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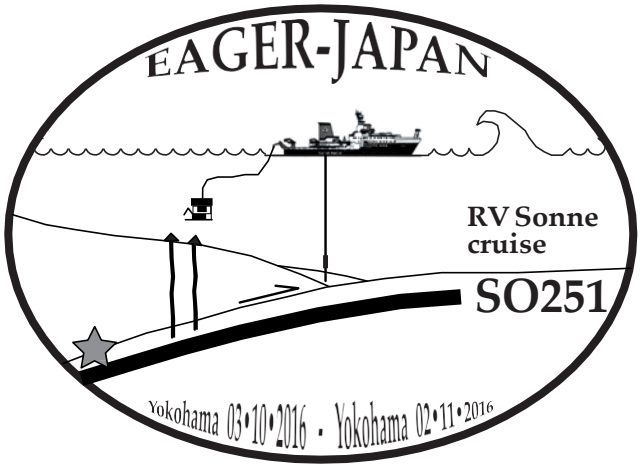
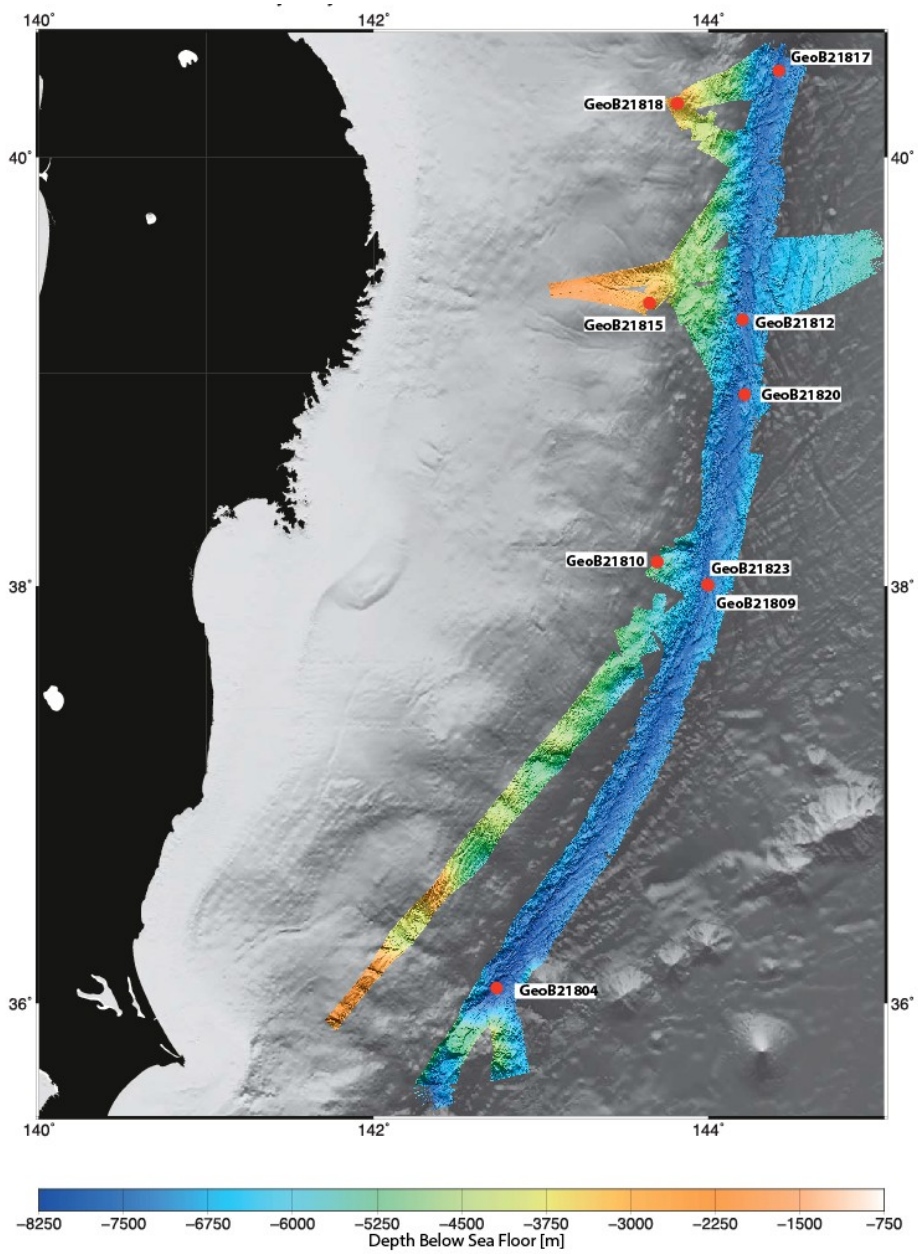
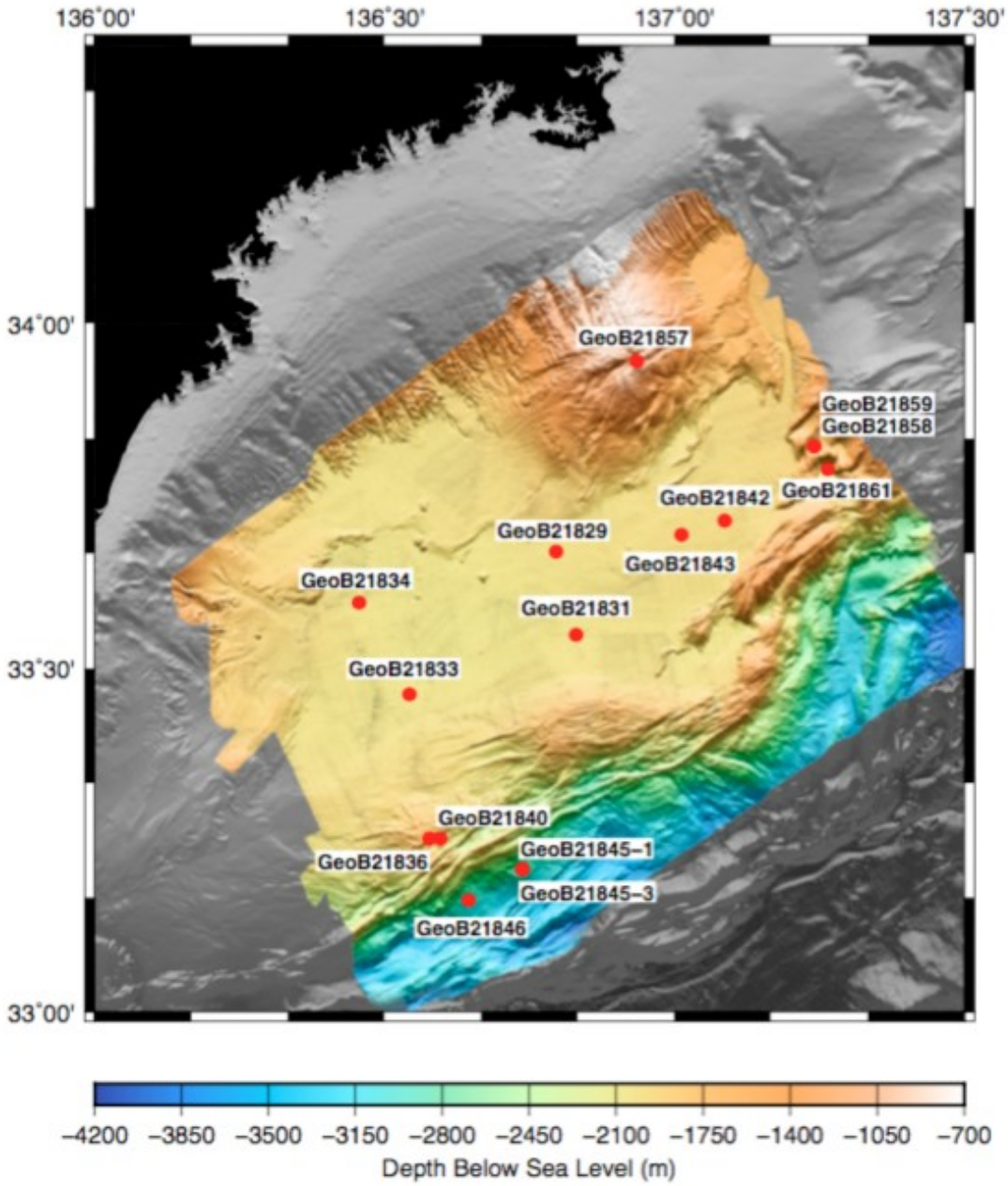
Short Cruise Report
RV Sonne cruises SO251 Leg 1 and Leg 2
Yokohama (Japan) – Yokohama (Japan)
02.10.2016 – 02.11.2016
Chief Scientists: M. Strasser (SO251-1), A. Kopf (SO251-2)
Captain: O. Meyer





Track chart of R/V SONNE Leg SO251-1 in the Japan Trench, including coring locations.



Track chart of R/V SONNE Leg SO251-2 in the Nankai Trough area, including coring locations.

Objectives

The overarching goal of RV Sonne cruise SO251 and subsequent post-cruise research is to investigate fluid- and sediment mobilisation processes by mud volcanism, earthquake-triggered seafloor displacement, submarine landslide and related “paleoseismologic event deposits” and to compare inferred earthquake processes and rates along accretionary vs. erosive subduction margins of Japan (Nankai Trough and Japan Trench, respectively).
The goals lie within four research categories, namely:

1. Deep Water coring in the Japan Trench and Nankai Trough to unravel paleoseismological records,

2. ROV dives to recover seafloor and sub-seafloor instruments in the Kumano Basin mud volcanoes,

3. Detailed high resolution seafloor surveys by ROV and accompanied coring on the continental slope and on mud volcanoes, and

4. Sedimentological and Geotechnical post-cruise analysis and integration of all data, including those from cores, waters, and long-term instruments.

The work program was divided into two parts: Leg 1 conducted mapping and coring along the deep Japan Trench and along the upper slope and forearc escarpment from 36°N to 40°N; and Leg 2 to the Kumano Basin in the Nankai Trough area to pick up instruments in the mud volcano field by ROV followed by further mapping, coring and detailed video surveying of seafloor in the Kumano Basin, the forearc high and the shallow splay fault area. Post-cruise science will be coordinated among the international science party (see section 2.1 above).

With SO251 we will establish a bathymetric and sedimentary inventory of mass-movements, chronology of extreme-event deposits and their paleoseismologic interpretation. It further will investigate geotechnical aspects of earthquake-triggered mass wasting processes to allow for quantitative interpretation and comparison of the established event catalogue. We also will illuminate the relationship between mud volcanic activity (mudflows, seepage, etc.) and local seismicity by using long-term data, time series samples and additional core/data from the cruise. Anticipated conceptual advance in our understanding of sediment dynamic processes related to subduction zone earthquakes are expected to be transformative and may well apply for other active convergent margins worldwide, not just Japan and the circum-Pacific region.

Narrative

Leg SO251-1, Yokohama - Yokohama, 04.10.2016 – 15.10.2016

By September 30, all 29 scientists of the SO251-A science party safely arrived in Yokohama, Japan, and embarked research vessel *Sonne* on Oct 1st. Unfortunately, our scientific equipment, which was shipped from Bremen by a carrier that declared insolvency while the containers were on their way to Yokohama, did not arrive. Nevertheless, and thanks to the great support by our Japanese colleagues from JAMSTEC, the Geological Surveys of Japan, and the University of Tokyo, that kindly provided coring and laboratory equipment for our research cruise on very short notice, we could start our voyage with nearly complete infrastructure and a delay of 2 ½ days to leave the harbor on Tuesday Oct. 4 at 15:00.

The working area of the first part of the SO251 expedition, the Japan Trench, was reached after a transit of 17h. After a first CTD Station and two short multibeam bathymetry and Parasound mapping surveys, we successfully retrieved a piston core (GeoB21804) from the deepest part of the Japan Trench in more than 8000m water depth. From Wednesday Oct 5 we conducted detailed mapping and coring along the trench axis from S-N to have arrived in the norther part of the study area by Sunday, Oct 9. Piston coring operation included successful recovery of two nearly 10m long cores from the very deep trench basins in the >7000km deep Japan Trench (GeoB21809 and GeoB21812). Furthermore, at stations GeoB21810 and GeoB21815, we have sampled two sections from the slope.

Starting late evening on Sunday Oct 9 and continuing into Monday Oct 10, we acquired a 175km long East-West bathymetric profile perpendicular to the margin at 39.3°N. Followed by detailed Multibeam and Parasound mapping along the trench axis to the North, we arrived at the northernmost station (GeoB21817) of our expedition on Tuesday, Oct 11 to take a 10m long core from the trench basin infill. At the same day, we also managed to obtain a double coring of the slope sediment in the northern part (GeoB21818). On Wednesday, Oct 12, R/V Sonne navigated back southwards, thereby filling small gaps in mapping to eventually succeed in acquiring a complete high-resolution bathymetric map of the trench axis and nearly 2000 km of subbottom Parasound profiles, covering the entire along-strike extent of the Japan Trench from 36° to 40.3° N. On our voyage back south there remained enough time to take two additional cores in the deep trench (GeoB21821 and GeoB21823). On early morning Oct 14, we finished operation of Leg SO251-A, and after the transit back to Yokohama, the first leg ended on Saturday October 15 at 8 o'clock in the morning.

Leg SO251-2, Yokohama - Yokohama, 18.10.2016 – 02.11.2016

RV Sonne was in Yokohama port from 15-18 October in order to load and mobilise the Heat flow probe as well as the remotely operated vehicle PHOCA of our colleagues from GEOMAR Kiel. Despite the delivery of ROV PHOCA on very short notice because of the stranded expedition equipment on vessels of a bankrupt shipping company, the harbour

test was successful. In Yokohama we also had visits from several groups from JAMSTEC and CDEX to see RV Sonne and discuss scientific strategies.

The SO251 science party was partly exchanged to meet the requirements in the second study area, the Nankai Trough subduction zone. On 18.10. at 8 o'clock, RV Sonne departed and reached the Kumano forearc basin later the same day. The scientific work started with heat flow measurements across a mud volcano and along a N-S profile across the Kumano Basin, which complements data from cruise SO222 in 2012. During the 3rd week of the expedition, we had three dives with ROV PHOCA on mud volcanoes where we had placed instruments in 2012. In the periods between diving, we carried out hydroacoustic surveys during which we found indications for fluid seepage on mud volcanoes and other topographic features. Cores were taken on a new mud volcano (termed MV#14), of the Kumano Basin fill, and other mud volcanoes. On Oct 23 we hit bad weather conditions and decided to head for Yokohama again where a Japanese coring technician had to depart.

When back in the study area again on Oct 24, the weather had improved and heat flow, geophysical surveys and ROV operations continued. The final week of SO251 started with the successful recovery of a MeBoPLUG observatory and T-stick (GeoB21853) as well as the recovery of the SmartPlug-piezometer. Since the geophysical acquisition allowed us to identify new, previously unknown sites of flare activity, we also converted the heat flow probe as coring device and from Oct 29 onwards then sampled the seafloor again on suspected mud volcano (MV) sites, an isolated pond, and the Nankai slope outboard of the splay fault.
On subsequent dives, we also recovered a second set of MeBoPLUG observatory and T-stick (GeoB21856) as well as the most precious observatory, a MeBoCORK-A by using a second wire. This final dive on Oct 31 terminated the observatory recoveries and shifted the focus towards coring and mapping again. All station work was very successful and the main goals of the cruise were reached. For tracks covered during leg SO251-2, refer to Figure 3.2.
On Nov 01 at appx. 14.30h we finally departed from the study area and steamed towards Yokohama a third and final time. RV Sonne met the pilot at 5 a.m. on Nov 02 and docked about 2.5 hrs later.

Acknowledgements

We want to thank Captain Oliver Meyer and the entire crew for their friendly and helpful collaborative approach, in particular when we had to improvise as a result of the missing equipment and containers.

We also want to thank our colleagues onshore and offshore in Japan, without whom we would have not been able to set up the seagoing equipment or laboratories on RV Sonne. The following institutions provided tremendous help with this: JAMSTEC, AORI, Geological Survey of Japan.

We further are grateful for the help by GEOMAR, Kiel, who mobilized both ROV PHOCA and the violin bow HF probe at very short notice in a very collaborative way.

A number of outreach activities, mainly three ship blogs, were published over the course of the cruise on three websites: MARUM Bremen, Univ. Innsbruck, and Planet Erde. We thank those who provided the shore based support and posted the news in the respective locations.

Last but not least, we acknowledge receipt of initial funding for this cruise from BMBF via grant 03G0251A, and the offer for additional financial help after the bankruptcy of the shipping company took its course and resulted in no equipment showing up on time for cruise SO251.

Participants

Leg SONNE251-1, Yokohama - Yokohama, 04.10.2016 – 15.10.2016

NAME	Discipline	Institution
STRASSER, Michael	Chief	UIBK / MARUM
BACHMANN, Anna	Scientist	MARUM
Katharina	Hydroacoustic	MARUM
DOS SANTOS FERREIRA,	s	MARUM
Christian FLEISCHMANN, Timo	Hydroacoustic	JAMSTEC
FUJIWARA, Toshiya	s Coring / Lab	GEOMAR
HILLMAN, Jess Irene	Hydroacoustic	MARUM
Tsahai HOEHNE, Mareike	s PhysProps	MARUM
IKARI, Matt	PhysProps	GSJ / AIST
IKEHARA, Ken	PhysProps	UIBK
JAEGER, Fabian	Sedimentolog	JAMSTEC
Dominik KANAMATSU,	y Coring / Lab	AORI / UIBK
KOELLING, Martin	Geochemistry	MARUM
LANGE, Karl	Hydroacoustic	MARUM
LUEBBEN, Neeske	s	MARUM
MCHUGH, Cecilia	Geochemistry	Queens Coll. /
Maria MOERNAUT,	Sedimentolog	Lamont UIBK
Jasper MOLENAAR,	y	UIBK
Ariana NAKANO,	Hydroacoustic	MWJ /
Yukihiko REX, Marie	s	JAMSTEC
ROESNER, Alexander	Sedimentolog	MARUM
SCHWESTERMANN,	y Coring	MARUM
Tobias	Lab	UIBK
SUN, Tianhaozhe	PhysProps /	PGS
SZCZUCINSKI,	Coring	University of
Witold TOECHTERLE,	Hydroacoustics	Poznan UIBK
Paul	Hydroacoustics	MARUM
TRUETNER,	Sedimentology	GSJ /
Sebastian USAMI,	Geochemistry	AIST

Leg SONNE251-2, Yokohama - Yokohama, 18.10.2016 – 02.11.2016

NAME	Discipline	Institution
KOPF, Achim	Chief	MARUM
ABEGG, Friedrich Werner	Scientist	GEOMAR
BACHMANN, Anna	ROV	MARUM
CUNO, Patrick	ROV	GEOMAR
DOS SANTOS FERREIRA,	Hydroacoustics	MARUM
Christian FLEISCHMANN, Timo	Coring/HF/Observatorie	MARUM
HATAKEYAMA, Ei	s Coring	MWJ /
HEESEMANN, Bernd	Heat	JAMSTEC
Reinhardt HOEHNE, Mareike	Flow	MARUM
HUUSMANN, Hannes	PhysProp	MARUM
JAEGER, Fabian Dominik	s ROV	GEOMAR
KANG, Min-Hua	Coring/Sedimentolog	UIBK
KAUL, Norbert	y ROV trainee	Taiwan
Emanuel KIOKA, Arata	Heat Flow	(ROC)
LANGE, Karl	Hydroacoustic	MARUM
LUEBBEN, Neeske	s	AORI / UIBK
MATTHIESSEN,	Hydroacoustic	MARUM
Torge MEIER, Arne	s	MARUM
MENAPACE, Walter	Geochemistry	GEOMAR
MOCHIZUKI, Kenta	ROV	GEOMAR
MOERNAUT, Jasper	Hydroacoustic	UIBK
MOLENAAR, Ariana	s	UIBK
Willemina MOORE, Gregory	Sedimentolog	Hawaii Univ.
Frank	y	Taiwan
MU, Ling-Ji	Hydroacoustic	(ROC)
PIEPER,	s ROV	GEOMAR
Martin	trainee ROV	MARUM
REX, Marie Luise Pia Alina	Heat Flow	MARUM
ROESNER, Alexander	Observatories /	UIBK

Participating Institutions /Liste der teilnehmenden Institutionen

AIST	National Institute of Advanced Industrial Science and Technology, Japan
AORI	Atmosphere and Ocean Research Institute, University of Tokyo, Japan
GEOMAR	Geomar, Kiel, Germany
GSJ	Geological Survey Japan
JAMSTEC	Japan Agency for Marine-Earth Science and Technology, Japan
Lamont	Lamont-Doherty Earth Observatory, Columbia University, USA
MARUM	Center for Environmental Sciences, University of Bremen, Germany
MWJ	Marine Works Japan
PGC	Pacific Geoscience Centra, Sidney, B.C., Canada
Queens Coll.	Queens College, City University of New Nork, USA
TORI	Taiwan Ocean Research institute, Kaohsiung, Taiwan
UIBK	University of Innsbruck, Austria
U-Poznan	University of Poznan, Poland
Yamaguchi	University of Yamaguchi, Japan
SOEST	SOEST, University of Hawaii, USA

Station lists / Stationslisten

See following pages

Station List (Coring Sites)

GeoB	Ships Station	Device	Bottom Contact Date Time	Latitude	Longitude	Depth (m)	Recovery	Comment
21804	SO251/1_4-1	PC	05/10/2016 07:38:28,000	36° 4,256' N	142° 44,045' E	8025	976	SL max 8053m No Posidonia
21809	SO251/1_10-1	PC	07/10/2016 08:31:15,000	38° 0,428' N 38° 0,409' N	143° 59,634' E 143° 59,636' E	7540,4	913	SL max 7573 m Posidonia SL1800m
21810-1	SO251/1_11-1	PC	07/10/2016 14:36:23,000	38° 6,788' N 38° 6,776' N	143° 41,662' E 143° 41,684' E	5216,6	462	SL max 5239m Posidonia SL50m
21810-3	SO251/1_12-1	PC	07/10/2016 18:54:01,000	38° 6,795' N 38° 6,777' N	143° 41,670' E 143° 41,673' E	5215,1	444	SLmax 5239m Posidonia SL50m
21812	SO251/1_14-1	PC	09/10/2016 00:07:30,000	39° 14,908' N 39° 14,897' N	144° 12,230' E 144° 12,189' E	7743,9	906	SL max 7499m Posidonia SL1600m
21815-1	SO251/1_18-1	PC	10/10/2016 06:40:42,000	39° 19,535' N 39° 19,575' N	143° 38,859' E 143° 38,874' E	3105,5	467	SLmax 3117m Posidonia SL50m
21815-3	SO251/1_19-1	PC	10/10/2016 10:18:45,000	39° 19,563' N 39° 19,606' N	143° 38,885' E 143° 38,894' E	3107,3	366	SLmax 3118m Posidonia SL50m
21817	SO251/1_21-1	PC	10/10/2016 23:58:58,000	40° 23,743' N 40° 23,743' N	144° 25,226' E 144° 25,226' E	7607,8	971	SL max 7632m Posidonia SL1700m
21818-1	SO251/1_23-1	PC	11/10/2016 07:19:39,000	40° 14,767' N 40° 14,789' N	143° 48,783' E 143° 48,807' E	3138,9	463	SLmax 3142m Posidonia SL50m
21818-3	SO251/1_25-1	PC	11/10/2016 10:56:10,000	40° 14,786' N 40° 14,784' N	143° 48,830' E 143° 48,820' E	3136,9	460	SLmax 3141m Posidonia SL50m
21821	SO251/1_27-1	PC	12/10/2016 15:07:04,000	38° 53,963' N	144° 12,972' E	7664	970	SLmax 7433m No Posidonia
21823	SO251/1_29-1	PC	13/10/2016 03:58:19,000	38° 0,180' N 38° 0,204' N	143° 59,972' E 143° 59,989' E	7555,6	878	SLmax 7577m Posidonia SL1800m
21829	SO251/2_34-1	PC	19/10/2016 11:24:46,000	33° 40,141' N 33° 40,159' N	136° 47,792' E 136° 47,802' E	2029,9	450	SL max 2032m Posidonia SL50m
21831	SO251/2_36-1	PC	19/10/2016 16:19:09,000	33° 32,904' N 33° 32,915' N	136° 49,878' E 136° 49,892' E	2038,2	408	SLmax 2042m Posidonia SL50m
21833	SO251/2_38-1	PC	20/10/2016 06:10:15,000	33° 27,739' N 33° 27,746' N	136° 32,604' E 136° 32,614' E	2055,5	430	SLmax 2059m Posidonia SL50m
21834	SO251/2_39-1	PC	20/10/2016 09:17:39,000	33° 35,725' N 33° 35,732' N	136° 27,406' E 136° 27,409' E	2043,2	417	SL: 2046m Posidonia SL50m

Station List (Coring Sites)

GeoB	Ships Station	Device	Bottom Contact Date Time	Latitude	Longitude	Depth (m)	Recovery	Comment
21836-2	SO251/2_42-1	PC/MTL	20/10/2016 15:43:25,000	33° 15,131' N	136° 35,820' E	1916,8	428	SLmax 1952m No Posidonia
21840	SO251/2_47-1	PC	21/10/2016 22:46:14,000	33° 15,136' N 33° 15,148' N	136° 34,663' E 136° 34,743' E	1818,8	457	SL: 1868m Posidonia SL50m
21842	SO251/2_49-1	PC/MTL	22/10/2016 12:26:24,000	33° 42,853' N 33° 42,850' N	137° 5,225' E 137° 5,232' E	1829,2	95	SL max 1828 m Posidonia SL50m
21843	SO251/2_50-1	PC/MTL	22/10/2016 16:04:54,000	33° 41,621' N 33° 41,625' N	137° 0,738' E 137° 0,753' E	1985	460	SLmax 1989m Posidonia SL50m
21845-1	SO251/2_52-1	PC	23/10/2016 00:37:01,000	33° 12,488' N 33° 12,512' N	136° 44,350' E 136° 44,368' E	2863,4	449	SL max 2894 m Posidonia SL50m
21845-3	SO251/2_52-2	PC	23/10/2016 03:48:48,000	33° 12,418' N 33° 12,454' N	136° 44,265' E 136° 44,357' E	2863,5	444	SLmax 2893m Posidonia SL50m
21846	SO251/2_53-1	PC	23/10/2016 06:51:03,000	33° 9,760' N 33° 9,773' N	136° 38,716' E 136° 38,790' E	2882,3	454	SLmax 2916m Posidonia SL50m
21857-2	SO251/2_64-1	HF / GC	30/10/2016 00:10:43,000	33° 56,694' N 33° 56,688' N	136° 56,120' E 136° 56,128' E	740,2	0	SLmax 757 m Posidonia SL50m
21858-2	SO251/2_65-1	HF / GC	30/10/2016 02:53:02,000	33° 49,296' N 33° 49,298' N	137° 1,450' E 137° 1,442' E	1918,4	258	SL max 1945m Posidonia SL50m
21860-2	SO251/2_67-1	HF / GC	30/10/2016 07:56:10,000	33° 40,679' N 33° 40,675' N	136° 55,133' E 136° 55,129' E	2001,2		SLmax: 2026m Posidonia SL50m
21861-2	SO251/2_68-1	HF / GC	30/10/2016 11:32:18,000	33° 47,323' N 33° 47,382' N	137° 15,883' E 137° 16,097' E	2160,9	81	SL max 2188m Posidonia SL50m
21864-2	SO251/2_71-1	HF / GC	31/10/2016 09:38:36,000	33° 46,624' N 33° 46,623' N	136° 29,078' E 136° 29,075' E	2034,6	171	BOKO, SLmax: 2058m Posidonia SL50m
21866-2	SO251/2_73-1	HF / GC	31/10/2016 23:30:20,000	33° 9,731' N 33° 9,732' N	136° 38,805' E 136° 38,805' E	2890,8	281	SLmax 2935m Posidonia SL50m

Station List (hydroacoustic profiles, ROV, HF, and CTD)

GeoB	Station	Device	Date Time	Latitude	Longitude	Depth (m)	Comment	Action
21801	SO251/1_1-1	CTD	04/10/2016 21:00:02,000	35° 35,997' N	142° 21,712' E	7448,6		station start
	SO251/1_1-1	CTD	04/10/2016 22:03:21,000	35° 36,230' N	142° 23,752' E	7265,8	SL max 2000m	max depth
	SO251/1_1-1	CTD	04/10/2016 22:46:00,000	35° 36,675' N	142° 25,054' E	6990,1		station end
21801-2	SO251/1_1-2	CTD	04/10/2016 21:32:35,000	35° 35,930' N	142° 22,721' E	7377,5		Station start
	SO251/1_1-2	CTD/XSV	04/10/2016 21:43:24,000	35° 35,974' N	142° 23,052' E	7344	SL max 1200m	station end
21802	SO251/1_2-1	EM122	04/10/2016 23:41:11,000	35° 35,503' N	142° 20,987' E	7960,7		station start
	SO251/1_2-1	EM122	05/10/2016 01:15:07,000	35° 43,872' N	142° 26,548' E	6640,4		station end
21803	SO251/1_3-1	EM122	05/10/2016 02:49:03,000	36° 2,800' N	142° 42,894' E	7976,3		station start
	SO251/1_3-1	EM122	05/10/2016 03:52:11,000	36° 8,043' N	142° 47,292' E	7912,3		station end
21805	SO251/1_5-1	EM122	05/10/2016 11:01:24,000	36° 2,848' N	142° 46,739' E	7775,6		station start
	SO251/1_5-1	EM122	05/10/2016 13:00:00,000	36° 3,325' N	142° 45,798' E	7902,4		station end
21806	SO251/1_6-1	EM122	06/10/2016 04:55:35,000	36° 4,109' N	142° 44,092' E	8030,7		station start
	SO251/1_6-1	EM122	06/10/2016 23:24:41,000	38° 0,441' N	144° 0,273' E	0		station end
21807	SO251/1_7-1	CTD	06/10/2016 23:30:22,000	38° 0,444' N	144° 0,276' E	7562,6		station start
	SO251/1_7-1	CTD	07/10/2016 00:34:30,000	38° 0,449' N	144° 0,271' E	0	SL max 2000m	max depth
	SO251/1_7-1	CTD	07/10/2016 01:14:24,000	38° 0,407' N	144° 0,182' E	7552,8		station end
21808	SO251/1_9-1	EM122	07/10/2016 02:12:44,000	38° 4,635' N	143° 52,575' E	6825,4		station start
	SO251/1_9-1	EM122	07/10/2016 04:08:37,000	38° 2,997' N	144° 7,125' E	6858,5		station end
21811	SO251/1_13-1	EM122	07/10/2016 22:11:02,000	38° 10,601' N	144° 0,091' E	7461,5		station start
	SO251/1_13-1	EM122	08/10/2016 19:35:40,000	39° 20,294' N	144° 15,393' E	7424,7		station end
21813	SO251/1_15-1	CTD	09/10/2016 02:49:42,000	39° 14,409' N	144° 9,629' E	6938,3		station start
	SO251/1_16-1	CTD	09/10/2016 04:41:09,000	39° 15,335' N	144° 8,570' E	6705,9		station end
21814	SO251/1_17-1	EM122	09/10/2016 08:23:04,000	39° 34,651' N	144° 56,122' E	5680,3		station start
	SO251/1_17-1	EM122	10/10/2016 02:42:09,000	39° 23,291' N	143° 3,018' E	1897,2		station end
21816	SO251/1_20-1	EM122	10/10/2016 15:31:08,000	39° 58,541' N	144° 17,969' E	7508,1		station start
	SO251/1_22-1	EM122	11/10/2016 03:22:51,000	40° 24,350' N	144° 23,135' E	7262,5		station end
21819	SO251/1_24-1	CTD/XSV	11/10/2016 08:57:48,000	40° 15,345' N	143° 50,124' E	3163,9	XVS	information
	SO251/1_24-1	CTD/XSV	11/10/2016 08:58:19,000	40° 15,323' N	143° 50,171' E	3167,2		in the water
	SO251/1_24-1	CTD/XSV	11/10/2016 09:05:46,000	40° 15,042' N	143° 50,239' E	3180,4	SL max 1500m	deployed
21820	SO251/1_26-1	EM122	11/10/2016 12:33:36,000	40° 16,419' N	143° 47,375' E	2999,5		station start
	SO251/1_26-1	EM122	12/10/2016 11:32:59,000	38° 53,584' N	144° 11,908' E	7302,6		station end
21822	SO251/1_28-1	EM122	12/10/2016 18:33:40,000	38° 50,266' N	144° 19,757' E	6720		station start
	SO251/1_28-1	EM122	13/10/2016 01:08:14,000	38° 0,086' N	144° 0,931' E	7406,9		station end
21824;21825	SO251/1_30-1	EM122	13/10/2016 07:50:43,000	37° 42,129' N	143° 54,419' E	7420,4		station start
	SO251/1_30-1	EM122	13/10/2016 15:45:51,000	37° 39,108' N	143° 31,179' E	5239,3		station end

Station List (hydroacoustic profiles, ROV, HF, and CTD)

GeoB	Station	Device	Date Time	Latitude	Longitude	Depth (m)	Comment	Action
21826	SO251/2_31-1	HF	18/10/2016 14:00:55,000	33° 46,724' N	136° 54,755' E	1919,2	HF_1650	station start
	SO251/2_31-1	HF	18/10/2016 14:47:08,000	33° 46,721' N	136° 54,832' E	1917,8	WP1;GeoB16784-1	max depth
				33° 46,722' N	136° 54,858' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 15:29:26,000	33° 46,501' N	136° 54,828' E	1929,5	WP2;GeoB16784-2	max depth
				33° 46,529' N	136° 54,868' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 16:09:12,000	33° 46,352' N	136° 54,825' E	1936,8	WP3;GeoB16784-3	max depth
				33° 46,364' N	136° 54,859' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 16:48:34,000	33° 46,197' N	136° 54,842' E	1927,6	WP4;GeoB16784-4	max depth
				33° 46,212' N	136° 54,883' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 17:23:23,000	33° 46,119' N	136° 54,835' E	1882,2	WP5;GeoB16784-5	max depth
				33° 46,123' N	136° 54,868' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 17:51:53,000	33° 46,078' N	136° 54,839' E	1886,3	WP6;GeoB16784-6	max depth
				33° 46,083' N	136° 54,861' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 18:35:48,000	33° 45,909' N	136° 54,845' E	1930,5	WP7;GeoB16784-7	max depth
				33° 45,912' N	136° 54,868' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 19:42:02,000	33° 45,398' N	136° 54,913' E	2015,7	WP8;GeoB16784-8	max depth
				33° 45,405' N	136° 54,929' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 20:48:47,000	33° 44,855' N	136° 54,936' E	2015,5	WP9;GeoB16784-9	max depth
				33° 44,862' N	136° 54,957' E			Posidonia SL100m
	SO251/2_31-1	HF	18/10/2016 22:00:05,000	33° 44,854' N	136° 54,944' E	2017,1		station end
21827	SO251/2_32-1	CTD	18/10/2016 22:04:25,000	33° 44,855' N	136° 54,945' E	2016,6		station start
	SO251/2_32-1	CTD	18/10/2016 23:46:07,000	33° 44,860' N	136° 54,942' E	2011,5		station end
21828-1	SO251/2_33-1	MOOR	19/10/2016 00:35:15,000	33° 39,786' N	136° 55,447' E	2005,9	MV#2	station start
	SO251/2_33-1	MOOR	19/10/2016 00:36:53,000	33° 39,788' N	136° 55,449' E	2006,8	Hydrophone z/W	information
	SO251/2_33-1	MOOR	19/10/2016 01:04:54,000	33° 39,786' N	136° 55,445' E	0	CAT release failed	information
21828-2;21828-3	SO251/2_33-2	ROV	19/10/2016 01:29:46,000	33° 40,554' N	136° 55,290' E	1991,5		station start
	SO251/2_33-2	ROV	19/10/2016 09:34:34,000	33° 40,608' N	136° 55,299' E	1994,5		station end
							CAT Recovery failed, T-Stick NE-SW transect	
21830	SO251/2_35-1	EM122	19/10/2016 12:22:45,000	33° 40,147' N	136° 47,793' E	2029,5		station start
	SO251/2_35-1	EM122	19/10/2016 14:39:58,000	33° 28,450' N	136° 51,072' E	1922,3		station end

Station List (hydroacoustic profiles, ROV, HF, and CTD)

GeoB	Station	Device	Date Time	Latitude	Longitude	Depth (m)	Comment	Action
21832	SO251/2_37-1	HF	19/10/2016 17:54:24,000	33° 29,871' N	136° 49,392' E	2014	HF_1651	station start
	SO251/2_37-1	HF	19/10/2016 18:44:41,000	33° 29,931' N	136° 49,286' E	2013,5	WP1	max depth
				33° 29,931' N	136° 49,301' E			Posidonia SL100m
	SO251/2_37-1	HF	19/10/2016 19:48:35,000	33° 30,356' N	136° 48,894' E	2020,1	WP2	max depth
				33° 30,354' N	136° 48,911' E			Posidonia SL100m
	SO251/2_37-1	HF	19/10/2016 20:58:55,000	33° 30,790' N	136° 48,503' E	2027,1	WP3	max depth
				33° 30,785' N	136° 48,520' E			Posidonia SL100m
	SO251/2_37-1	HF	19/10/2016 22:05:34,000	33° 31,226' N	136° 48,121' E	2034,6	WP4	max depth
				33° 31,217' N	136° 48,134' E			Posidonia SL100m
	SO251/2_37-1	HF	19/10/2016 23:09:18,000	33° 31,649' N	136° 47,723' E	2039,8	WP5	max depth
				33° 31,647' N	136° 47,738' E			Posidonia SL100m
	SO251/2_37-1	HF	20/10/2016 00:21:20,000	33° 32,089' N	136° 47,340' E	2040,2	WP6	max depth
				33° 32,086' N	136° 47,353' E			Posidonia SL100m
	SO251/2_37-1	HF	20/10/2016 02:30:47,000	33° 32,525' N	136° 46,963' E	2042,6	WP7	max depth
				33° 32,525' N	136° 46,962' E			Posidonia SL100m
	SO251/2_37-1	HF	20/10/2016 03:34:01,000	33° 32,517' N	136° 46,955' E	2041,1		station end
21835	SO251/2_40-1	EM122	20/10/2016 11:16:50,000	33° 27,089' N	136° 31,819' E	2056,2		station start
	SO251/2_40-1	EM122	20/10/2016 12:56:12,000	33° 14,893' N	136° 36,457' E	2024		station end
21837	SO251/2_43-1	EM122	20/10/2016 17:15:09,000	33° 15,030' N	136° 35,672' E	1984,7		station start
	SO251/2_43-1	EM122	21/10/2016 00:25:51,000	33° 38,083' N	136° 40,199' E	1948		station end
21838	SO251/2_44-1	ROV	21/10/2016 00:30:39,000	33° 38,084' N	136° 40,195' E	1948,1	MV#3	station start
	SO251/2_44-1	ROV	21/10/2016 01:49:55,000	33° 38,081' N	136° 40,209' E	1946	BOSI	max depth
	SO251/2_44-1	ROV	21/10/2016 09:40:04,000	33° 38,024' N	136° 40,280' E	1940,3		station end
21839	SO251/2_45-1	EM122	21/10/2016 11:11:10,000	33° 24,460' N	136° 35,017' E	1986,8		station start
	SO251/2_45-1	EM122	21/10/2016 16:13:34,000	33° 22,645' N	136° 42,284' E	2101,8		station end
21839-2	SO251/2_46-1	EM122	21/10/2016 16:51:25,000	33° 16,418' N	136° 41,838' E	2311,5	Profil Beginn rwK 150°, d 9,35nm	station start
	SO251/2_46-1	EM122	21/10/2016 20:46:31,000	33° 15,244' N	136° 35,005' E	1876		station end
21841	SO251/2_48-1	ROV	22/10/2016 02:26:46,000	33° 39,332' N	136° 38,124' E	1986,9		station start
	SO251/2_48-1	ROV	22/10/2016 08:52:21,000	33° 39,369' N	136° 38,045' E	1971,2		station end
21844	SO251/2_51-1	EM122	22/10/2016 17:20:38,000	33° 41,624' N	137° 0,754' E	1987,1	Beginn Profil, rwK 200°, d 2,54nm	station start
	SO251/2_51-1	EM122	22/10/2016 22:26:16,000	33° 12,557' N	136° 44,427' E	2858,2		station end
21847	SO251/2_54-1	EM122	24/10/2016 10:26:03,000	34° 0,652' N	137° 10,474' E	1822,7		station start
	SO251/2_54-1	EM122	25/10/2016 03:09:53,000	33° 42,490' N	137° 4,342' E	1982		station end

Station List (hydroacoustic profiles, ROV, HF, and CTD)

GeoB	Station	Device	Date Time	Latitude	Longitude	Depth (m)	Comment	Action
21848	SO251/2_55-1	HF	25/10/2016 03:39:06,000	33° 43,103' N	137° 5,955' E	1959,2	HF_1652	station start
	SO251/2_55-1	HF	25/10/2016 04:31:12,000	33° 43,256' N	137° 6,209' E	1966,3	WP1	max depth
				33° 43,253' N	137° 6,208' E			Posidonia SL100m
	SO251/2_55-1	HF	25/10/2016 05:15:30,000	33° 43,135' N	137° 5,920' E	1958,6	WP2	max depth
				33° 43,152' N	137° 5,931' E			Posidonia SL100m
	SO251/2_55-1	HF	25/10/2016 07:26:31,000	33° 42,516' N	137° 4,495' E	1981,8	WP3	max depth
				33° 42,532' N	137° 4,488' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 08:12:26,000	33° 42,670' N	137° 4,791' E	1981,8	WP4	max depth
				33° 42,677' N	137° 4,78' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 08:58:23,000	33° 42,771' N	137° 5,037' E	1904,2	WP5	max depth
				33° 42,781' N	137° 5,014' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 09:29:14,000	33° 42,822' N	137° 5,157' E	1836	WP6	max depth
				33° 42,820' N	137° 5,129' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 10:02:02,000	33° 42,849' N	137° 5,236' E	1825	WP7	max depth
				33° 42,860' N	137° 5,219' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 10:36:19,000	33° 42,875' N	137° 5,295' E	1824,9	WP8	max depth
				33° 42,885' N	137° 5,278' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 11:17:53,000	33° 42,900' N	137° 5,361' E	1846	WP9	max depth
				33° 42,906' N	137° 5,353' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 11:50:20,000	33° 42,940' N	137° 5,457' E	1905,6	WP10	max depth
				33° 42,948' N	137° 5,443' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 11:55:09,000	33° 42,942' N	137° 5,456' E	1902,9	WP11	max depth
				33° 42,948' N	137° 5,443' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 12:48:28,000	33° 43,009' N	137° 5,641' E	1932,6	WP12	max depth
				33° 42,989' N	137° 5,642' E			Posidonia SL100m
	SO251/2_55-1	HF	25.10.2016 13:50:02,000	33° 43,006' N	137° 5,641' E	1932,2		station end
21849	SO251/2_56-1	EM122	25.10.2016 14:11:02,000	33° 40,815' N	137° 3,505' E	1988		station start
	SO251/2_56-1	EM122	25.10.2016 23:44:47,000	33° 43,163' N	137° 10,003' E	1949,1		station end
21850	SO251/2_57-1	ROV	26.10.2016 02:06:30,000	33° 39,314' N	136° 38,025' E	1979	MV #4	station start
	SO251/2_57-1	ROV	26.10.2016 09:17:18,000	33° 39,542' N	136° 38,087' E	0	Obs. Recovered	information
	SO251/2_57-1	ROV	26.10.2016 11:06:15,000	33° 39,561' N	136° 38,080' E	2049,8		station end

Station List (hydroacoustic profiles, ROV, HF, and CTD)

GeoB	Station	Device	Date Time	Latitude	Longitude	Depth (m)	Comment	Action
21851	SO251/2_58-1	EM122	26.10.2016 11:16:59,000	33° 39,351' N	136° 38,357' E	2054,1		station start
	SO251/2_58-1	EM122	26.10.2016 22:38:06,000	33° 38,831' N	136° 37,594' E	2056,9		station end
21852	SO251/2_59-1	HF	27.10.2016 00:28:27,000	33° 39,485' N	136° 55,298' E	2006	HF_1653	station start
	SO251/2_59-1	HF	27.10.2016 01:20:13,000	33° 39,515' N	136° 55,265' E	2005,7	WP1	max depth
				33° 39,515' N	136° 55,266' E			Posidonia SL100m
	SO251/2_59-1	HF	27.10.2016 02:36:28,000	33° 40,075' N	136° 55,233' E	2009,3	WP2	max depth
				33° 40,070' N	136° 55,241' E			Posidonia SL100m
	SO251/2_59-1	HF	27.10.2016 03:23:24,000	33° 40,231' N	136° 55,235' E	2007,6	WP3	max depth
				33° 40,22' N	136° 55,237' E			Posidonia SL100m
	SO251/2_59-1	HF	27.10.2016 04:07:44,000	33° 40,362' N	136° 55,251' E	1999,8	WP4	max depth
				33° 40,372' N	136° 55,250' E			Posidonia SL100m
	SO251/2_59-1	HF	27.10.2016 04:49:59,000	33° 40,481' N	136° 55,233' E	1994,3	WP5	max depth
				33° 40,480' N	136° 55,236' E			Posidonia SL100m
	SO251/2_59-1	HF	27.10.2016 05:32:50,000	33° 40,591' N	136° 55,224' E	1992,5	WP6	max depth
				33° 40,590' N	136° 55,228' E			Posidonia SL100m
	SO251/2_59-1	HF	27.10.2016 06:07:58,000	33° 40,645' N	136° 55,216' E	1995	WP7	max depth
				33° 40,837' N	136° 55,229' E			Posidonia SL100m
	SO251/2_59-1	HF	27.10.2016 06:47:18,000	33° 40,756' N	136° 55,195' E	2003,4	WP8	max depth
				33° 40,754' N	136° 55,202' E			Posidonia SL100m
	SO251/2_59-1	HF	27.10.2016 08:00:00,000	33° 40,787' N	136° 55,213' E	2005		station end
21853	SO251/2_60-1	ROV	27.10.2016 09:28:01,000	33° 38,022' N	136° 40,270' E	1942,8	MV#3; MeBo Plug #1 and T-Stick Rec.	station start
	SO251/2_60-1	ROV	27.10.2016 12:15:53,000	33° 38,061' N	136° 40,258' E	1941,5	Borehole sealed	information
	SO251/2_60-1	ROV	27.10.2016 13:47:40,000	33° 38,056' N	136° 40,266' E	1941,5		station end
21854	SO251/2_61-1	EM122	27.10.2016 13:51:32,000	33° 38,037' N	136° 40,296' E	1940,9		station start
	SO251/2_61-1	EM122	27.10.2016 23:00:04,000	33° 39,077' N	136° 37,807' E	2059,2		station end
21855	SO251/2_62-1	ROV	27.10.2016 23:20:58,000	33° 39,342' N	136° 38,037' E	1968,1	MV # 4	station start
	SO251/2_62-1	ROV	28.10.2016 03:57:26,000	33° 39,420' N	136° 38,054' E	0	Smartplug Recovered	information
	SO251/2_62-1	ROV	28.10.2016 09:08:43,000	33° 39,334' N	136° 38,319' E	2053,1		station end
21856	SO251/2_63-1	EM122	28.10.2016 09:09:03,000	33° 39,333' N	136° 38,325' E	2050,9		station start
	SO251/2_63-1	EM122	29/10/2016 23:49:46,000	33° 56,693' N	136° 56,103' E	737,5		station end
21857-1	SO251/2_64-1	HF/GC	29/10/2016 23:50:08,000	33° 56,694' N	136° 56,102' E	739,2		station start
	SO251/2_64-1	HF/GC	30/10/2016 00:10:43,000	33° 56,694' N	136° 56,120' E	740,2		max depth
				33° 56,688' N	136° 56,128' E			Posidonia SL50m
	SO251/2_64-1	HF/GC	30/10/2016 00:50:57,000	33° 56,701' N	136° 56,087' E	730,8		station end

Station List (hydroacoustic profiles, ROV, HF, and CTD)

GeoB	Station	Device	Date Time	Latitude	Longitude	Depth (m)	Comment	Action
21858-1	SO251/2_65-1	HF/GC	30/10/2016 02:08:23,000	33° 49,303' N	137° 1,431' E	1920,9		station start
	SO251/2_65-1	HF/GC	30/10/2016 02:53:02,000	33° 49,296' N	137° 1,450' E	1918,4		max depth
				33° 49,298' N	137° 1,442' E			Posidonia SL50m
	SO251/2_65-1	HF/GC	30/10/2016 04:01:38,000	33° 49,296' N	137° 1,445' E	1914,8		station end
21859	SO251/2_66-1	EM122	30/10/2016 05:02:33,000	33° 41,282' N	136° 56,004' E	2001,5		station start
	SO251/2_66-1	EM122	30/10/2016 06:42:07,000	33° 40,529' N	136° 56,102' E	2005,7		station end
21860-1	SO251/2_67-1	HF/GC	30/10/2016 07:10:23,000	33° 40,668' N	136° 55,128' E	1998,7		station start
	SO251/2_67-1	HF/GC	30/10/2016 07:56:10,000	33° 40,679' N	136° 55,133' E	2001,2		max depth
				33° 40,675' N	136° 55,129' E			Posidonia SL50m
	SO251/2_67-1	HF/GC	30/10/2016 09:00:01,000	33° 40,663' N	136° 55,135' E	2001,3		station end
21861-1	SO251/2_68-1	HF/GC	30/10/2016 10:46:14,000	33° 47,310' N	137° 15,845' E	2160,5		station start
	SO251/2_68-1	HF/GC	30/10/2016 11:32:18,000	33° 47,323' N	137° 15,883' E	2160,9		max depth
				33° 47,382' N	137° 16,097' E			Posidonia SL50m
	SO251/2_68-1	HF/GC	30/10/2016 12:36:54,000	33° 47,307' N	137° 15,871' E	2157,2		station end
21862	SO251/2_69-1	EM122	30/10/2016 12:37:08,000	33° 47,307' N	137° 15,870' E	2159,2		station start
	SO251/2_69-1	EM122	30/10/2016 23:00:07,000	33° 39,187' N	136° 38,005' E	2061,9		station end
21863	SO251/2_70-1	ROV	30/10/2016 23:00:24,000	33° 39,207' N	136° 38,002' E	2041,2		station start
	SO251/2_70-1	ROV	31/10/2016 04:33:37,000	33° 39,382' N	136° 38,034' E	0	MeBo Plug #2 Rec.	information
	SO251/2_70-1	ROV	31/10/2016 07:43:49,000	33° 39,377' N	136° 38,041' E	0		station end
21864-1	SO251/2_71-1	HF/GC	31/10/2016 08:53:11,000	33° 46,600' N	136° 29,051' E	2034,7		station start
	SO251/2_71-1	HF/GC	31/10/2016 09:38:36,000	33° 46,624' N	136° 29,078' E	2034,6		max depth
				33° 46,420' N	136° 29,038' E			
	SO251/2_71-1	HF/GC	31/10/2016 10:44:35,000	33° 46,322' N	136° 29,038' E	2038		station end
21865	SO251/2_72-1	EM122	31/10/2016 10:45:12,000	33° 46,323' N	136° 29,042' E	2038,2		station start
	SO251/2_72-1	EM122	31/10/2016 22:09:24,000	33° 9,809' N	136° 38,912' E	2889,8		station end
21866-1	SO251/2_73-1	HF/GC	31/10/2016 22:30:10,000	33° 9,754' N	136° 38,839' E	2888,8		station start
	SO251/2_73-1	HF/GC	31/10/2016 23:30:20,000	33° 9,731' N	136° 38,805' E	2890,8		max depth
				33° 9,732' N	136° 38,805' E			
	SO251/2_73-1	HF/GC	01/11/2016 00:49:59,000	33° 9,507' N	136° 39,311' E	2957,4		station end
21867	SO251/2_74-1	EM122	01/11/2016 01:14:16,000	33° 10,456' N	136° 38,550' E	2789,3		station start
	SO251/2_74-1	EM122	01/11/2016 05:40:25,000	33° 34,626' N	137° 30,138' E	3896,1		station end