

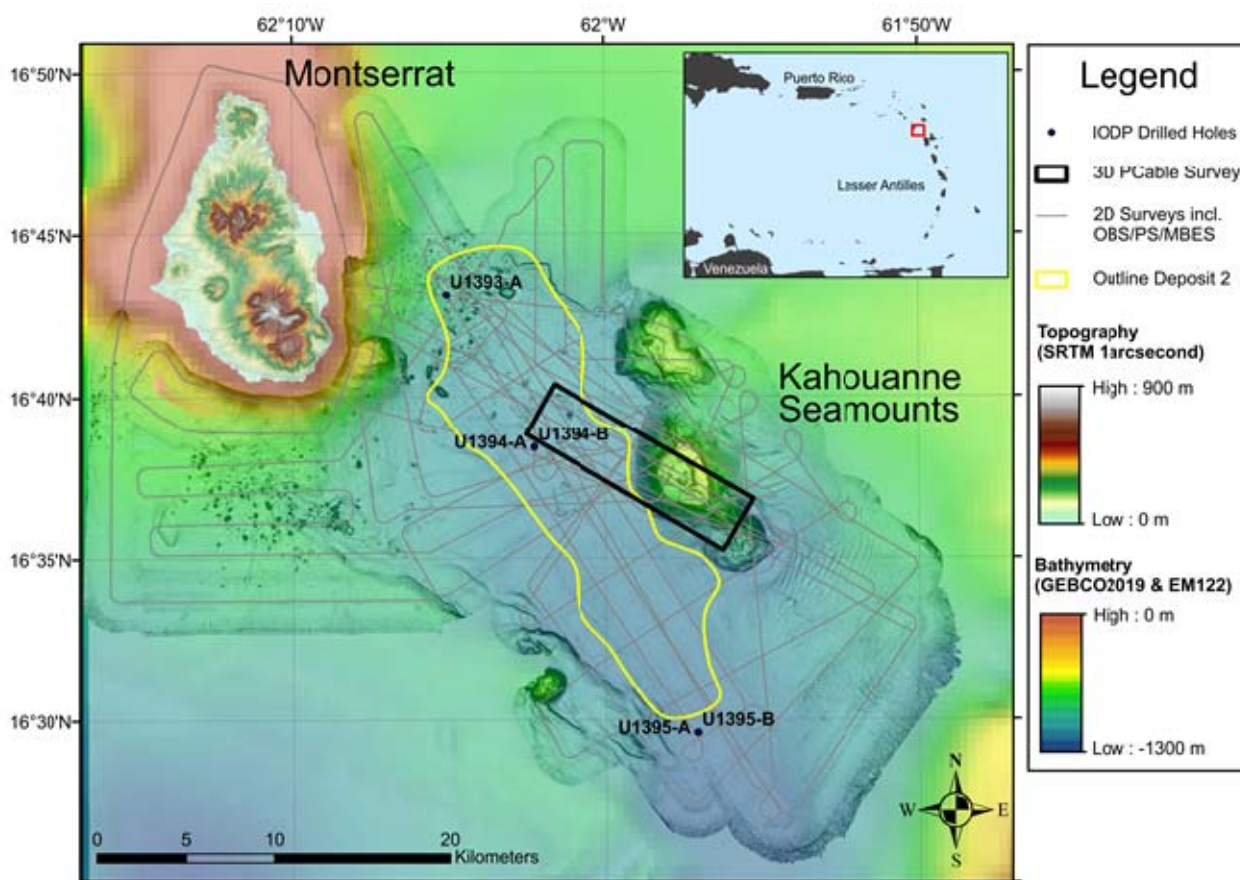
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Short Cruise Report METEOR 154/1

Mindelo (Cape Verde) – Point-à-Pitre (Guadeloupe)
April 3 – April 25, 2019

Chief Scientist: Prof. Christian Berndt
Captain: Rainer, Hammacher



Objectives

Deep-seated collapses of volcanic islands have generated the largest volume mass flows worldwide. These mass flows might trigger mega-tsunamis. The way in which these collapse events are emplaced is poorly understood, even though this emplacement process determines the scale of associated tsunamis.

Key questions such as whether they are emplaced in single or multiple events, how they may incorporate seafloor sediment to increase their volume, and how they are related to volcanic eruption cycles and migration of volcanic centers, remain to be answered.

The main scientific goals of this project / cruise are to determine where the landslides are sourced from; to understand how these landslides are emplaced; and to understand the relationship between landslides, eruption cycles and initiation of new volcanic centres.

The most crucial task during the cruise was the collection of a high-resolution 3D seismic cube – using the P-Cable seismic system –extending the cube collected in 2010 out beyond the edge of debris avalanche deposit. With this cube, it is possible a) to determine whether the crucial Deposit 2 consists of two events or if it was caused by one event that changes character laterally, b) to determine the amount of erosion at the slide plane; and c) to determine the geometry at the toe of the deposit. This will be achieved by creating horizon attributes (steering, dip, amplitude, RMS amplitude) and volume attributes (co-herency, similarity, etc.) of the 3D seismic data and integrating them via core-log seismic integration with the results of the two IODP cores within the planned cube and with the information from MeBo drilling during the second leg of the cruise. In order to provide velocity information for the 3D processing after the cruise, we acquired four ocean bottom seismometer (OBS) data sets distributed within the area of the P-Cable cube. The ocean bottom seismometers were deployed before the 3D data acquisition commenced, and were recovered after shooting had stopped.

Narrative

The cruise departed from Mindelo at 09:00 local time on April 3 and set sail for Montserrat in the Caribbean. When outside the Cape Verde EEZ a sound velocity profile was collected and used to calibrate the hydroacoustic equipment. Then the deep sea echosounder EM122 and the subbottom profiler Parasound was activated and kept running until the French EEZ was reached on April 9. The transit across the Atlantic until 10.4.2019 was used to prepare the seismic equipment for the main experiment.

The study area off Montserrat was reached at 10:30 on 10.4.2019. First a releaser test for the ocean bottom seismometers was carried out and another sound velocity profile was collected. From 14:00 onwards 10 ocean bottom seismometers were deployed. This was completed at 20:00. Afterwards the 2D seismic streamer to shoot profiles along the OBS tracks was also deployed. The system was up and running at 22:30.

During the morning on the 11.4.2019, acquiring 2D seismic data along the track lines was continued. After lunch, deployment of the 3D seismic system took place and was finished at 17:00. The first sail line of the 3D seismic cube across Kahouane Seamounts and the central part of deposit 2 started at 18:00. In total sixteen streamers and a shot interval of 5 seconds were used. Unfortunately, the wind picked up to Bft 5-6 which was not ideal for the quality of the seismic data. At 21:00 the junction box between the cross cable and the data cable had a water intrusion which made it necessary to recover that part of the P-Cable and re-terminate.

Repairs and redeployment took until 2:30 on 12.4.2019. Afterwards P-Cable shooting continued but at 14:00 the starboard paravane caught a fishing net. Fixing the system took until 17:00 and the P-Cable was redeployed and acquisition continued.

By midnight, the wind had picked up that the waves caused damage to the data cable and the system had to be recovered. Throughout the night (13.4.2019), the system was re-rigged to 2D mode until at 7:00 in the morning. Shooting continued throughout that day.

In the morning of 14.4.2019 the first GI gun started to leak air and the seismic source had to be recovered. Replacing the first gun took until noon.

On 15.4.2019 shooting 2D seismic data continued until noon when the weather calmed down. During the afternoon, the system was re-rigged to the P-Cable mode and data collection started at 20:45 in force 5-6 winds.

Shooting 3D seismic data continued on the 16.4.2019 with only one interruption in the morning by a 1.5 h airgun service.

At 05:30 on the 17.4.2019 the system had to be recovered because the data link broke down. The tension release on the data cable had slipped and the resulting movement had loosened a connector in the junction box. After repairs until 09:30 the system was redeployed. At 12:00 the second streamer had problems and it was replaced until 14:30. By 16:15 the system had communication problems. Cruising speed was reduced to 3 kts through the water to relieve tension on the cross-cable which improved the communication. At 19:00 the portside paravane caught a fishing line and the system broke down and had to be recovered.

It took until 03:00 on the next day (18.4.2019) to get rid of the fishing line and the 2D system was deployed. During the day, 2D data acquisition continued and all cross-cable segments were replaced. In the evening the 3D P-Cable system was deployed, which took until 22:00.

On the 19.4.2019 3D data acquisition continued in winds up to force 7. Surveying continued until 13:30 on the next day (20.4.2019). Then the data cable had to be replaced which took until 17:30. Then surveying continued while the wind abated.

The final planned waypoint of the 3D cube was reached in the early morning of 21.4.2019 and the time until 13:00 on the 23.4 was used to shooting infill lines. Afterwards the first ocean bottom seismometers were released. The first was up on deck at 4:15 pm. As two of the first four OBS came up upside down, it was judged to be too risky to recover the remaining six OBS at nighttime. Therefore, the multi-beam and Parasound profiles were run during the night and recovery of the remaining OBS were postponed until the next day.

At break of dawn on the 24.4.2019 the 5th OBS was released. Just as the first and fourth OBS this one surfaced upside down confirming that the new design of the OBS is deficient and justifying the decision not to collect further OBS during night time. The remaining OBS were recovered until 10 am. Afterwards another SVP cast for multibeam calibration was conducted and surveying with EM122 and Parasound to map the most recent deposits around Montserrat continued before finishing the science program at 21:00 and steaming towards Point a Pitre where Meteor docked on 25.4.2019 morning at 6 am.

Acknowledgements

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Stationsliste

Station No.	Date	Gear	Time	Latitude	Longitude	Water Depth	Remarks/Recovery
METEOR	2019		[UTC]	[°N]	[°W]	[m]	
M154/1_0_Underway-1	4.4	Deep-sea Multibeam Echosounder	04:01	17°08.020'	028°52.123'	4725	profile start
M154/1_0_Underway-1	4.4	P-70 Parasound	04:01	17°08.020'	028°52.123'	4725	profile start
M154/1_0_Underway-2	4.4	Sound Velocity Profiler	04:01	17°08.020'	028°52.124'	4724	W2, Vorgewicht, in the water
M154/1_0_Underway-2	4.4	Sound Velocity Profiler	04:04	17°08.020'	028°52.123'	4724	SVP, SL = 10m, in the water
M154/1_1-1	4.4	Sound Velocity Profiler	05:27	17°08.021'	028°52.124'	4723	SLmax = 4650m, max depth/on ground
M154/1_1-1	4.4	Sound Velocity Profiler	06:57	17°08.022'	028°52.127'	4725	on deck
M154/1_1-1	9.4	Deep-sea Multibeam Echosounder	18:30	17°00.357'	057°35.313'	5837	Unterbrechung Datenaufzeichnung, Eintritt EEZ Frankreich, profile end
M154/1_1-1	9.4	P-70 Parasound	18:30	17°00.357'	057°35.313'	5837	Unterbrechung Datenaufzeichnung, Eintritt EEZ Frankreich, profile end
M154/1_2-1	10.4	Sound Velocity Profiler	14:57	16°37.001'	062°02.013'	1130	W2, mit Releaser-Test, in the water
M154/1_2-1	10.4	Sound Velocity Profiler	15:19	16°37.001'	062°02.013'	1130	SLmax = 1100m, max depth/on ground
M154/1_2-1	10.4	Sound Velocity Profiler	15:22	16°37.000'	062°02.012'	1128	Hydrophon, in the water
M154/1_2-1	10.4	Sound Velocity Profiler	15:24	16°37.001'	062°02.012'	1129	Hydrophon, on deck
M154/1_2-1	10.4	Sound Velocity Profiler	15:28	16°37.001'	062°02.012'	1128	Hydrophon, in the water
M154/1_2-1	10.4	Sound Velocity Profiler	15:33	16°37.001'	062°02.012'	1129	Hydrophon, on deck
M154/1_2-1	10.4	Sound Velocity Profiler	15:33	16°37.002'	062°02.012'	1130	Hydrophon, in the water
M154/1_2-1	10.4	Sound Velocity Profiler	16:01	16°37.001'	062°02.012'	1131	Hydrophon, on deck
M154/1_2-1	10.4	Sound Velocity Profiler	16:03	16°37.000'	062°02.012'	1131	Hydrophon, in the water
M154/1_2-1	10.4	Sound Velocity Profiler	16:14	16°37.002'	062°02.013'	1131	Hydrophon, on deck
M154/1_2-1	10.4	Sound Velocity Profiler	16:14	16°37.002'	062°02.012'	1131	hoisting
M154/1_2-1	10.4	Sound Velocity Profiler	16:38	16°37.001'	062°02.012'	1131	on deck
M154/1_3-1	10.4	Seismic Ocean Bottom Receiver	19:10	16°39.995'	062°02.949'	1082	OBS 1, OBS deployed
M154/1_4-1	10.4	Seismic Ocean Bottom Receiver	19:37	16°39.347'	062°01.603'	1106	OBS 2, OBS deployed
M154/1_5-1	10.4	Seismic Ocean Bottom Receiver	20:02	16°38.772'	062°00.476'	1109	OBS 3, OBS deployed
M154/1_6-1	10.4	Seismic Ocean Bottom Receiver	20:27	16°38.132'	061°59.429'	1119	OBS 4, OBS deployed
M154/1_7-1	10.4	Seismic Ocean Bottom Receiver	21:16	16°35.492'	061°54.434'	1158	OBS 5, OBS deployed
M154/1_8-1	10.4	Seismic Ocean Bottom Receiver	21:59	16°31.030'	061°57.022'	1178	OBS 6, OBS deployed
M154/1_9-1	10.4	Seismic Ocean Bottom Receiver	22:32	16°32.992'	061°58.266'	1160	OBS 7, OBS deployed

M154/1_10-1	10.4	Seismic Ocean Bottom Receiver	22:58	16°34.749'	061°59.464'	1154	OBS 8, OBS deployed
M154/1_11-1	10.4	Seismic Ocean Bottom Receiver	23:24	16°36.638'	062°00.676'	1137	OBS 9, OBS deployed
M154/1_12-1	10.4	Seismic Ocean Bottom Receiver	23:50	16°38.443'	062°01.895'	1113	OBS 10, OBS deployed
M154/1_13-1	11.4	Seismic Towed Receiver	00:17	16°38.456'	062°01.358'	1114	Airgun in water
M154/1_13-1	11.4	Seismic Towed Receiver	00:27	16°38.395'	062°01.030'	1119	Streamer, information
M154/1_13-1	11.4	Seismic Towed Receiver	03:48	16°44.024'	062°05.681'	885	profile start
M154/1_13-1	11.4	Seismic Towed Receiver	16:14	16°42.272'	062°07.380'	703	profile end
M154/1_13-1	11.4	Seismic Towed Receiver	16:37	16°42.734'	062°07.109'	715	Streamer, on deck
M154/1_13-1	11.4	Seismic Towed Receiver	16:49	16°42.546'	062°06.774'	779	Airgun, on deck
M154/1_0_Underway-3	11.4	Deep-sea Multibeam Echosounder	00:29	16°38.390'	062°00.993'	1120	profile start
M154/1_0_Underway-3	11.4	P-70 Parasound	00:29	16°38.388'	062°00.983'	1119	profile start
M154/1_0_Underway-3	11.4	Seismic Towed Receiver	17:54	16°40.397'	062°03.415'	1072	Stb-Scherbrett im Wasser, information
M154/1_0_Underway-3	11.4	Seismic Towed Receiver	19:38	16°37.888'	062°00.529'	1123	Bb-Scherbrett im Wasser, information
M154/1_0_Underway-3	11.4	Seismic Towed Receiver	20:38	16°36.444'	061°58.872'	1139	Airgun in water
M154/1_0_Underway-3	11.4	Seismic Towed Receiver	21:55	16°35.380'	061°56.326'	1000	profile start
M154/1_0_Underway-4	12.4	Seismic Towed Receiver	01:31	16°38.946'	062°00.983'	1109	Airgun, on deck
M154/1_0_Underway-4	12.4	Seismic Towed Receiver	05:45	16°34.818'	061°53.067'	1026	Airgun in water
M154/1_0_Underway-4	12.4	Seismic Towed Receiver	18:39	16°36.028'	061°57.092'	988	Airgun, on deck
M154/1_0_Underway-4	12.4	Seismic Towed Receiver	20:10	16°36.598'	061°55.580'	1063	Beginn Aussetzen, information
M154/1_0_Underway-4	12.4	Seismic Towed Receiver	20:12	16°36.599'	061°55.550'	1033	Bb-Scherbrett zu Wasser, information
M154/1_0_Underway-4	12.4	Seismic Towed Receiver	20:40	16°36.544'	061°55.014'	1075	Airgun in water
M154/1_14-1	13.4	Seismic Towed Receiver	04:33	16°38.956'	062°02.276'	1108	profile end
M154/1_14-1	13.4	Seismic Towed Receiver	04:57	16°39.295'	062°02.079'	1104	Airgun, on deck
M154/1_14-1	13.4	Seismic Towed Receiver	06:26	16°39.104'	062°00.498'	1107	Bb-Scherbrett, on deck
M154/1_14-1	13.4	Seismic Towed Receiver	06:43	16°39.101'	062°00.255'	1104	Stb-Scherbrett, on deck
M154/1_14-1	13.4	Seismic Towed Receiver	08:41	16°38.829'	061°59.419'	1109	streamer zu Wasser, information
M154/1_14-1	13.4	Seismic Towed Receiver	09:09	16°38.847'	061°58.810'	1066	Airgun in water
M154/1_14-1	13.4	Seismic Towed Receiver	12:19	16°41.646'	062°01.092'	1065	profile start
M154/1_14-1	14.4	Seismic Towed Receiver	14:06	16°36.678'	062°00.414'	1136	Airgun, on deck
M154/1_14-1	14.4	Seismic Towed Receiver	15:48	16°38.641'	061°59.019'	1102	Airgun in water
M154/1_14-1	15.4	Seismic Towed Receiver	15:28	16°43.394'	062°07.374'	645	profile end
M154/1_14-1	15.4	Seismic Towed	15:49	16°43.988'	062°07.276'	693	Airgun, on deck

		Receiver					
M154/1_14-1	15.4	Seismic Towed Receiver	16:08	16°44.166'	062°06.846'	811	Streamer, on deck
M154/1_14-1	15.4	Seismic Towed Receiver	19:37	16°37.469'	062°05.039'	1065	Bb-Scherbrett zu Wasser, information
M154/1_14-1	15.4	Seismic Towed Receiver	19:49	16°37.517'	062°04.873'	1071	Stb-Scherbrett zu Wasser, information
M154/1_15-1	16.4	Seismic Towed Receiver	00:03	16°38.237'	062°00.670'	1116	Streamer zu Wasser, information
M154/1_15-1	16.4	Seismic Towed Receiver	00:30	16°38.509'	062°00.031'	1111	Airgun in water
M154/1_15-1	16.4	Seismic Towed Receiver	00:58	16°38.008'	061°58.772'	977	profile start
M154/1_15-1	16.4	Seismic Towed Receiver	12:56	16°40.243'	062°01.681'	1086	Airgun, on deck
M154/1_15-1	16.4	Seismic Towed Receiver	13:50	16°40.870'	062°00.563'	1085	Airgun in water
M154/1_15-1	17.4	Seismic Towed Receiver	10:00	16°39.524'	062°01.002'	1106	Airgun an Deck, information
M154/1_15-1	17.4	Seismic Towed Receiver	10:27	16°39.232'	062°00.405'	1102	Stb-Scherbrett dichtgeholt, information
M154/1_15-1	17.4	Seismic Towed Receiver	11:39	16°38.696'	061°59.237'	1108	Stb-Scherbrett wieder ausgebracht, information
M154/1_16-1	17.4	Seismic Towed Receiver	13:32	16°37.559'	061°57.469'	652	Airgun in water
M154/1_16-1	17.4	Seismic Towed Receiver	16:25	16°38.951'	062°00.837'	1108	Airgun, on deck
M154/1_16-1	17.4	Seismic Towed Receiver	17:55	16°38.537'	061°58.763'	1015	Airgun in water
M154/1_16-1	18.4	Seismic Towed Receiver	02:54	16°36.616'	061°56.564'	769	profile end
M154/1_16-1	18.4	Seismic Towed Receiver	03:03	16°36.565'	061°56.365'	761	Airgun, on deck
M154/1_16-1	18.4	Seismic Towed Receiver	04:00	16°36.175'	061°55.074'	1131	Streamer, on deck
M154/1_16-1	18.4	Seismic Towed Receiver	05:52	16°35.617'	061°53.545'	1078	Bb-Scherbrett, on deck
M154/1_16-1	18.4	Seismic Towed Receiver	06:06	16°35.530'	061°53.361'	1056	Stb-Scherbrett, on deck
M154/1_16-1	18.4	Seismic Towed Receiver	06:56	16°35.297'	061°52.806'	996	2D, Airgun in water
M154/1_16-1	18.4	Seismic Towed Receiver	07:03	16°35.252'	061°52.704'	988	Streamer zu Wasser, information
M154/1_16-1	18.4	Seismic Towed Receiver	08:14	16°36.969'	061°54.691'	1021	profile start
M154/1_16-1	18.4	Seismic Towed Receiver	20:42	16°35.162'	062°08.729'	900	Streamer an Deck, information
M154/1_16-1	18.4	Seismic Towed Receiver	22:40	16°36.790'	062°02.316'	1132	profile end
M154/1_16-1	18.4	Seismic Towed Receiver	22:49	16°36.796'	062°02.160'	1134	Airgun an Deck, information
M154/1_16-1	18.4	Seismic Towed Receiver	23:08	16°36.863'	062°01.843'	1133	Stb Scherbrett zu Wasser, information
M154/1_16-1	18.4	Seismic Towed Receiver	23:20	16°36.918'	062°01.639'	1126	Bb Scherbrett zu Wasser, information
M154/1_16-1	19.4	Seismic Towed Receiver	00:41	16°37.191'	062°00.403'	1130	Streamer zu Wasser, information
M154/1_16-1	19.4	Seismic Towed Receiver	00:48	16°37.214'	062°00.335'	1129	Airgun in water
M154/1_17-1	19.4	Seismic Towed Receiver	06:00	16°39.640'	062°02.209'	1104	profile start
M154/1_17-1	20.4	Seismic Towed Receiver	18:17	16°38.570'	062°00.323'	1115	Unterbrechung, profile end

M154/1_17-1	20.4	Seismic Towed Receiver	18:38	16°38.923'	062°00.523'	1108	Airgun, on deck
M154/1_17-1	20.4	Seismic Towed Receiver	21:22	16°39.183'	061°58.421'	989	Airgun in water
M154/1_17-1	20.4	Seismic Towed Receiver	22:20	16°38.396'	062°00.092'	1118	Fortsetzung, profile start
M154/1_17-1	21.4	P-70 Parasound	17:13	16°37.518'	061°59.766'	1125	profile end
M154/1_18-1	22.4	Expendable Bathythermograph	19:14	16°36.170'	061°56.581'	851	in the water
M154/1_18-1	23.4	Deep-sea Multibeam Echosounder	18:11	16°39.883'	062°01.034'	1098	Unterbrechung, profile end
M154/1_18-1	23.4	Deep-sea Multibeam Echosounder	22:50	16°37.969'	061°59.780'	1119	Fortsetzung, profile start
M154/1_18-1	23.4	P-70 Parasound	22:50	16°37.966'	061°59.785'	1118	Fortsetzung, profile start
M154/1_18-1	23.4	Seismic Towed Receiver	16:40	16°39.694'	062°02.184'	1102	profile end
M154/1_18-1	23.4	Seismic Towed Receiver	17:02	16°40.249'	062°02.285'	1086	Airgun, on deck
M154/1_18-1	23.4	Seismic Towed Receiver	17:58	16°39.975'	062°01.256'	1090	Streamer, Datenkabel, on deck
M154/1_18-1	23.4	Seismic Towed Receiver	18:23	16°39.801'	062°00.844'	1098	Stb-Scherbrett, on deck
M154/1_18-1	23.4	Seismic Towed Receiver	18:32	16°39.752'	062°00.677'	1098	Bb-Scherbrett, on deck
M154/1_18-1	23.4	Seismic Ocean Bottom Receiver	19:00	16°39.808'	062°01.778'	1098	Hydrophon zu Wasser, information
M154/1_18-1	23.4	Seismic Ocean Bottom Receiver	19:01	16°39.801'	062°01.803'	1098	ausgelöst, information
M154/1_18-1	23.4	Seismic Ocean Bottom Receiver	19:05	16°39.776'	062°01.896'	1098	Hydrophon an Deck, information
M154/1_18-1	23.4	Seismic Ocean Bottom Receiver	19:26	16°40.000'	062°03.428'	1098	Hydrophon zu Wasser, information
M154/1_18-1	23.4	Seismic Ocean Bottom Receiver	19:37	16°39.950'	062°03.382'	1098	Hydrophon an Deck, information
M154/1_19-1	23.4	Seismic Ocean Bottom Receiver	19:47	16°39.849'	062°03.441'	1098	Hydrophon zu Wasser, information
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	20:01	16°39.717'	062°03.752'	1098	Hydrophon an Deck, information
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	20:09	16°39.777'	062°03.690'	1098	aufgetaucht, information
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	20:25	16°39.880'	062°03.226'	1098	on deck
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	20:28	16°39.846'	062°03.243'	1098	Hydrophon z/W, information
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	20:29	16°39.838'	062°03.252'	1098	ausgelöst, information
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	20:34	16°39.787'	062°03.340'	1098	Hydrophon a/D, information
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	20:57	16°39.594'	062°02.565'	1098	aufgetaucht, information
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	21:11	16°39.185'	062°02.032'	1098	angepickt, information
M154/1_20-1	23.4	Seismic Ocean Bottom Receiver	21:13	16°39.162'	062°02.036'	1098	on deck
M154/1_21-1	23.4	Seismic Ocean Bottom Receiver	21:13	16°39.161'	062°02.036'	1098	Hydrophon z/W, information
M154/1_21-1	23.4	Seismic Ocean Bottom Receiver	21:14	16°39.153'	062°02.042'	1098	ausgelöst, information
M154/1_21-1	23.4	Seismic Ocean Bottom Receiver	21:17	16°39.137'	062°02.067'	1098	Hydrophon a/D, information
M154/1_21-1	23.4	Seismic Ocean Bottom Receiver	21:30	16°38.968'	062°01.337'	1098	aufgetaucht, information
M154/1_21-1	23.4	Seismic Ocean Bottom	21:46	16°38.712'	062°00.791'	1098	angepickt, information

		Receiver					
M154/1_21-1	23.4	Seismic Ocean Bottom Receiver	21:48	16°38.693'	062°00.783'	1098	on deck
M154/1_22-1	23.4	Seismic Ocean Bottom Receiver	21:48	16°38.690'	062°00.784'	1098	Hydrophon z/W, information
M154/1_22-1	23.4	Seismic Ocean Bottom Receiver	21:50	16°38.680'	062°00.796'	1098	ausgelöst, information
M154/1_22-1	23.4	Seismic Ocean Bottom Receiver	21:54	16°38.656'	062°00.849'	1098	Hydrophon a/D, information
M154/1_22-1	23.4	Seismic Ocean Bottom Receiver	22:11	16°38.262'	061°59.942'	1098	gesichtet, information
M154/1_22-1	23.4	Seismic Ocean Bottom Receiver	22:23	16°38.076'	061°59.693'	1098	angepickt, information
M154/1_22-1	23.4	Seismic Ocean Bottom Receiver	22:26	16°38.051'	061°59.658'	1098	on deck
M154/1_23-1	24.4	Deep-sea Multibeam Echosounder	09:40	16°35.332'	061°54.331'	1158	Unterbrechung, profile end
M154/1_23-1	24.4	Deep-sea Multibeam Echosounder	15:58	16°38.224'	062°02.299'	1125	Fortsetzung, profile start
M154/1_23-1	24.4	P-70 Parasound	09:40	16°35.346'	061°54.337'	1158	Unterbrechung, profile end
M154/1_23-1	24.4	P-70 Parasound	15:57	16°38.224'	062°02.298'	1126	Fortsetzung, profile start
M154/1_23-1	24.4	Seismic Ocean Bottom Receiver	09:53	16°35.387'	061°54.656'	1162	Hydrophon z/W, information
M154/1_23-1	24.4	Seismic Ocean Bottom Receiver	09:55	16°35.352'	061°54.653'	1162	ausgelöst, information
M154/1_24-1	24.4	Seismic Ocean Bottom Receiver	09:58	16°35.315'	061°54.661'	1162	Hydrophon a/D, information
M154/1_24-1	24.4	Seismic Ocean Bottom Receiver	10:12	16°35.383'	061°54.658'	1162	gesichtet, information
M154/1_24-1	24.4	Seismic Ocean Bottom Receiver	10:25	16°35.368'	061°54.701'	1162	angepickt, information
M154/1_24-1	24.4	Seismic Ocean Bottom Receiver	10:27	16°35.361'	061°54.717'	1162	on deck
M154/1_24-1	24.4	Seismic Ocean Bottom Receiver	11:03	16°31.955'	061°56.703'	1162	Hydrophon z/W, information
M154/1_24-1	24.4	Seismic Ocean Bottom Receiver	11:04	16°31.940'	061°56.729'	1162	ausgelöst, information
M154/1_25-1	24.4	Seismic Ocean Bottom Receiver	11:10	16°31.869'	061°56.834'	1162	Hydrophon a/D, information
M154/1_25-1	24.4	Seismic Ocean Bottom Receiver	11:24	16°30.870'	061°57.180'	1162	gesichtet, information
M154/1_25-1	24.4	Seismic Ocean Bottom Receiver	11:31	16°30.898'	061°57.190'	1162	angepickt, information
M154/1_25-1	24.4	Seismic Ocean Bottom Receiver	11:33	16°30.885'	061°57.198'	1162	on deck
M154/1_25-1	24.4	Seismic Ocean Bottom Receiver	11:34	16°30.872'	061°57.210'	1162	Hydrophon z/W, information
M154/1_25-1	24.4	Seismic Ocean Bottom Receiver	11:35	16°30.867'	061°57.215'	1162	ausgelöst, information
M154/1_26-1	24.4	Seismic Ocean Bottom Receiver	11:38	16°30.848'	061°57.230'	1162	Hydrophon a/D, information
M154/1_26-1	24.4	Seismic Ocean Bottom Receiver	11:50	16°31.638'	061°57.744'	1162	gesichtet, information
M154/1_26-1	24.4	Seismic Ocean Bottom Receiver	12:14	16°32.749'	061°58.646'	1162	angepickt, on deck
M154/1_26-1	24.4	Seismic Ocean Bottom Receiver	12:14	16°32.749'	061°58.646'	1162	Hydrophon, in the water
M154/1_26-1	24.4	Seismic Ocean Bottom Receiver	12:15	16°32.747'	061°58.660'	1162	ausgelöst, information
M154/1_27-1	24.4	Seismic Ocean Bottom Receiver	12:32	16°33.793'	061°59.453'	1162	aufgetaucht, information
M154/1_27-1	24.4	Seismic Ocean Bottom Receiver	12:53	16°34.493'	061°59.873'	1162	on deck

M154/1_27-1	24.4	Seismic Ocean Bottom Receiver	12:53	16°34.493'	061°59.873'	1162	Hydrophon, in the water
M154/1_27-1	24.4	Seismic Ocean Bottom Receiver	12:53	16°34.488'	061°59.877'	1162	ausgelöst, information
M154/1_28-1	24.4	Seismic Ocean Bottom Receiver	13:10	16°35.286'	062°00.386'	1162	aufgetaucht, information
M154/1_28-1	24.4	Seismic Ocean Bottom Receiver	13:35	16°36.498'	062°01.189'	1162	on deck
M154/1_28-1	24.4	Seismic Ocean Bottom Receiver	13:35	16°36.498'	062°01.189'	1162	Hydrophon, in the water
M154/1_28-1	24.4	Seismic Ocean Bottom Receiver	13:35	16°36.498'	062°01.197'	1162	ausgelöst, information
M154/1_29-1	24.4	Seismic Ocean Bottom Receiver	13:51	16°37.556'	062°01.840'	1162	aufgetaucht, information
M154/1_29-1	24.4	Seismic Ocean Bottom Receiver	14:10	16°38.278'	062°02.287'	1121	on deck
M154/1_29-1	24.4	Sound Velocity Profiler	14:36	16°38.225'	062°02.297'	1121	in the water
M154/1_29-1	24.4	Sound Velocity Profiler	15:00	16°38.225'	062°02.298'	1121	SLmax = 1100m, max depth/on ground
M154/1_30-1	24.4	Sound Velocity Profiler	15:33	16°38.224'	062°02.298'	1122	on deck
M154/1_30-1	25.4	Deep-sea Multibeam Echosounder	02:28	16°33.728'	062°05.513'	954	profile end
M154/1_30-1	25.4	P-70 Parasound	02:27	16°33.728'	062°05.532'	952	profile end