:50:34	17:36:05	05:35	20° 47,977' S	70° 48,931' W	20° 47,862' S	70° 48,722' W	2738	A101	H.Kopp	
28.11.2015	244/2_2-2	Acoustic Geodetic Seafloor Station	19:37:32	19:48:24	22:52:02	00:51:04	05:13	20° 47,682' S	70° 48,461' W	20° 47,717' S	70° 48,466' W	2602,9	A102	H.Kopp	
29.11.2015	244/2_2-3	Acoustic Geodetic Seafloor Station	09:12:02	09:49:40	13:12:19	14:38:31	05:26	20° 47,403' S	70° 48,544' W	20° 47,416' S	70° 48,535' W	2626,3	A104	H.Kopp	
29.11.2015	244/2_2-4	Acoustic Geodetic Seafloor Station	15:15:45	15:18:04	17:31:18	19:05:31	03:49	20° 47,608' S	70° 49,001' W	20° 47,618' S	70° 49,019' W		A103	H.Kopp	
29.11.2015	244/2_2-5	Acoustic Geodetic Seafloor Station	19:25:12	19:30:25	21:25:53	23:45:42	04:20	20° 48,132' S	70° 49,388' W	20° 48,152' S	70° 49,402' W	2873,2	A105	H.Kopp	
29.11.2015	244/2_3-1	KONGSBERG EM122	23:52:53	23:54:31	08:35:43	08:36:00	08:43	20° 48,192' S	70° 49,568' W	21° 4,019' S	71° 44,080' W	2910,8		F.Petersen	
30.11.2015	244/2_4-1	Acoustic Geodetic Seafloor Station	09:00:42	09:22:32	12:54:13	14:27:24	05:26	21° 3,349' S	71° 43,830' W	21° 3,417' S	71° 43,848' W	4117,2	A201	H.Kopp	
30.11.2015	244/2_4-2	Acoustic Geodetic Seafloor Station	15:00:18	15:04:16	17:22:47	20:37:28	05:37	21° 3,122' S	71° 43,932' W	21° 3,133' S	71° 43,934' W	4111,7	A202	H.Kopp	
30.11.2015	244/2_4-3	Acoustic Geodetic Seafloor Station	20:56:02	21:09:21	12:36:49	15:19:27	18:23	21° 3,480' S	71° 44,141' W	21° 3,485' S	71° 44,133' W		A203	H.Kopp	
01.12.2015	244/2_4-4	Wave Glider	10:43:55	10:45:10	22:54:02	23:00:00	12:16	21° 3,484' S	71° 44,138' W	21° 3,065' S	71° 43,831' W			D.Lange	
01.12.2015	244/2_4-5	Acoustic Geodetic Seafloor Station	15:42:01	16:11:56	16:42:29	17:53:57	02:11	21° 3,128' S	71° 44,238' W	21° 3,123' S	71° 44,261' W		A204	H.Kopp	
01.12.2015	244/2_4-6	Acoustic Geodetic Seafloor Station	18:12:03	18:17:38	20:20:07	22:03:56	03:51	21° 3,365' S	71° 44,145' W	21° 3,376' S	71° 44,136' W		A205	H.Kopp	
02.12.2015	244/2_5-1	CTD	03:50:23	03:53:09	07:17:33	07:18:23	03:28	20° 47,052' S	71° 4,001' W	20° 47,048' S	71° 4,006' W	5246,6	SLmax: 4500m	WTD	
02.12.2015	244/2_6-1	Acoustic Geodetic Seafloor Station	09:00:23	09:57:12	12:35:35	14:35:01	05:34	20° 47,052' S	71° 3,998' W	20° 47,083' S	71° 4,017' W		A301	H.Kopp	
02.12.2015	244/2_6-2	Acoustic Geodetic Seafloor Station	16:12:05	16:14:00	18:47:12	20:55:24	04:43	20° 47,597' S	71° 4,934' W	20° 47,597' S	71° 4,936' W		A302	H.Kopp	
03.12.2015	244/2_6-3	Acoustic Geodetic Seafloor Station	11:00:09	11:11:51	13:25:55	15:37:29	04:37	20° 46,887' S	71° 3,522' W	20° 46,887' S	71° 3,524' W		A303	H.Kopp	
03.12.2015	244/2_6-4	Acoustic Geodetic Seafloor Station	16:10:26	16:11:55	18:52:22	21:00:21	04:49	20° 46,577' S	71° 4,636' W	20° 46,597' S	71° 4,646' W	5339,2	A304	H.Kopp	
03.12.2015	244/2_7-1	KONGSBERG EM122	21:05:27	21:06:26	08:47:50	08:48:09	11:42	20° 46,625' S	71° 4,687' W	20° 46,819' S	71° 5,093' W	5367,5		F.Petersen	
04.12.2015	244/2_6-5	Acoustic Geodetic Seafloor Station	09:00:29	09:11:51	11:40:47	13:43:05	04:42	20° 46,955' S	71° 5,082' W	20° 46,988' S	71° 5,070' W	5357	A305	H.Kopp	
04.12.2015	244/2_6-6	Acoustic Geodetic Seafloor Station	14:20:58	14:27:16	16:41:43	19:10:01	04:49	20° 46,649' S	71° 4,054' W	20° 46,625' S	71° 4,066' W		A306	H.Kopp	
04.12.2015	244/2_6-7	Acoustic Geodetic Seafloor Station	19:32:17	19:34:47	21:40:28	23:46:38	04:14	20° 48,069' S	71° 4,063' W	20° 48,074' S	71° 4,089' W		A307	H.Kopp	
05.12.2015	244/2_6-8	Acoustic Geodetic Seafloor Station	09:00:03	09:09:24	11:15:38	13:19:29	04:19	20° 47,929' S	71° 3,605' W	20° 47,930' S	71° 3,608' W		A308	H.Kopp	
05.12.2015	244/2_6-9	Acoustic Geodetic Seafloor Station	13:45:00	13:51:05	16:05:06	18:07:24	04:22	20° 47,716' S	71° 3,197' W	20° 47,716' S	71° 3,194' W		A309	H.Kopp	
05.12.2015	244/2_6-10	Acoustic Geodetic Seafloor Station	18:37:29	18:39:06	20:50:53	01:42:06	07:04	20° 47,269' S	71° 3,858' W	20° 47,254' S	71° 3,383' W		A310	H.Kopp	
06.12.2015	244/2_2-6	Acoustic Geodetic Seafloor Station	15:12:17	15:14:01	16:45:44	17:57:26	02:45	20° 47,817' S	70° 49,441' W	20° 47,824' S	70° 49,464' W		A106	H.Kopp	
06.12.2015	244/2_2-7	Acoustic Geodetic Seafloor Station	18:19:41	18:24:22	19:57:56	21:09:36	02:49	20° 47,916' S	70° 49,832' W	20° 47,921' S	70° 49,831' W		A107	H.Kopp	
06.12.2015	244/2_8-1	KONGSBERG EM710	23:24:21	23:27:12	09:22:12	09:23:01	09:58	20° 58,004' S	70° 31,249' W	20° 51,223' S	70° 34,043' W	762,1		F.Petersen	
07.12.2015	244/2_2-8	Acoustic Geodetic Seafloor Station	11:00:01	11:16:54	12:51:56	16:58:47	05:58	20° 47,627' S	70° 49,986' W	20° 47,670' S	70° 49,014' W		A108	H.Kopp	
07.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver	17:50:42			14:21:19	20:30	20° 46,114' S	70° 47,871' W	21° 33,006' S	70° 45,009' W	2596,3		A.Krabbenhoeff	
07.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		17:51:17				20° 46,108' S	70° 47,871' W			2501,4	OBS02	A.Krabbenhoeff	
07.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		19:39:57				20° 28,192' S	70° 52,567' W			2898,5	OBS03	A.Krabbenhoeff	
07.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		20:52:58				20° 22,010' S	71° 3,961' W			5011,9	OBS04	A.Krabbenhoeff	
07.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		22:28:20				20° 6,026' S	71° 7,133' W			4819,3	OBS05	A.Krabbenhoeff	
07.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		23:50:38				19° 53,399' S	71° 12,653' W			5345,9	OBS06	A.Krabbenhoeff	
08.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		01:37:55				19° 36,126' S	71° 16,650' W			4881,2	OBS07	A.Krabbenhoeff	
08.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		03:40:22				19° 20,743' S	71° 1,293' W			1736,1	OBS08	A.Krabbenhoeff	
08.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		05:35:45				19° 34,789' S	70° 49,802' W			1728,9	OBS09	A.Krabbenhoeff	
08.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		07:19:02				19° 48,932' S	70° 43,646' W			1432,8	OBS10	A.Krabbenhoeff	
08.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		08:49:37				19° 56,435' S	70° 55,912' W			2735,6	OBS11	A.Krabbenhoeff	
08.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		10:30:00				20° 12,095' S	70° 54,017' W			2999,2	OBS12	A.Krabbenhoeff	
08.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		11:44:36				20° 17,717' S	70° 43,848' W			2100,4	OBS13	A.Krabbenhoeff	

SO244-2							Station list								
			Time (UTC)				Begin / on seafloor		End / off seafloor						
Start Date	St. No.	Instrument	Begin	Start Sci.	End Sci.	Program	End	Duration	Latitude	Longitude	Latitude	Longitude	Water	Recovery	Supervisor
2015	SO244-2							hh:mm	S	W	S	W	depth (m)	Remarks	
08.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		18:17:29				20:52	20° 44,494' S	70° 3,756' W			5349,6	OBS01	A.Krabbenhoeft
12.12.2015	244/2_9-1	Seismic Ocean Bottom Receiver		14:19:54					21° 32,993' S	70° 45,003' W			2787,4	OBS14	A.Krabbenhoeft
08.12.2015	244/2_10-1	Wave Glider	14:52:33	15:06:44	11:25:00	11:45:00	20:52	20° 47,838' S	70° 49,022' W	20° 47,296' S	70° 48,492' W	2764,8			D.Lange
08.12.2015	244/2_11-1	Acoustic Geodetic Seafloor Station	18:52:05	18:53:05	23:58:23	00:00:07	05:08	20° 47,275' S	71° 3,867' W	20° 47,279' S	71° 3,862' W	5233,4	Modem		H.Kopp
09.12.2015	244/2_12-1	Acoustic Geodetic Seafloor Station	12:00:00	18:53:05	15:57:17	15:58:12	03:58	20° 47,302' S	70° 48,478' W	20° 47,624' S	70° 49,993' W		Modem		H.Kopp
09.12.2015	244/2_13-1	Acoustic Geodetic Seafloor Station	17:33:18	17:35:28	19:41:52	19:43:36	02:10	20° 47,114' S	71° 3,948' W	20° 47,110' S	71° 3,962' W		Modem		H.Kopp
09.12.2015	244/2_14-1	Wave Glider	23:43:26	23:49:13	42:17,0	11:53:58	12:10	21° 3,272' S	71° 44,084' W	21° 3,351' S	71° 44,043' W				D.Lange
10.12.2015	244/2_15-1	KONGSBERG EM122	01:07:22	01:08:54	10:56:35	10:57:48	09:50	21° 2,194' S	71° 44,410' W	21° 2,805' S	71° 44,530' W	4085,6			F.Petersen
10.12.2015	244/2_16-1	Wave Glider	11:20:50	11:22:12	11:42:17	11:53:58	00:33	21° 3,040' S	71° 43,952' W	21° 3,351' S	71° 44,043' W		WG recovery		D.Lange
10.12.2015	244/2_17-1	KONGSBERG EM122	14:30:48	14:33:20	02:09:32	02:10:10	11:39	21° 25,148' S	71° 34,760' W	22° 16,215' S	72° 10,046' W	4600			F.Petersen
End of SO244-2															