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Short Cruise Report RV Sonne-Cruise SO310

Wellington - Wellington 20.02.2025 – 22.03.2025 Chief Scientist: Prof. Dr. Sebastian Krastel Captain: Tilo Birnbaum





Fig 1: Track chart of Cruise SO310 (Wellington – Wellington). Yellow dots are OBS locations. Red triangles show coring locations

Objectives

Submarine canyons incise active and passive continental margins around the world. They are highly dynamic submarine systems forming complex seafloor structures. Turbidity currents and mass wasting are dominant processes in formation of canyon topography. Canyon head and flank failures often progress upslope forming retrogressive terraces. Usually being located close to populated areas, such failures in canyons do have a hazard potential to settlement and submarine installations. Canyons have been investigated in active and passive margin settings but direct comparisons based on field data are rare. RV SONNE Expedition SO310 aimed in comparing canyon systems from a passive and an active margin off New Zealand (Palliser and Pegasus Canyon). We will develop frequency-volume relationships of landslides in canyons with special focus on systematic differences between active and passive margin settings. In addition, we will investigate factors controlling the size and location of failures including topographic amplification effects of canyons for earthquake waves. The integrated analysis of the data shall lead to an improved assessment of hazards and risks related to sediment failures in canyons at active and passive margins.

Available data sets (high-resolution bathymetry, seismic profiles, geological samples) show gaps in the existing database and relatively low resolution for seismic profiles. For this reason, additional 2D and 3D reflection seismic measurements were carried out during the SO310 cruise, oceanbottom seismometers were deployed, and geological samples were taken at selected locations for geotechnical investigations.

Narrative

The scientific team of Cruise SO310 boarded SONNE in Wellington on the morning of 19 February. Parts of the scientific team supported activities onboard during the two preceding days including an event of the German Embassy. The German Embassy hosted a 'Climate Talks' event on the evening of 17 February, followed by a reception to highlight the close cooperation between New Zealand and Germany in marine sciences. In addition to the 'Climate Talks', numerous groups (students, diplomats, journalists) were given a tour of the ship.

The scientific crew embarking in Wellington consisted of 12 scientists from Kiel University, 10 scientists from GEOMAR - Helmholtz Centre for Ocean Research Kiel, 3 scientists from NIWA (Wellington, NZ), 2 scientists from GNS Science (Lower Hutt, NZ), 1 representative of Iwi/Maori (NZ), 1 scientist from the Geological Survey of Israel and 1 meteorologist from the German Weather Service. RV SONNE left the port of Wellington on 20 February at 09:00 local time under sunny skies and calm seas.

As the first working area (Palliser Canyon) was located directly in the Cook Strait, we had practically no transit and began recording hydroacoustic data as soon as we reached the working area at 12:00 on the day of departure. After a releaser test for the Ocean Bottom Seismometers (OBS) and the recording of a sound velocity profile, we started a short first systematic Parasound survey. Due to interference of the Parasound system and the EM122 mb-system, we decided to focus on the Parasound data as the entire working area is already fully mapped with multibeam.

Ocean Bottom Seismometers (OBS) were deployed on the night of 21 February. Eight OBS remained on the seafloor throughout the expedition to permanently record small earthquakes; four more OBS were deployed for active seismic measurements.

After deploying the OBS, we took a first core (SO310_5) on the Palliser Bank based on the results of the Parasound data. This core targeted undisturbed sediments on the plateau of Palliser Bank. The 517 cm-long core consists of relatively homogeneous clay-rich sediments. After the sampling we started with reflection seismic measurements on 21 February at 12:00 using a single seismic

source and the 600m-long NIWA-Streamer containing 96 channels. We started with regional overview profiles over the Palliser Canyon. We continued with recording a close-meshed grid of 2D lines across the northern flank of the Palliser Bank. These lines were also important for selecting the final location of the 3D-Cube. The data show numerous interesting features such as large landslide masses, prominent glide planes and clear BSRs in some places.

The 2D streamer was retrieved in the evening of 23 February. The following night was used to retrieve 4 OBS and deploy 16 OBS for a Full Waveform Inversion (FWI) experiment. 8 OBS each were deployed along two lines crossing landslide scarps of different morphology. The aim of this experiment is to characterize potential glide planes using seismic data. Prior to the start of the FWI experiment, gravity cores were taken at 3 stations along a profile crossing a prominent landslide scarp on the northern flank of the Palliser Bank (SO310_09-11). The first core targeted undisturbed sediments on the Palliser Bank and recovered 540 cm of background sediments. We used a 5m core barrel for the flank core, which over penetrated on the first attempt. The second attempt with a 10m core barrel yielded 572 cm of mixed sediments. The thalweg core was very short and contained redeposited material such as a piece of coral and shell fragments.

Data acquisition for the FWI experiment began in the afternoon of 24 February. First, we collected two lines across the OBS with the seismic source and the streamer. The lines were reshot with the seismic source only to reduce the shot spacing on the OBS records. We then collected a perpendicular line and a circle around the OBS for accurate positioning of the OBS, which is critical to the accuracy of the FWI. We stopped seismic operations in the early hours of 25 February. Activities on 25 February were limited due to high winds (gales of up to 10 Bft), but we were still able to use the time to re-image parts of the Palliser Bank with the multibeam systems of RV SONNE. Our survey was briefly interrupted on the morning of 26 February to collect some spare parts in Palliser Bay with the kind assistance of NIWA. Back in the work area, we deployed the P-Cable for the 3D seismic survey. The P-Cable cube included undisturbed sediments of Palliser Bank and numerous landslide scarps and mass transport deposits on its northern flank. The cube is 10x4km wide. Crossline profile distance was 60 m. We collected data with the P-Cable until the morning of 28 February. Due to increasing wind, we interrupted the survey late morning on 28 February and retrieved the system. The afternoon was used for coring of the thalweg of Palliser Canyon (Cores SO310 19-21). Cores were very short but all three attempts recovered extremely consolidate clays and rock pieces indicating that the canyon is active. Three OBS were recovered in the evening.

As the weather forecast for Cook Strait was poor for the following days, we moved to our second working area (Pegasus Canyon) where we arrived in the early morning of 02 March. After deploying 3 OBS, we acquired a network of 2D seismic profiles traversing Pegasus Canyon at various locations using the 600m NIWA streamer. This operation was continued until 23:30 on 4 March when we decided to retrieve the streamer due to predicted high winds in the second half of the night. During the night we collected Parasound profiles along the upper part of the thalweg of Pegasus and Pukakai Canyon. The profiles show a very interesting pattern of mass wasting and contouritic deposits along the canyon axes. 5 March was a windy day but coring was still possible. We took 4 cores (SO310 26-29) along the thalweg of Pegasus Canyon, targeting different sedimentary units. Core lengths ranged from 572 to 802 cm. Most cores showed significant gas expansion and it was necessary to drill some holes in the liner to allow the gas to escape. The night was used to continue hydroacoustic mapping around Pegasus Canyon. In the morning of 6 March we collected the three OBS deployed along one of the 2D profiles. This was followed by another long day of coring. A transect of 5 cores (SO310 32-36) sampled different landslide deposits. Coring was very successful with core recoveries varying between 205 and 909 cm. We then left the Pagasus Canyon area as the weather forecast for the Palliser region predicted a few

calm days with favorable conditions for the continuation of the 3D cube. We arrived in the Palliser Canyon region early on 7 March and collected some additional hydroacoustic data. P-cable deployment began at 08:00. The deployment went smoothly, but tests before the start of the profile indicated electrical problems. So the P-Cable was retrieved and tests quickly revealed that water had entered the junction box between the data cable and the cross cable. Repairs required the data cable to be replaced, which took until the evening. The afternoon and night were spent collecting hydroacoustic data across the Booboo Fault, which displaces the seafloor in the southern Cook Strait. The P-Cable was redeployed in the morning of 8 March. Data acquisition began, but another cable failure forced us to retrieve the system again in the evening. The night was again used for hydroacoustic imaging. The P-Cable was ready for deployment on the morning of 09 March, but testing on deck indicated another problem, most likely still caused by the water intrusion into the junction box two days earlier. We therefore decided not to deploy the system, but to collect giant box cores across the thalweg of the Palliser Canyon in order to investigate the main path of activity for this canyon. During the following night we collected a dense network of Parasound profiles across several landslide scarps on the edge of the Palliser Bank. The P-Cable was deployed again on the morning of 10 March, but another failure occurred after full deployment and the cable was retrieved. Due to the forecast of bad weather over the next few days, we made a short transit to the Pegasus area to continue our 2D seismic imaging of this area. The streamer was fully deployed at 18:00 and the seismic survey continued until 06:00 on 12 March. The focus of this survey was to acquire tie-lines between cross-profiles and some additional cross-profiles based on the results of the previous survey. Two cores (SO310 50 and 51) were taken in the early hours of the same day, targeting the canyon thalweg and the drape over a large landslide deposit. Coring was then suspended due to stormy weather conditions. Coring was resumed at 08:00 on 13 March. The first two cores (SO310-53 and 54) targeted distal deposits at the thalweg of Pegasus Canyon. Two additional cores (SO310-55 and 59) targeted different areas of the neighbouring Hurunui Canyon. We also re-sampled the previous day's station SO310 50. Core SO310 50 contained open holes and linear structures that are difficult to explain. We speculated that they might be formed by hydrates that dissociate when the cores are at the surface. We therefore prepared a liner that could be opened immediately after core recovery and measured the temperature around the open holes. The areas of the holes are at least 1° colder than the surrounding sediments - water is present in the holes. We interpreted this as an indication of very small pieces of dissociating hydrate, although definitive proof is lacking and we do not have the tools on board to test the presence of hydrates conclusively. However, we also identified Bottom Simulating Reflectors (BSRs) on some of our seismic lines showing that hydrates are present in the Pegasus Canyon region.

After a very successful day of coring, we returned to the Palliser area where we arrived on the morning of 14 March. We deployed the P-cable and started collecting data. Despite a successful and promising start, by late afternoon we were experiencing problems and were losing records from individual streamer sections, indicating a problem with the data cable under tension. The P-cable was recovered and we then collected a series of profiles for the OBS that were still on the seafloor. 4 stations (SO310_53-56) across a landslide scarp were sampled on 15 March; two cores from these stations were duplicated for geotechnical testing after the cruise on whole round core samples. Additional shots for the OBS were collected during the night. We started to recover the OBS at 06:00 on 16 March. The release of all OBS went smoothly and all OBS were on board by early evening. We collected three final cores in the Palliser region before making another short transit to the Pegasus region due to slightly better weather conditions forecast for this region. The plan was to acquire a series of 2D seismic lines along and parallel to the axis of Pegasus Canyon. The seismic equipment was deployed at 08:00 on 17 March, but the start of data acquisition had to

be delayed several times due to marine mammals in the vicinity of the vessel. We finally started acquiring data around midday, but the wind picked up rapidly with gusts of 9 Beaufort and above, and we had to retrieve the gear due to the stormy weather conditions. We continued to acquire Parasound data along the canyon axis until the morning of 18 March. The 2D seismic system was deployed again at 08:00 on 18 March. We ran a seismic line along the axis of the Pegasus Canyon and the data nicely shows the importance of faulting in the canyon area. Unfortunately we had to stop the seismic data acquisition at 15:00 because the wind was predicted to pick up very suddenly and we already had significantly higher wind speeds. We continued with some hydroacoustic profiling in the Kaikoura Canyon area, but had to stop this profiling as the wind increased to 10 Beaufort and above. As the storm continued to intensify, we moved east out of the area with the highest predicted wind speeds and weathered the storm there. We stopped all data collection as we left our working area; at 12:30 the next day the wind had decreased and we started a transit to the Palliser region. We entered our working area again at 16:00 and continued data acquisition. During the night we acquired a seismic line across the Opouawe Bank. We deployed the P-cable on the morning of 20 March and continued to collect data successfully until the early morning of 21 March, when we had to stop the survey to start packing our equipment. Final hydroacoustic data were collected in the Pegasus region until 21:00, when we started the very short transit to Wellington. We arrived in Wellington on 22 March at 08:30.

RV SONNE Cruise SO310 was a great success. We collected about 3000 nautical miles of hydroacoustic data in and between the canyon systems. We acquired about 1300 km of high resolution seismic profiles of excellent quality. Approximately 30 km² were covered by our 3D seismic system. 31 OBS deployments recorded our seismic source and earthquakes during most of the expedition. Geological samples were collected at 37 stations (30 gravity cores and 7 giant box cores). The new data will allow a detailed analysis of the role of mass wasting in both investigated canyon systems.

Acknowledgements

The scientific party of RV SONNE Cruise SO310 gratefully acknowledges the very friendly and most effective cooperation with Captain Birnbaum and his crew. Their great flexibility and their perfect technical assistance substantially contributed to make this cruise a scientific success. We would also like to thank our New Zealand colleagues from NIWA and GNS, without whom this expedition would not have been possible. We also appreciate the valuable support by the Leitstelle Deutsche Forschungsschiffe (German Research Fleet Coordination Centre) at the University of Hamburg. The expedition was funded by the BMBF (Bundesministerium für Bildung und Forschung).

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CAU Christian-Albrechts-Universität zu Kiel, Germany
GEOMAR GEOMAR - Helmholtz Centre for Ocean Research Kiel, Germany
GNS GNS Science, Lower Hutt, New Zealand
GSI Geological Survey of Israel, Haifa, Israel
NIWA National Institute of Water and Atmospheric Research, New Zealand
DWD Deutscher Wetterdienst, Germany

Stationlist

Station	Date/Time UTC	Device Latitude		Longitude	Depth (m)	Comment	
SO310_1-1	20.02.2025 01:56	Releaser Test (1) with SVP	41° 45,585' S	175° 01,513' E	1663	with SVP	
SO310_1-2	20.02.2025 03:37	Releaser Test (2)	41° 45,586' S	175° 01,514' E	1662		
SO310_2-1	20.02.2025 05:00	Parasound	41° 45,605' S	175° 01,580' E	1694	start survey	
SO310_2-1	20.02.2025 11:15	Parasound	41° 40,170' S	175° 11,990' E	567	end survey	
SO310_3-1	20.02.2025 11:58	OBS 01	41° 41,771' S	175° 15,144' E	416	deployed	
SO310_3-2	20.02.2025 12:26	OBS 02	41° 40,509' S	175° 12,874' E	731	deployed	
SO310_3-3	20.02.2025 13:00	OBS 03	41° 38,864' S	175° 09,505' E	213	deployed	
SO310_3-4	20.02.2025 13:46	OBS 1001	41° 41,128' S	175° 11,562' E	904	deployed	
SO310_3-5	20.02.2025 14:25	OBS-1002	41° 42,343' S	175° 12,645' E	699	deployed	
SO310_3-6	20.02.2025 15:01	OBS-04	41° 44,145' S	175° 14,140' E	468	deployed	
SO310_3-7	20.02.2025 15:24	OBS 1003	41° 45,115' S	175° 15,004' E	543	deployed	
SO310_3-8	20.02.2025 15:56	OBS 1004	41° 47,571' S	175° 17,047' E	1667	deployed	
SO310_3-9	20.02.2025 16:39	OBS 05	41° 45,148' S	175° 11,187' E	682	deployed	
SO310_3-10	20.02.2025 17:11	OBS 06	41° 42,269' S	175° 08,935' E	1096	deployed	
SO310_3-11	20.02.2025 17:46	OBS 07	41° 39,241' S	175° 06,568' E	236	deployed	
SO310_3-12	20.02.2025 18:22	OBS 08	41° 43,064' S	175° 07,236' E	1195	deployed	
SO310_4-1						No activities	
SO310_5-1	20.02.2025 19:25	Gravity corer	41° 43,069' S	175° 14,605' E	452	10m	
SO310_6-1	21.02.2025 01:31	2D-Seismic	41° 45,106' S	175° 02,764' E	1484	start survey	
SO310_6-1	23.02.2025 06:21	2D-Seismic	41° 41,364' S	175° 16,636' E	619	end survey	
SO310_7-1	23.02.2025 08:18	OBS 1003	41° 45,241' S	175° 14,641' E		recovered	
SO310_7-2	23.02.2025 09:10	OBS 1004	41° 47,670' S	175° 16,618' E		recovered	
SO310_7-3	23.02.2025 10:31	OBS 1002	41° 42,470' S	175° 12,495' E		recovered	
SO310_7-4	23.02.2025 12:42	OBS 1001	41° 41,014' S	175° 11,236' E		deployed	
SO310_8-1	23.02.2025 13:49	OBS 2001	41° 43,619' S	175° 07,261' E		deployed	
SO310_8-2	23.02.2025 14:06	OBS 2002	41° 43,944' S	175° 07,585' E		deployed	
SO310_8-3	23.02.2025 14:33	OBS 2003	41° 44,267' S	175° 07,909' E		deployed	
SO310_8-4	23.02.2025 14:52	OBS 2004	41° 44,595' S	175° 08,230' E		deployed	
SO310_8-5	23.02.2025 15:10	OBS 2005	41° 44,918' S	175° 08,565' E		deployed	
SO310_8-6	23.02.2025 15:26	OBS 2006	41° 45,227' S	175° 08,876' E		deployed	
SO310_8-7	23.02.2025 15:37	OBS 2007	41° 45,558' S	175° 09,198' E		deployed	
SO310_8-8	23.02.2025 15:47	OBS 2008	41° 45,882' S	175° 09,543' E		deployed	
SO310_8-9	23.02.2025 16:22	OBS 2009	41° 43,046' S	175° 11,358' E		deployed	
SO310_8-10	23.02.2025 16:33	OBS 2010	41° 43,130' S	175° 11,888' E		deployed	
SO310_8-11	23.02.2025 16:41	OBS 2011	41° 43,196' S	175° 12,407' E		deployed	
SO310_8-12	23.02.2025 16:50	OBS 2012	41° 43,283' S	175° 12,952' E		deployed	
SO310_8-13	23.02.2025 17:14	OBS 2013	41° 43,357' S	175° 13,496' E		deployed	
SO310_8-14	23.02.2025 17:33	OBS 2014	41° 43,425' S	175° 14,013' E		deployed	
SO310_8-15	23.02.2025 17:43	OBS 2015	41° 43,486' S	175° 14,561' E		deployed	
SO310_8-16	23.02.2025 17:51	OBS 2016	41° 43,555' S	175° 15,079' E		deployed	
SO310_9-1	23.02.2025 19:52	Gravity corer	41° 45,066' S	175° 07,802' E	845	10m	
SO310_10-1	23.02.2025 21:15	Gravity corer	41° 44,748' S	175° 07,283' E	1007	5m with USBL	
SO310_11-1	23.02.2025 23:02	Gravity corer	41° 43,787' S	175° 05,643' E	1326	5m with USBL	

Station	Date/Time UTC	Device	Latitude	Longitude	Depth (m)	Comment
SO310_10-2	24.02.2025 00:31	Gravity corer	41° 44,748' S	175° 07,261' E	1015	10m
SO310_12-1	24.02.2025 02:57	2D-Sesmik	41° 46,012' S	175° 09,657' E	895	start survey
SO310_12-1	24.02.2025 15:51	2D-Sesmik	41° 42,807' S	175° 14,195' E	429	end survey
SO310_13-1	24.02.2025 03:54	XSV	41° 42,748' S	175° 08,264' E	1148	
SO310_14-1	24.02.2025 04:32	XSV	41° 43,113' S	175° 11,670' E	743	
SO310_15-1	24.02.2025 17:28	Parasound	41° 45,198' S	175° 02,792' E	1501	start survey
SO310_15-1	25.02.2025 03:34	Parasound	41° 44,330' S	175° 06,389' E	1221	end survey
SO310_16-1	25.02.2025 04:28	Multibeam	41° 49,437' S	175° 01,092' E	1888	start survey
SO310_16-1	25.02.2025 17:31	Multibeam	41° 46,303' S	175° 10,924' E	936	end survey
SO310_17-1	25.02.2025 21:01	Parasound	41° 34,065' S	174° 56,048' E	857	start survey
SO310_17-1	25.02.2025 22:04	Parasound	41° 39,818' S	174° 56,093' E	1208	end survey
SO310_18-1	26.02.2025 03:16	3D-Seismik	41° 43,081' S	175° 06,240' E	1245	start survey
SO310_18-1	28.02.2025 20:55	3D-Seismik	41° 42,950' S	175° 14,606' E	453	ernd survey
SO310_19-1	01.03.2025 00:23	Gravity corer	41° 41,793' S	175° 10,127' E	1021	5m with USBL
SO310_20-1	01.03.2025 02:01	Gravity corer	41° 42,392' S	175° 09,113' E	1088	5m with USBL
SO310 21-1	01.03.2025 03:17	Gravity corer	41° 42,524' S	175° 08,844' E	1106	5m with USBL
SO310 22-1	01.03.2025 04:44	OBS2008	41° 45,975' S	175° 09,620' E		recovered
SO310 22-2	01.03.2025 05:07	OBS2007	41° 45,719' S	175° 09,516' E		recovered
SO310 22-3	01.03.2025 05:28	OBS2006	41° 45,375' S	175° 09,123' E		recovered
SO310 23-1	01.03.2025 15:29	OBS3003	42° 45,190' S	174° 05,263' E	1638	deployed
SO310 23-2	01.03.2025 15:45	OBS3002	42° 45.125' S	174° 04.401' E	1647	deploved
SO310 23-3	01.03.2025 16:04	OBS3002	42° 44.902' S	174° 01.710' E	2003	deploved
SO310 24-1	01.03.2025 20:32	2D-Seismic	42° 48.644' S	174° 19.145' E	1504	start survev
SO310 24-1	04.03.2025 10:47	2D-Seismic	43° 05,336' S	173° 41,703' E	326	end survey
SO310 25-1	04.03.2025 12:49	Parasound	43° 07,161' S	173° 47,633' E	1185	start survey
SO310 25-1	04.03.2025 21:16	Parasound	43° 02,504' S	173° 59,964' E	1447	end survey
SO310 26-1	04.03.2025 22:54	Gravity corer	43° 02,515' S	173° 50,922' E	1414	10m with USBL
SO310 27-1	05.03.2025 01:50	Gravity corer	42° 54,844' S	173° 58,543' E	1662	10m with USBL
SO310 28-1	05.03.2025 04:02	Gravity corer	42° 51,272' S	174° 01,402' E	1868	10m with USBL
SO310 29-1	05.03.2025 06:08	Gravity corer	42° 50,846' S	174° 01,968' E	1862	10m with USBL
SO310 30-1	05.03.2025 07:51	Parasound	42° 49,634' S	174° 06,475' E	1511	start survey
SO310 30-1	05.03.2025 15:44	Parsound	42° 35,366' S	174° 06,064' E	2154	end survey
SO310_31-1	05.03.2025 17:41	OBS3003	42° 44,560' S	174° 05,103' E		recovered
SO310_31-2	05.03.2025 18:06	OBS3002	42° 44,602' S	174° 04,239' E		recovered
SO310_31-3	05.03.2025 18:40	OBS3001	42° 44,404' S	174° 01,601' E		recoevered
SO310_32-1	05.03.2025 21:01	Gravity corer	42° 54,020' S	173° 54,894' E	1554	10m
SO310_33-1	05.03.2025 22:45	Gravity corer	42° 53,400' S	173° 52,043' E	1341	10m with USBL
SO310 34-1	06.03.2025 00:25	Gravity corer	42° 52,926' S	173° 49,808' E	1194	10m with USBL
SO310 35-1	06.03.2025 02:03	Gravity corer	42° 52,495' S	173° 47,924' E	966	10m with USBL
SO310 36-1	06.03.2025 03:26	Gravity corer	42° 52,133' S	173° 46,242' E	718	10m with USBL
SO310 37-1	06.03.2025 12:59	Parasound	41° 47,560' S	175° 09,273' E	1582	start survev
SO310 37-1	06.03.2025 18:00	Parasound	41° 45,712' S	175° 17,002' E	783	end survev
			440.07.0001.0		101	technical
<u>SO310_38-1</u>	06.03.2025 19:42	3D-Seismic	41° 37,629' S	175° 08,086' E	101	problems
SU310_39-1	07.03.2025 00:42	Parasound	41° 45,844' S	175° 16,650' E	807	start survey

Station	Date/Time UTC	Device	Latitude	Longitude	Depth (m)	Comment
SO310_39-1	07.03.2025 18:22	Parasound	41° 40,391' S	175° 08,188' E	660	end survey
SO310_40-1	07.03.2025 22:12	3D-Seismik	41° 42,340' S	175° 15,967' E	479	start survey
SO310_40-1	08.03.2025 05:21	3D-Seismik	41° 43,540' S	175° 07,790' E	1170	end survey
SO310_41-1	08.03.2025 07:45	Parasound	41° 42,330' S	175° 05,740' E	1083	start survey
SO310_41-1	08.03.2025 18:18	Parsound	41° 39,122' S	175° 15,423' E	88	end survey
SO310_42-1	08.03.2025 22:09	Box corer	41° 42,467' S	175° 07,973' E	1147	with USBL and VSP
SO310_43-1	08.03.2025 23:50	Box corer	41° 42,622' S	175° 08,119' E	1138	with USBL
SO310_44-1	09.03.2025 01:12	Box corer	41° 42,767' S	175° 08,261' E	1135	with USBL
SO310_45-1	09.03.2025 02:38	Box corer	41° 42,906' S	175° 08,347' E	1099	with USBL
SO310_46-1	09.03.2025 03:58	Box corer	41° 43,127' S	175° 08,519' E	1103	with USBL
SO310_47-1	09.03.2025 05:08	Parasound	41° 42,639' S	175° 09,749' E	1054	start survey
SO310_47-1	09.03.2025 17:45	Parsound	41° 42,017' S	175° 09,746' E	1038	end survey
SO310_48-1	09.03.2025 18:55	3D-Seismic	41° 34,565' S	175° 02,418' E	174	technical problems
SO310_49-1	10.03.2025 05:47	2D-Seismic	42° 43,682' S	174° 12,269' E	1721	start survey
SO310_49-1	11.03.2025 16:51	2D-Seismic	43° 04,488' S	173° 47,200' E	1181	end survey
SO310_50-1	11.03.2025 19:01	Gravity corer	43° 07,065' S	173° 48,085' E	1195	10m with USBL
SO310_51-1	11.03.2025 21:07	Gravity corer	42° 58,043' S	173° 50,881' E	1200	15m with USBL
SO310_52-1	12.03.2025 00:12	Parasound	43° 00,847' S	173° 33,711' E	119	start survey
SO310_52-1	12.03.2025 17:56	Parasound	42° 36,650' S	174° 02,826' E	2055	end survey
SO310_53-1	12.03.2025 20:05	Gravity corer	42° 43,644' S	174° 01,629' E	2020	10m with USBL
SO310_54-1	12.03.2025 22:26	Gravity corer	42° 47,421' S	174° 02,250' E	1939	10m with USBL
SO310_55-1	13.03.2025 00:55	Gravity corer	42° 50,778' S	173° 53,332' E	1323	10m with USBL
SO310_56-1	13.03.2025 02:49	Box corer	42° 52,505' S	173° 47,922' E	965	with USBL
SO310_57-1	13.03.2025 04:49	Box corer	43° 01,109' S	173° 47,374' E	742	
SO310_58-1	13.03.2025 06:32	Gravity corer	43° 07,063' S	173° 48,082' E	1196	5m
SO310_59-1	13.03.2025 09:00	Gravity corer	42° 55,609' S	173° 44,129' E	837	10m with USBL
SO310_59-1	13.03.2025 09:16	Gravity corer	42° 55,614' S	173° 44,130' E	837	
SO310_59-1	13.03.2025 09:28	Gravity corer	42° 55,612' S	173° 44,128' E	837	
SO310_59-1	13.03.2025 10:03	Gravity corer	42° 55,436' S	173° 44,247' E	839	
SO310_60-1	13.03.2025 21:41	3D-Seismik	41° 38,232' S	175° 03,459' E	477	start survey
SO310_60-1	14.03.2025 05:10	3D-Seismik	41° 43,508' S	175° 08,288' E	1136	end survey
SO310_61-1	14.03.2025 07:46	seismic source	41° 44,287' S	175° 05,455' E	1367	start survey
SO310_61-1	14.03.2025 18:30	seismic source	41° 44,588' S	175° 13,357' E	565	end survey
SO310_62-1	14.03.2025 19:22	Gravity corer	41° 42,975' S	175° 13,498' E	423	10m
SO310_63-1	14.03.2025 20:18	Gravity corer	41° 43,001' S	175° 13,241' E	443	10m with USBL
SO310_64-1	14.03.2025 21:48	Gravity corer	41° 43,012' S	175° 13,176' E	454	5m with USBL
SO310_64-2	14.03.2025 22:33	Gravity corer	41° 43,012' S	175° 13,176' E	453	5m with USBL
SO310_65-1	14.03.2025 23:34	Gravity corer	41° 43,024' S	175° 12,991' E	542	3m with USBL
SO310_65-2	15.03.2025 00:23	Gravity corer	41° 43,026' S	175° 12,991' E	541	3m with USBL
SO310_66-1	15.03.2025 03:12	seismic source	41° 44,554' S	175° 13,665' E	531	start survey
SO310_66-1	15.03.2025 15:54	seismic source	41° 44,591' S	175° 12,079' E	582	end survey
SO310_67-1	15.03.2025 17:39	OBS4	41° 44,572' S	175° 14,034' E		recovery
SO310_67-2	15.03.2025 18:12	OBS2026	41° 43,642' S	175° 15,097' E		recovery
SO310_67-3	15.03.2025 18:40	OBS205	41° 43,616' S	175° 14,658' E		recovery

Station	Date/Time UTC	Device	Latitude	Longitude	Depth (m)	Comment
SO310_67-4	15.03.2025 19:01	OBS2014	41° 43,535' S	175° 14,085' E		recovery
SO310_67-5	15.03.2025 19:27	OBS2013	41° 43,488' S	175° 13,525' E		recovery
SO310_67-6	15.03.2025 19:51	OBS2012	41° 43,346' S	175° 13,037' E		recovery
SO310_67-7	15.03.2025 20:15	OBS2011	41° 43,254' S	175° 12,463' E		recovery
SO310_67-8	15.03.2025 20:40	OBS2010	41° 43,197' S	175° 11,962' E		recovery
SO310_67-9	15.03.2025 21:11	OBS2009	41° 43,200' S	175° 11,390' E		recovery
SO310_67-10	15.03.2025 21:59	OBS01	41° 41,772' S	175° 15,388' E		recovery
SO310_67-11	15.03.2025 22:32	OBS02	41° 40,558' S	175° 13,024' E		recovery
SO310_67-12	15.03.2025 23:14	OBS03	41° 39,011' S	175° 09,571' E		recovery
SO310_67-13	15.03.2025 23:44	OBS07	41° 39,400' S	175° 06,867' E		recovery
SO310_67-14	16.03.2025 00:33	OBS06	41° 42,542' S	175° 09,339' E		recovery
SO310_67-15	16.03.2025 01:06	OBS08	41° 43,417' S	175° 07,781' E		recovery
SO310_67-16	16.03.2025 01:31	OBS2001	41° 43,897' S	175° 07,417' E		recovery
SO310_67-17	16.03.2025 02:02	OBS2002	41° 44,274' S	175° 07,712' E		recovery
SO310_67-18	16.03.2025 02:29	OBS2003	41° 44,623' S	175° 08,052' E		recovery
SO310_67-19	16.03.2025 02:56	OBS2004	41° 44,861' S	175° 08,413' E		recovery
SO310_67-20	16.03.2025 03:31	OBS2005	41° 45,410' S	175° 08,953' E		recovery
SO310_67-21	16.03.2025 04:01	OBS05	41° 45,378' S	175° 11,461' E		recovery
SO310_68-1	16.03.2025 05:20	Gravity corer	41° 43,043' S	175° 12,829' E	562	10m with USBL
SO310_69-1	16.03.2025 06:16	Gravity corer	41° 43,064' S	175° 12,469' E	601	10m
SO310_70-1	16.03.2025 08:00	Gravity corer	41° 43,241' S	175° 10,498' E	890	10m
SO310_71-1	16.03.2025 09:13	Parasound	41° 43,300' S	175° 09,440' E	988	start survey
SO310_71-1	16.03.2025 18:32	Parasound	42° 38,508' S	174° 09,544' E	2076	end survey
SO310_72-1	17.03.2025 00:35	2D-Seismik	42° 26,742' S	174° 12,919' E	1623	start survey
SO310_72-1	17.03.2025 01:15	2D-Seismik	42° 28,412' S	174° 13,815' E	2047	end survey
SO310_73-1	17.03.2025 04:12	Parasound	42° 35,807' S	174° 05,089' E	2133	start survey
SO310_73-1	17.03.2025 17:55	Parasound	43° 06,167' S	173° 47,511' E	1246	end survey
SO310_74-1	17.03.2025 20:16	2D-Seismic	43° 10,603' S	173° 45,526' E	1155	start survey
SO310_74-1	18.03.2025 01:38	2D-Seismic	42° 49,523' S	174° 03,469' E	1865	end survey
SO310_75-1	18.03.2025 03:53	Parasound	42° 43,648' S	173° 57,917' E	1487	start survey
SO310_75-1	18.03.2025 07:22	Parasound	42° 46,063' S	173° 50,573' E	1406	end survey
SO310_76-1	19.03.2025 08:35	2D-Seismic	41° 54,352' S	175° 16,571' E	2151	start survey
SO310_76-1	19.03.2025 11:34	2D-Seismic	41° 45,285' S	175° 28,389' E	1171	end survey
SO310_77-1	19.03.2025 13:54	Parasound	41° 42,054' S	175° 17,109' E	630	start survey
SO310_77-1	19.03.2025 17:58	Parasound	41° 42,063' S	175° 12,050' E	848	end survey
SO310_78-1	20.03.2025 01:15	3D-Seismic	41°43,555' S	175° 06,283' E	1158	start survey
SO310_78-1	20.03.2025 17:47	3D-Seismic	41° 42,480' S	175° 14,717' E	446	end survey
SO310_79-1	21.03.2025 03:57	Parasound	42° 40,170' S	173° 49,821' E	1668	start survey
SO310 79-1	21.03.2025 08:32	Parasound	42° 38,307' S	173° 46,912' E	1592	end survey

List of seismic profiles

Profile -Nr.	Date Start	Time Start UTC	Time End UTC	Latitude Start (South)	Longitude Start (East)	Latitude End (South)	Longitude End (East)	FFN Start	FFN End
P1000_001	21.02.25	01:33	04:07	41° 45.06	175° 02.89	41° 38.20	175° 18.13	1608	3460
P1000_002	21.02.25	05:06	08:54	41° 41.11	175° 21.33	41° 47.16	175° 02.15	4173	6903
P1000_003	21.02.25	10:09	12:11	41° 43.51	175° 59.39	41° 37.94	175° 11.35	7803	9342
P1000_004	21.02.25	13:14	16:15	41° 39.03	175° 17.08	41° 49.98	175° 27.73	10102	12277
P1000_005	21.02.25	16:45	19:48	41° 50.97	175° 26.16	41° 39.16	175° 15.87	12628	14824
P1000_006	21.02.25	20:19	23:07	41° 40.15	175° 13.93	41° 51.38	175° 23.33	15201	17220
P1000_007	21.02.25	23:44	03:27	41° 51.79	175° 20.67	41° 36.13	175° 06.79	17654	20334
P1000_008	22.02.25	03:59	08:17	41° 37.73	175° 05.44	41° 53.49	175° 17.73	20725	23818
P1000_009	22.02.25	08:44	12:38	41° 54.37	175° 15.98	41° 38.83	175° 03.94	24134	26948
P1000_010	22.02.25	13:17	15:00	41° 40.32	175° 02.15	41° 46.83	175° 07.55	27410	28646
P1000_011	22.02.25	15:30	16:10	41° 45.85	175° 09.09	41° 43.78	175° 05.61	29006	29497
P1000_012	22.02.25	16:43	17:15	41° 45.05	175° 05.01	41° 46.65	175° 07.70	29889	30271
P1000_013	22.02.25	17:50	18:37	41° 45.18	175° 09.36	41° 43.03	175° 05.38	30686	31256
P1000_014	22.02.25	19:00	19:46	41° 44.17	175° 04.96	41° 46.38	175° 08.65	31531	32086
P1000_015	22.02.25	20:13	20:50	41° 45.51	175° 10.51	41° 43.02	175° 07.75	32408	32856
P1000_016	22.02.25	21:12	22:10	41° 41.92	175° 08.77	41° 44.40	175° 13.05	33112	33806
P1000_017	22.02.25	22:33	23:24	41° 45.46	175° 12.16	41° 42.51	175° 07.87	34091	34702
P1000_018	22.02.25	23:55	01:08	41° 43.30	175° 07.22	41° 44.54	175° 14.11	35066	35944
P1000_019	23.02.25	01:28	02:24	41° 43.49	175° 14.19	41° 42.46	175° 08.20	36189	36856
P1000_020	23.02.25	02:45	03:51	41° 41.35	175° 08.42	41° 43.15	175° 14.15	37106	37900
P1000_021	23.02.25	04:17	04:55	41° 42.21	175° 15.20	41° 41.15	175° 11.06	38218	38672
P1000_022	23.02.25	05:21	06:21	41° 40.12	175° 11.42	41° 41.35	175° 16.59	38979	39701
P1000_023	24.02.25	02:59	03:33	41° 45.91	175° 09.54	41° 43.51	175° 07.16	40281	40696
P1000_024	24.02.25	04:24	05:11	41° 43.02	175° 10.97	41° 43.60	175° 15.30	41308	41867
P4000.0001	01.03.25	22:33	00:14	42° 44.04	174° 26.40	42° 46.02	174° 16.80	111440	112649
P4000.0002	02.03.25	00:20	05:11	42° 46.09	174° 16.20	42° 43.71	173° 46.91	112724	116215
P5000.0001	02.03.25	05:45	10:06	42° 45.70	173° 46.45	42° 49.42	174° 11.97	117259	120396
P5000.0002	02.03.25	10:50	15:37	42° 51.94	174° 11.07	42° 46.72	173° 43.28	120918	124368
P5000.0003	02.03.25	16:24	21:12	42° 49.26	173° 42.44	42° 55.01	174° 10.53	124937	128389
P5000.0004	02.03.25	21:51	02:26	42° 57.30	174° 09.95	42° 51.47	173° 43.02	128850	132150
P5000.0005	03.03.25	02:54	07:21	42° 53.04	173° 42.51	42° 59.81	174° 07.99	132489	135691
P5000.0006	03.03.25	07:51	12:21	43° 01.35	174° 07.31	42° 54.98	173° 41.14	136053	139301
P5000.0007	03.03.25	12:49	17:26	42° 56.39	173° 40.64	43° 03.58	174° 06.31	139632	142955
P5000.0008	03.03.25	17:59	23:23	43° 05.21	174° 05.48	42° 55.64	173° 34.69	143356	147240
P5000.0009	04.03.25	00:50	06:14	43° 00.87	173° 34.47	43° 06.34	174° 05.51	148255	152136
P5000.0010	04.03.25	06:25	06:49	43° 07.04	174° 05.94	43° 08.76	174° 05.05	152270	152555
P5000.0011	04.03.25	07:01	10:49	43° 09.14	174° 04.04	43° 05.31	173° 41.52	152700	155439
P7000.0001	10.03.25	05:16	11:58	42° 41.71	174° 13.17	43° 10.45	174° 01.66	170000	174800
P7000.0002	10.03.25	12:06	15:22	43° 10.75	174° 01.05	43° 04.42	173° 44.80	174900	177250
P7000.0003	10.03.25	15:26	20:39	43° 04.13	173° 44.73	42° 43.37	173° 57.56	177300	181050
P7000.0004	10.03.25	20:47	23:04	42° 43.52	173° 58.34	42° 53.79	174° 01.84	181150	182800
P7000.0005	10.03.25	23:13	02:16	42° 54.21	174° 01.29	42° 50.61	173° 43.41	182900	185100
P7000.0006	11.03.25	02:48	05:54	42° 52.00	173° 41.97	42° 56.38	173° 59.87	185480	187720
P7000.0007	11.03.25	06:18	09:19	42° 54.92	174° 00.70	42° 51.19	173° 43.04	188080	190175

Profile -Nr.	Date Start	Time Start UTC	Time End UTC	Latitude Start (South)	Longitude Start (East)	Latitude End (South)	Longitude End (East)	FFN Start	FFN End
P7000.0008	11.03.25	09:36	12:49	42° 52.16	173° 43.17	42° 56.74	174° 00.79	190380	192700
P7000.0009	11.03.25	12:59	14:23	42° 57.07	173° 59.93	42° 55.13	173° 51.99	192820	193820
P7000.0010	11.03.25	14:29	16:52	42° 55.38	173° 51.57	43° 04.54	173° 47.17	193890	195615
P10000.0001	17.03.25	20:21	01:38	43° 10.26	173° 45.84	42° 49.53	174° 03.44	206000	209798
P11000.0001	19.03.25	08:31	11:36	41° 54.56	175° 16.43	41° 45.22	175° 28.57	210000	212222