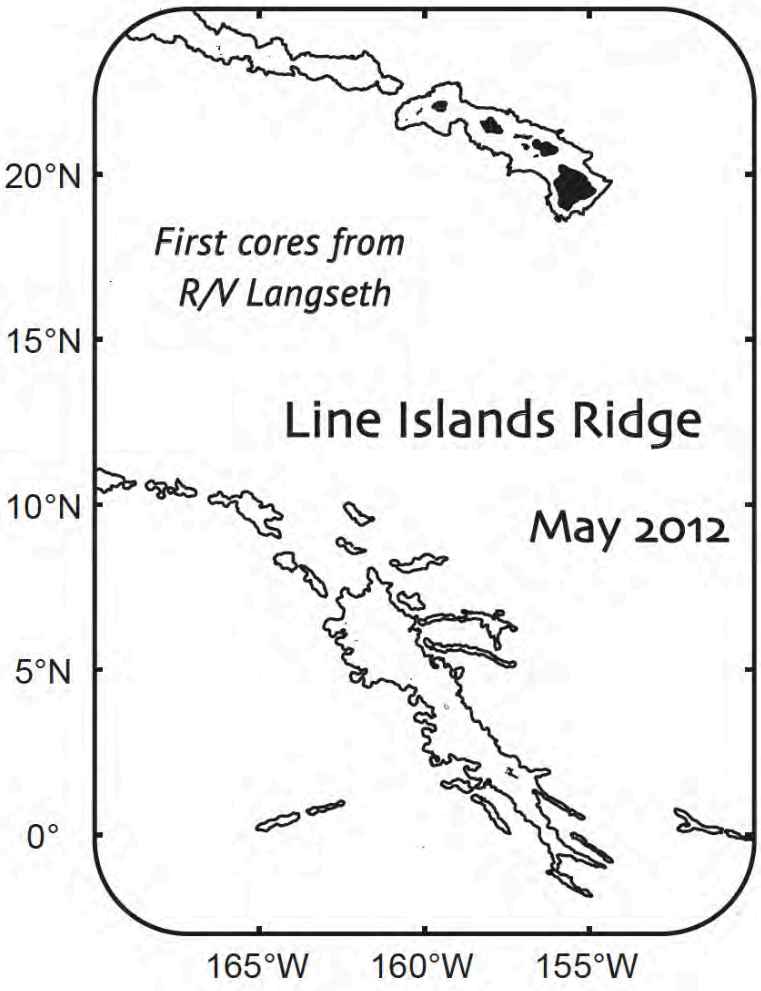
MGL12-08
May 1-26, 2012
R/V Marcus G. Langseth

Line Island Ridge
Survey and Core Collection

Cruise Report



1. Cruise Objectives

The central tropical Pacific is an ideal place to monitor changes in the Pacific Marine ITCZ and ENSO variability. Previous work in Pleistocene and Holocene sediment in the Central Tropical Pacific has been equatorward of ~4-6°N and rarely west of 140°W, with low time resolution in the northern cores. This is a consequence of deep ocean crust at depths near the carbonate compensation depth and the low sedimentation rates in deep waters north of the equator. The Line Islands Ridge is a broad, relatively shallow feature spanning a latitude range of 0 to 10°N and topped in many areas with carbonate sediments. The aim of this cruise was to collect sedimentary materials suitable for paleoceanographic research.

We surveyed selected areas of the Line Islands Ridge that appeared promising for collecting sediment cores using multibeam bathymetry, 3.5 kHz single channel seismic reflection and multi-channel seismic reflection surveys. We collected multi-cores, gravity cores, and piston cores from a meridional transect along the ridge. On-board multi-sensor track and micropaleontological analyses allowed us to make a preliminary assessment of sedimentation rates and time scales covered and the stratigraphic integrity of the cores collected, and also facilitated preliminary correlations between sites. Water column properties and samples were also collected using a CTD/rosette in order to better tie modern processes to the sedimentary record in this area.

2. Personnel

First name	Last name	Position	University
Eric	Arneson	Coring	Oregon State University
Maziet	Cheseby	Coring	Oregon State University
Chris	Moser	Coring	Oregon State University
Paul	Walczak	Coring	Oregon State University
Samantha	Bova	Science	Brown University
Victor	Castro	Science	University of Cal., Santa Cruz
Ann	Dunlea	Science	Boston University
Heather	Ford	Science	University of Cal., Santa Cruz
Jennifer	Hertzberg	Science	Texas A&M University
Steve	Hovan	Science	Indiana U of Pennsylvania
Allison	Jacobel	Science	Lamont Doherty Earth Obs.
Christina	King	Science	University of Rhode Island
Mitchell	Lyle	Science	Texas A&M University
Jean	Lynch-Stieglitz	Science	Georgia Inst. of Technology
Ashley	Maloney	Science	University of Washington
Rick	Murray	Science	Boston University
Rob	Pockalny	Science	University of Rhode Island
Pratigya	Pollisar	Science	Lamont Doherty Earth Obs.
Julia	Shackford	Science	Texas A&M University
Katherine	Wejnert	Science	Georgia Inst. of Technology
Ruifang	Xie	Science	Texas A&M University
Chris	Francis	Tech	
Weston	Groves	Tech	
Rob	Hagg	Tech	
Lisa	Hawkins	Tech	
Mike	Martello	Tech	
David	Martinson	Tech	
Tom	Spoto	Tech	
Mike	Tatro	Tech	
Tina	Thomas	Tech	

3. Methods

Multibeam
Multibeam swath data were collected with Kongsberg's EM122 1° x 1° hull-mounted system and displayed in real time with Kongsberg's Seafloor Information System software. The beam spacing was set to high-density, equidistant mode with a maximum beam angle of 65˚ and a maximum swath width of 20 km. The Dual Swath Mode and Ping Mode were set to automatic. Multibeam data were merged with navigation and written to disk at 1.5 hour intervals. Multibeam data were not logged while at a coring station.

Sound velocity profiles were obtained primarily with Sippican T5 and T7 XBTs to a depth of ~2000 m. We also used one CTD lowering to a depth of 4000 m. In the primary survey areas, the time intervals between sound velocity profiles were typically less than 12 hours or as needed on a shorter time scale. During transits to and from the survey area, only daily sound velocity profiles were obtained with XBTs. The resulting sound velocity profile data were then entered into the real-time acquisition software.

Post-processing of the multibeam data was conducted in 3 phases.
1) Initial cleaning of the data with MB-System's MBCLEAN application
2) Hand-editing remaining bad pings with MB-System's MBEDIT application
3) Apply the edits with MB-System's MBPROCESS application
4) Create a 100 m interval grid with MB-System's MBGRID application
5) Plot the bathymetry and backscatter data with Generic Mapping Tool's GRDIMAGE and GRDVIEW applications.
If additional edits were needed, we would return to Step 2 and repeat the process.

Chirp
High Resolution sub-bottom seismic data were collected with a Knudsen 3260 echosounder and displayed/controlled in real-time with the Soundersuite Echo Control Client v 2.35. The transmit pulse was set to 1 ms for the initial survey, but then changed to 2 ms once in the primary survey area. The transmit power ranged from 2 to 4, but was set to 4 for most of the cruise. A manual gain ranging from 35-42 db was used for most of the cruise and no time-varying gain was applied. A 500 m range was displayed during the majority of underway operations, but the range was often reduced to 200 m while coming onto a potential coring site. Other setting used include a process shift ranging form 0-2, a draft of 0 and a transmit blank of 20 ms.

Seismic Surveys
Two seismic reflection surveys were run on MGL12-08, a 19 hour survey of Region E (JD126 00:26 to 19:50), and a combined survey of Regions A and B lasting 33 hours (JD 131 15:04 to JD135 00:00). Both surveys used a 900 m streamer with 60 live channels and 12.5 m group spacing. The seismic source was dual 45-105 cubic inch GI guns. Shots were spaced at 25 m, and 8 seconds of record digitized at 0.5 msec intervals was recorded. The seismic lines were processed at sea to help interpret sedimentation along the Line Islands Ridge.

Coring Systems
All Coring Systems were provided by the Oregon State University Coring Group.

Multi-corer (MC): We used an Ocean Instruments MC-800 multicorer with 8 subcores. A Niskin bottle attached to one leg of the multi-corer was set to trip on pullout. Water from this bottle was sampled for chemical analysis (see Water Sampling below).

Gravity Corer (GC): The gravity core consisted of a 10' 4" PVC pipe with a one-way purge valve on the top and core cutter and catcher on the bottom. It was fitted with between 9 and 12 70 lb weight rings (630-940 lbs) at the top. A fabric "sock" was often necessary in the core catcher to retain sandy sediments.

"Big Bertha" Gravity Corer (BB): The Jumbo Piston Core bomb (3000 lbs) and steel core barrel were used as a gravity core, with a one-way purge valve on top. The core barrel was lined with PVC liner. The Big Bertha was usually rigged with a 20' core barrel. After cutting the bottom sections of core, the top 10' of core was transferred to a vertical position before removing the one-way valve and siphoning off the water at the core top in order to better preserve the core top.

Piston Corer (PC) with gravity core trigger (TC): The 30' Jumbo Piston Core (4" diameter) was configured to a 30' barrel. The Jumbo Piston Corer uses a gravity core (4" PVC pipe) as a trigger core. The Piston Core Bomb has a weight of 3000 lbs and was deployed without additional weight ("pigs"). The core barrel was lined with PVC liner.

Biostratigraphy

The pink-pigmented variety of the planktonic foraminifera *Globigerinoides ruber* disappeared from the Pacific Ocean at ~120 kyr BP (Thompson *et al*., 1979). Therefore, the down-core appearance of *G. ruber* (pink) can be used as a stratigraphic datum marker for sediment cores from the Pacific. Based on this principle, we took samples of all sediment cores taken on MGL12-08 as the cores were being split into sections in order to construct a basic age model, from which approximate sedimentation rates could be determined. Roughly 10 cc's of sediment were removed from the core section breaks, wet sieved through a 63 μm mesh, and dried. Using a microscope, the foraminifera from each sample were sorted to determine which samples contained *G. ruber* (pink). In addition, the presence of *Globerginoides fistulosus*, a dinstinctive foraminifera which has a last appearance at 1.6 Ma (near the Pliocene/Pleistocene boundary), was noted. Smear slides were examined at the bottom of each sediment core in order to determine the presence/absence of *Discoaster*, a marine haptophyte which has a last appearance at the Pliocene/Pleistocene boundary.

Multi-Sensor Track (MST)

The GEOTEK multi-sensor track system was used to measure bulk sediment physical properties every 1 cm on whole core sections. Gamma attenuation counts made for bulk density were calibrated before each core using an aluminum block of varying thickness submerged in distilled water. Gamma attenuation counts were collected for 5 seconds at each interval and corrected for non-standard core thickness. Magnetic susceptibility data were collected using a Bartington loop sensor with a count time of 1 sec. Non-contact resistivity measurements were calibrated against standards of varying salinity and corrected for temperature. P-wave measurements were calibrated against a distilled water standard and corrected for temperature. Data output files include the following columns: sub-bottom depth (cm), core section #, depth in section (cm), core thickness (cm), P-wave amplitude, P-wave velocity (m/s), bulk density ($g/cm^{3)}$, magnetic

susceptibility (10^{-5} SI), calculated acoustic impedance, fractional porosity (assuming grain density of 2.7 g/cm^3 and pore water salinity of 1.026 g/cm^3), and resistivity.

Core Curating

Cores were split and described onboard. The PVC core liner was cut longitudinally with a circular saw, a wire was drawn along the cut, and the two halves separated. The surface of split cores was scraped clean with a metal spatula and sediment color, lithology, and textural features were recorded. Sediment descriptions will be archived at the Lamont-Doherty Earth Observatory core repository and available on the cruise website.

CTD and Underway TSG

The CTD was a SBE 9/11plus V 5.1g, and was launched with a 24-position rosette of 10 liter Niskin bottles. The dual temperature and salinity modules were calibrated Feb. 17, 2012 at WHOI. We collected bottled samples for analysis of salinity from a selection of the uncontaminated seawater, CTD Niskin bottles and multi-corer Niskin bottle. In addition, at each CTD cast the TSG and 2 meter CTD temperature and salinity sensor readings were compared. Agreement was generally better than a few hundredths of a unit (°C or psu).

An uncontaminated seawater line entering at ~5-6 m near the bow delivers water to the wet lab just off the main deck. Water from this line enters an automated p_{CO2} equilibrator run by Taro Takahashi and an SBE-21 SEACAT Thermosalinograph (TSG) manufactured by Seabird. A third line was plumbed from the main line to allow water sampling while underway.

Water Sampling

Water samples for chemical analyses were taken from the ship's uncontaminated seawater line, CTD casts, multi-corer Niskin bottle and a rain collector. The table below lists the types of samples, PI, # of replicates and water source for these samples.

Sample	Abbrev.	Container	PI	# Reps	Uncontam. Seawater Line Transit	Uncontam. Seawater Line Survey	Uncontam. Seawater Line On Station	CTD 500m (12 depths)	CTD Mix Layer (1 depth)	CTD deep (12 depths)	Multicore Bottle	Rain water
dissolved inorganic C	DIC	125 ml serum	Polissar	2	w/POC	w/POC		ea. depth	w/POC		ea. MC site	
d13C of DIC	d13DIC	4 dram SC	Polissar	2	w/POC	w/POC		ea. depth	w/POC		ea. MC site	
total alkalinity	TA	125 ml serum	Polissar	3	w/POC	w/POC		ea. depth	w/POC		ea. MC site	
Nutrients (NO3, PO4)	NUT	15 ml centrif.	Polissar	2	w/POC	w/POC		ea. depth	w/POC		ea. MC site	
isotopes B (d18O, dD)	ISOB	25 ml nalgene	Polissar/ Sachs	1	w/POC	w/POC			w/POC			
particulate organic carbon	POC	GF filters	Polissar/ Sachs	-	continuous during transit	paired with multicore site			Chl max			
d15N NO3	d15NO3	125 ml pretreated	Altabet	1				ea. depth			ea. MC site	
isotopes A (d18O, dD)	ISO	1 dram crimp	Cobb/ Polissar	2	3x day	3x day	1/day	ea. depth		ea. depth	ea. MC site	1/day
U-series		large volume	Marc-antonio	1						ea. depth		
salinity	SAL	?	Cobb	1	1/day	1/day		10, 100, 200 and 500 m		top/bottom depth	ea. MC site	

4. Sedimentary Environment

The Line Islands are a complex NW-SE trending chain of atolls, seamounts and volcanic ridges in the central Pacific extending from the Mid-Pacific Mountains to the Tuamotu Plateau. During this cruise, we investigated the central section from 0° - 10°N, which is dominated by a continuous, relatively broad (100-300 km-wide), volcanic ridge. The top of the volcanic ridge, as outlined by the 3000-m isobath, resembles a plateau with a series of *en echelon* and overlapping ridges defining the edge of the plateau. Larger isolated seamounts are also present on top of the ridge and coincide with the location of Kingman Reef, Palmyra Atoll, Teraina (formerly Washington Island), Tabuaeran (formerly Fanning Island) and Kiritimati (formerly Christmas Island).

Above 2000 m water depth the plateau is covered by mostly smooth sediments characterized by low EM122 multibeam back scatter and limited or no layering evident in the Knudsen 3.5 kHz subbottom profiler. In some places these sediments were quite thick, and in others volcanic features protruded through the sediment surface. These sediments contained evidence of strong current activity, including not only the smooth surfaces, but also sediment waves, and large sediment drifts in the lee of volcanic features. Attempts to core these sediments were not successful, and the limited material that was captured suggested that these sediments are composed primarily of winnowed foraminifera sands.

The sediments below 2000 m water depths showed predominantly erosional features at the surface. The style of erosion varied, from gently stepping incised terraces near the equator, to more mature looking dendritic channels further north. In general, the ridge tops showed low back scatter on the multibeam suggesting recent sedimentation, and the sides and bottoms of the channels showed higher back scatter suggesting sandy/harder ground. When we crossed channels during seismic reflection surveys they were eroded into older sediment.

Most coring was in areas with erosional features, and core sites were chosen on local highs or ridges in between the more deeply eroded channels between water depths of 2500-3500 m. Sediments consist mainly of carbonate oozes dominated by foraminiferal and nanofosssil components. Bio-siliceous materials were only a minor component of the sediment. Our preliminary shipboard analyses of these ridge top sediments often show a consistent pattern in sediment density as determined by the multi-sensor track (MST) and Late Quaternary microfossil assemblages at the surface suggesting that we recovered recently deposited sediments. The last appearance of *Globogerinoides ruber* (pink) which is dated at 120,000 years BP suggests accumulation rates on the ridge tops ranging from around 2-3 cm kyr^{-1} at the equator to 1.4 cm kyr^{-1} at 7°N (Fig. 1).

In addition to the ridge top sites, we collected cores at two sites in deeper areas (3500-3800 m water depth) with smooth sediments away from the ridge. These cores showed the same consistent regional patterns in MST density, but the foraminiferal assemblage is more dissolved.

Both the multi-channel seismic reflection data (Fig. 2) and the depth of the incised valleys suggest that sediment is more than 500 m thick over much of the ridge, and in many areas over 1000 m thick. Given the 70-85 Ma age of volcanism forming the Line Islands Ridge (Schlanger

et al., 1984), this suggests net sedimentation of at least 0.6 cm kyr^{-1} over the long-term history of the ridge. However, erosional features such as discontinuous layering and filled channels are present through the full sedimentary sequence. This suggests a dynamic sedimentary environment with accumulation of sediment on the ridge matched in part with simultaneous transport of sediment off the ridge through the channel systems throughout the history of this feature.

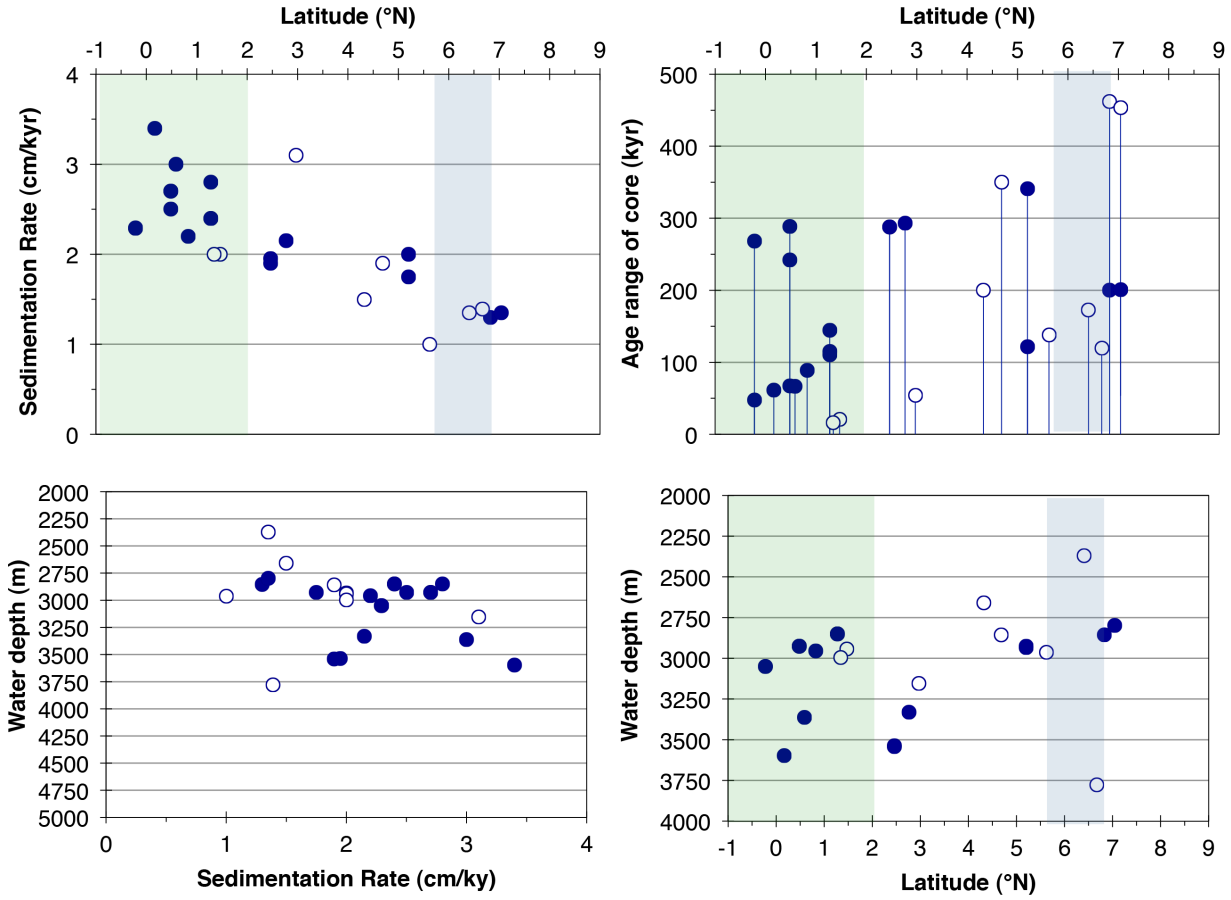


Figure 1 – Estimated sedimentation rate and the age range of cores from MGL12-08. The open circles indicate sedimentation rates and age ranges that are uncertain due to poor correlation of density profiles with the regional stratigraphy. Blue shading shows the seasonal range of ITCZ, green shading the equatorial zone of elevated chlorophyll.

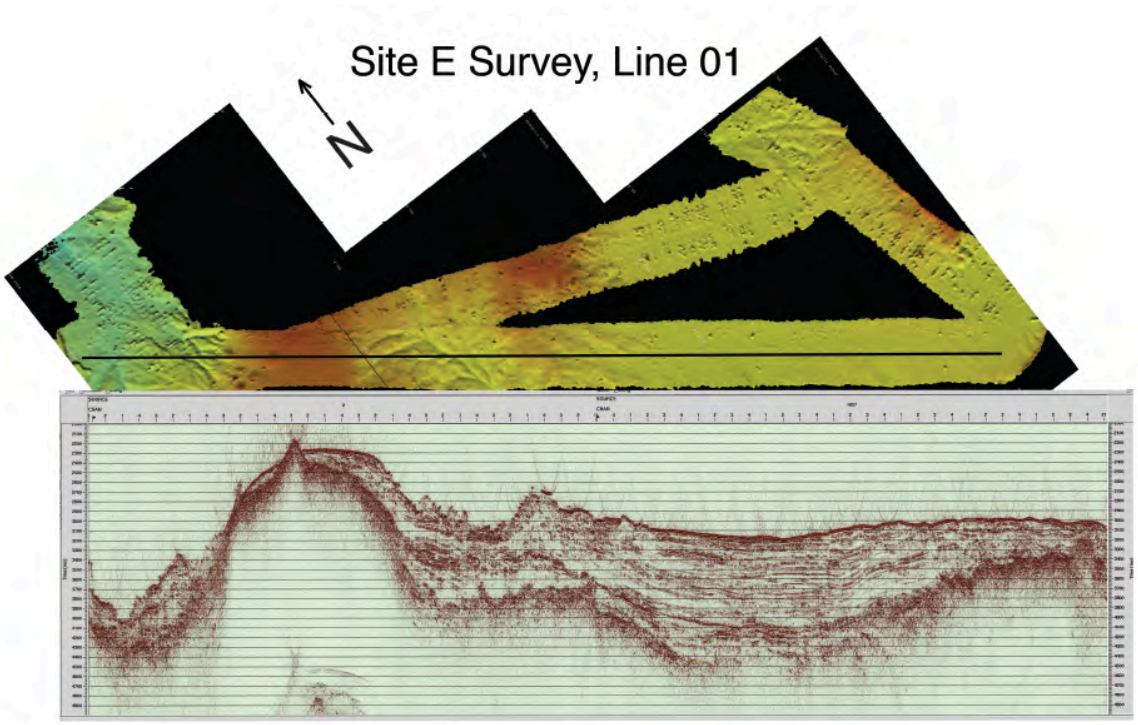


Figure 2 – Multibeam (top) and multi-channel seismic reflection data (bottom) illustrating the smooth, current dominated bathymetry on the shallow ridge tops, the incised valleys on the side of the ridge, and the significant accumulation (more than 500 m) of sediments on the ridge.

5. Oceanographic Environment

The cruise transit started at Hawaii, passing through the relatively cool, high salinity subtropical surface water of the North Pacific Subtropical Gyre, the relatively warm fresh Tropical Surface Waters through the North Equatorial Current (NEC) (8°-20°N) and the relatively warm, salty Equatorial Surface Water in the region of the North Equatorial Counter Current (NECC) and the equator (0-8°N) (Fig. 3).

Subsurface sampling and measurement of seawater properties (CTD/rosette) was between the equator and 8°N. Here, the relatively fresh subtropical underwater of the northern hemisphere characterizes the thermocline at all CTD stations except the station just north of the equator where the saltier subtropical underwater of the southern hemisphere dominates (Fig. 4). The thermocline is shallowest at the 6°N station, at the boundary between the north equatorial current (NEC) and the north equatorial countercurrent (NECC). The core sites between 2500-3800 m water depth are bathed by North Pacific Deep Water (NPDW).

King Neptune visited the ship at 1400 on May 25, 2012, to read charges against the pollywogs on board. After much discussion, the pollywogs were transitioned into crusty shellbacks.

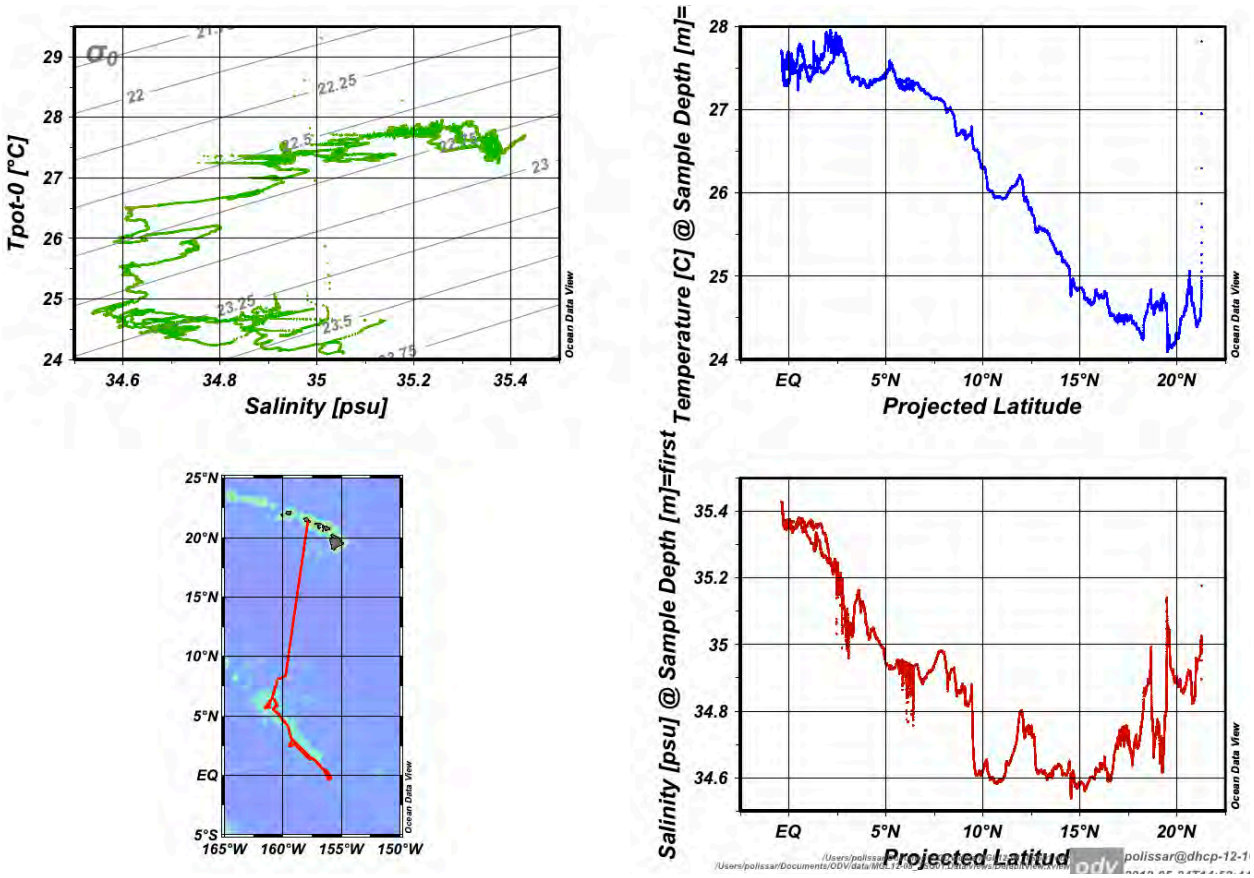


Figure 3 – Surface ocean conductivity and temperature from the ship's seawater intake line during MGL12-08.

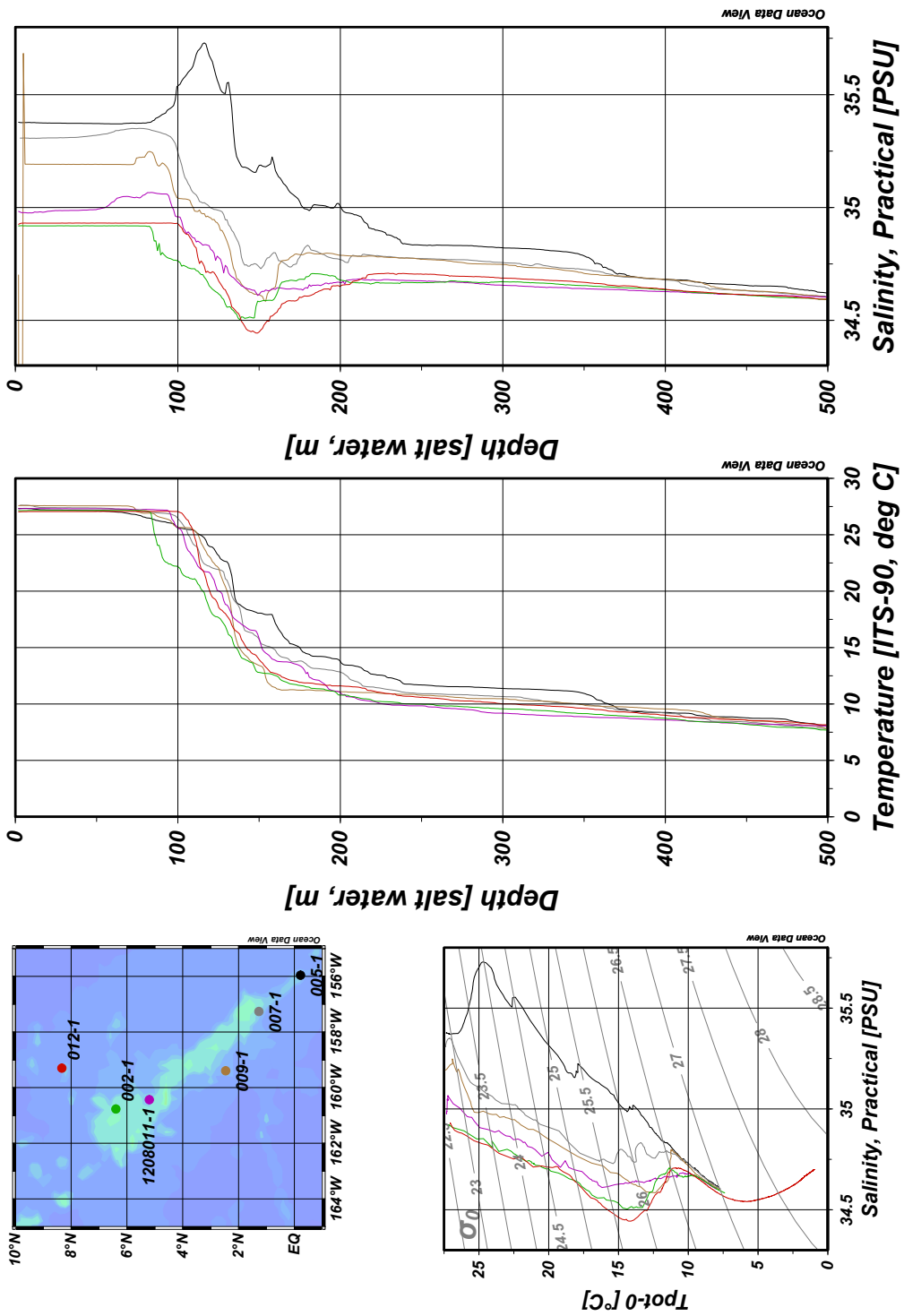


Figure 4 – Upper water column CTD profiles during MGL12-08.

6. Sample Summary

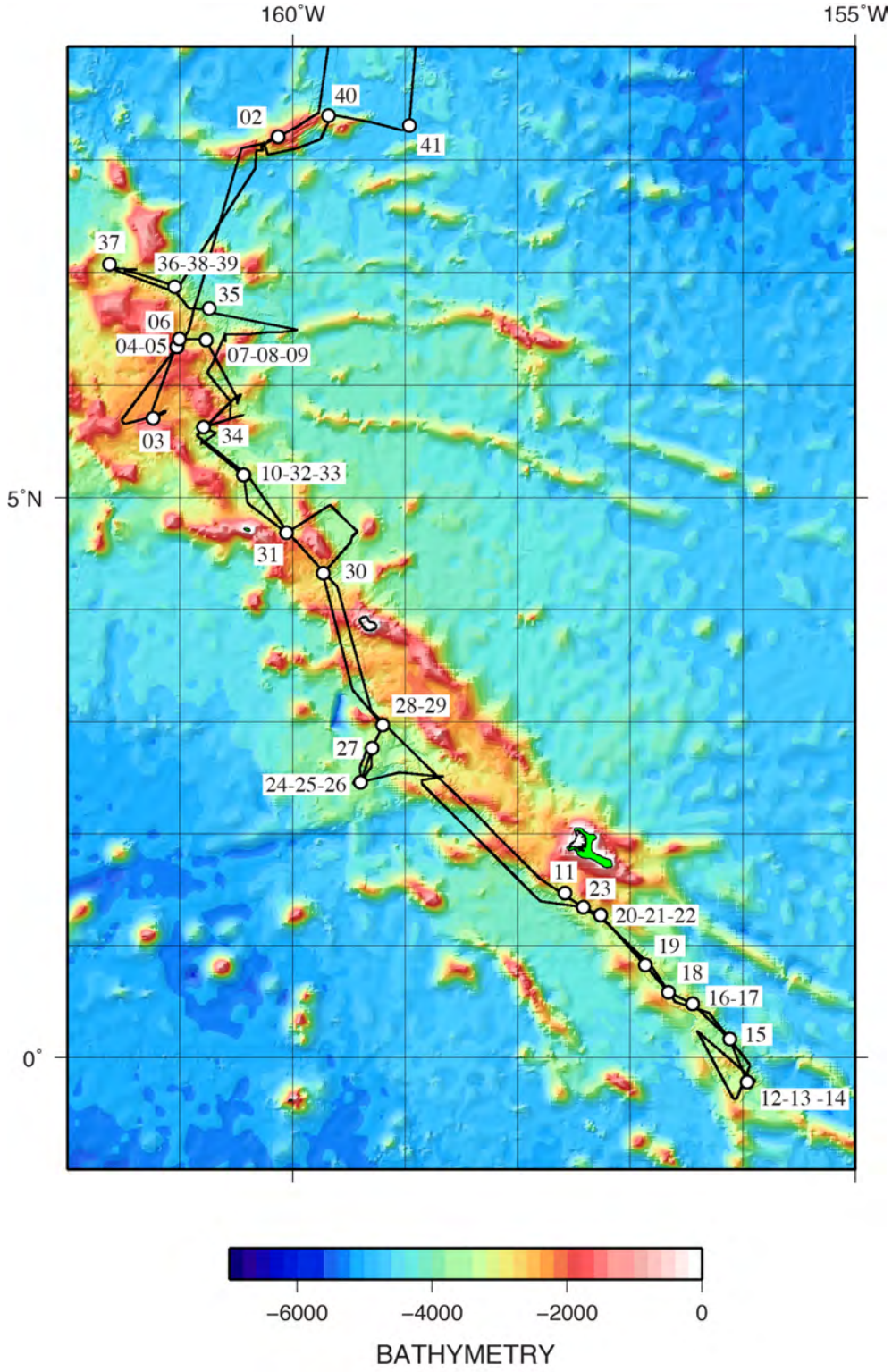


Figure 6 - Bathymetric map showing location of sediment cores.

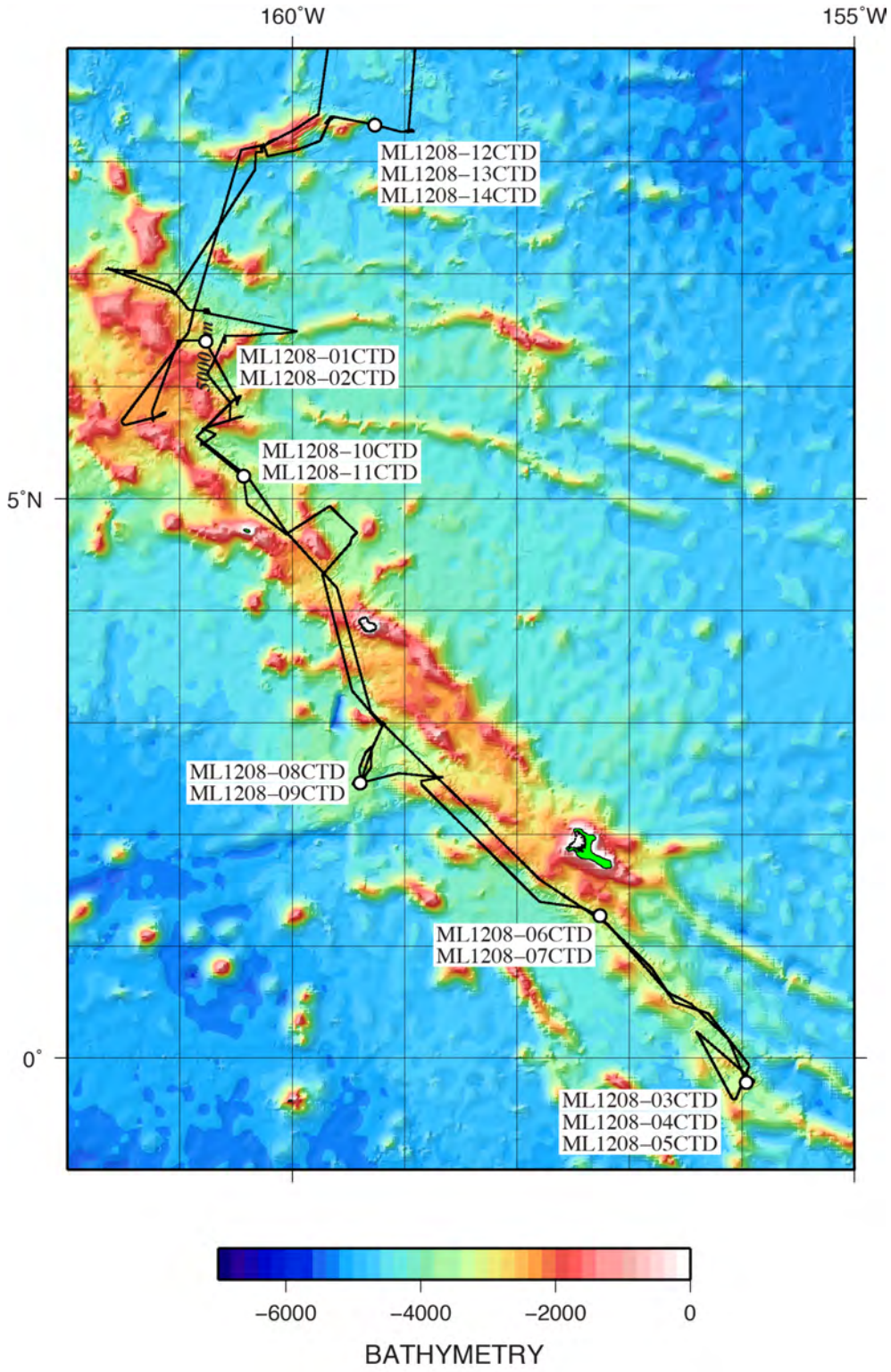


Figure 7 - Bathymetric map showing location of CTD casts.

MGL12-08 Sediment Cores

Site #	Location Name	Core Name	Date GMT	Time GMT	Latitude deg	min	N/S	Longitude deg	min	E/W	MB Water Depth (m)	Core Type	Recovery (m)	# sections
1	Hawaii	ML1208-01PC	5/1/12	7:00	21	11.97	N	158	31.51	W	2960	PC	7.21	5
1	Hawaii	ML1208-01TC	5/1/12	7:00	21	11.97	N	158	31.51	W	2960	TC	1.61	2
2	Core F1	ML1208-02GC	5/5/12	13:00	8	12.26	N	160	7.748	W	1349	GC	0.00	0
3	Core E1	ML1208-03GC	5/6/12	21:19	5	42.22	N	161	14.31	W	2088	GC	0.00	0
4	Core E3	ML1208-04GC	5/7/12	5:52	6	20.42	N	161	1.62	W	1866	GC	0.00	0
5	Core E3	ML1208-05BB	5/7/12	8:47	6	20.43	N	161	1.64	W	1863	BB	0.00	0
6	Core E4	ML1208-06BB	5/7/12	12:09	6	24.48	N	161	0.45	W	2371	BB	2.33	2
7	Core E5	ML1208-07BB	5/7/12	18:30	6	23.89	N	160	46.12	W	3163	BB	3.47	3
8	Core E5	ML1208-08PC	5/8/12	0:35	6	23.88	N	160	46.12	W	3163	PC	6.15	5
8	Core E5	ML1208-08TC	5/8/12	0:35	6	23.88	N	160	46.12	W	3163	TC	1.59	2
9	Core E5	ML1208-09MC	5/8/12	8:11	6	23.9	N	160	46.15	W	3163	MC	0.30	8
10	Core D1	ML1208-10GC	5/8/12	2:15	5	11.86	N	160	26.04	W	2933	GC	2.43	2
11	Core B5	ML1208-11GC	5/10/12	11:34	1	28.15	N	157	34.83	W	2942	GC	0.42	1
12	Core A1	ML1208-12GC	5/12/12	5:30	0	13.17	S	155	57.67	W	3050	GC	1.10	1
13	Core A1	ML1208-13BB	5/12/12	9:45	0	13.18	S	155	57.67	W	3050	BB	6.17	5
14	Core A1	ML1208-14MC	5/12/12	14:34	0	13.18	S	155	57.67	W	3049	MC	0.37	8
15	Core A2	ML1208-15GC	5/13/12	4:52	0	9.87	N	156	7.046	W	3597	GC	2.80	2
16	Core B0	ML1208-16BB	5/13/12	11:41	0	28.92	N	156	26.89	W	2926	BB	6.07	5
17	Core B0	ML1208-17PC	5/13/12	19:31	0	28.89	N	156	26.89	W	2926	PC	7.81	6
17	Core B0	ML1208-17TC	5/13/12	19:31	0	28.89	N	156	26.89	W	2926	TC	2.64	2
18	Core B1	ML1208-18GC	5/14/12	2:32	0	35.13	N	156	39.55	W	3362	GC	2.00	2
19	Core B2	ML1208-19GC	5/14/12	7:58	0	49.51	N	156	52.03	W	2956	GC	1.95	2
20	Core B3	ML1208-20BB	5/14/12	17:08	1	16.41	N	157	15.71	W	2850	BB	5.99	5
21	Core B3	ML1208-21MC	5/14/12	20:44	1	16.41	N	157	15.74	W	2850	MC	0.38	6
22	Core B3	ML1208-22PC	5/15/12	3:56	1	16.43	N	157	15.73	W	2850	PC	7.87	6
22	Core B3	ML1208-22TC	5/15/12	3:56	1	16.43	N	157	15.73	W	2850	TC	2.77	2
23	Core B4	ML1208-23GC	5/15/12	10:09	1	20.68	N	157	25.03	W	2995	GC	0.33	1
24	Core C3	ML1208-24BB	5/16/12	8:57	2	27.76	N	159	23.71	W	3538	BB	5.62	4
25	Core C3	ML1208-25BB	5/16/12	17:18	2	27.76	N	159	23.70	W	3542	BB	5.48	4
26	Core C3	ML1208-26MC	5/17/12	0:04	2	27.76	N	159	23.69	W	3545	MC	0.40	7
27	Core C4	ML1208-27BB	5/17/12	5:33	2	46.14	N	159	17.47	W	3331	BB	6.31	5
28	Core C1	ML1208-28BB	5/17/12	11:58	2	58.31	N	159	11.89	W	3153	BB	6.15	5
29	Core C1	ML1208-29MC	5/17/12	15:37	2	58.3	N	159	11.89	W	3152	MC	0.40	7
30	Core D2	ML1208-30BB	5/18/12	3:21	4	19.35	N	159	43.73	W	2660	BB	5.99	5
31	Core D3	ML1208-31BB	5/18/12	14:53	4	40.97	N	160	3.11	W	2857	BB	6.66	5
32	Core D1	ML1208-32BB	5/18/12	22:46	5	11.84	N	160	26.06	W	2926	BB	5.97	5
33	Core D1	ML1208-33MC	5/19/12	3:55	5	11.85	N	160	26.07	W	2933	MC	0.36	7
34	Core D6	ML1208-34BB	5/19/12	12:17	5	37.42	N	160	47.60	W	2963	BB	5.02	4
35	Core E7	ML1208-35BB	5/20/12	11:08	6	40.17	N	160	43.84	W	3777	BB	4.61	4
36	Core E8	ML1208-36BB	5/20/12	17:46	6	49.62	N	161	2.47	W	2855	BB	6.02	5
37	Core E9	ML1208-37BB	5/21/12	2:39	7	2.616	N	161	38.08	W	2798	BB	6.13	4
38	Core E8	ML1208-38MC	5/21/12	10:30	6	49.61	N	161	2.48	W	2859	MC	0.15	3
39	Core E8	ML1208-39MC	5/21/12	13:30	6	49.6	N	161	2.48	W	2859	MC	0.37	4
40	Core F3	ML1208-40BB	5/22/12	9:20	8	20.46	N	159	41.83	W	2998	BB	1.85	2
41	Core R1	ML1208-41BB	5/23/12	5:35	8	15.65	N	158	57.98	W	4705	BB	5.92	5

MC = multicore
PC = Piston Core
TC = Trigger Core
GC = Gravity Core
BB = "Big Bertha" Gravity Core

MGL12-08 Subsampling of multicores

MC1208-09MC	MC tube position	1	2	3	4	5	6	7	8
MC1208-09MC	length (cm)	28.4	26.4	7.4	28.6	26.8	30	27.6	27.5
MC1208-09MC	PI	Sachs	Marchitto	Katz	Polissar/Lynch-Stieglitz/Murray 2	Archive	Polissar/Lynch-Stieglitz/Murray 1	Ravelo	Marcantonio
MC1208-14MC	MC tube position	1	2	3	4	5	6	7	8
MC1208-14MC	length (cm)	27.25	21.25	36.5	15.75	25	33.25	19	30.5
MC1208-14MC	PI	Ravelo	Archive	Polissar/Lynch-Stieglitz/Murray 1	Katz	Marcantonio	Polissar/Lynch-Stieglitz/Murray 2	Marchitto	Sachs
MC1208-21MC	MC tube position	1	2	3	4	5	6	7	8
MC1208-21MC	length (cm)	empty	23	38	empty	5	31.2	28.9	22.7
MC1208-21MC	PI	empty	Sachs	Polissar/Lynch-Stieglitz/Murray 1	empty	Ravelo	Polissar/Lynch-Stieglitz/Murray 2	Marcantonio	Archive
MC1208-26MC	MC tube position	1	2	3	4	5	6	7	8
MC1208-26MC	length (cm)	39.5	30.5	38	empty	37	38	30	37
MC1208-26MC	PI	Polissar/Lynch-Stieglitz/Murray 1	Katz	Marcantonio	empty	Polissar/Lynch-Stieglitz/Murray 2	Sachs	Marchitto	Ravelo
MC1208-29MC	MC tube position	1	2	3	4	5	6	7	8
MC1208-29MC	length (cm)	38.5	30.5	40	empty	32.5	32	25.5	32
MC1208-29MC	PI	Polissar/Lynch-Stieglitz/Murray 1	Marchitto	Polissar/Lynch-Stieglitz/Murray 2	empty	Sachs	Marcantonio	Katz	Ravelo
MC1208-33MC	MC tube position	1	2	3	4	5	6	7	8
MC1208-33MC	length (cm)	35	33	34	37	31 Maloney/Sachs (water drained out, took for lipid method development)	36	35	32
MC1208-33MC	PI	Sachs	Katz	Polissar/Lynch-Stieglitz/Murray 1	Ravelo	empty	Marchitto	Polissar/Lynch-Stieglitz/Murray 2	Marcantonio
MC1208-38MC	MC tube position	1	2	3	4	5	6	7	8
MC1208-38MC	length (cm)	empty	empty	empty	5.5 (disturbed sed)	empty	13	14.5	10 (disturbed sed)
MC1208-38MC	PI	empty	empty	empty	Katz	empty	Marchitto	Marcantonio	Archive
MC1208-39MC	MC tube position	1	2	3	4	5	6	7	8
MC1208-39MC	length (cm)	19.5	22.25	37.5	no tube	21.5	no tube	no tube	no tube
MC1208-39MC	PI	Ravelo	Polissar/Lynch-Stieglitz/Murray 2	Polissar/Lynch-Stieglitz/Murray 1	-	Sachs	-	-	-

Biostratigraphy

Core	Site	Section (pre-core)	Section	Top/ Bottom	Depth (cm)	*G. ruber* (pink)	*G. ruber* (transitional)	*G. fistulosus*	*Discoaster*	Note
ML1208-01PC	Hawaii	V	1	T	0	absent			absent	
ML1208-01PC	Hawaii	IV	2	T	144	present				
ML1208-01PC	Hawaii	III	3	T	298	present				
ML1208-01PC	Hawaii	CC			721	present			absent	
ML1208-01TC	Hawaii	I	2	T	78	absent			absent	
ML1208-01TC	Hawaii	CC			161	present			absent	
ML1208-03GC	E1	CC			0	absent				
ML1208-04GC	E3	CC			0	absent				
ML1208-05BB	E3	CC			0	present				
ML1208-06BB	E4	II	1	T	0	absent				
ML1208-06BB	E4	I	2	T	129.4	absent				
ML1208-06BB	E4	CC			232.7	present				
ML1208-07BB	E5	III	1	T	0	present				
ML1208-07BB	E5	II	2	T	50.3	present				
ML1208-07BB	E5	I	3	T	200.4	present				
ML1208-07BB	E5	CC			346.6	present			absent	
ML1208-08PC	E5	V	1	T	0	present				
ML1208-08PC	E5	IV	2	T	36.5	present				
ML1208-08PC	E5	III	3	T	189.5					
ML1208-08PC	E5	II	4	T	343.4					
ML1208-08PC	E5	I	5	T	494.1					
ML1208-08PC	E5	CC			614.6				absent	
ML1208-08TC	E5	II	1	T	0	absent	present			
ML1208-09MC	E5			T	0.25	absent				
ML1208-09MC	E5			B	28.5	absent				
ML1208-10GC	D1	II	1	T	0	absent				
ML1208-10GC	D1	I	2	T	106.2	absent				

Core	Site	Section (pre-core)	Section	Top/ Bottom	Depth (cm)	*G. ruber* (pink)	*G. ruber* (transitional)	*G. fistulosus*	*Discoaster*	Note
ML1208-10GC	D1	CC			243.6	absent			absent	
ML1208-11GC	B5	I	1	T	0	absent	absent			
ML1208-11GC	B5	CC			42	absent	absent		absent	
ML1208-12GC	A1	I	1	T	0	absent	absent			
ML1208-12GC	A1	CC			110	absent	absent		absent	
ML1208-13BB	A1	V	1	T	0	absent	absent			
ML1208-13BB	A1	IV	2	T	49.8	absent	absent			
ML1208-13BB	A1	III	3	T	174.5	absent	absent			
ML1208-13BB	A1	II	4	T	323.1	present	present			
ML1208-13BB	A1	I	5	T	471.3	present	present			
ML1208-13BB	A1	CC			616.7	present	absent		absent	
ML1208-15GC	A2	I	2	T	133.5	absent	absent			
ML1208-15GC	A2	CC			279.9	absent	absent		absent	
ML1208-16BB	B0	V	1	T	0	absent	absent			
ML1208-16BB	B0	IV	2	T	69	absent	absent			
ML1208-16BB	B0	III	3	T	170	absent	absent			
ML1208-16BB	B0	II	4	T	318	present	present			
ML1208-16BB	B0	I	5	T	466					
ML1208-16BB	B0	CC			607				absent	
ML1208-17PC	B0	VI	1	T	0	absent	absent			
ML1208-17PC	B0	V	2	T	50	absent	absent			
ML1208-17PC	B0	IV	3	T	206	absent	absent			
ML1208-17PC	B0	III	4	T	361	present	present			
ML1208-17PC	B0	CC	CC		780.6				absent	
ML1208-17TC	B0	II	1	T	0	absent	absent			
ML1208-17TC	B0	I	2	T	122.5	absent	absent			
ML1208-17TC	B0	CC	CC		264	absent	absent		absent	
ML1208-18GC	B1	I	2	T	60	absent	absent			
ML1208-18GC	B1	CC	CC		200	absent	absent		absent	

Core	Site	Section (pre-core)	Section	Top/ Bottom	Depth (cm)	*G. ruber* (pink)	*G. ruber* (transitional)	*G. fistulosus*	*Discoaster*	Note
ML1208-19GC	B2	CC	CC		195	absent	absent		absent	
ML1208-20BB	B3	III	3	T	169	absent	absent			
ML1208-20BB	B3	II	4	T	310	present	present			
ML1208-20BB	B3	I	5	T	457	absent	present			Dissolved forams
ML1208-20BB	B3	CC	CC			absent	absent		absent	
ML120822PC	B3		3	T	206.8	absent	absent			
ML120822PC	B3		4	T	361.7	present	absent			foram species not late pleistocene
ML120822PC	B3		5	T	514.6	absent	absent			
ML120822PC	B3	CC	CC		787.3				absent	
ML1208-23GC	B4	I	1	T	0	absent	absent		rare (<5)	
ML1208-23GC	B4	CC			32.8	present	present			
ML1208-24BB	C3	IV	1	T	0	absent	absent			
ML1208-24BB	C3	III	2	T	131.9	absent	absent			
ML1208-24BB	C3	II	3	T	273.8	absent	absent			
ML1208-24BB	C3	I	4	T	421.3	absent	absent			
ML1208-24BB	C3	CC			562	absent	absent		absent	
MB1208-25BB	C3	IV	1	T	0	absent				Preserv. Ok, not 100%
MB1208-25BB	C3	III	2	T	123	absent				Preserv. Ok
MB1208-25BB	C3	II	3	T	261	present				Preserv. Ok, not 100%
MB1208-25BB	C3	I	4	T	409	present				Preserv. Poor
MB1208-25BB	C3	CC			547	absent			absent	
MB1208-27BB	C4	III	3	T	189.1	absent	absent			Preserv. Good
MB1208-27BB	C4	II	4	T	336.1	present	present			Preserv. Good
MB1208-27BB	C4	CC			631.1	present	absent		absent	Preserv. Ok
MB1208-28BB	C1	IV	2	T	71.9	absent	absent			Preserv. Good
MB1208-28BB	C1	III	3	T	178.9	absent	present			Preserv. Good
MB1208-28BB	C1	II	4	T	322.9	present	present			Preserv. Good
MB1208-28BB	C1	CC	CC		614.5				absent	

Core	Site	Section (pre-core)	Section	Top/ Bottom	Depth (cm)	*G. ruber* (pink)	*G. ruber* (transitional)	*G. fistulosus*	*Discoaster*	Note
MB1208-30BB	D2	V	1	T	0	absent				
MB1208-30BB	D2	IV	2	T	47.8	absent				
MB1208-30BB	D2	III	3	T	180.8	present				
MB1208-30BB	D2	II	4	T	325.8	present				
MB1208-30BB	D2	I	5	T	471.8	present				
MB1208-30BB	D2	CC	CC		598.8				absent	
MB1208-31BB	D3	IV	2	T	96.9	absent	absent			
MB1208-31BB	D3	III	3	T	245.9	present	absent			
MB1208-31BB	D3	II	4	T	386.9	present				
MB1208-31BB	D3	CC	CC		665.5				absent	
MB1208-32BB	D1	IV	2	T	11.9	absent	absent			
MB1208-32BB	D1	III	3	T	159.9	absent	absent			
MB1208-32BB	D1	II	4	T	308.9	present				
MB1208-32BB	D1	CC	CC		597.1				absent	
MB1208-34BB	D6	IV	1	T	0.9	absent	absent			
MB1208-34BB	D6	III	2	T	69.9	present	present			
MB1208-34BB	D6	II	3	T	212.9	present	present			
MB1208-34BB	D6	I	4	T	358.9	present	present			
MB1208-34BB	D6	CC	CC		501.6				absent	
MB1208-35BB	E7	III	2	T	24.4	absent	absent			
MB1208-35BB	E7	II	3	T	172.3	absent	present			
MB1208-35BB	E7	I	4	T	320.8	present	present			
MB1208-35BB	E7	CC	CC		461.3				rare (<5)	
MB1208-36BB	E8	IV	2	T	53.9	absent	absent			
MB1208-36BB	E8	III	3	T	174.6	present	present			
MB1208-36BB	E8	II	4	T	320.9	present	present			
MB1208-36BB	E8	I	5	T	463	absent	absent	present	rare (<5)	
MB1208-36BB	E8	CC	CC		601.8	absent	absent	present	abundant	
MB1208-37BB	E9	IV	2	T	17.8	absent	absent			
MB1208-37BB	E9	III	3	T	172.7	present	present			
MB1208-37BB	E9	II	4	T	327.3	present	present			

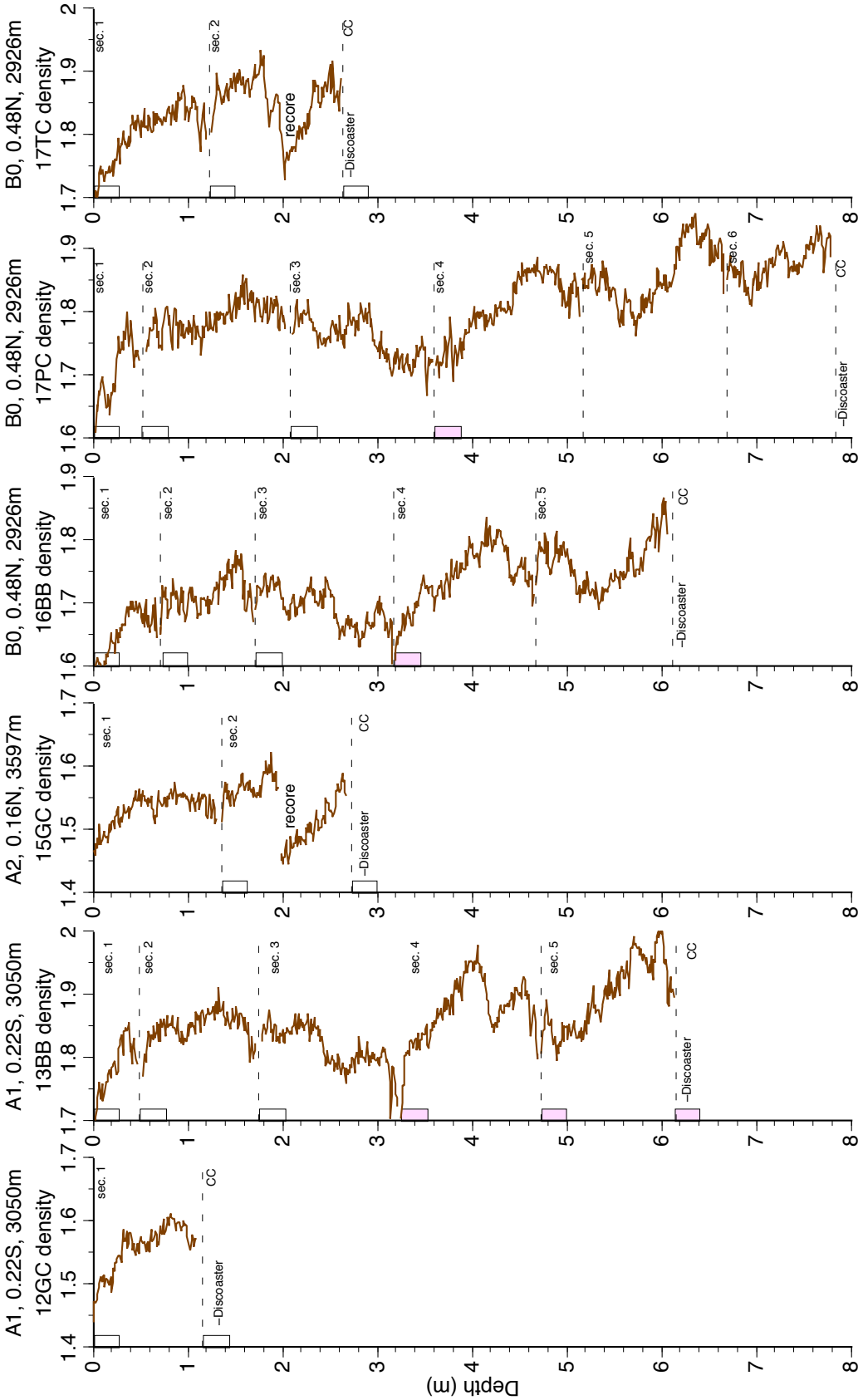
Core	Site	Section (pre-core)	Section	Top/ Bottom	Depth (cm)	*G. ruber* (pink)	*G. ruber* (transitional)	*G. fistulosus*	*Discoaster*	Note
MB1208-37BB	E8	I	5	T	481.4	present				
MB1208-37BB	E9	CC	CC		612.9	absent (poor pres.)	absent (poor pres.)	absent	rare (<5)	
MB1208-40BB	F3	II	1	T	0	present		absent	present	
MB1208-40BB	F3	I	2	T	38.1	absent		absent		
MB1208-40BB	F3	CC	CC		184.6	absent			abundant	

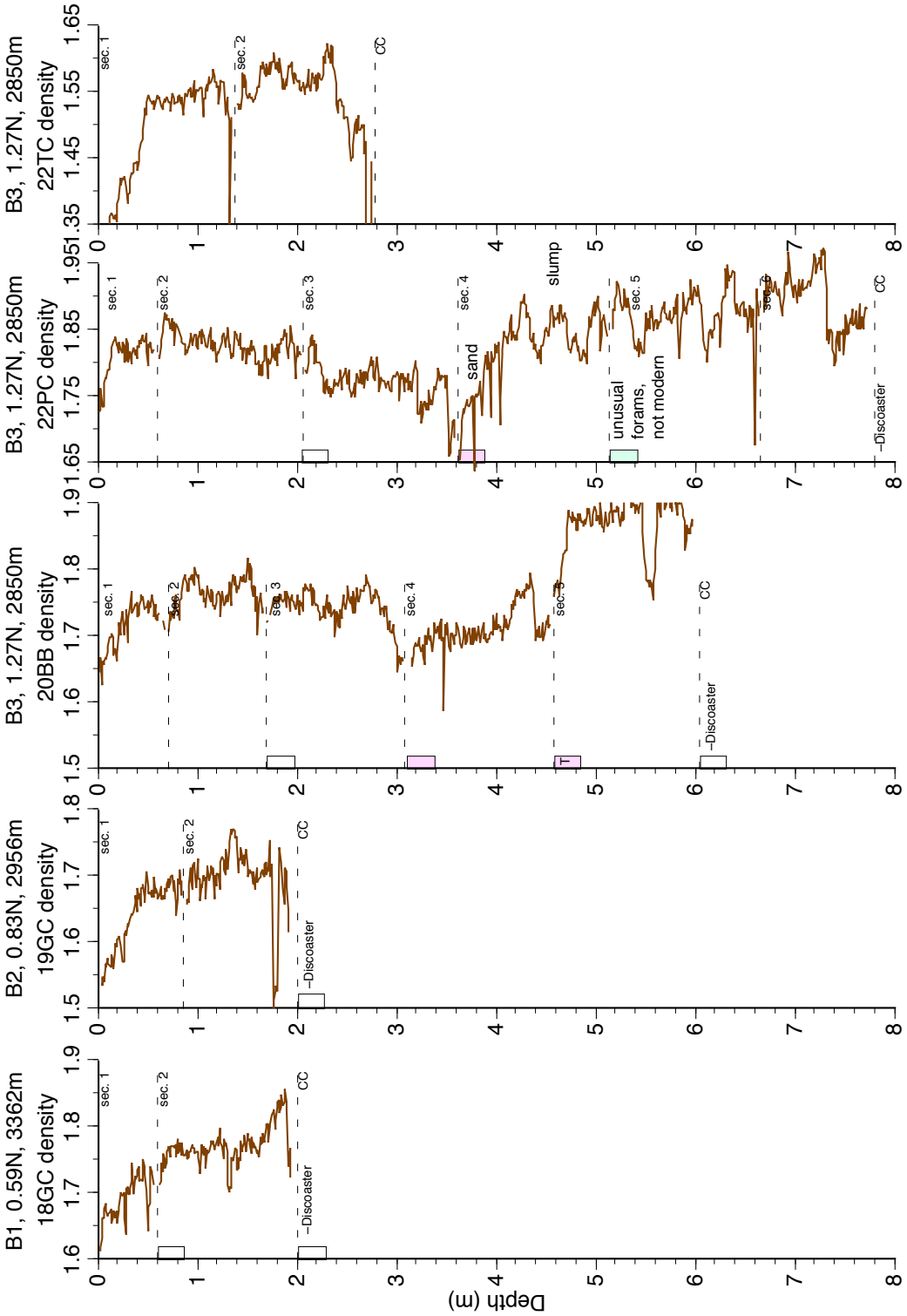
MGL12-08 CTD Casts

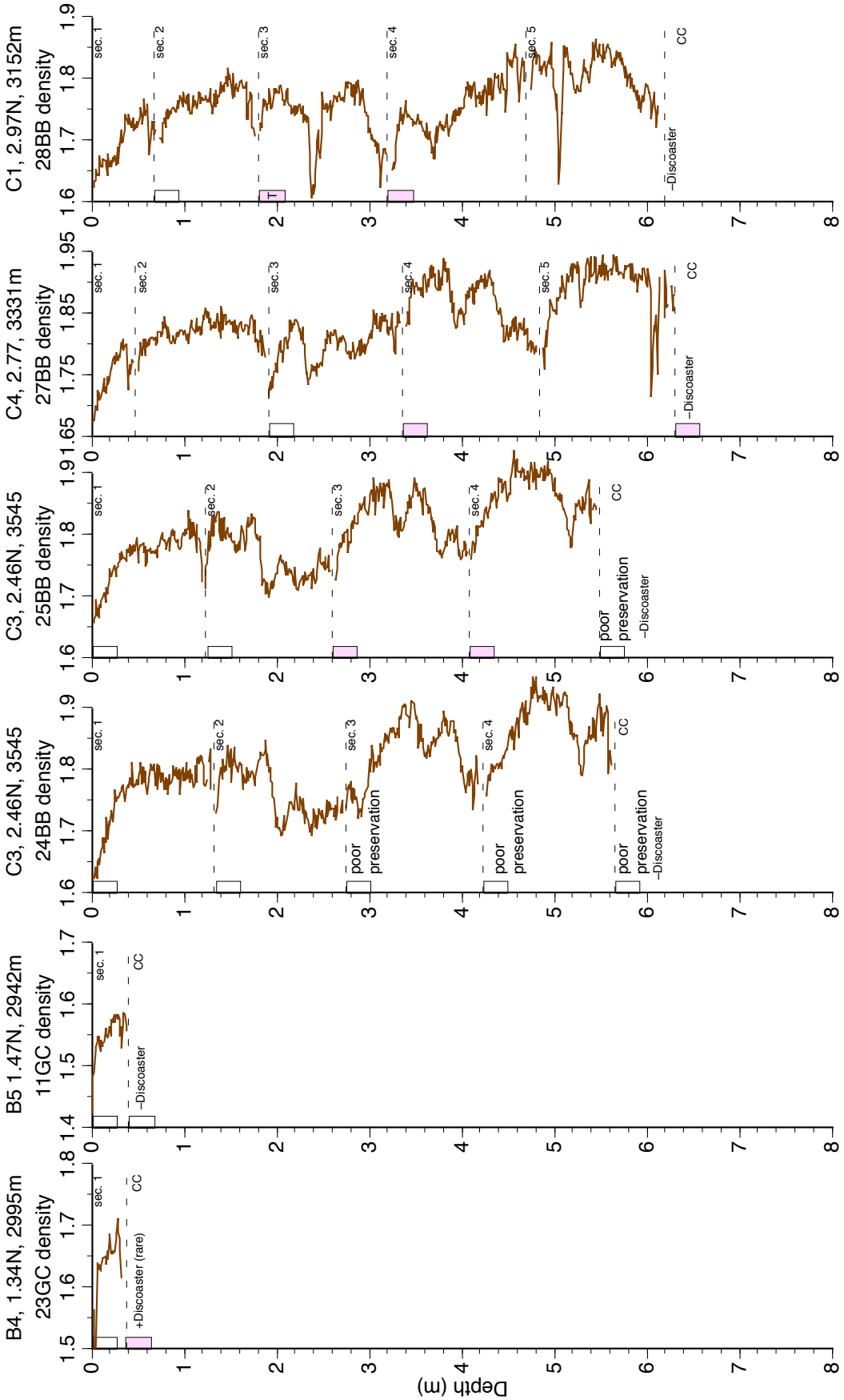
Cruise	Cast ID	GMT Date/Time	Lat (deg)	Lat (min.mm)	N/S	Lon (deg)	Lon (min.mm)	E/W	Filename	Bottom Depth	Cast Depth
MGL12-08	ML1208-01CTD	5/8/12 10:08	6	23.884	N	160	46.155	W	1208001	3177	Mixed Layer
MGL12-08	ML1208-02CTD	5/8/12 11:46	6	23.884	N	160	46.155	W	1208002	3177	500 m
MGL12-08	ML1208-03CTD	5/12/12 15:00?	0	13.166	S	155	57.668	W	1298003	3055	3038 m (12 m above bottom)
MGL12-08	ML1208-04CTD	5/12/12 21:00	0	13.178	S	155	57.669	W	1208004	3058	200 m
MGL12-08	ML1208-05CTD	5/12/12 22:15	0	13.186	S	155	57.668	W	1208005	3057	500 m
MGL12-08	ML1208-06CTD	5/14/12 22:45	1	16.4350	N	157	15.7300	W	1208006	2850	200 m
MGL12-08	ML1208-07CTD	5/14/12 23:27	1	16.4350	N	157	15.7300	W	1208007	2850	500 m
MGL12-08	ML1208-08CTD	5/16/12 19:47	2	27.7770	N	159	23.7170	W	1208008	3518	200 m
MGL12-08	ML1208-09CTD	5/16/12 21:00	2	27.7550	N	159	23.6950	W	1208009	3518	500 m
MGL12-08	ML1208-10CTD	5/19/12 0:44	5	11.8380	N	160	26.0510	W	1208010	2925	200 m
MGL12-08	ML1208-11CTD	5/19/12 1:22	5	11.8380	N	160	26.0490	W	1208011	2932	500 m
MGL12-08	ML1208-12CTD	5/22/12 15:22	8	19.9890	N	159	18.0000	W	1208012	4618	4608 m (10 m above bottom)
MGL12-08	ML1208-13CTD	5/22/12 21:09	8	19.9910	N	159	18.0050	W	1208013	4618	100 m
MGL12-08	ML1208-14CTD	5/22/12 21:56	8	19.9870	N	159	18.0030	W	1208014	4638	500 m

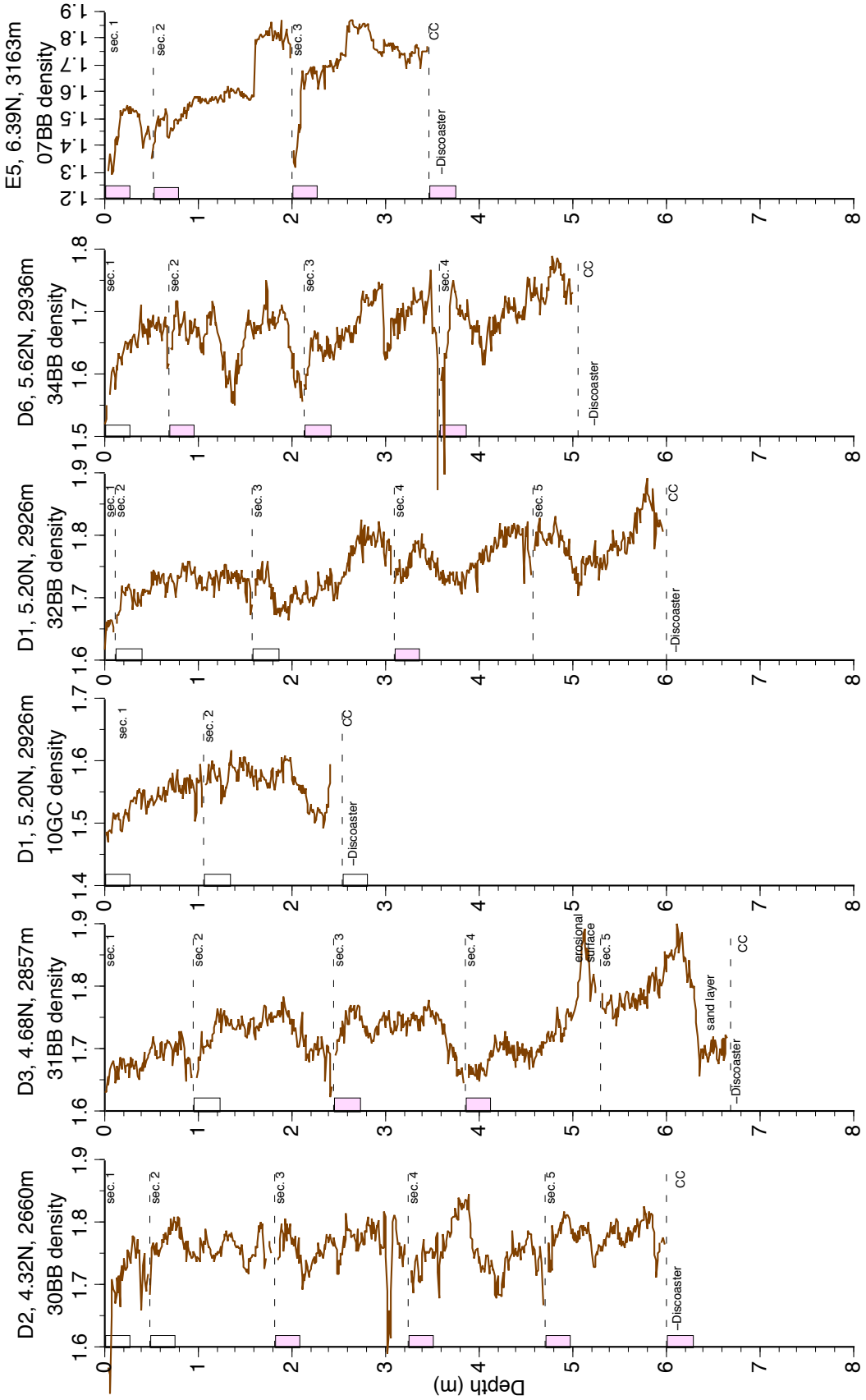
7. MST Density Profiles and Biostratigraphy

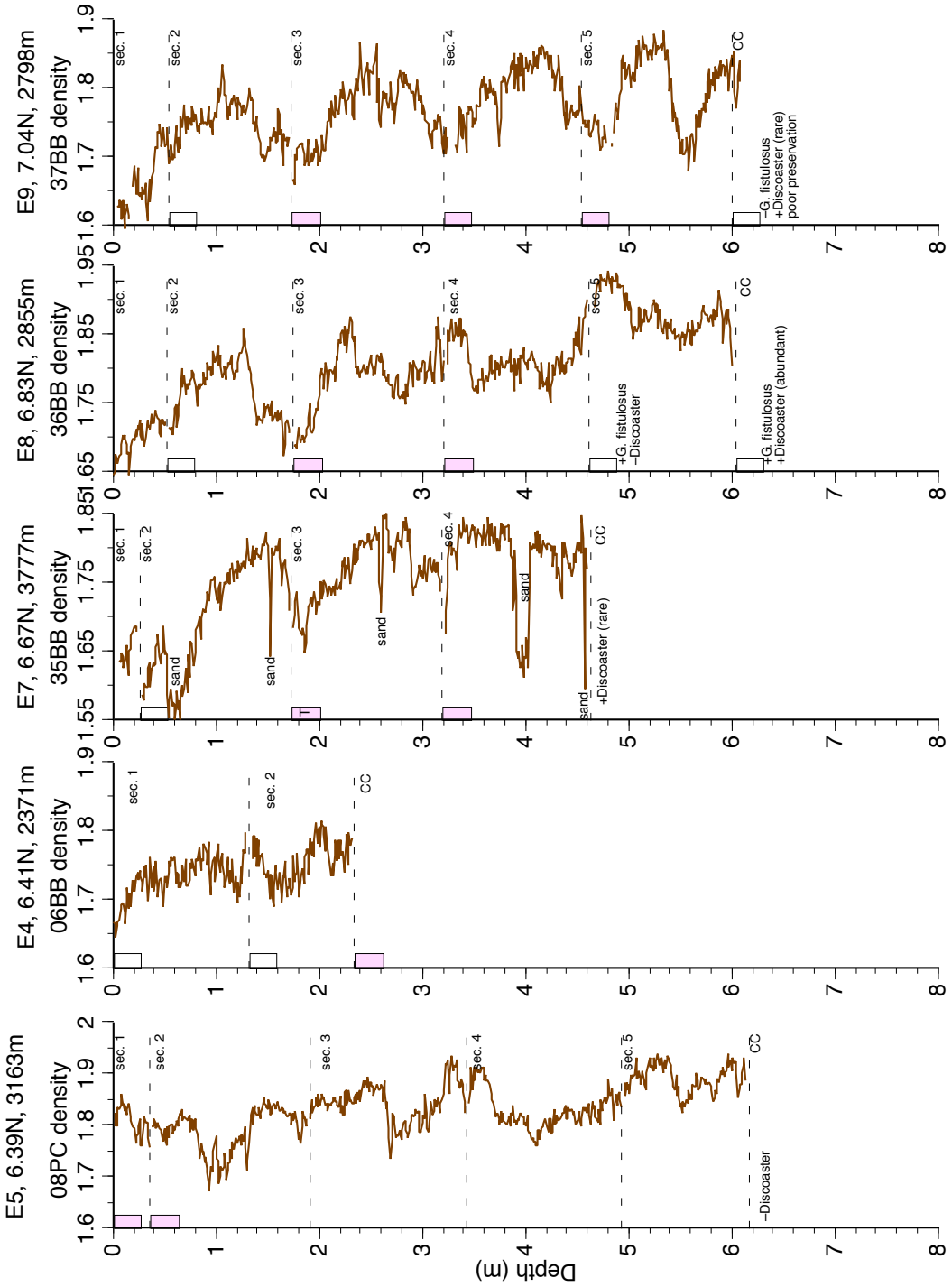
The multi-sensor track density profiles from many of the cores in the Line Islands shared characteristics allowing preliminary correlation between cores and core sites. These density profiles are presented here along with the biostratigraphic information. Rectangles at core breaks indicate samples analyzed for the presence of pink and white forms of *G. ruber*, and where noted, *G. fistulosus*. Pink and white rectangles identify the presence or absence of *G. ruber* (pink) while "T" in the rectangle identifies a transitional pink form with extremely light coloring. The presence/absence and relative abundance of *Discoaster* is noted where it was checked in smear slides (*-Discoaster* = absent, *+Discoaster* = present).

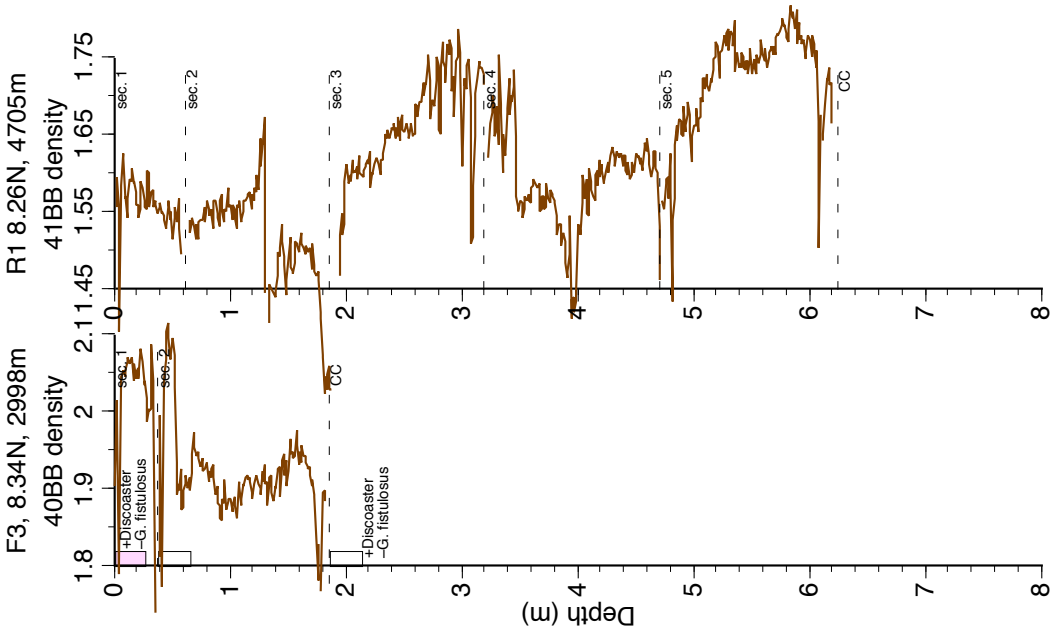

B0, 0.48N, 2926m
17TC density
sec. 1
sec. 2
recore
Discoaster
CC
B0, 0.48N, 2926m
17PC density
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
sec. 6
Discoaster
CC
B0, 0.48N, 2926m
16BB density
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
Discoaster
CC
A2, 0.16N, 3597m
15GC density
sec. 1
sec. 2
recore
Discoaster
CC
A1, 0.22S, 3050m
13BB density
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
Discoaster
CC
A1, 0.22S, 3050m
12GC density
sec. 1
Discoaster
CC
Depth (m)


B3, 1.27N, 2850m
22TC density
B3, 1.27N, 2850m
22PC density
B3, 1.27N, 2850m
20BB density
B2, 0.83N, 2956m
19GC density
B1, 0.59N, 3362m
18GC density
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
sec. 6
CC
slump
sand
unusual forams, not modern
Discoaster
T
Depth (m)


B4, 1.34N, 2995m
23GC density
+Discoaster (rare)
CC
sec. 1
B5 1.47N, 2942m
11GC density
–Discoaster
CC
sec. 1
C3, 2.46N, 3545
24BB density
poor preservation
–Discoaster
CC
sec. 1
sec. 2
sec. 3
sec. 4
C3, 2.46N, 3545
25BB density
poor preservation
–Discoaster
CC
sec. 1
sec. 2
sec. 3
sec. 4
C4, 2.77, 3331m
27BB density
–Discoaster
CC
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
C1, 2.97N, 3152m
28BB density
–Discoaster
CC
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
Depth (m)


E5, 6.39N, 3163m
07BB density
D6, 5.62N, 2936m
34BB density
D1, 5.20N, 2926m
32BB density
D1, 5.20N, 2926m
10GC density
D3, 4.68N, 2857m
31BB density
D2, 4.32N, 2660m
30BB density
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
CC
Discoaster
erosional surface
sand layer
Depth (m)


E9, 7.04N, 2798m
37BB density
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
CC
–G. fistulosus
+Discoaster (rare)
poor preservation
E8, 6.83N, 2855m
36BB density
+G. fistulosus
–Discoaster
+G. fistulosus
+Discoaster (abundant)
E7, 6.67N, 3777m
35BB density
sand
+Discoaster (rare)
E4, 6.41N, 2371m
06BB density
E5, 6.39N, 3163m
08PC density
–Discoaster
Depth (m)


R1 8.26N, 4705m
41BB density
1.75
1.65
1.55
1.45
sec. 1
sec. 2
sec. 3
sec. 4
sec. 5
CC
F3, 8.34N, 2998m
40BB density
2.1
2
1.9
1.8
sec. 1
sec. 2
CC
+Discoaster
–G. fistulosus
+Discoaster
–G. fistulosus
0
1
2
3
4
5
6
7
8
Depth (m)

8. Appendices

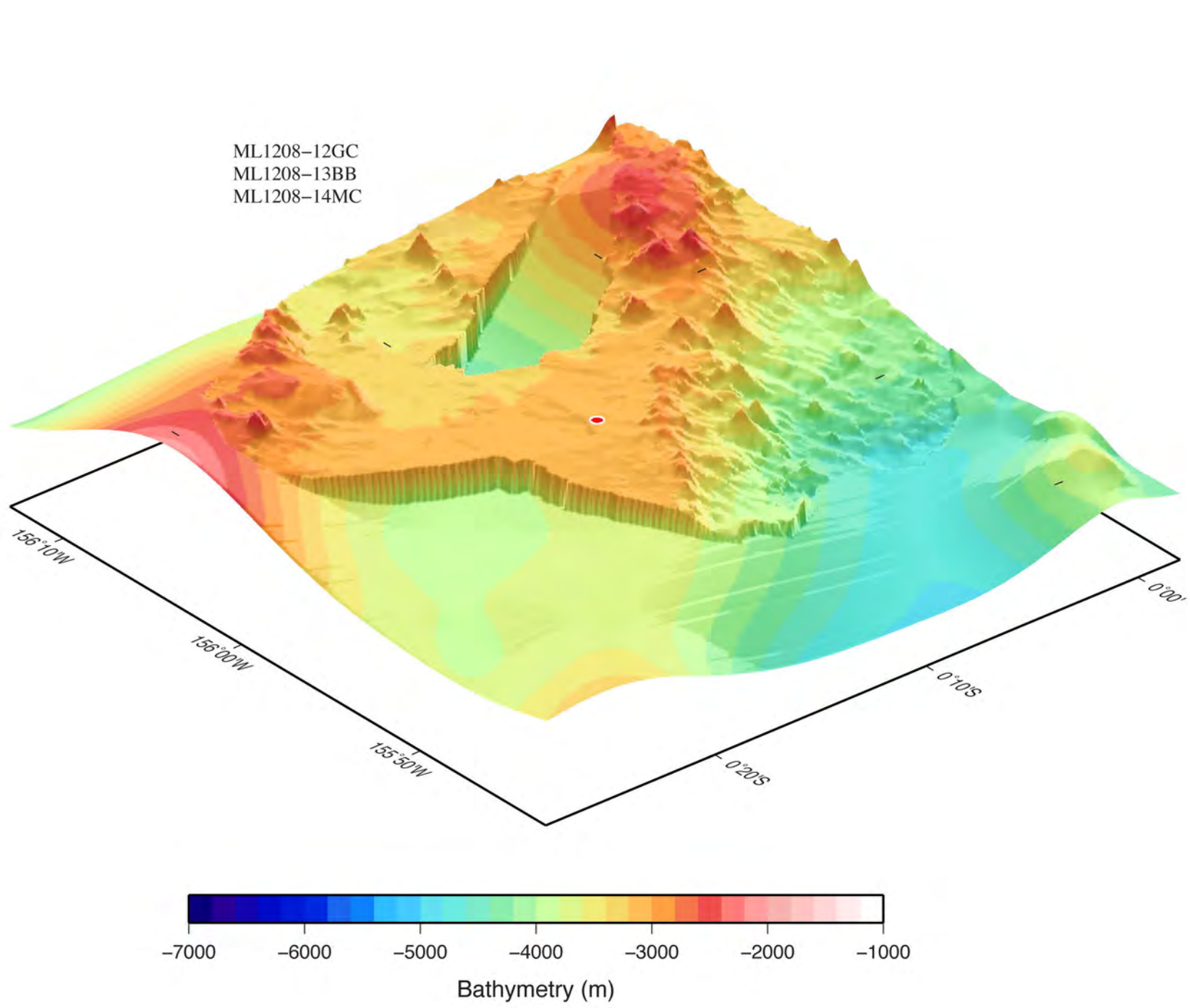
Core Site bathymetric and backscatter maps

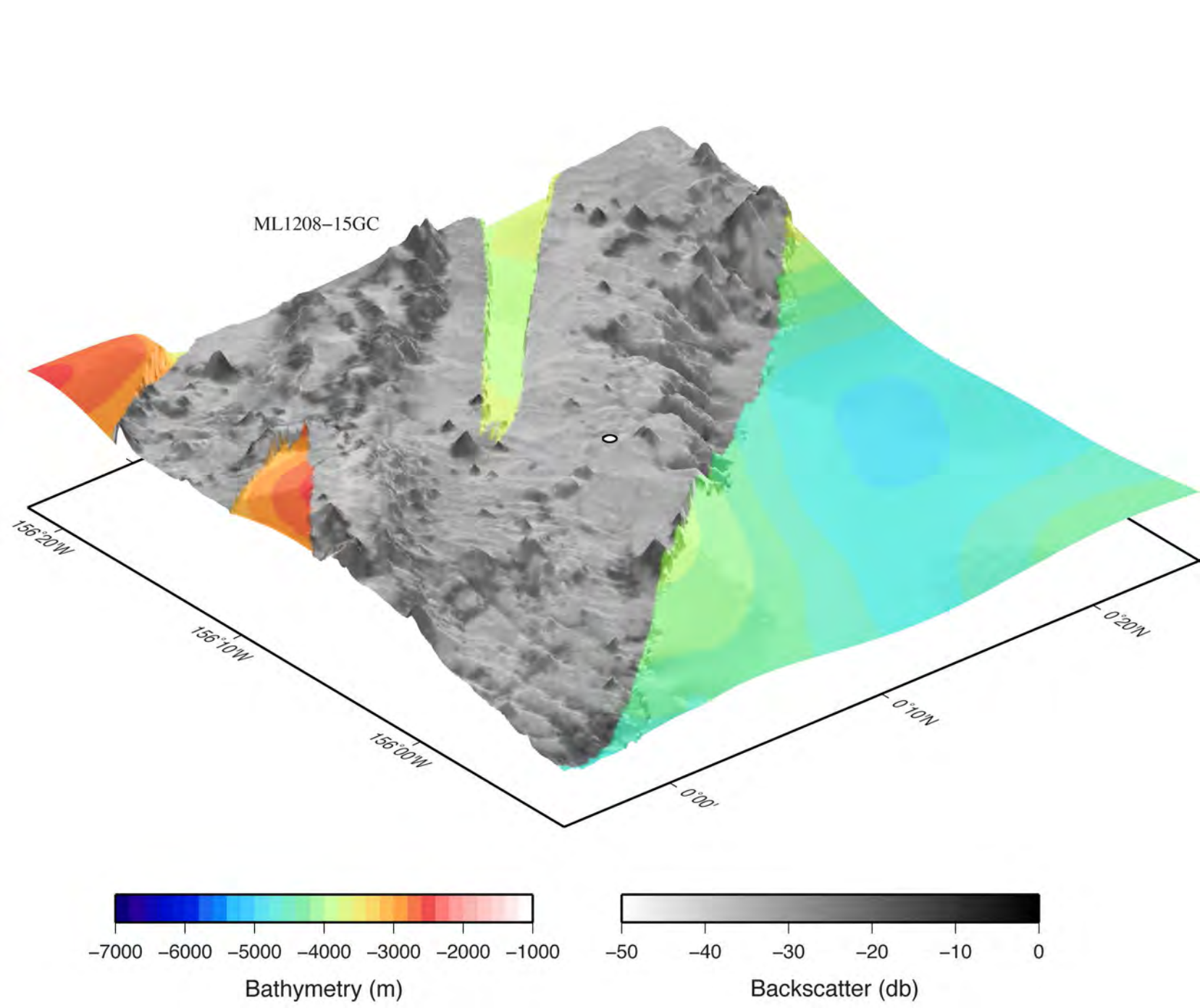
CTD/Rosette protocol and sampling

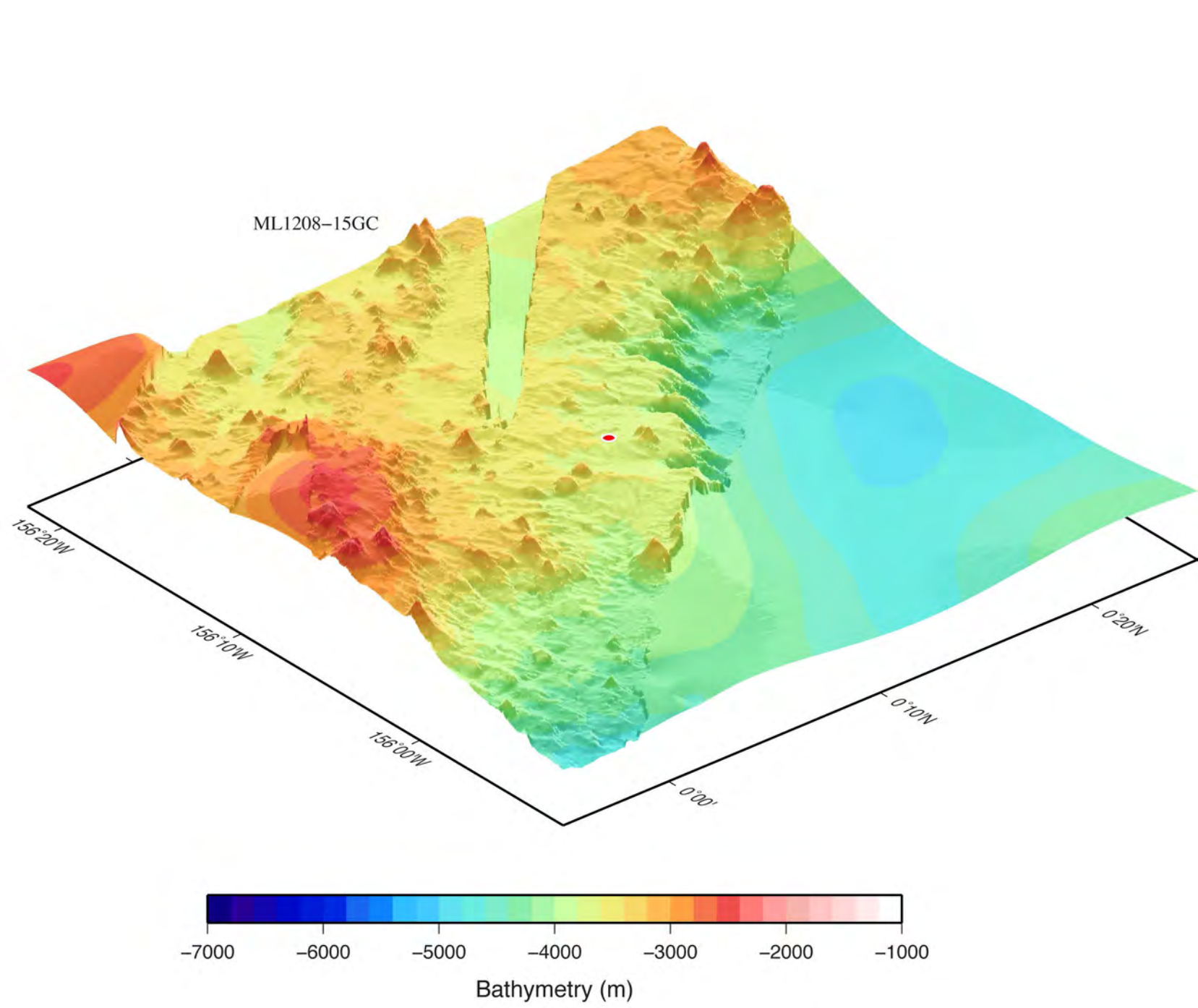
Individual water sampling procedures

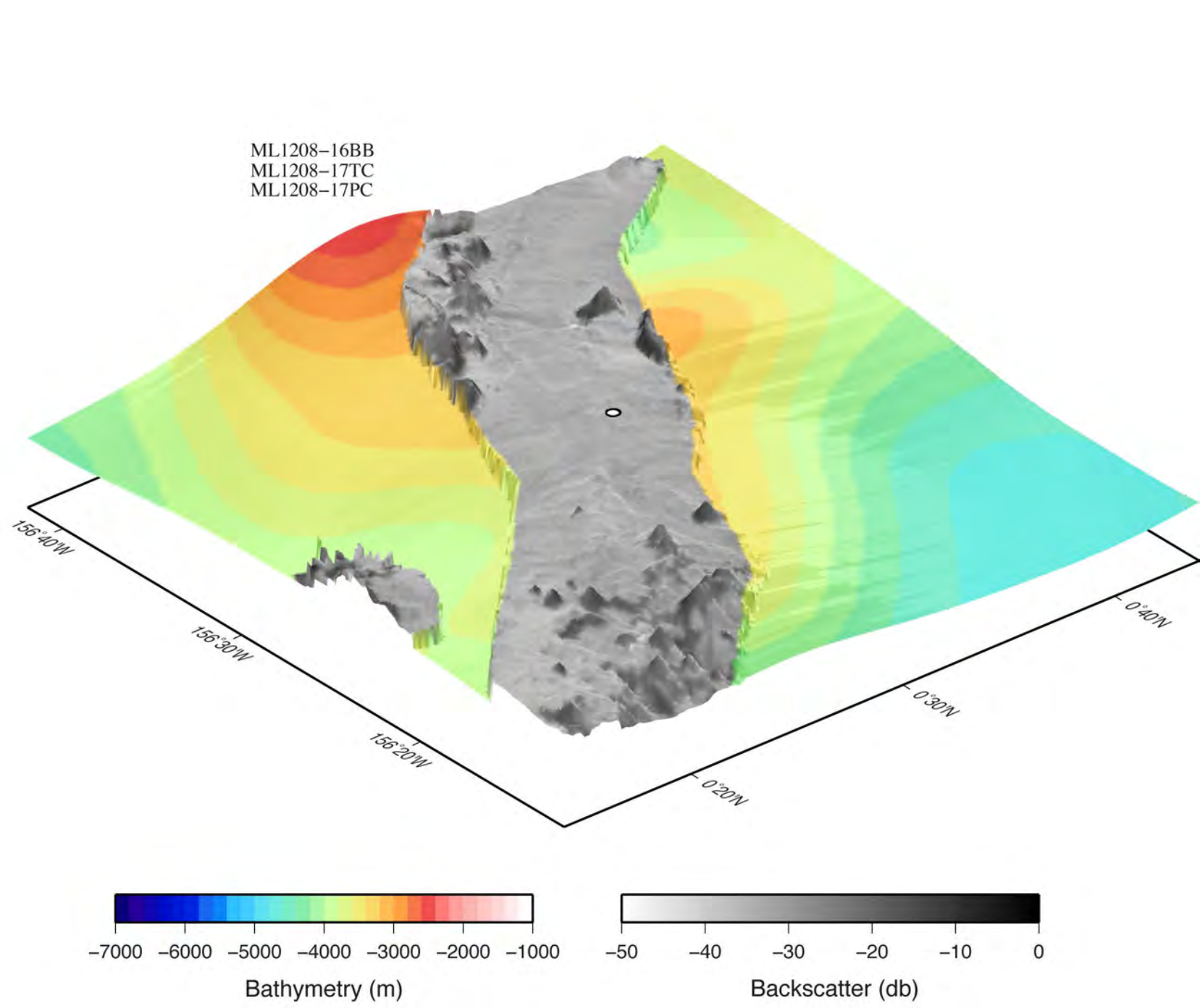
Core Logs

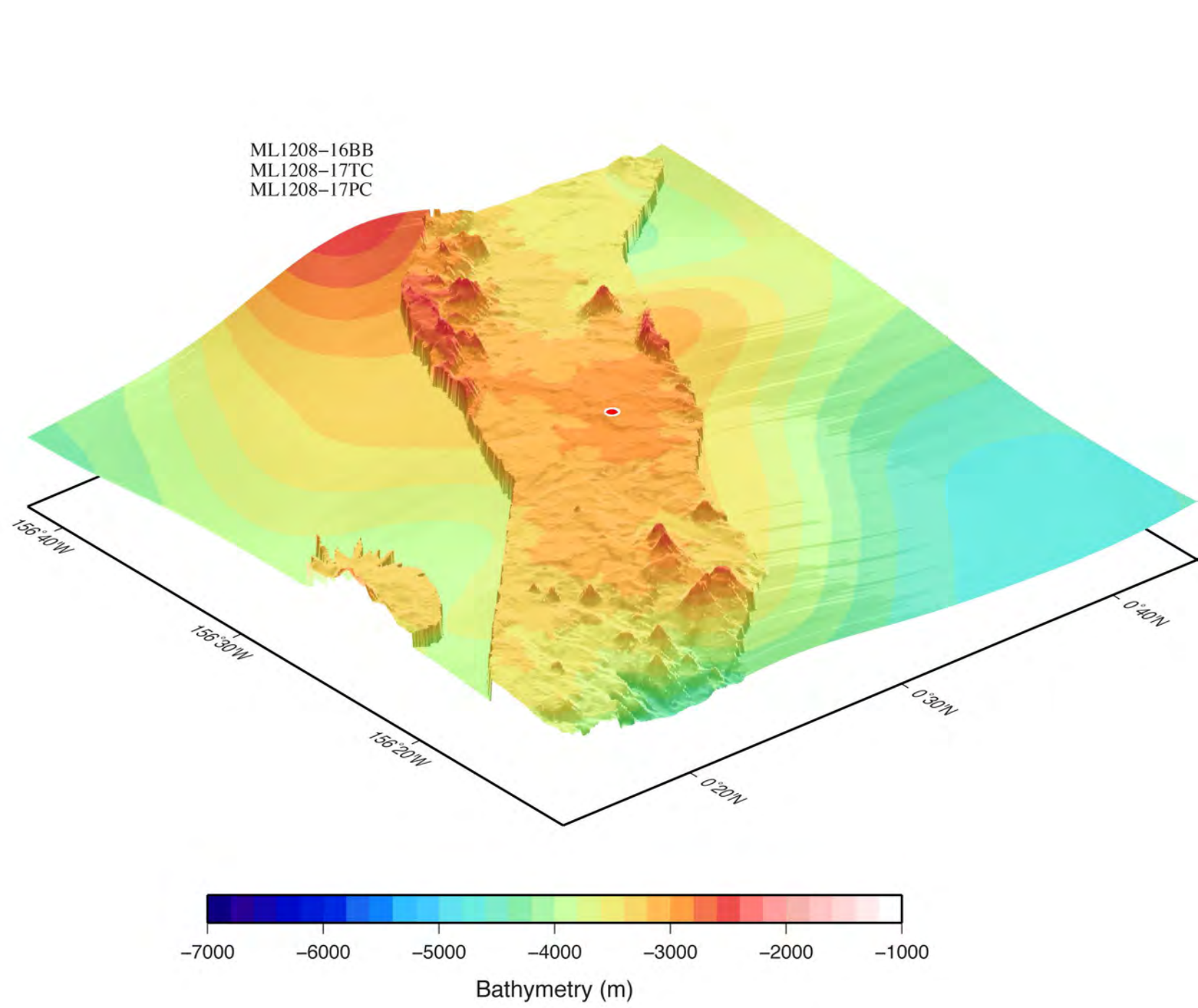
CTD/Rosette Logs

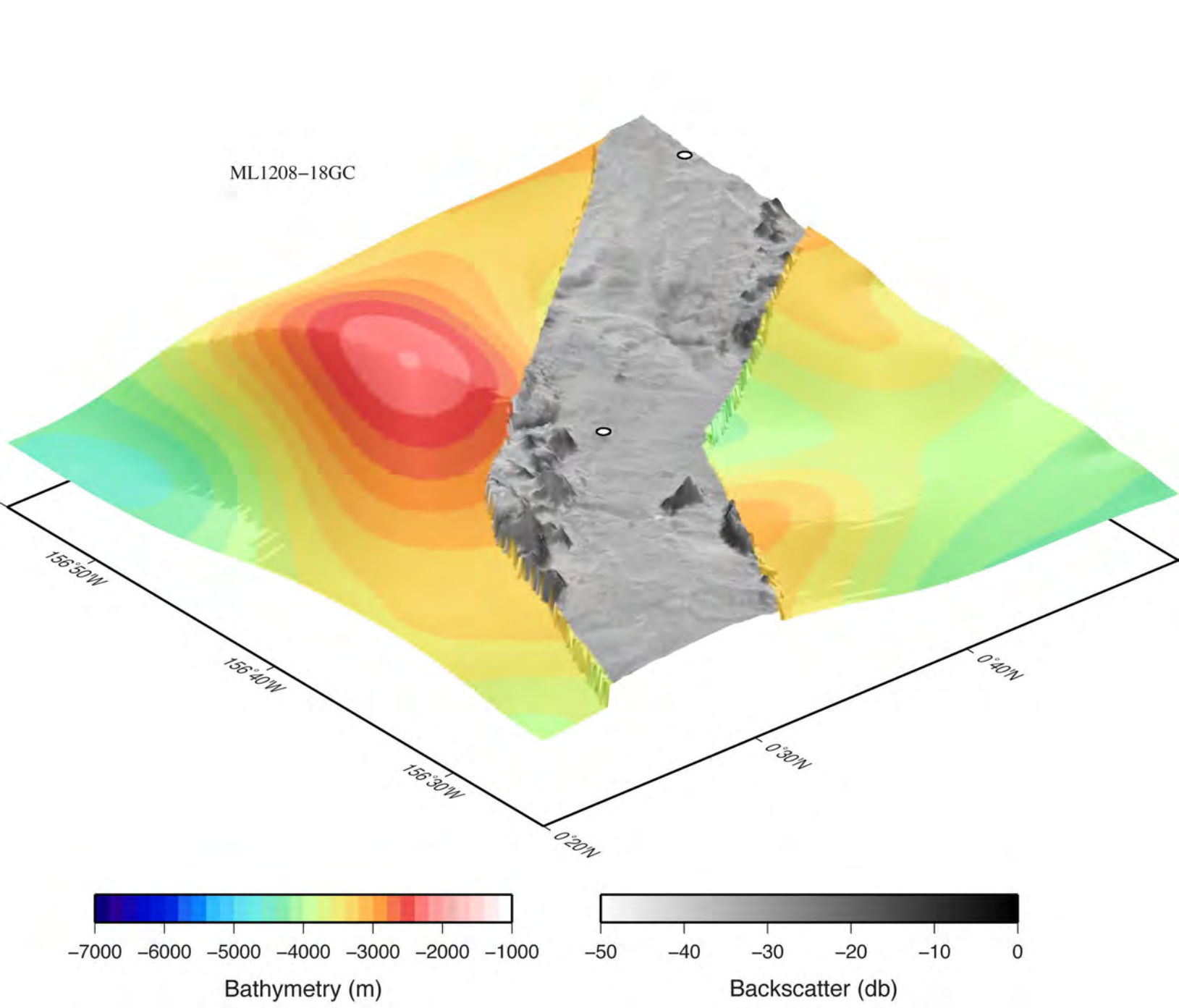

ML1208−12GC
ML1208−13BB
ML1208−14MC
156°10'W
156°00'W
155°50'W
0°20'S
0°10'S
0°00'
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

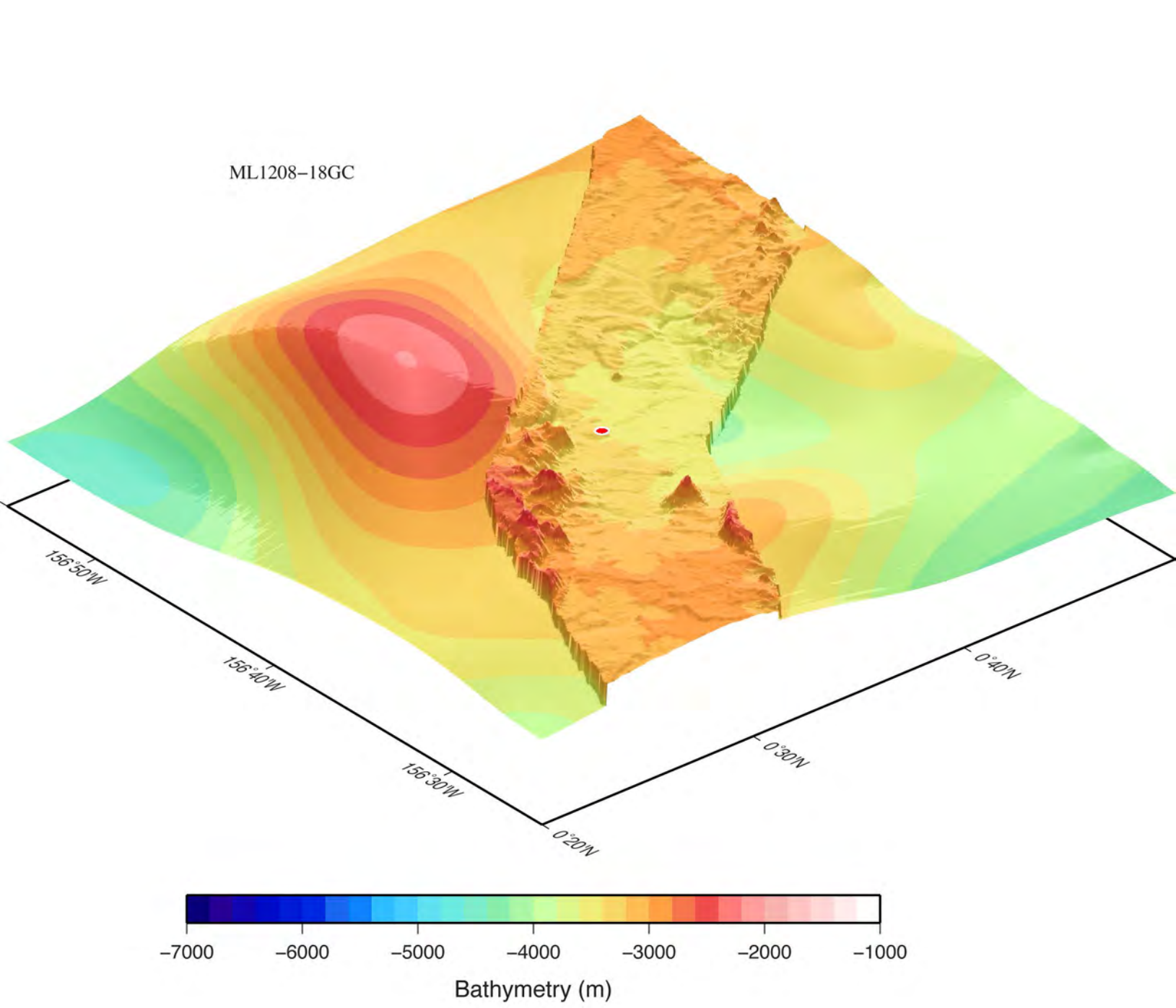

ML1208-15GC
156°20'W
156°10'W
156°00'W
0°00'
0°10'N
0°20'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

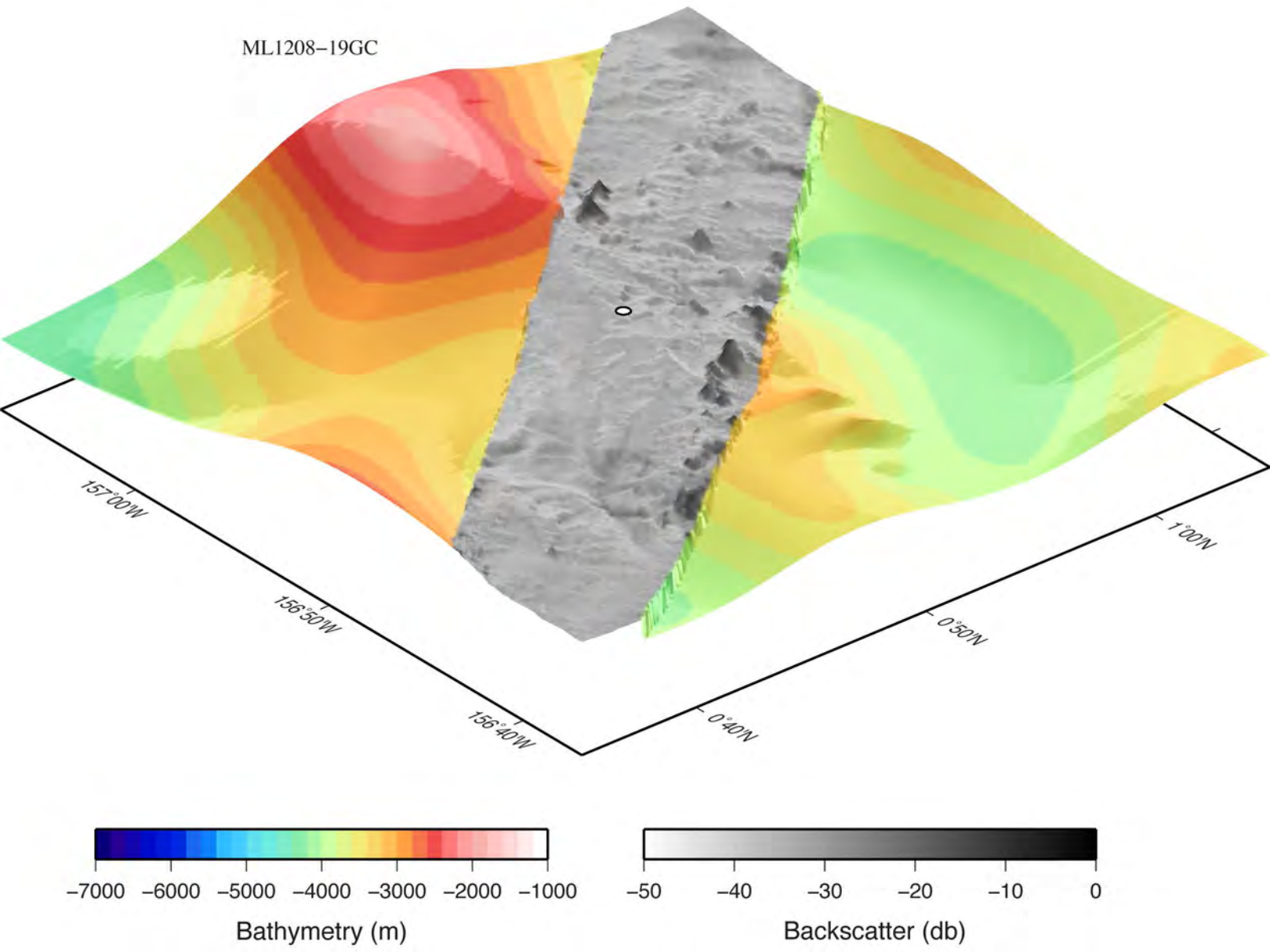

ML1208−15GC
156°20'W
156°10'W
156°00'W
0°00'
0°10'N
0°20'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

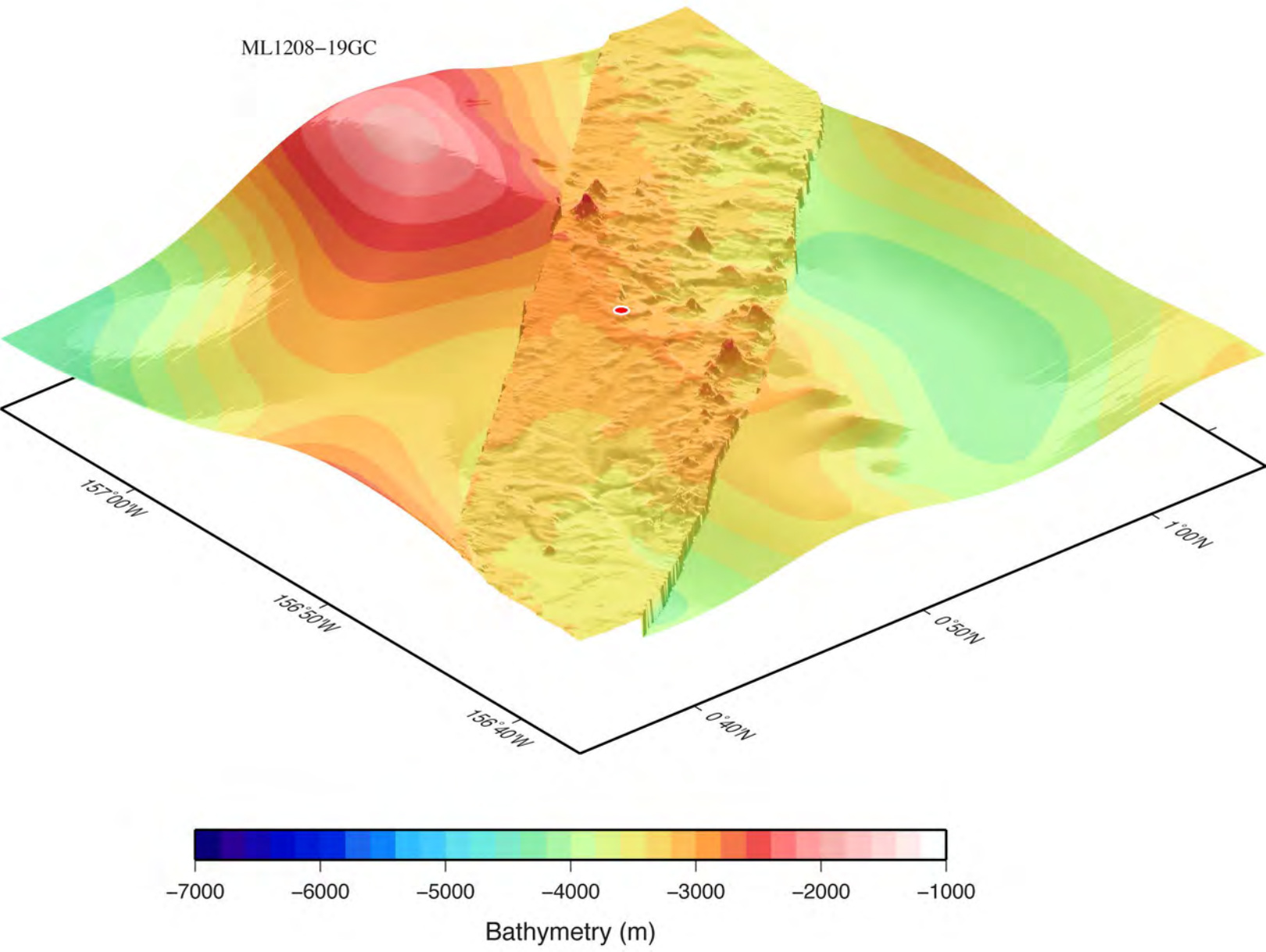

ML1208−16BB
ML1208−17TC
ML1208−17PC
156°40'W
156°30'W
156°20'W
0°20'N
0°30'N
0°40'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

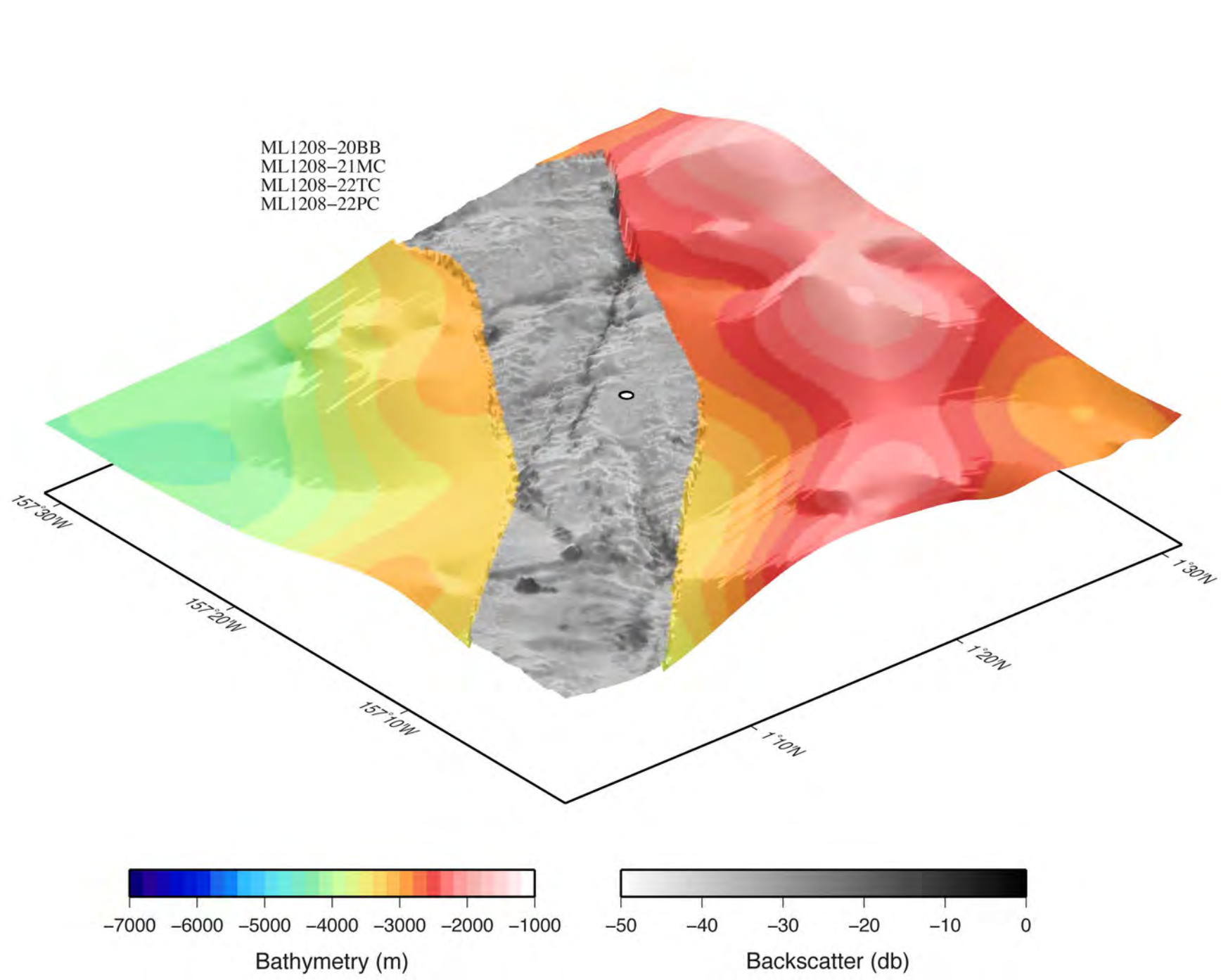

ML1208−16BB
ML1208−17TC
ML1208−17PC
156°40'W
156°30'W
156°20'W
0°20'N
0°30'N
0°40'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

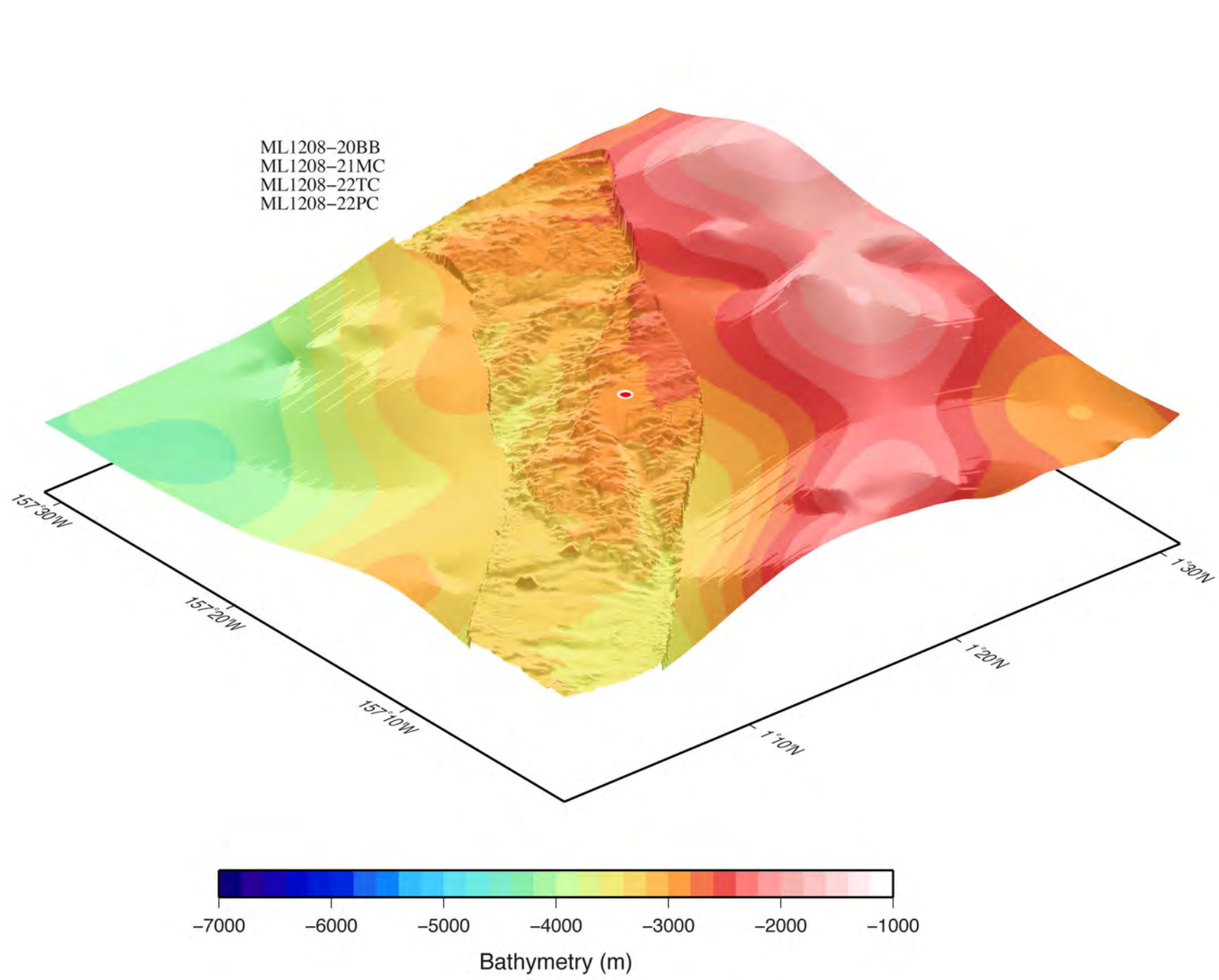

ML1208–18GC
156°50'W
156°40'W
156°30'W
0°20'N
0°30'N
0°40'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

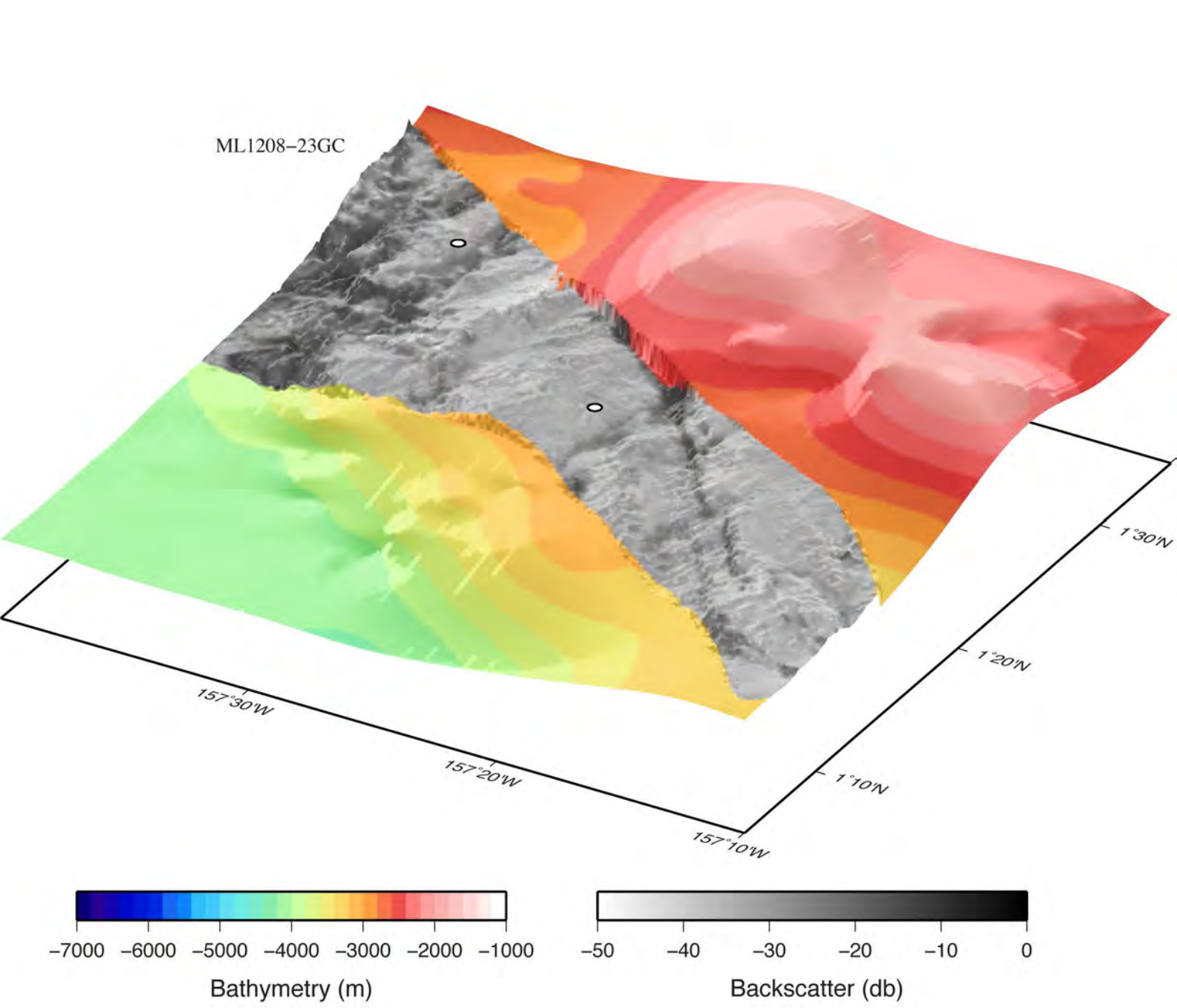

ML1208−18GC
156°50'W
156°40'W
156°30'W
0°20'N
0°30'N
0°40'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

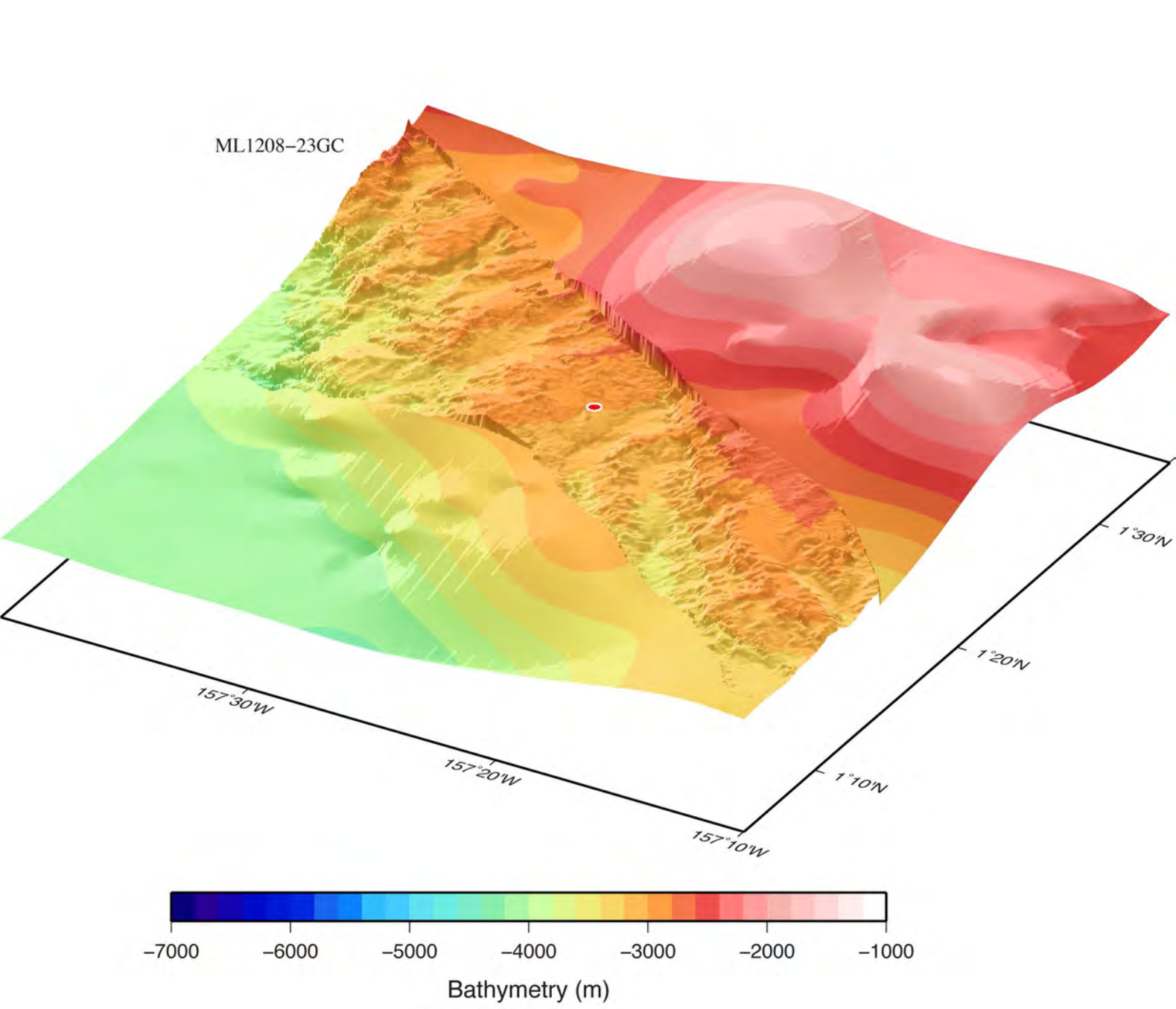

ML1208−19GC
157°00'W
156°50'W
156°40'W
0°40'N
0°50'N
1°00'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

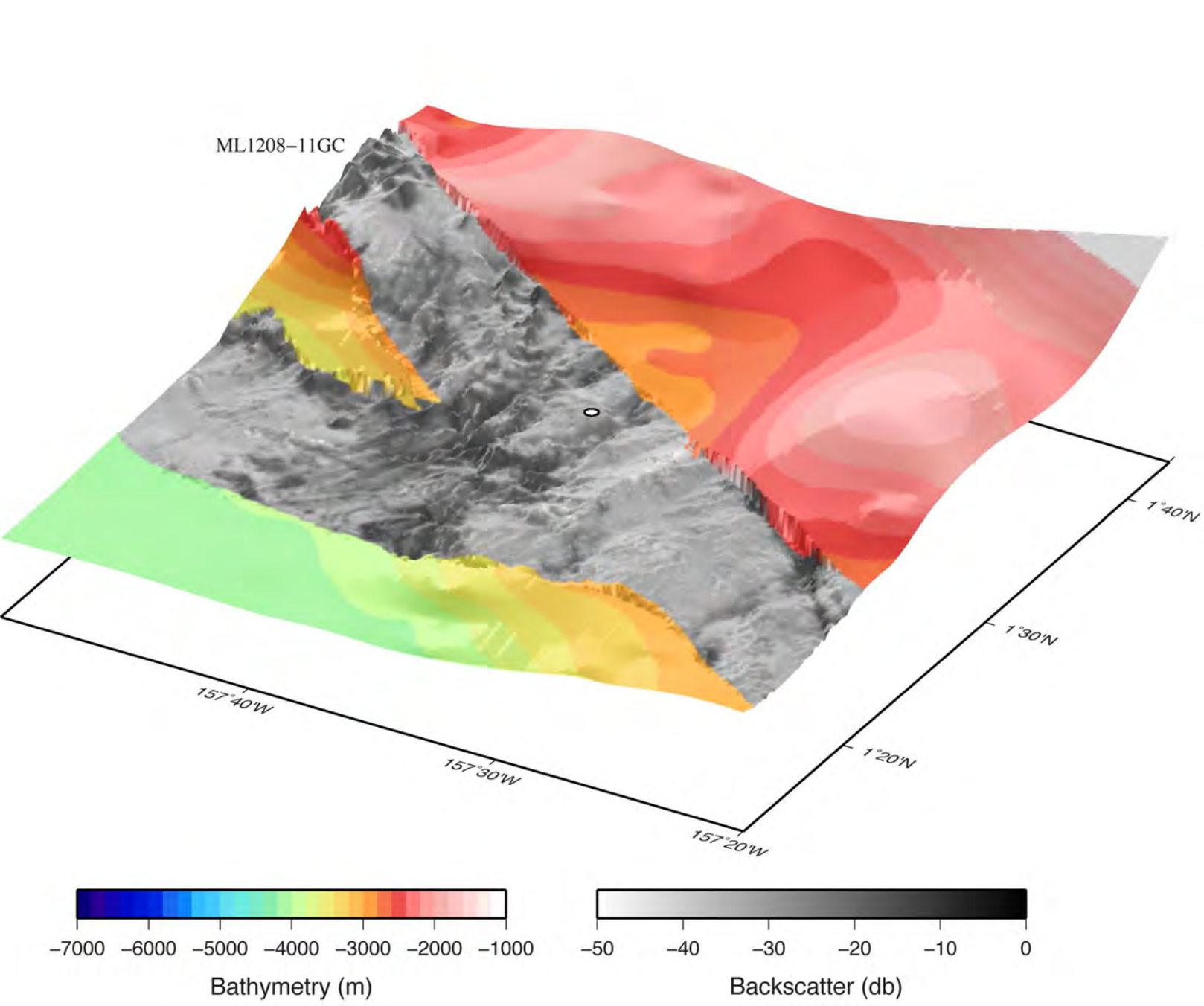

ML1208−19GC
157°00'W
156°50'W
156°40'W
0°40'N
0°50'N
1°00'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

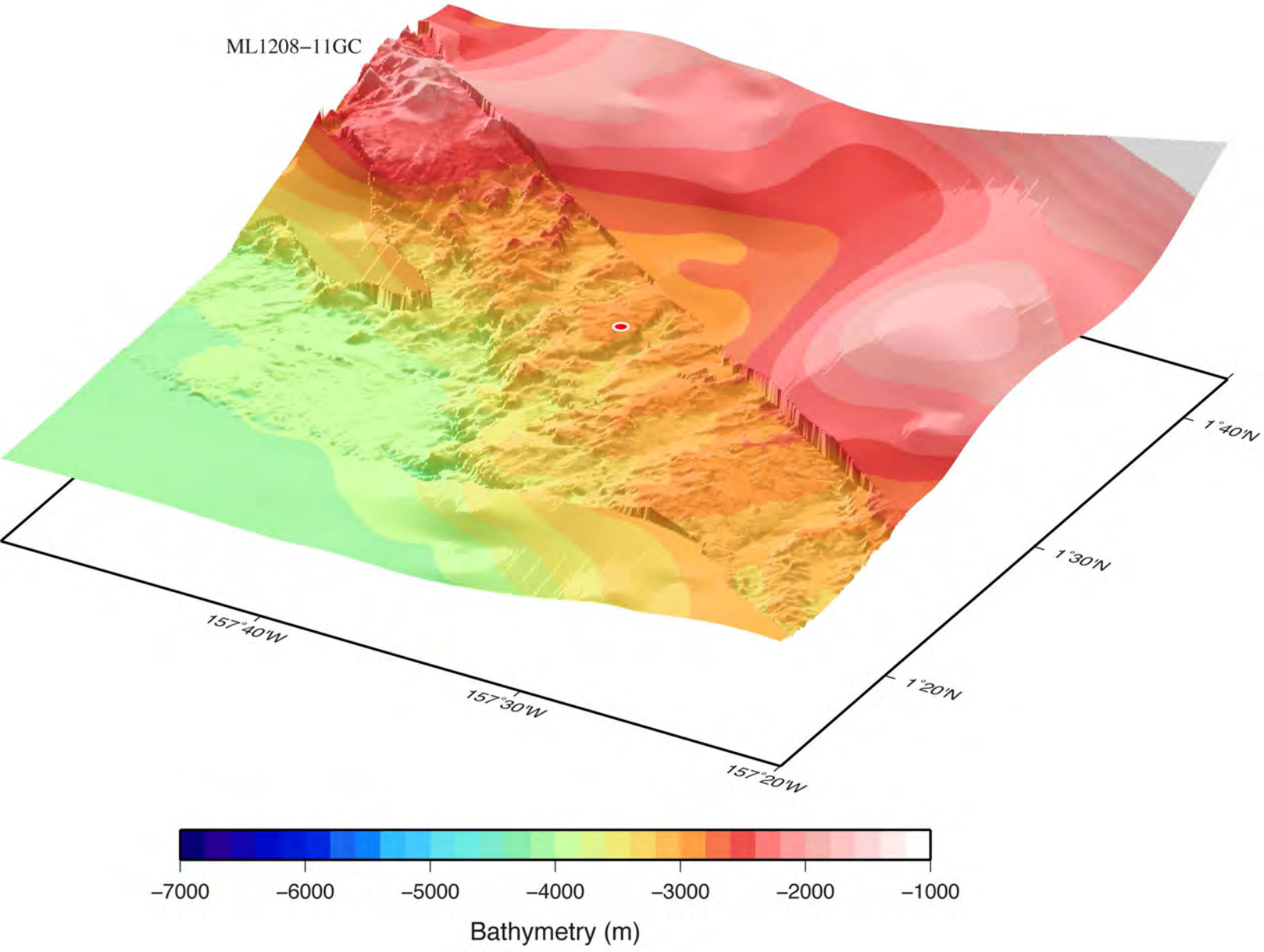

ML1208–20BB
ML1208–21MC
ML1208–22TC
ML1208–22PC
157°30W
157°20W
157°10W
1°10N
1°20N
1°30N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

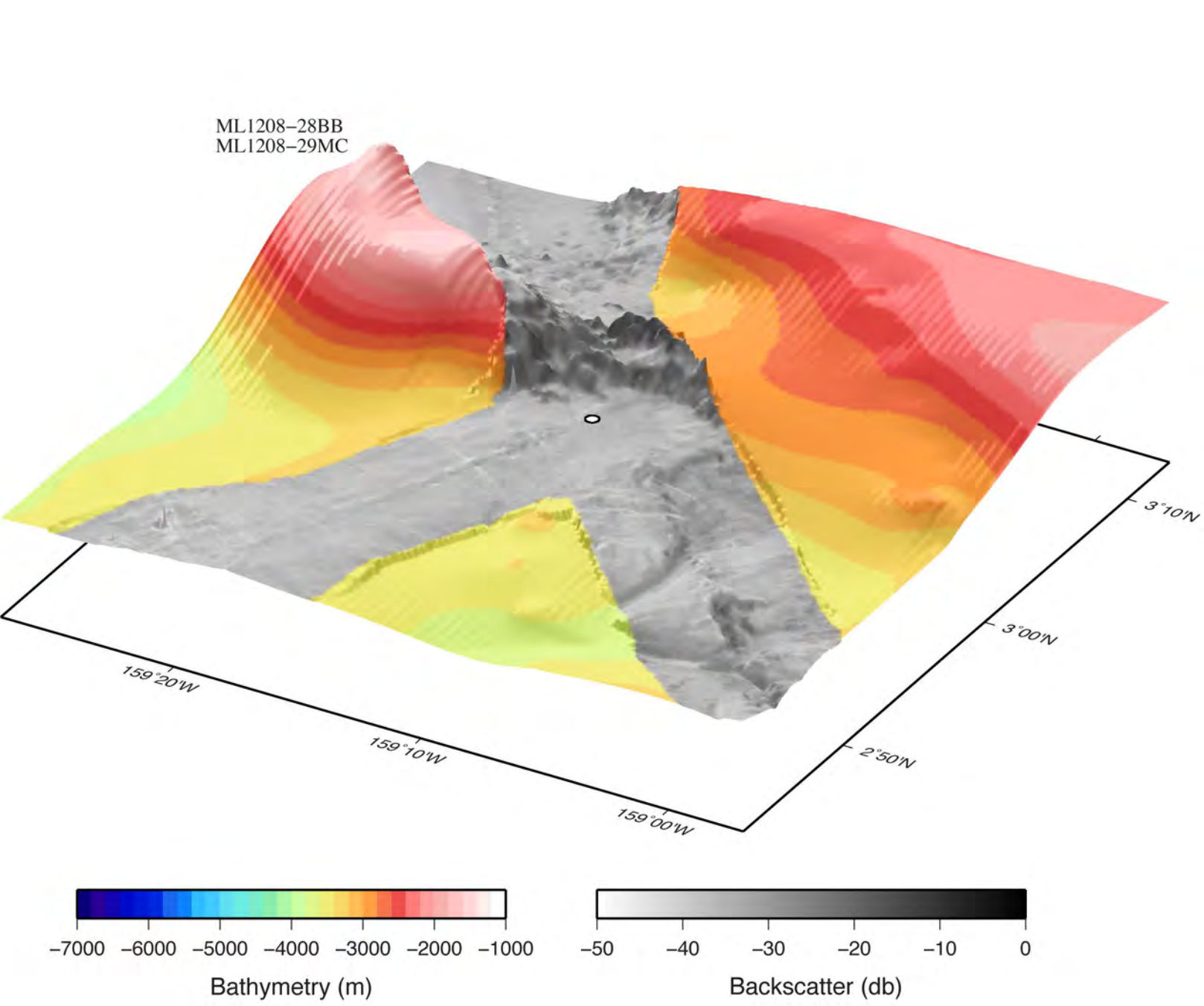

ML1208–20BB
ML1208–21MC
ML1208–22TC
ML1208–22PC
157°30W
157°20W
157°10W
1°10N
1°20N
1°30N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

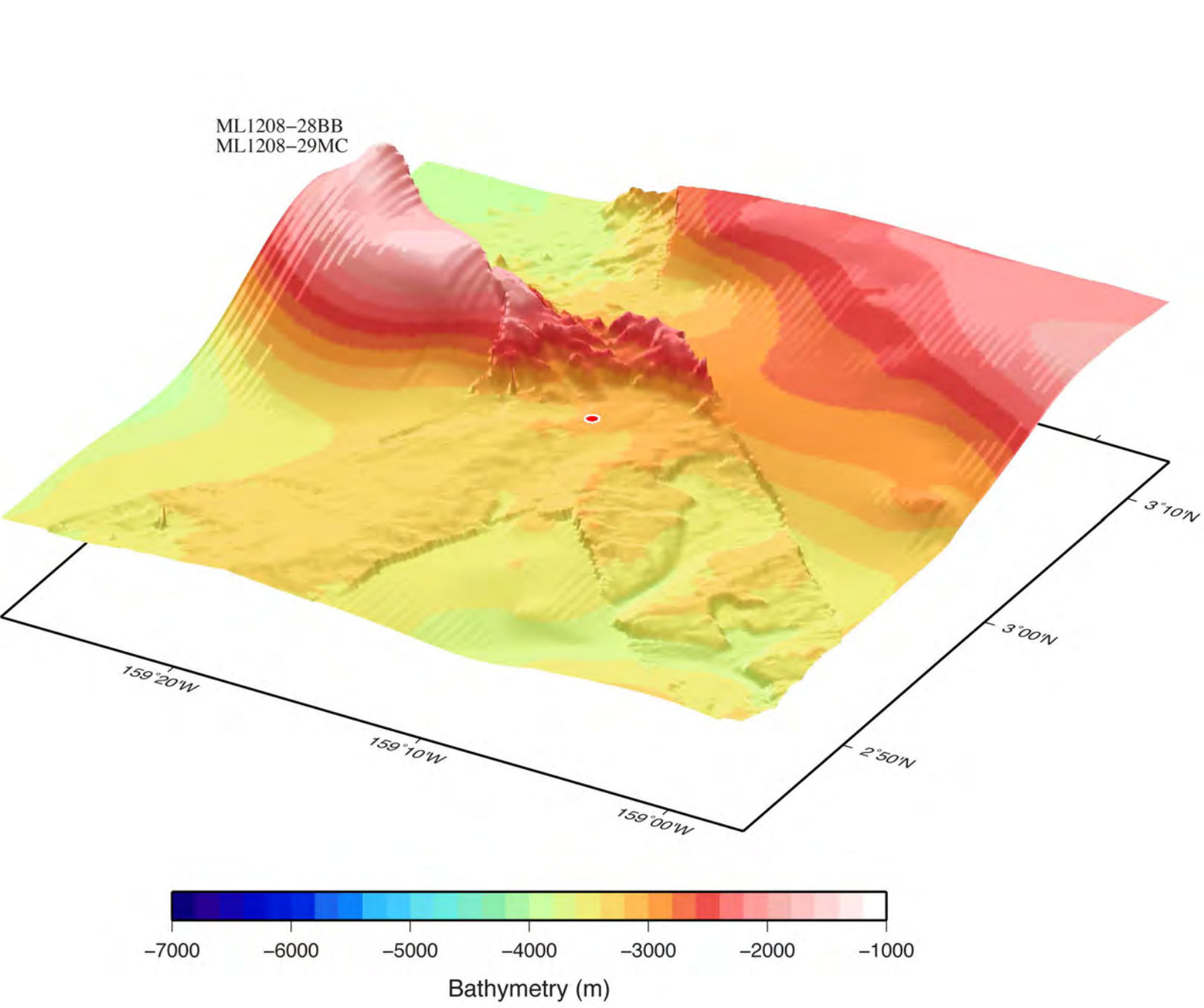

ML1208–23GC
157°30'W
157°20'W
157°10'W
1°10'N
1°20'N
1°30'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)


ML1208–23GC
157°30'W
157°20'W
157°10'W
1°30'N
1°20'N
1°10'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

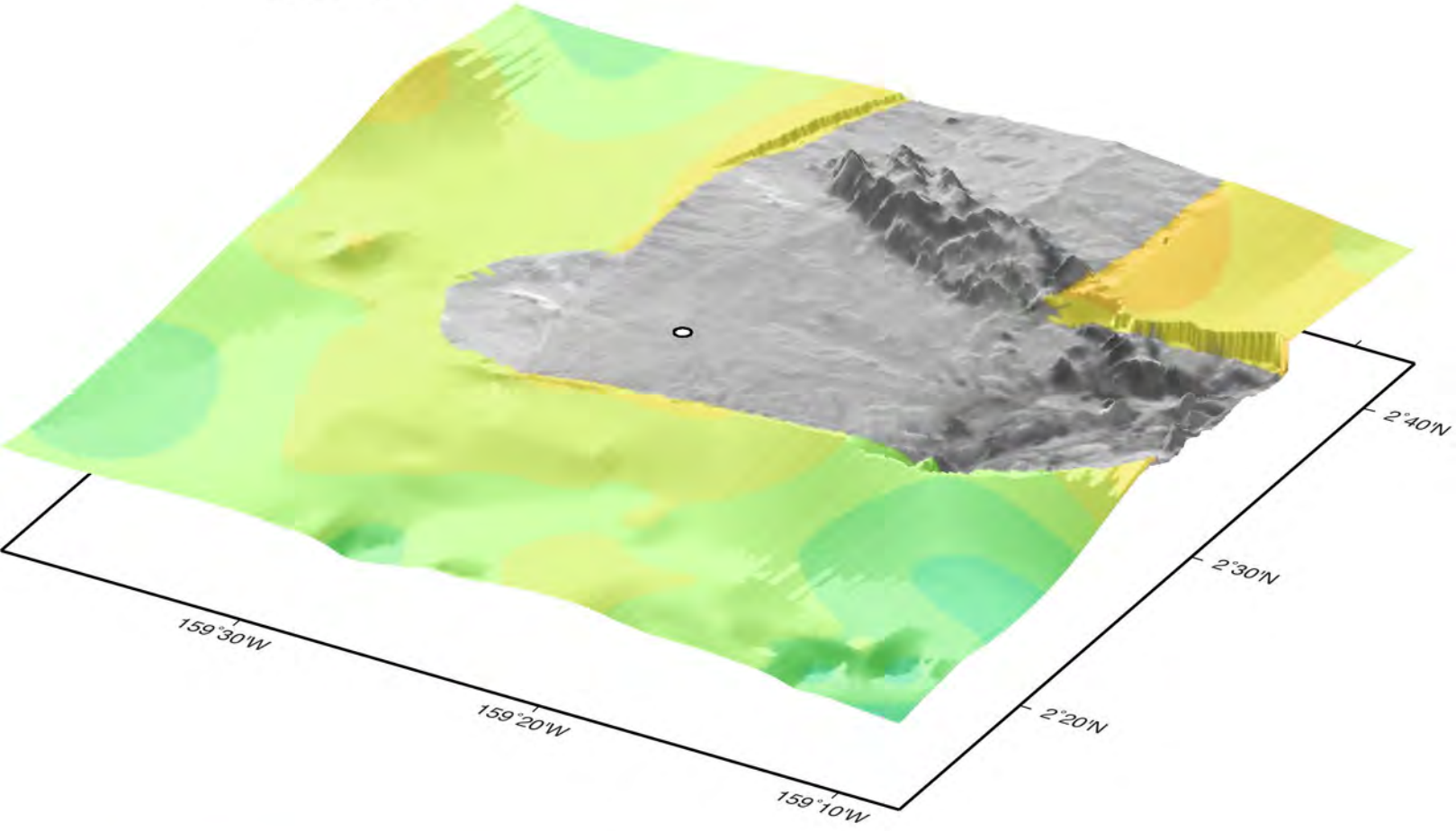

ML1208–11GC
157°40'W
157°30'W
157°20'W
1°40'N
1°30'N
1°20'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

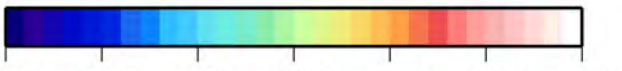

ML1208–11GC
157°40'W
157°30'W
157°20'W
1°40'N
1°30'N
1°20'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)


ML1208–28BB
ML1208–29MC
159°20'W
159°10'W
159°00'W
2°50'N
3°00'N
3°10'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

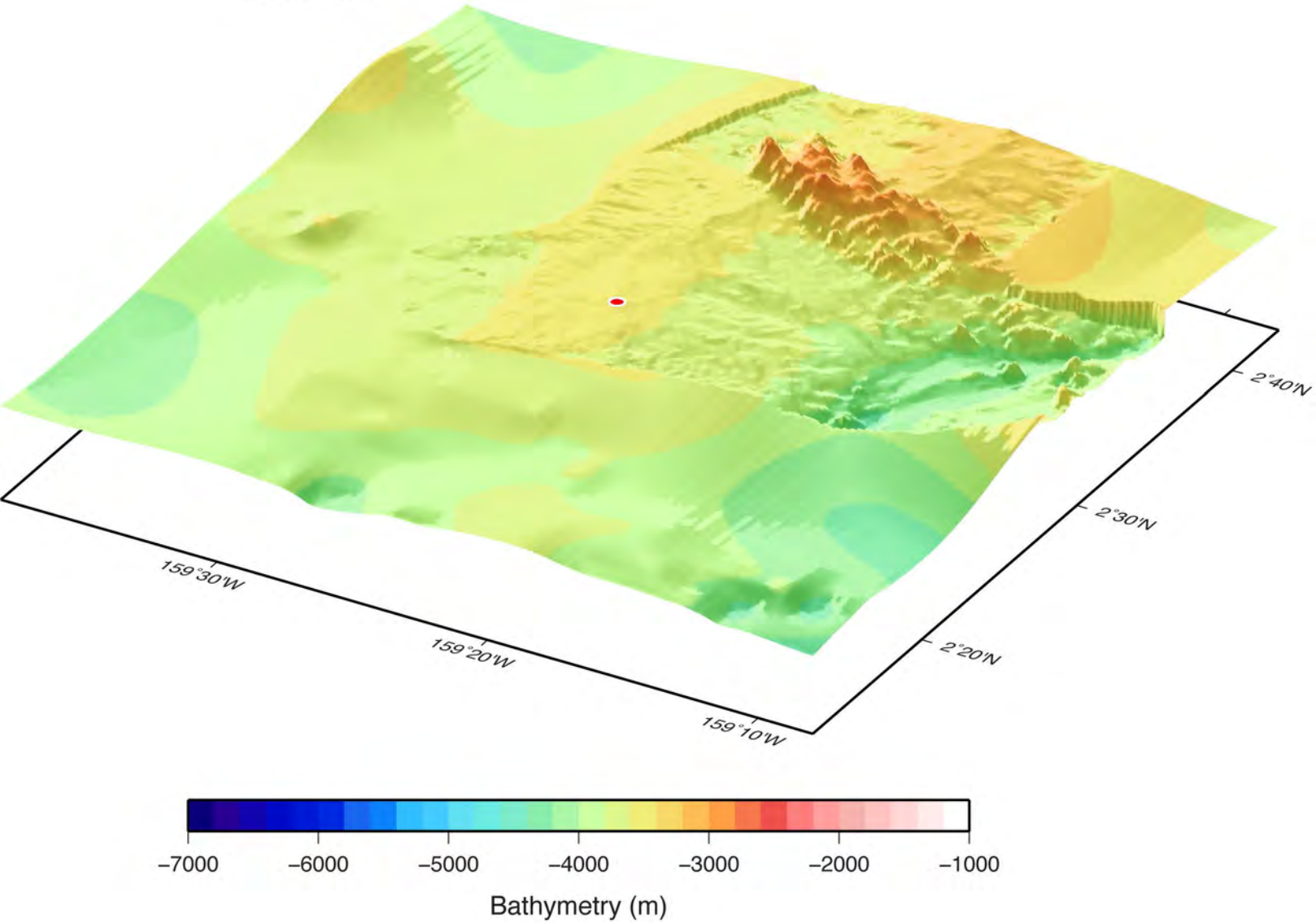

ML1208–28BB
ML1208–29MC
159°20'W
159°10'W
159°00'W
2°50'N
3°00'N
3°10'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

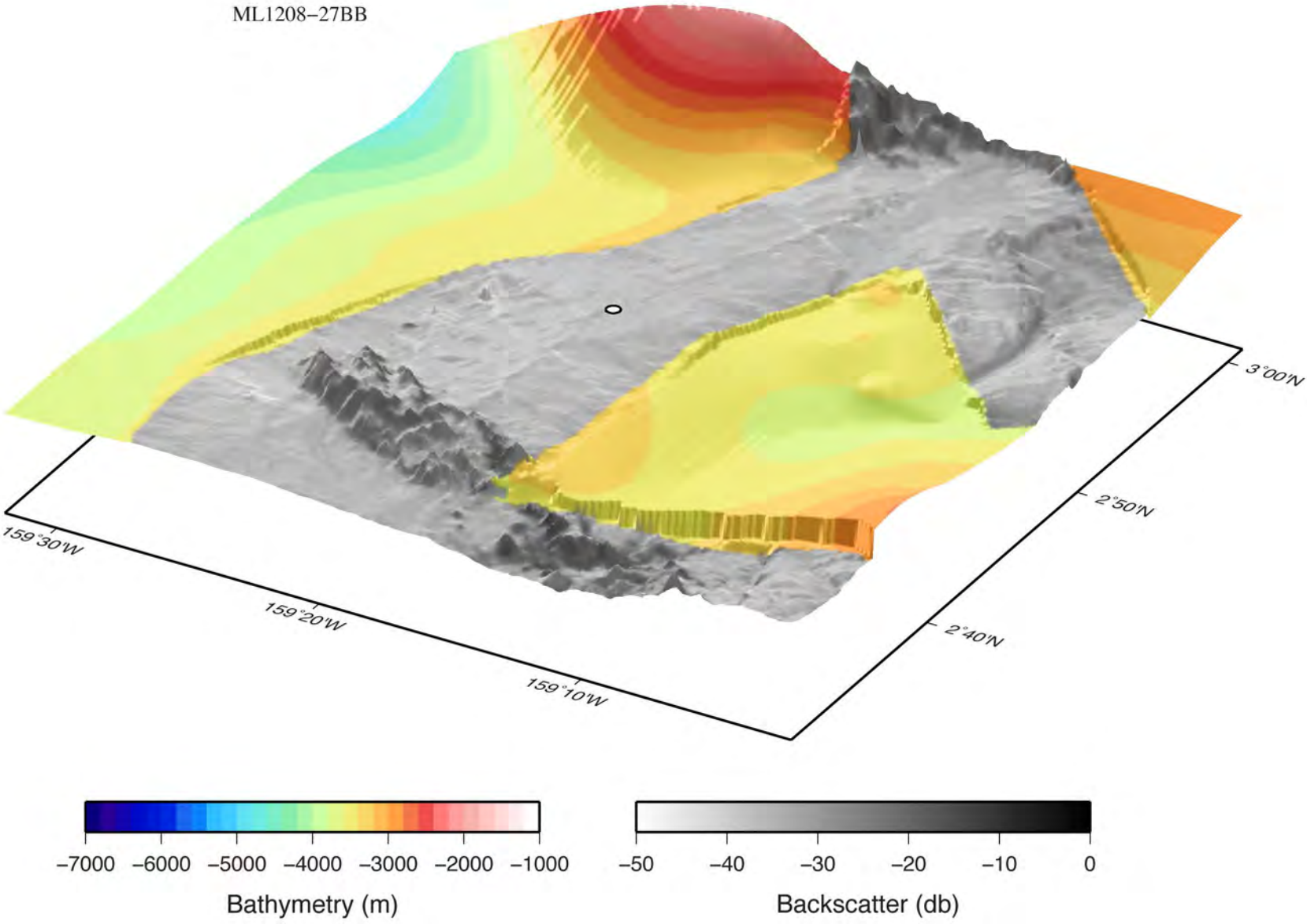
ML1208–24BB
ML1208–25BB
ML1208–26MC

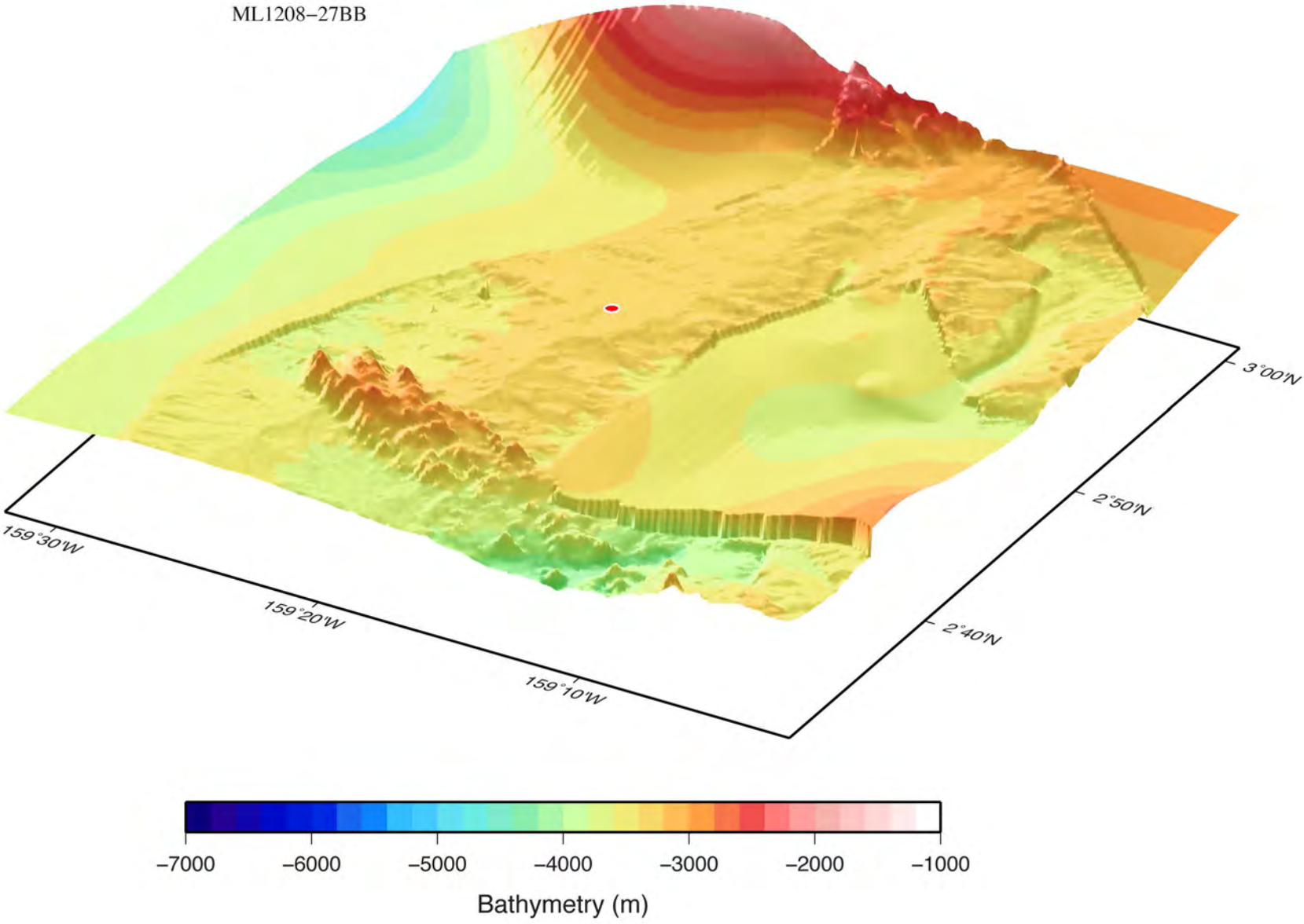


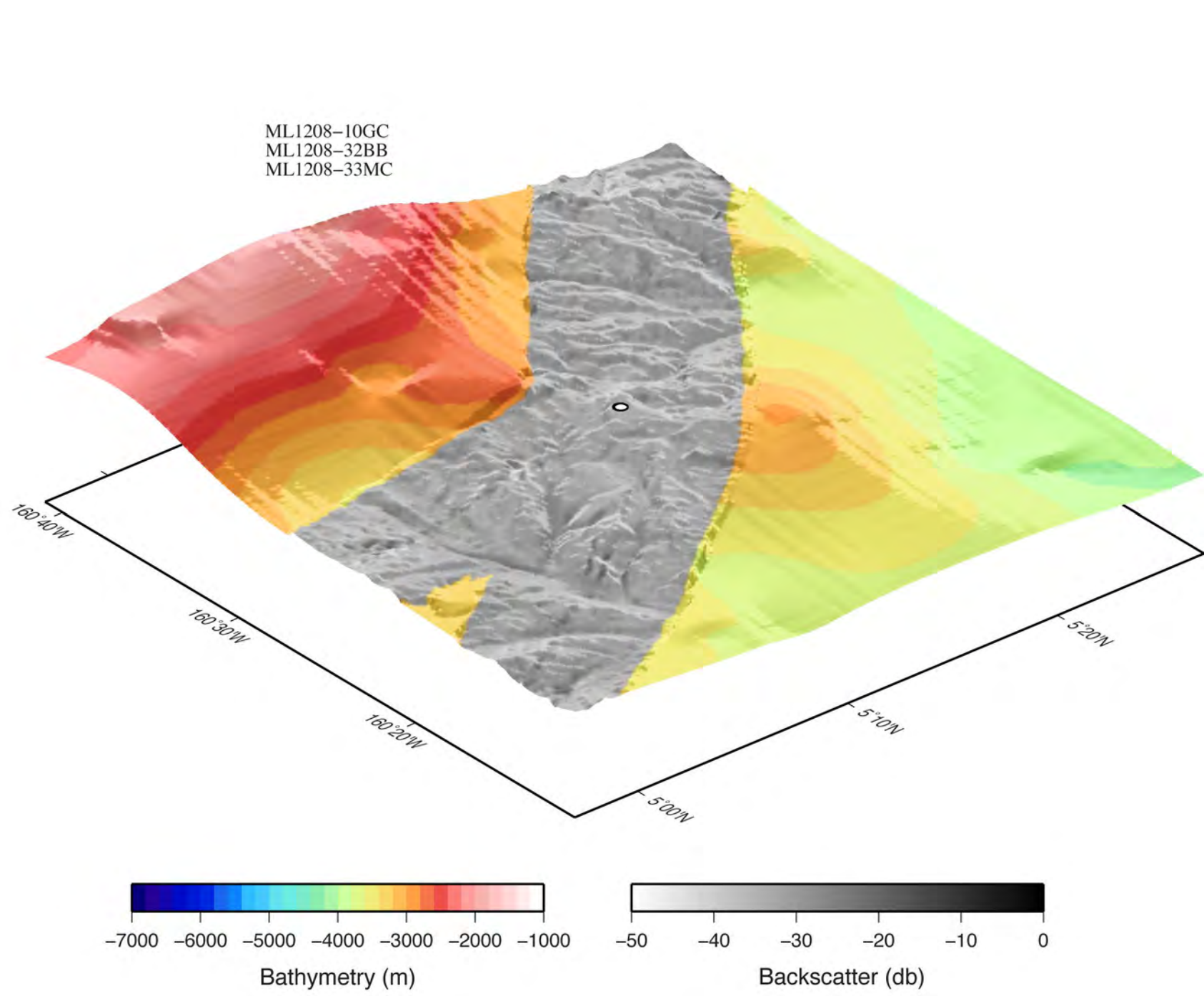


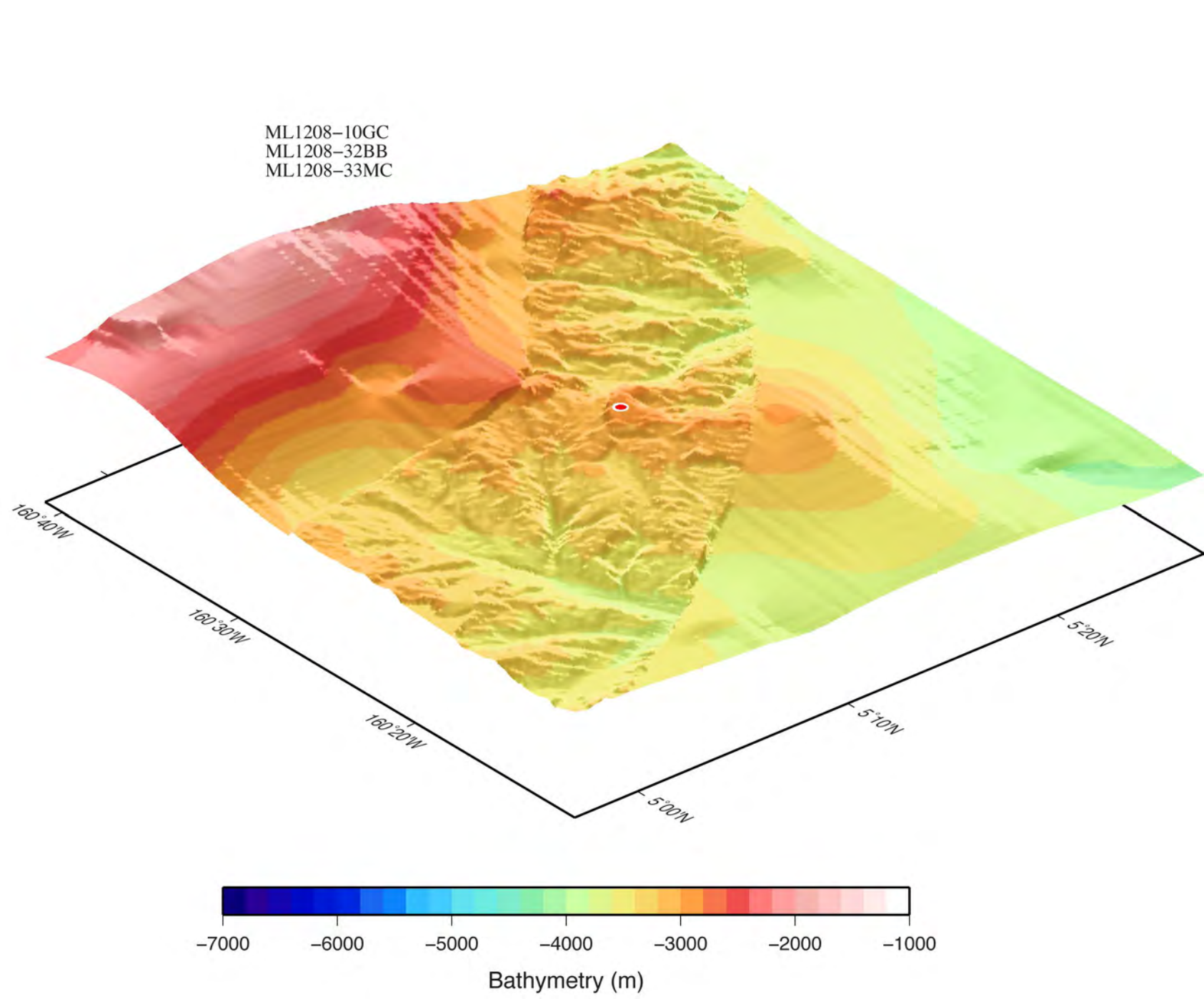
ML1208–24BB
ML1208–25BB
ML1208–26MC

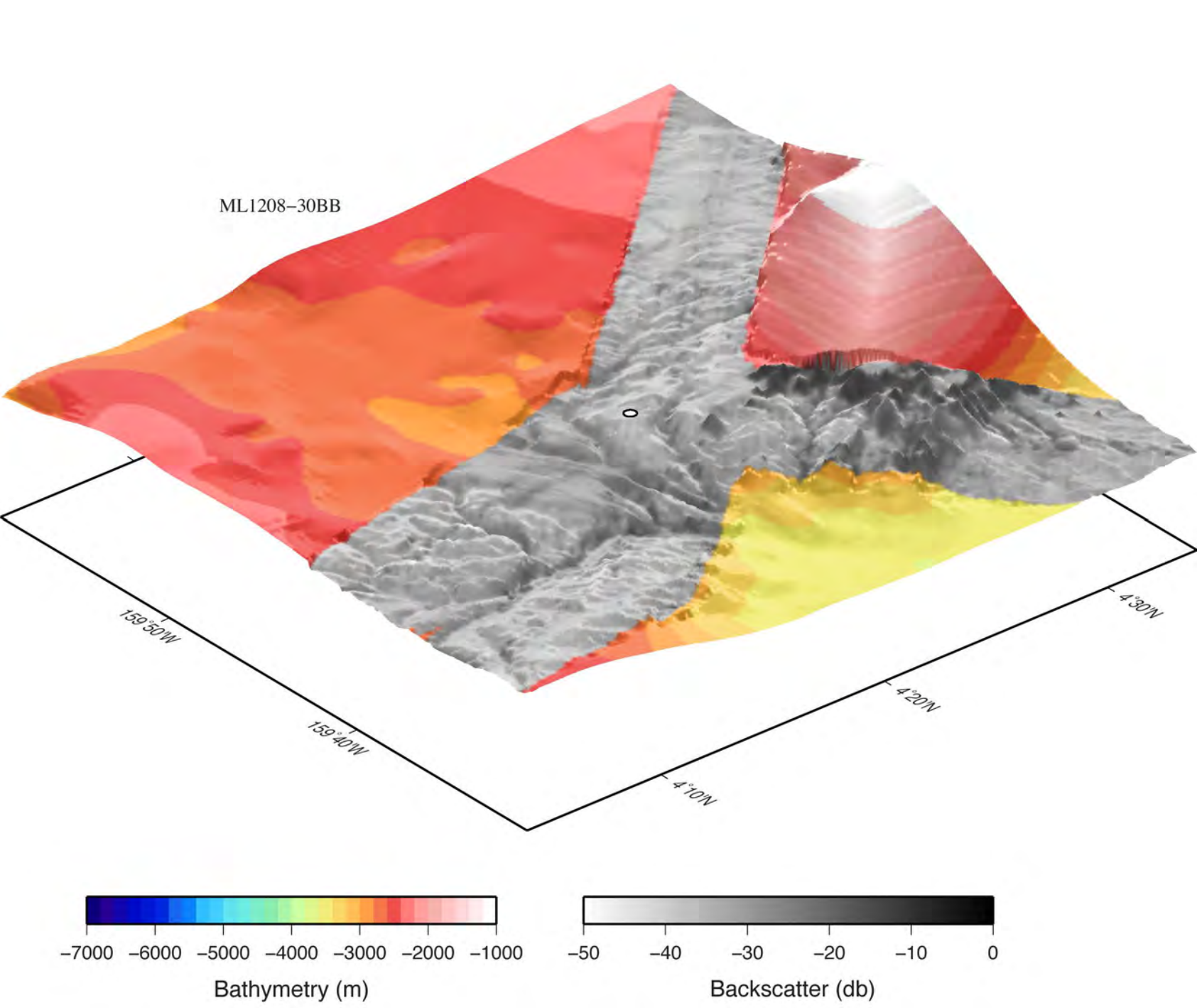


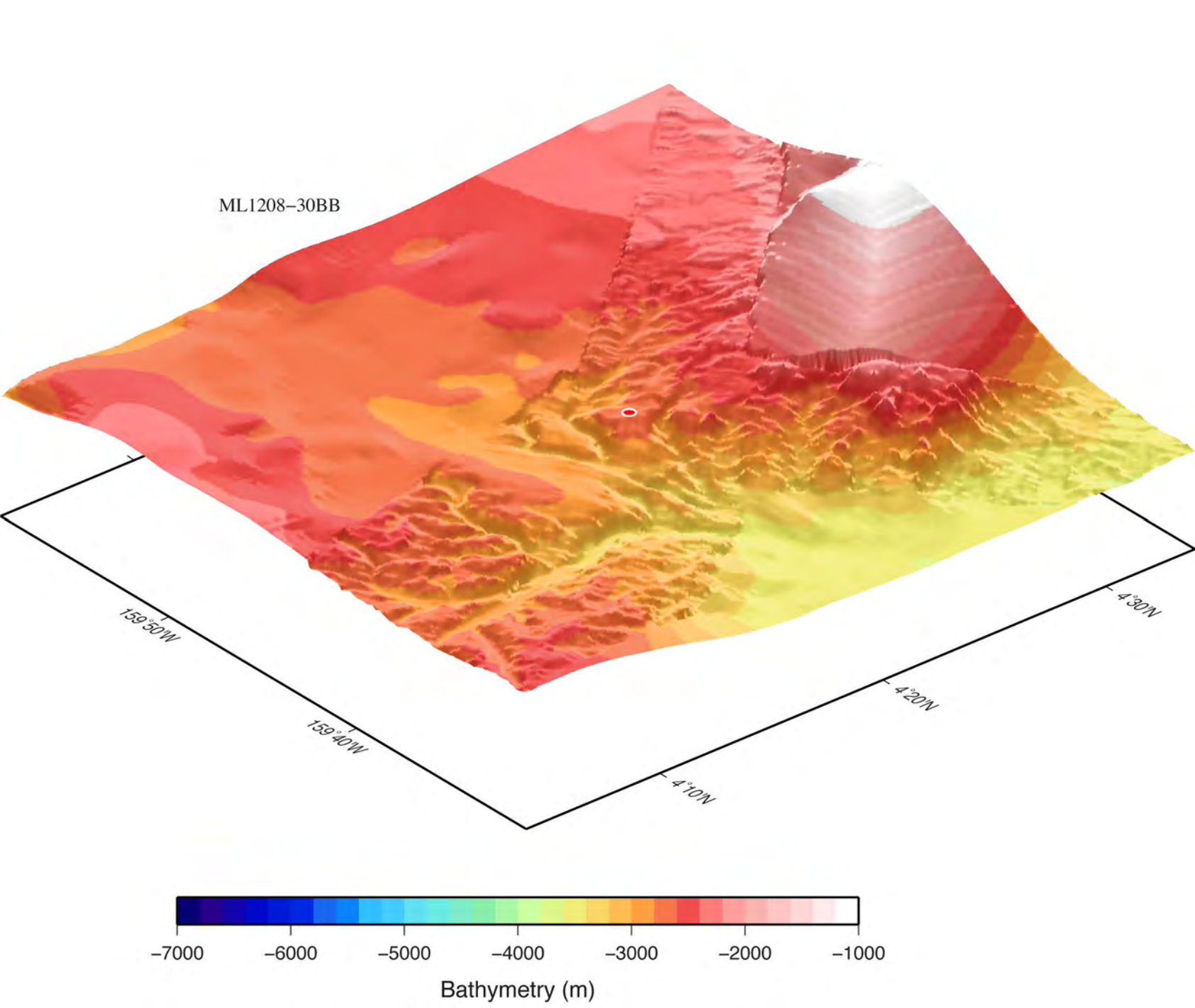

ML1208–27BB
159°30'W
159°20'W
159°10'W
2°40'N
2°50'N
3°00'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

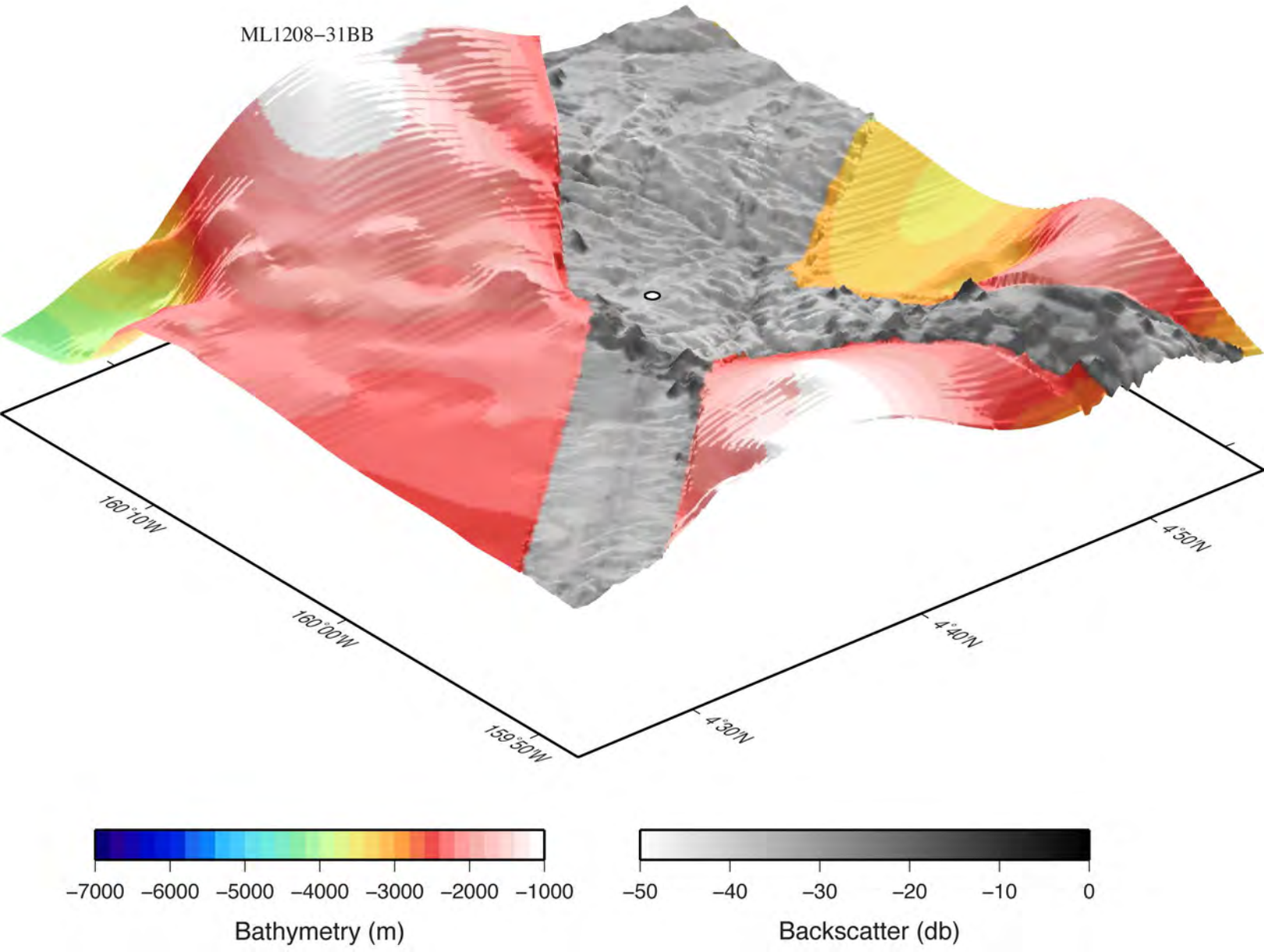

ML1208–27BB
159°30'W
159°20'W
159°10'W
2°40'N
2°50'N
3°00'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

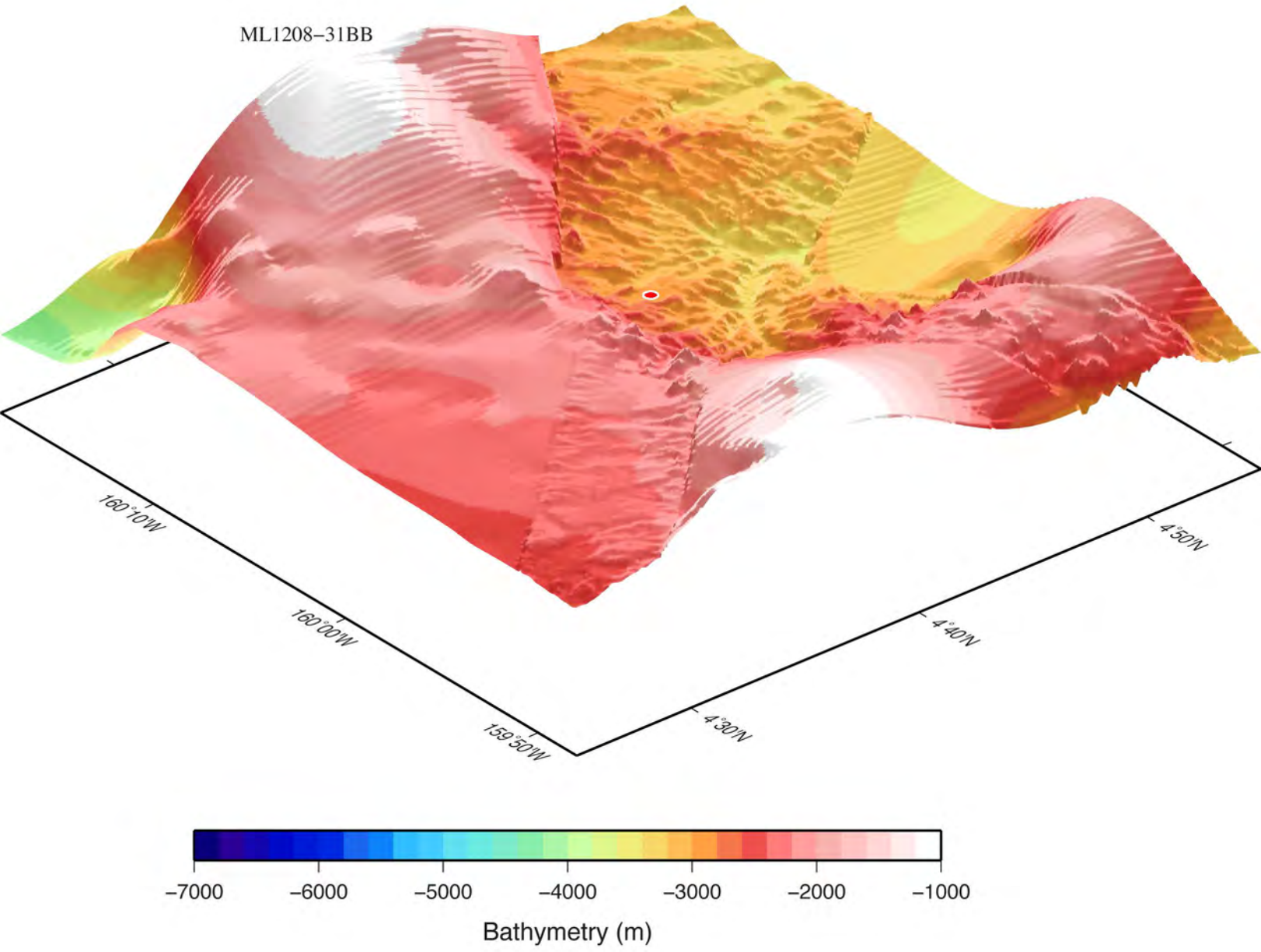

ML1208−10GC
ML1208−32BB
ML1208−33MC
160°40'W
160°30'W
160°20'W
5°00'N
5°10'N
5°20'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

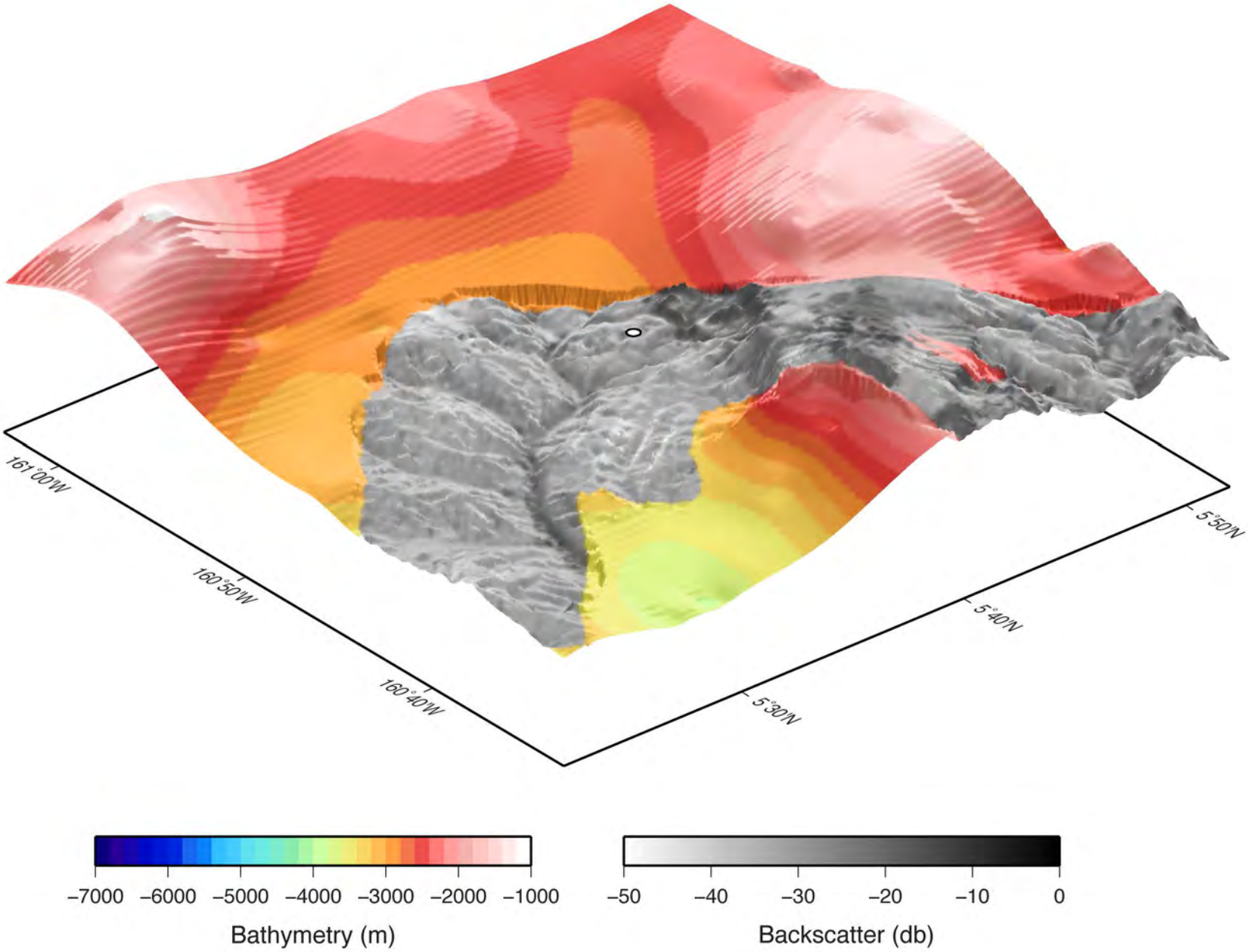

ML1208−10GC
ML1208−32BB
ML1208−33MC
160°40'W
160°30'W
160°20'W
5°00'N
5°10'N
5°20'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

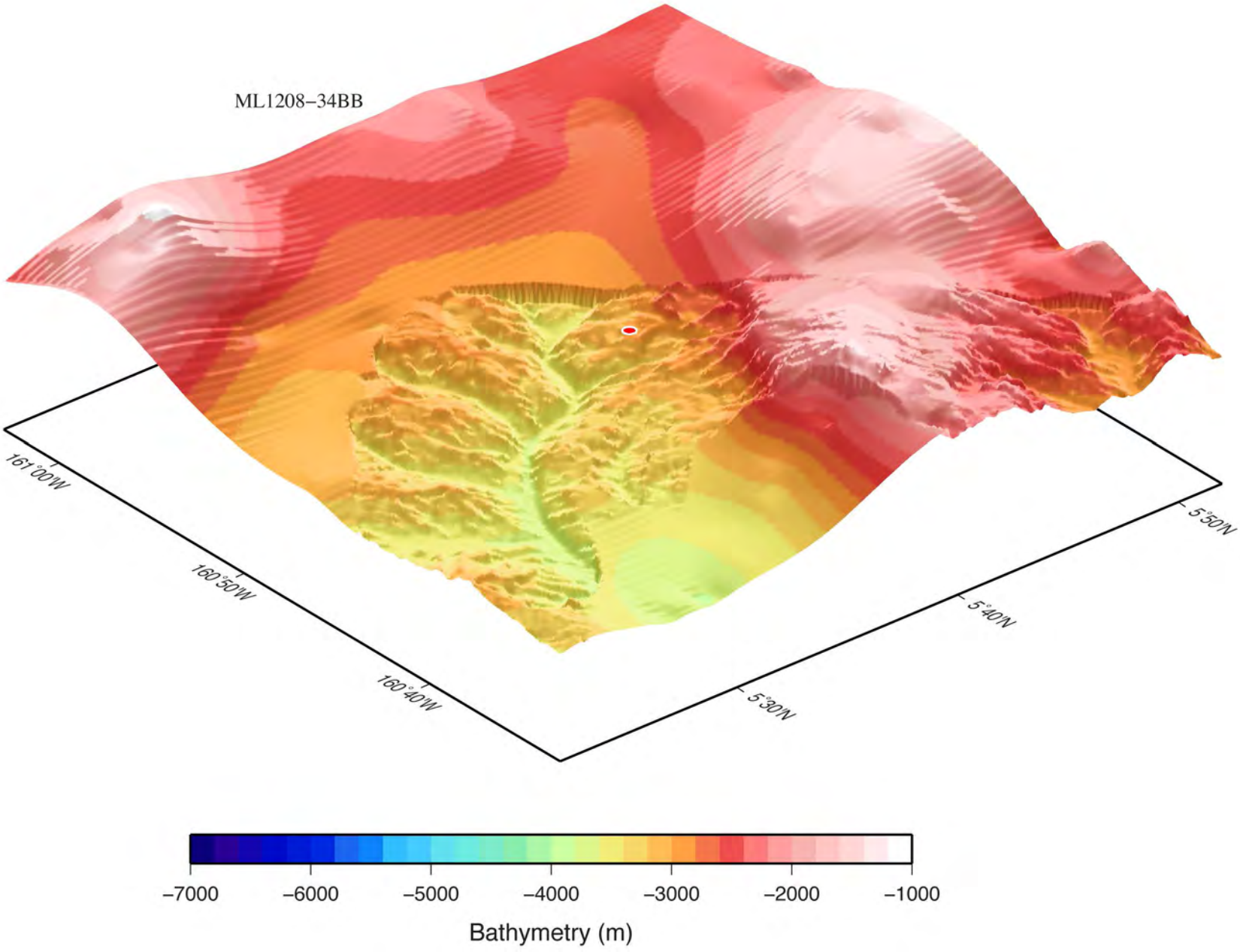

ML1208−30BB
159°50'W
159°40'W
4°10'N
4°20'N
4°30'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

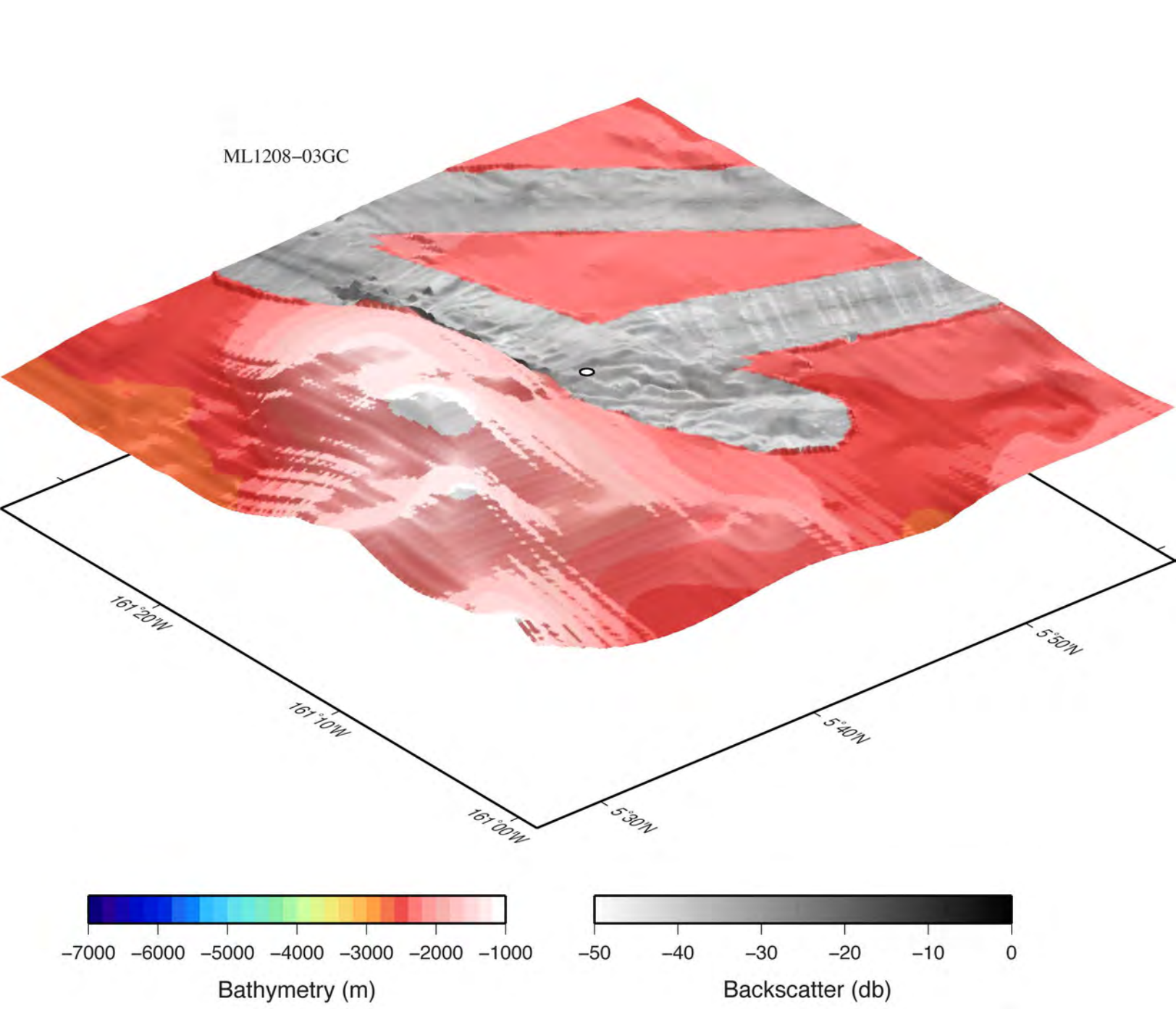

ML1208−30BB
159°50'W
159°40'W
4°10'N
4°20'N
4°30'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

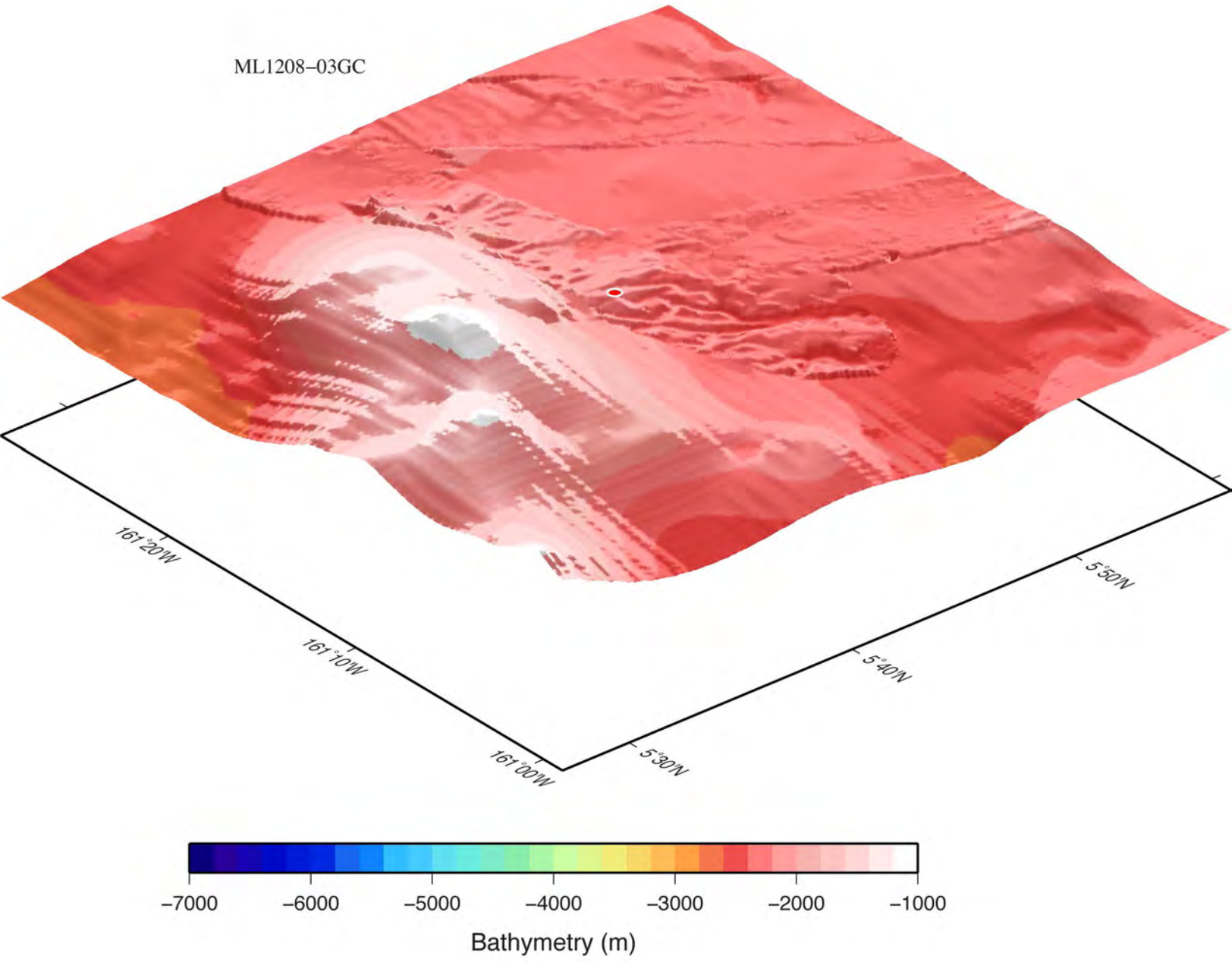

ML1208−31BB
160°10'W
160°00'W
159°50'W
4°50'N
4°40'N
4°30'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

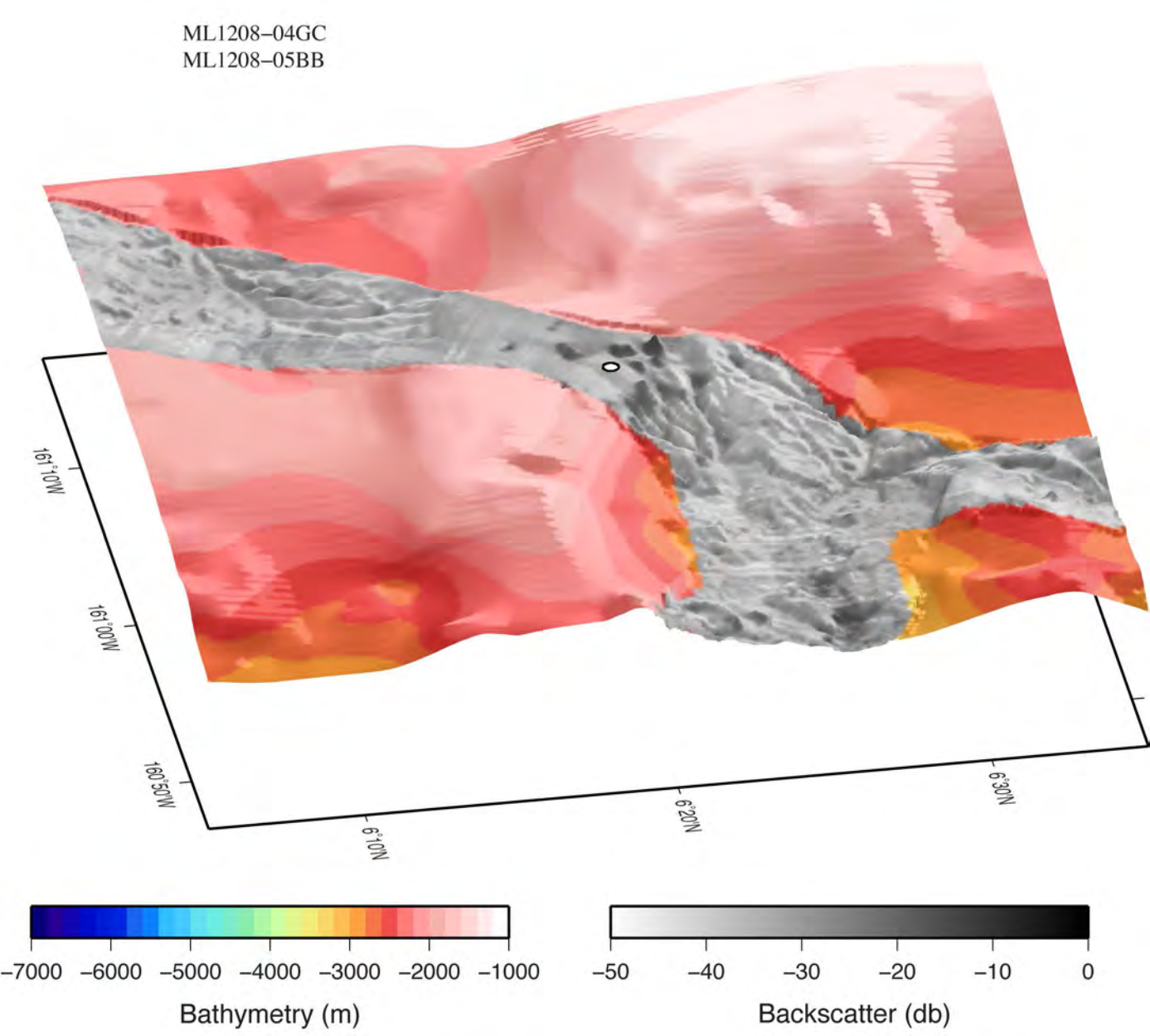

ML1208−31BB
160°10'W
160°00'W
159°50'W
4°30'N
4°40'N
4°50'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)


161°00'W
160°50'W
160°40'W
5°50'N
5°40'N
5°30'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

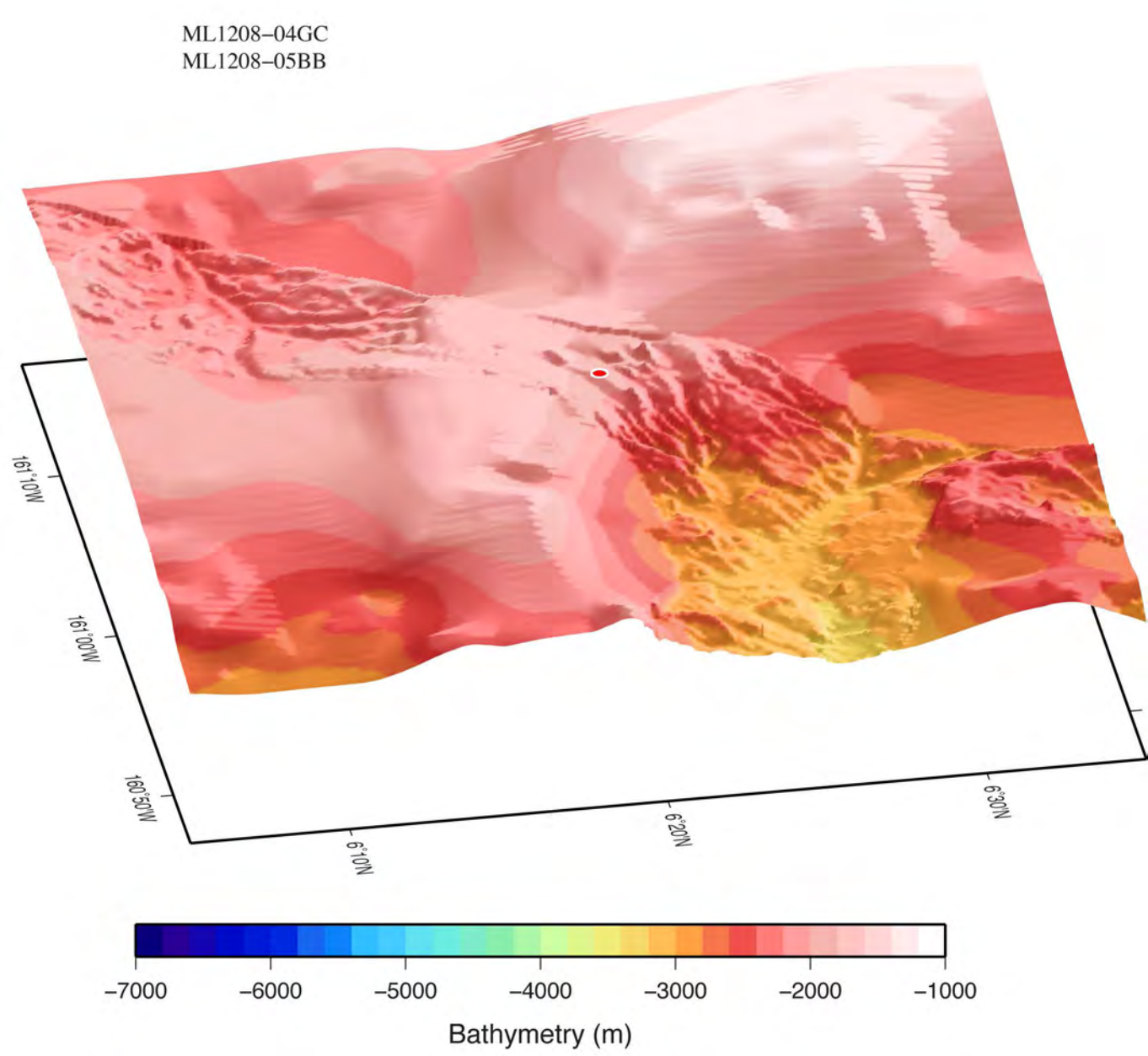

ML1208−34BB
161°00'W
160°50'W
160°40'W
5°30'N
5°40'N
5°50'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)


ML1208–03GC
161°20'W
161°10'W
161°00'W
5°30'N
5°40'N
5°50'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

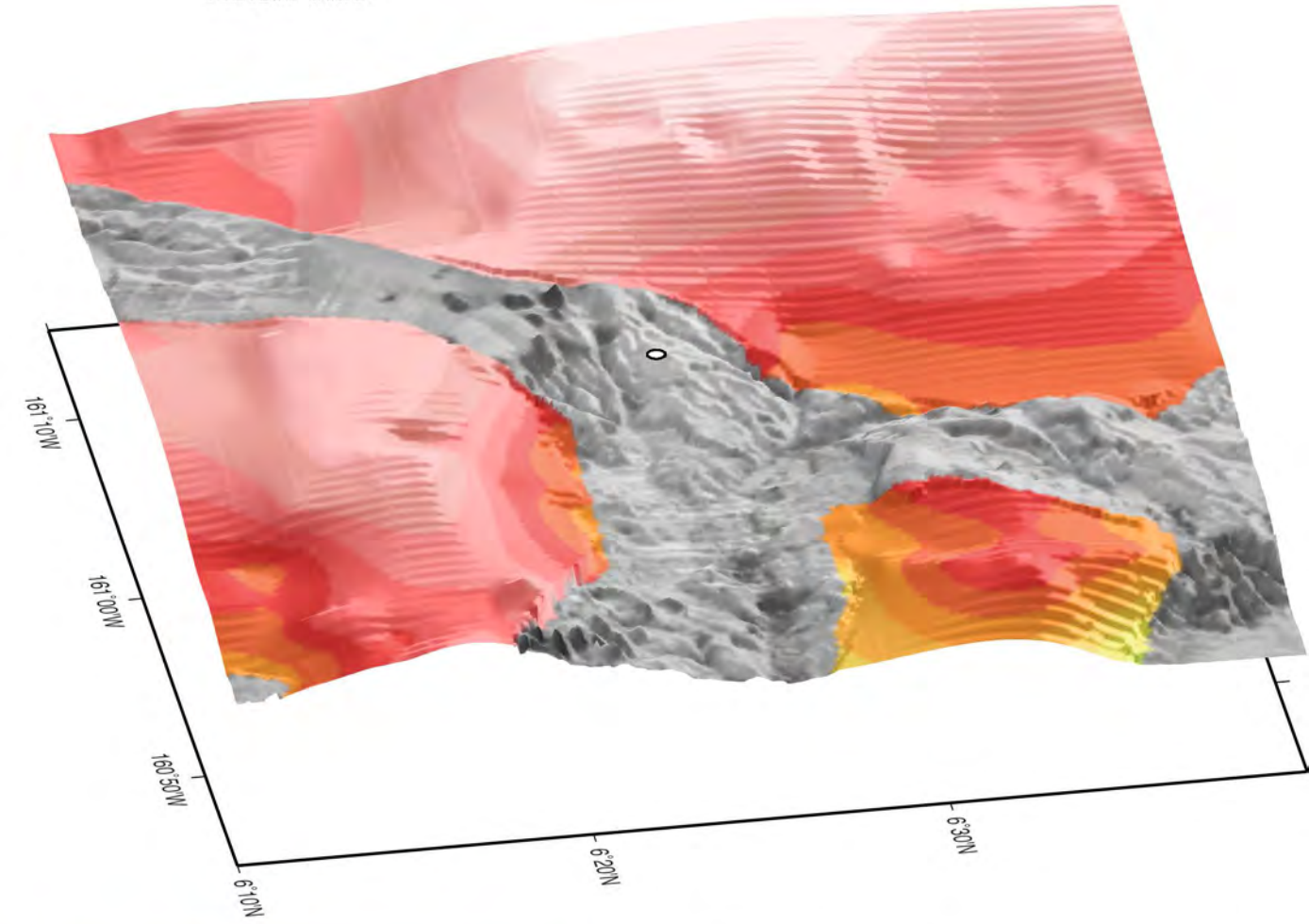

ML1208–03GC
161°20W
161°10W
161°00W
5°30N
5°40N
5°50N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)


ML1208–04GC
ML1208–05BB
161°10'W
161°00'W
160°50'W
6°10'N
6°20'N
6°30'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

ML1208–04GC
ML1208–05BB



ML1208–06BB

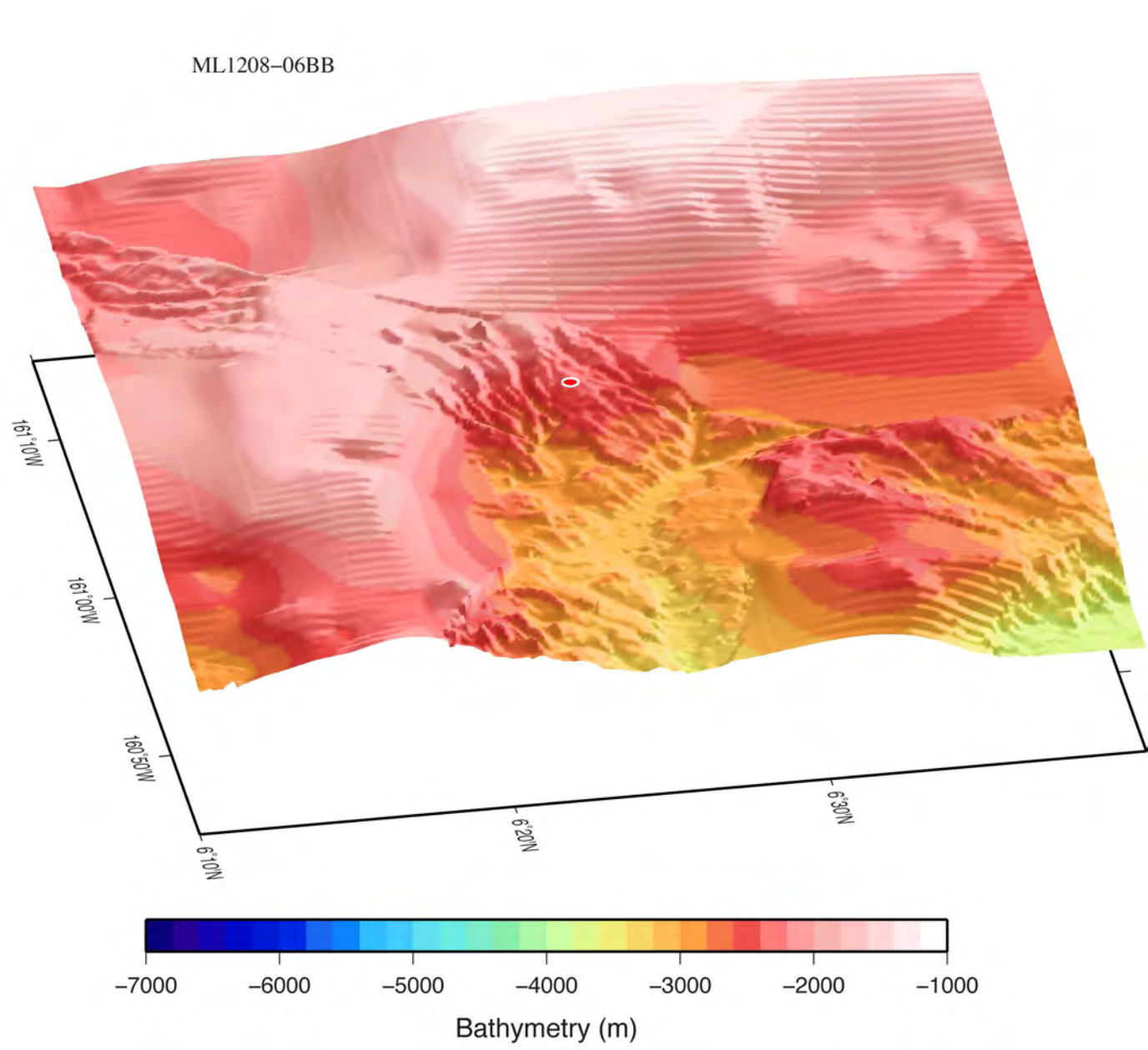


−7000 −6000 −5000 −4000 −3000 −2000 −1000

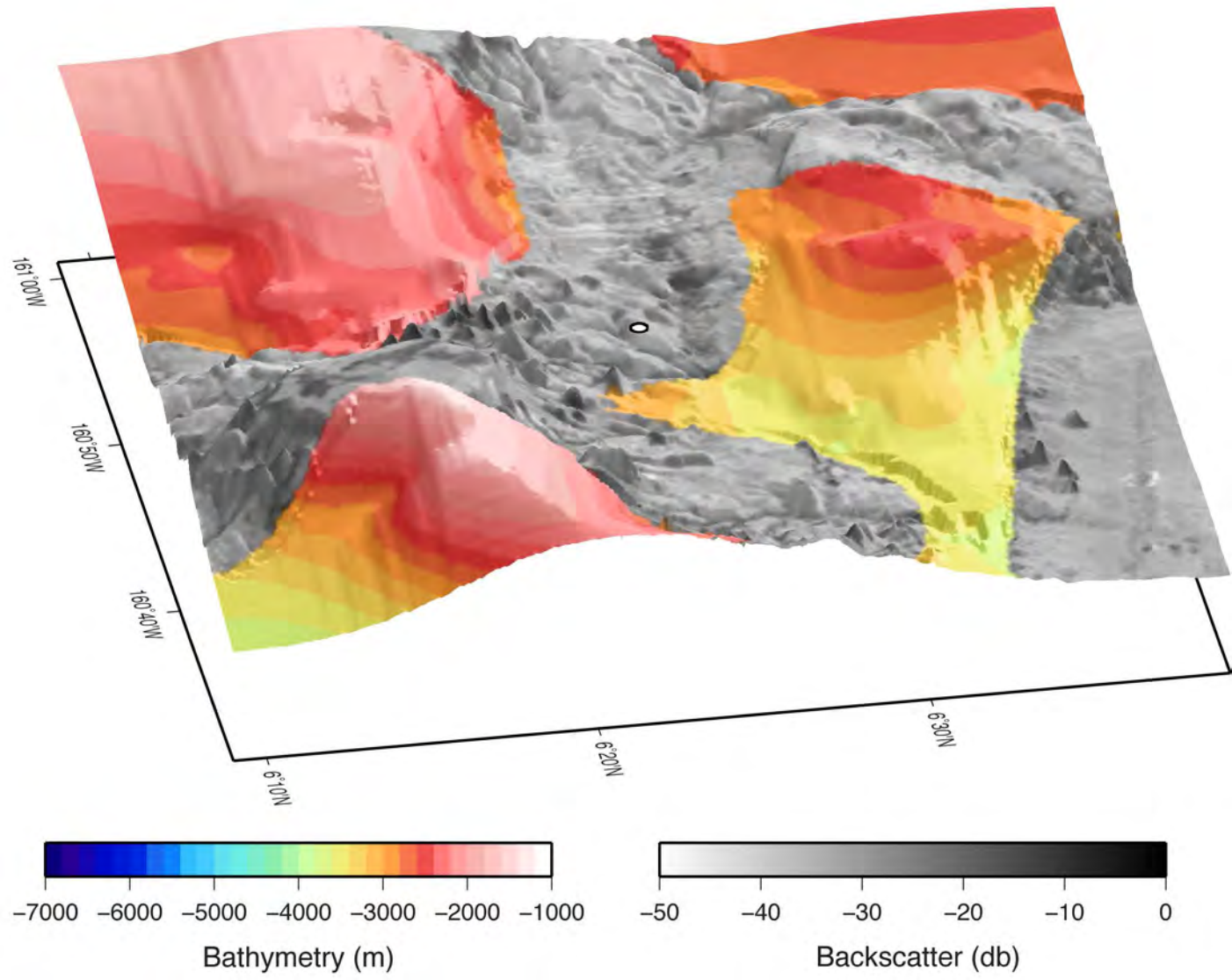
Bathymetry (m)

−50 −40 −30 −20 −10 0

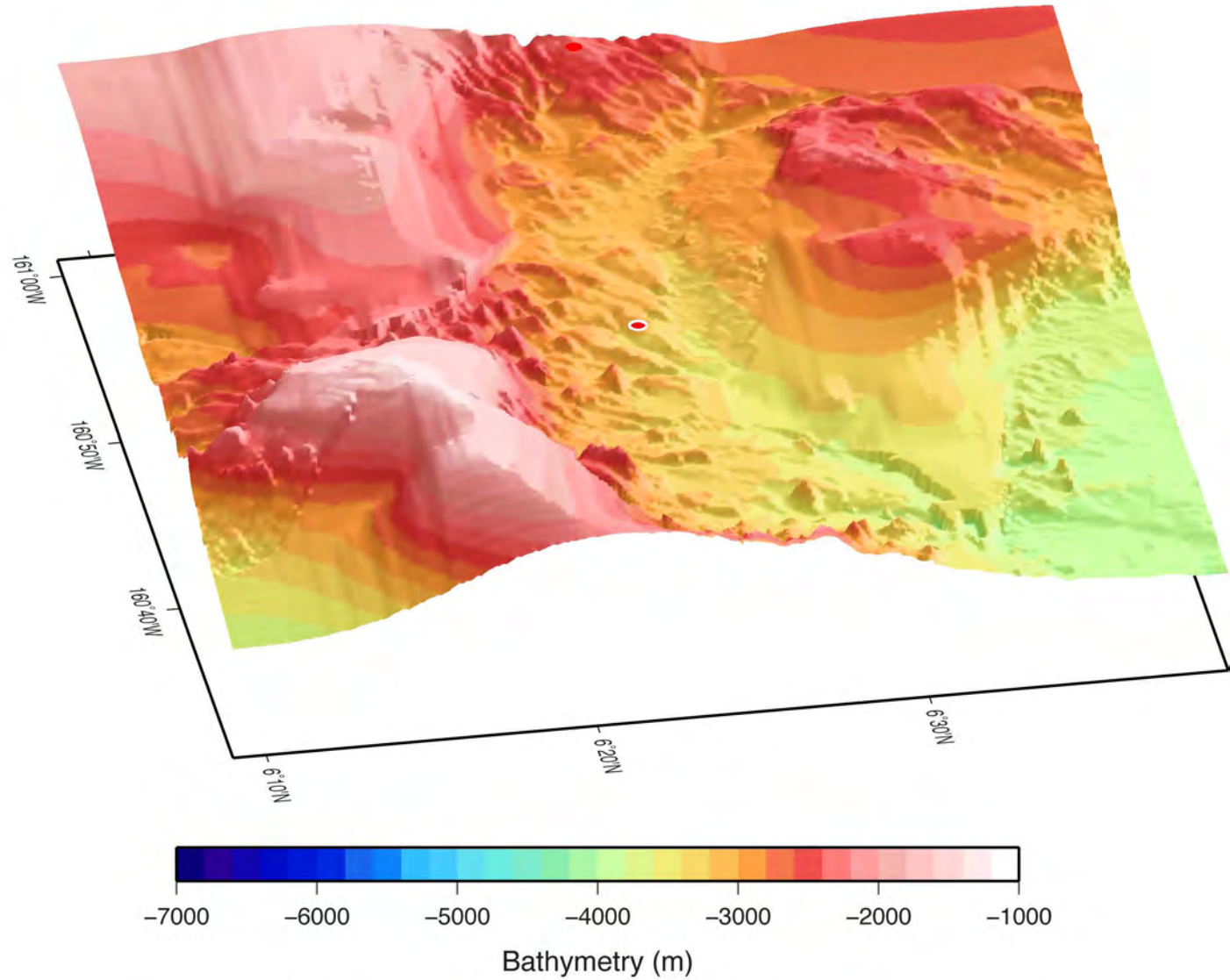
Backscatter (db)


ML1208–06BB
161°10'W
161°00'W
160°50'W
6°10'N
6°20'N
6°30'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

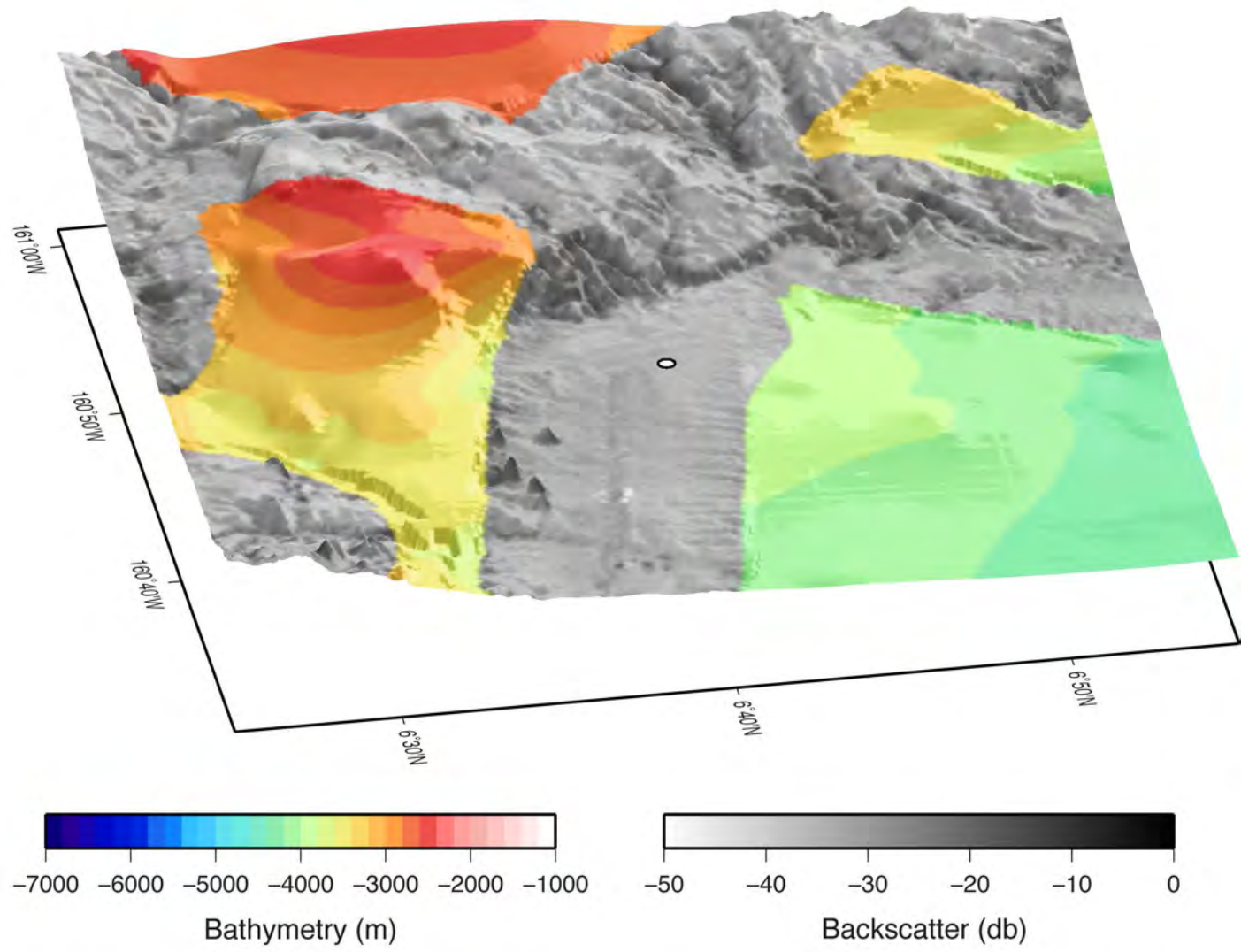
ML1208–07BB
ML1208–08PC
ML1208–08TC
ML1208–09MC



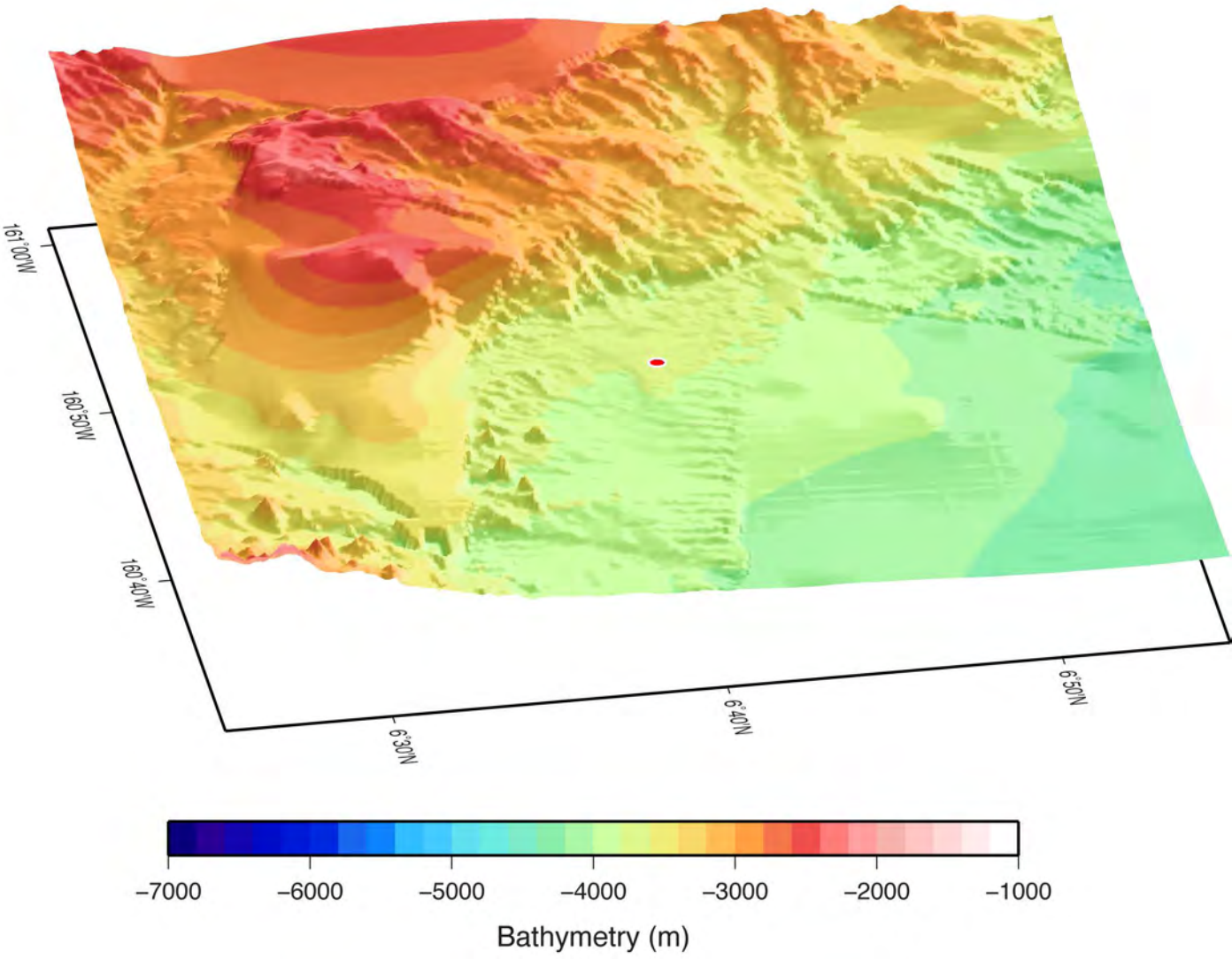
ML1208–07BB
ML1208–08PC
ML1208–08TC
ML1208–09MC



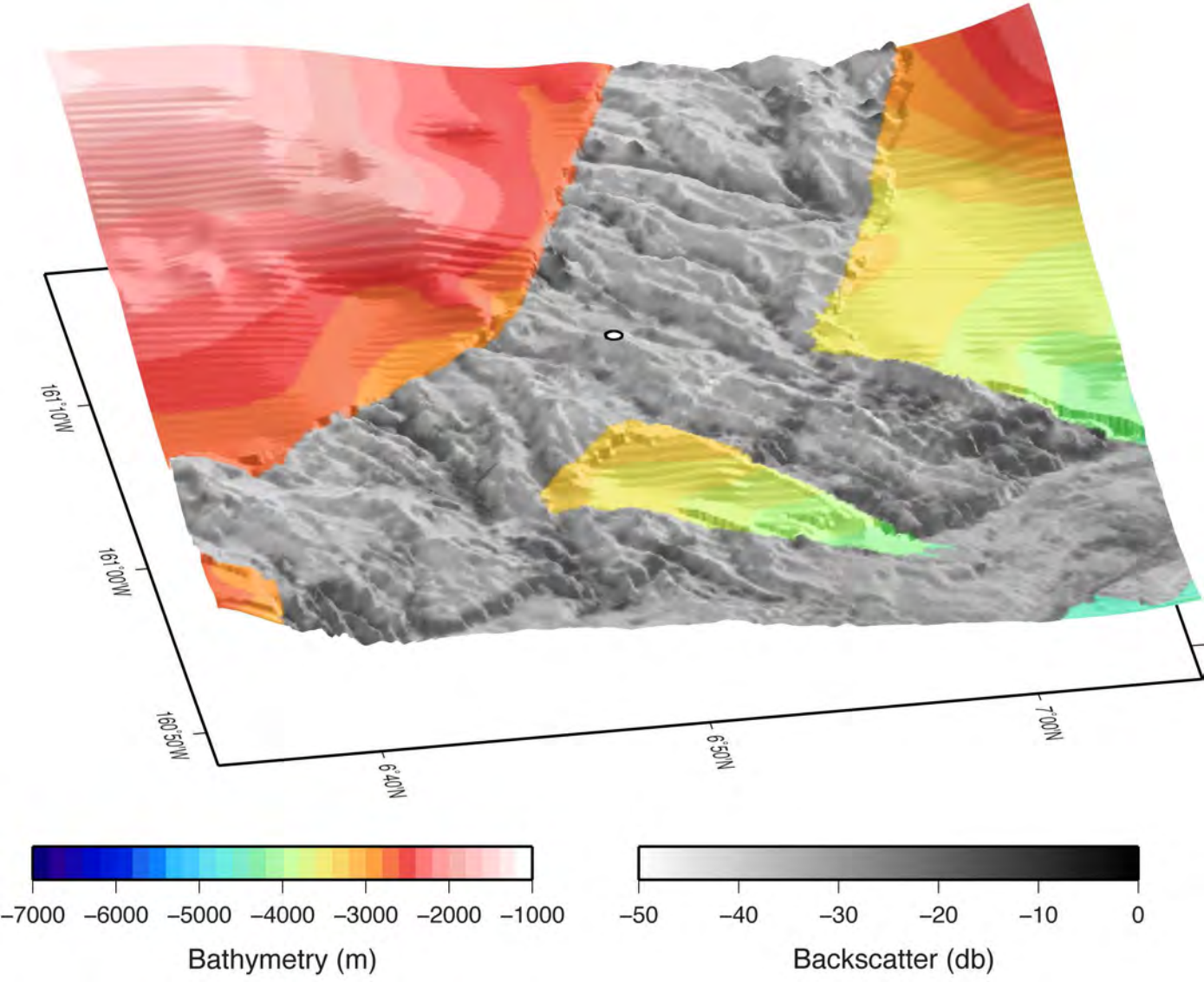
ML1208–35BB


161°00'W
160°50'W
160°40'W
6°30'N
6°40'N
6°50'N
0
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

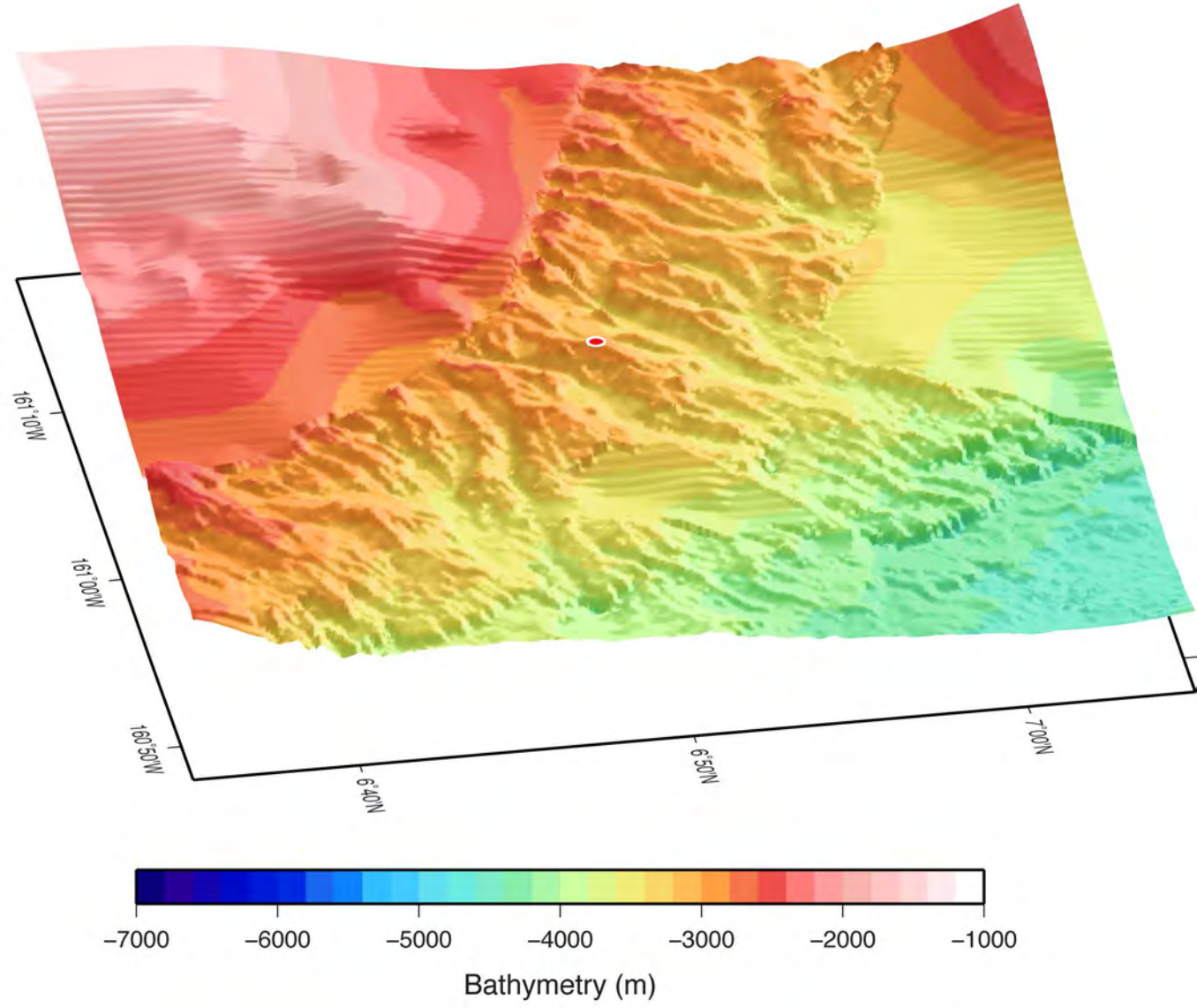
ML1208−35BB

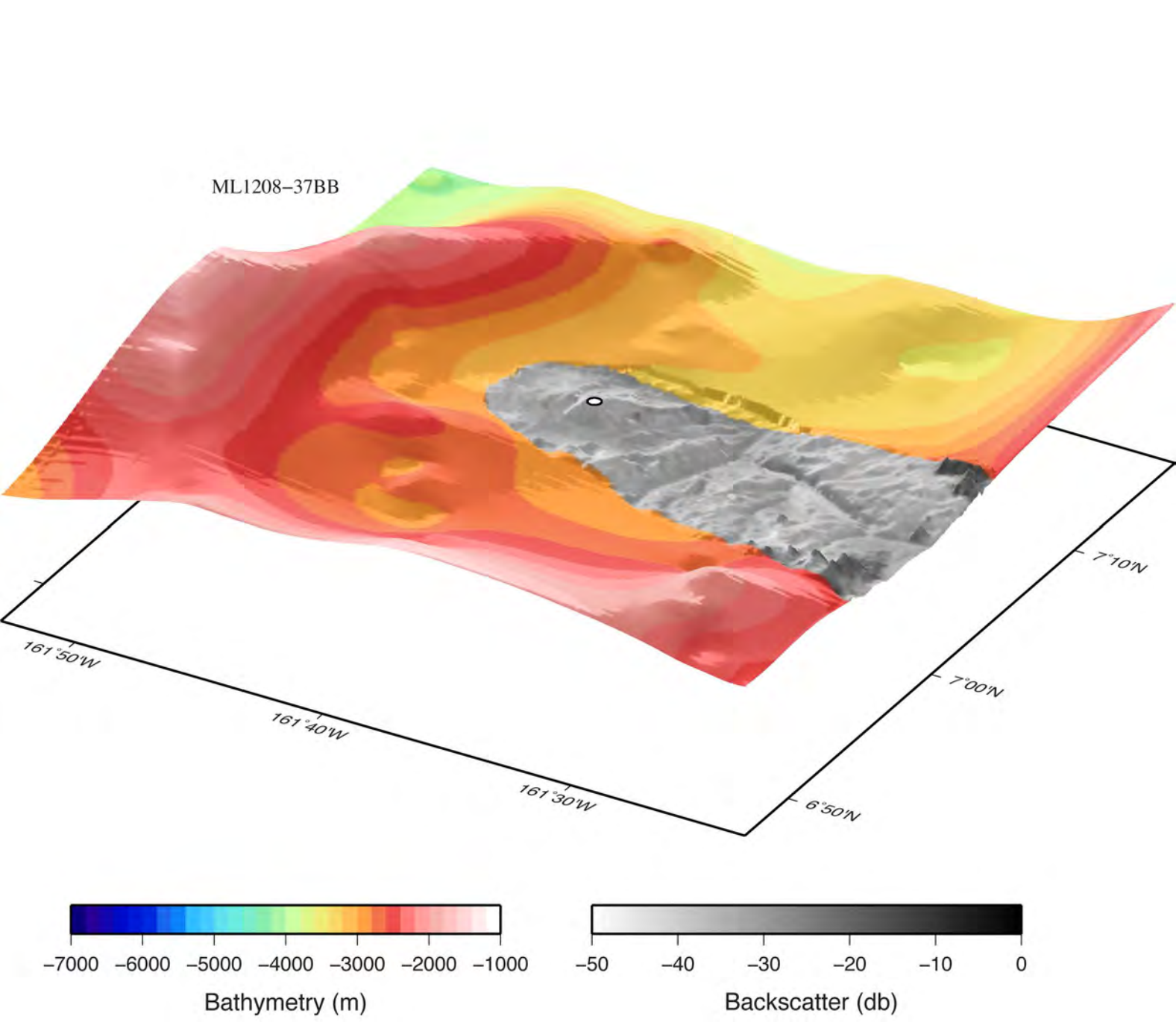

161°00'W
160°50'W
160°40'W
6°30'N
6°40'N
6°50'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

ML1208–36BB
ML1208–38MC
ML1208–39MC



ML1208–36BB
ML1208–38MC
ML1208–39MC

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161°40'W
161°30'W
7°10'N
7°00'N
6°50'N
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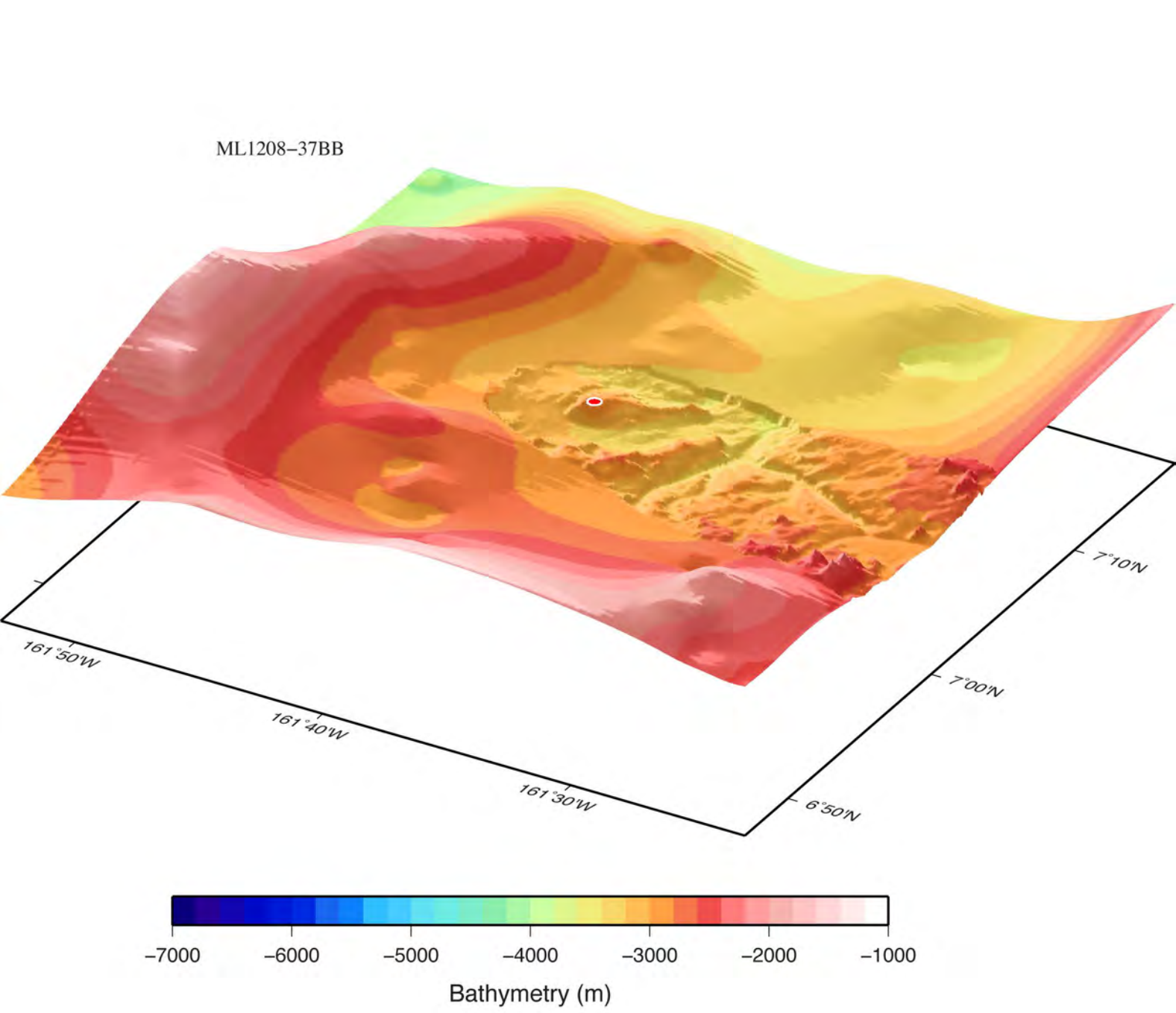
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)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161°50'W
161°40'W
161°30'W
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6°50'N
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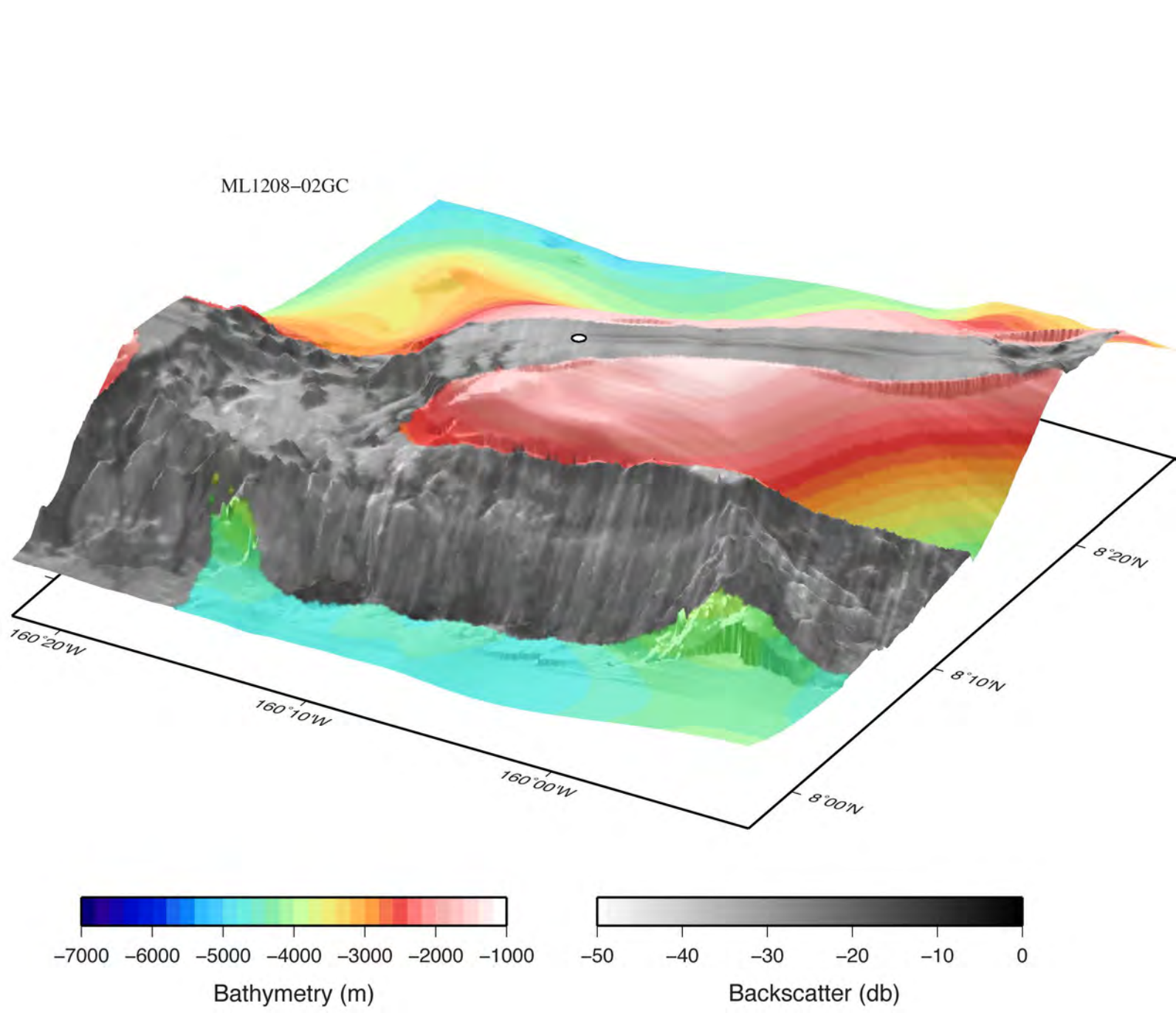
−4000
−3000
−2000
−1000
Bathymetry (m)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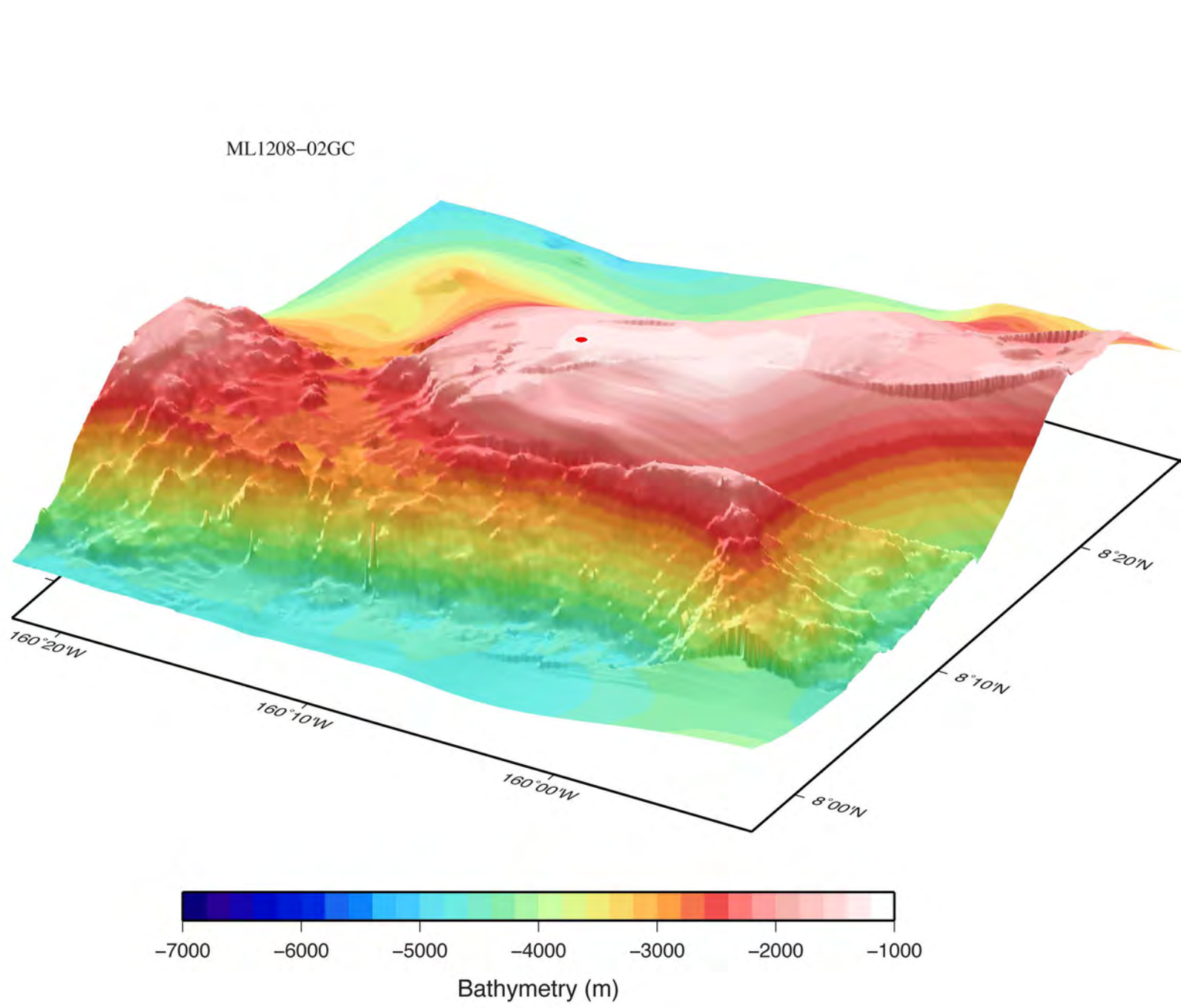
160°10'W
160°00'W
8°20'N
8°10'N
8°00'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)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−6000
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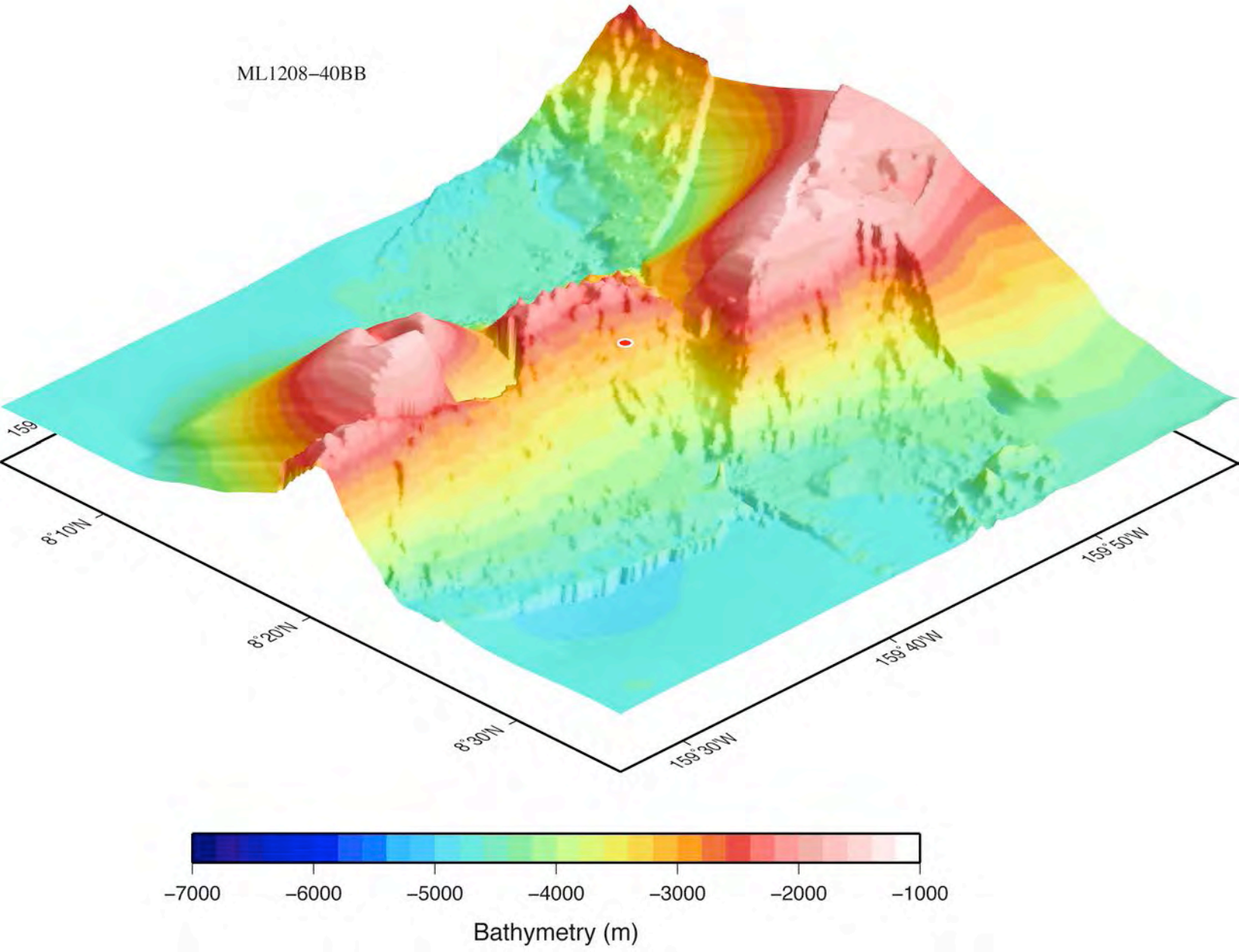
−4000
−3000
−2000
−1000
Bathymetry (m)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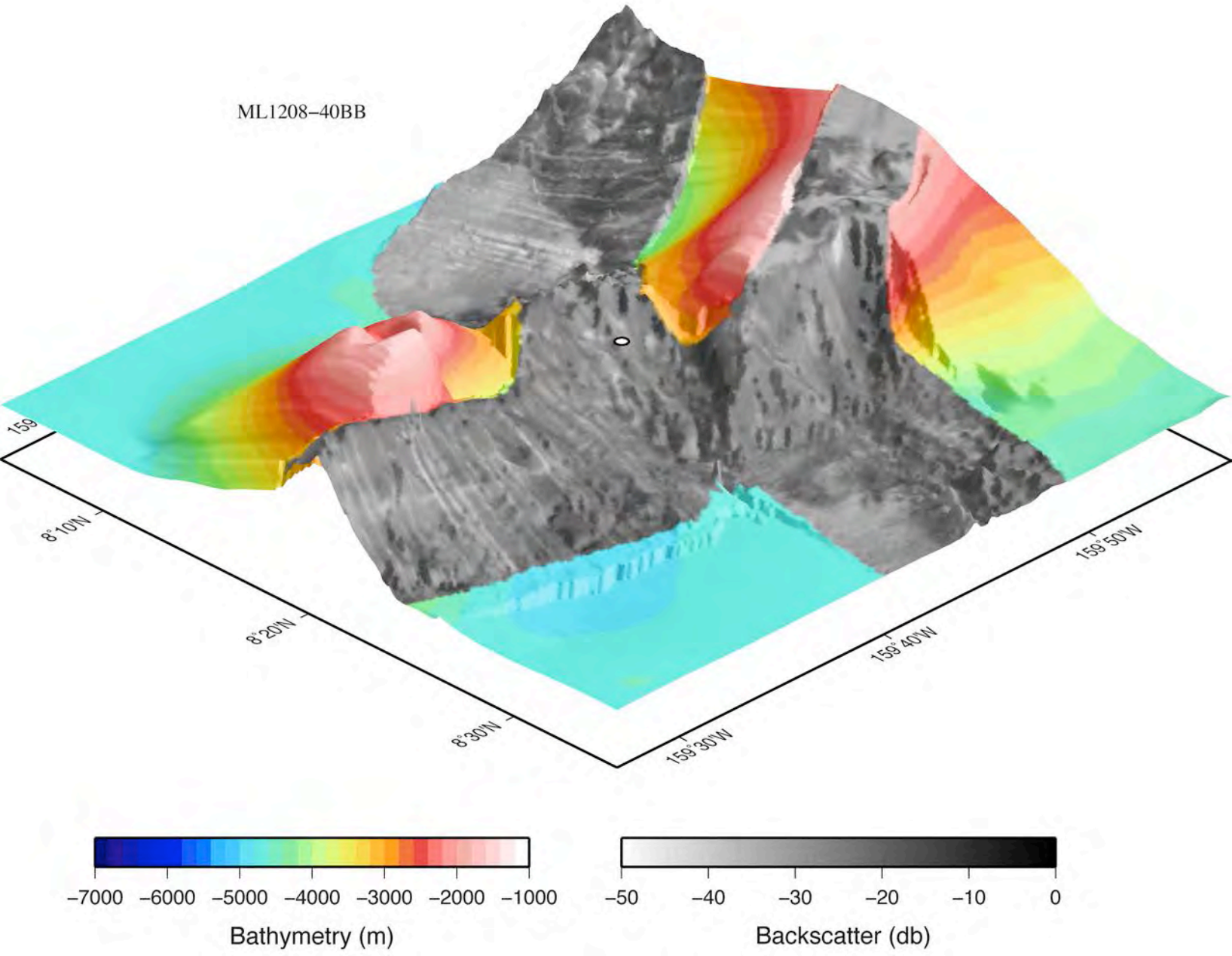
−4000
−3000
−2000
−1000
Bathymetry (m)


ML1208–40BB
159
8°10'N
8°20'N
8°30'N
159°30'W
159°40'W
159°50'W
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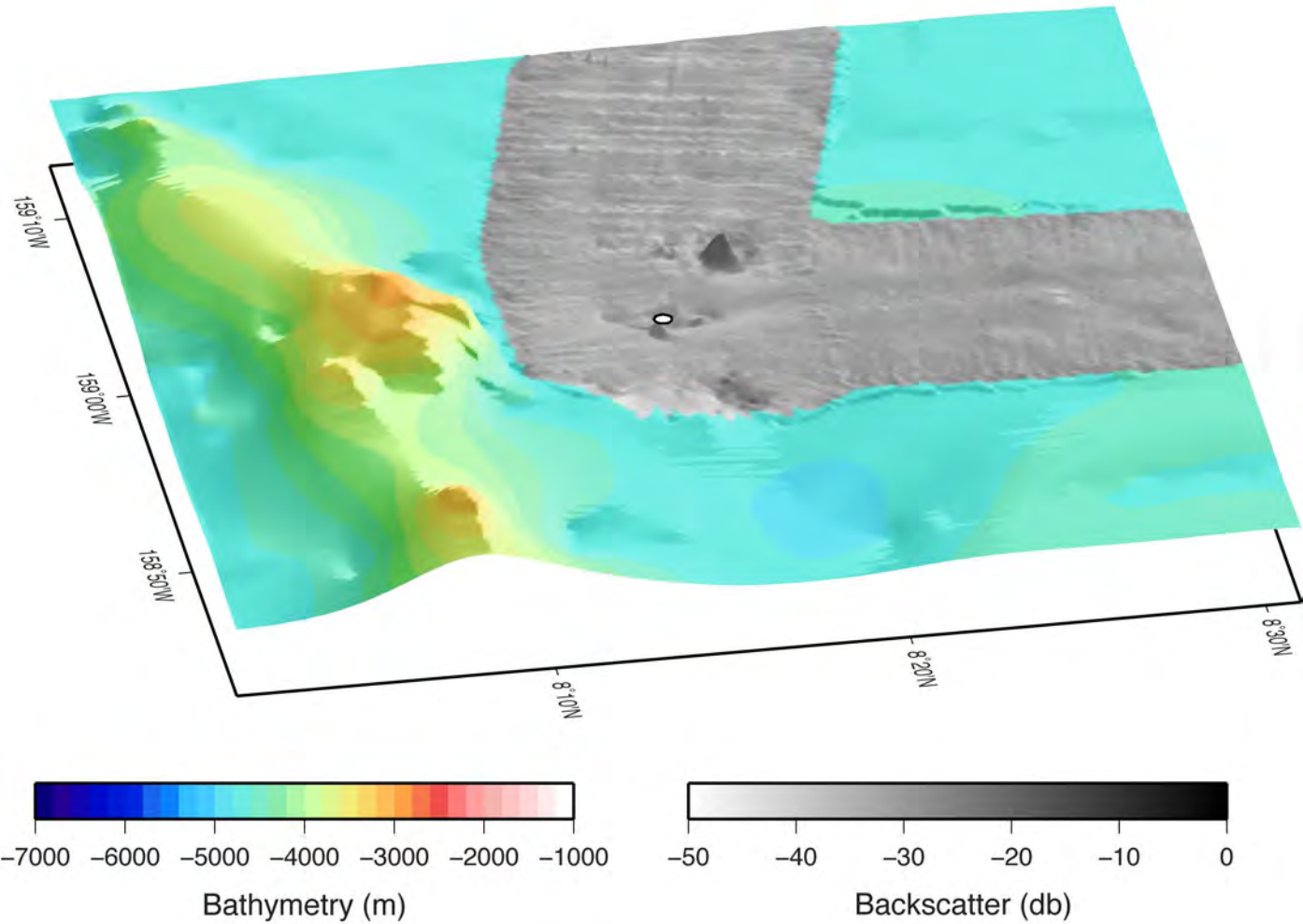
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

ML1208–41BB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159°00'W
158°50'W
8°10'N
8°20'N
8°30'N
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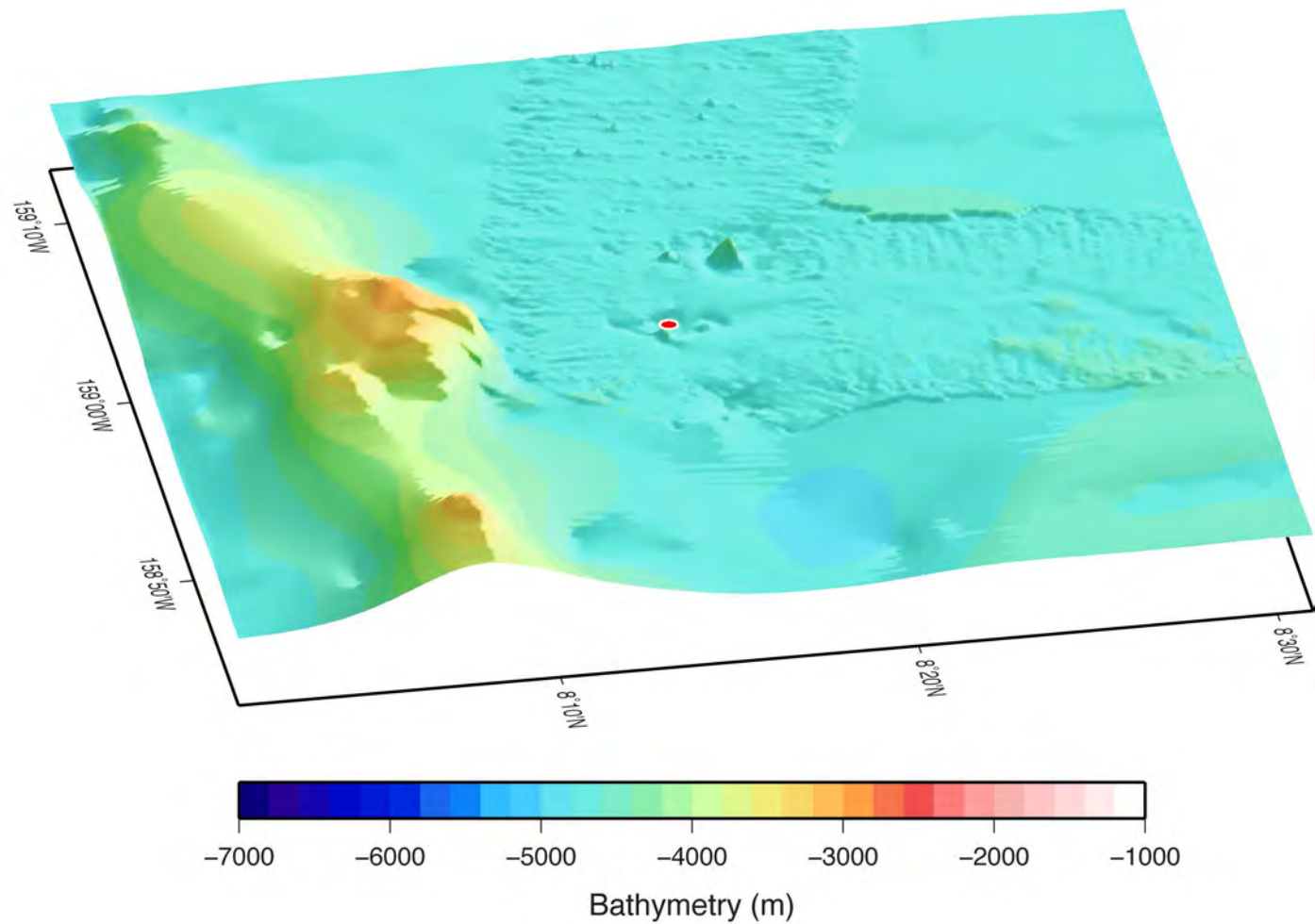
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)

ML1208–41BB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159°00'W
158°50'W
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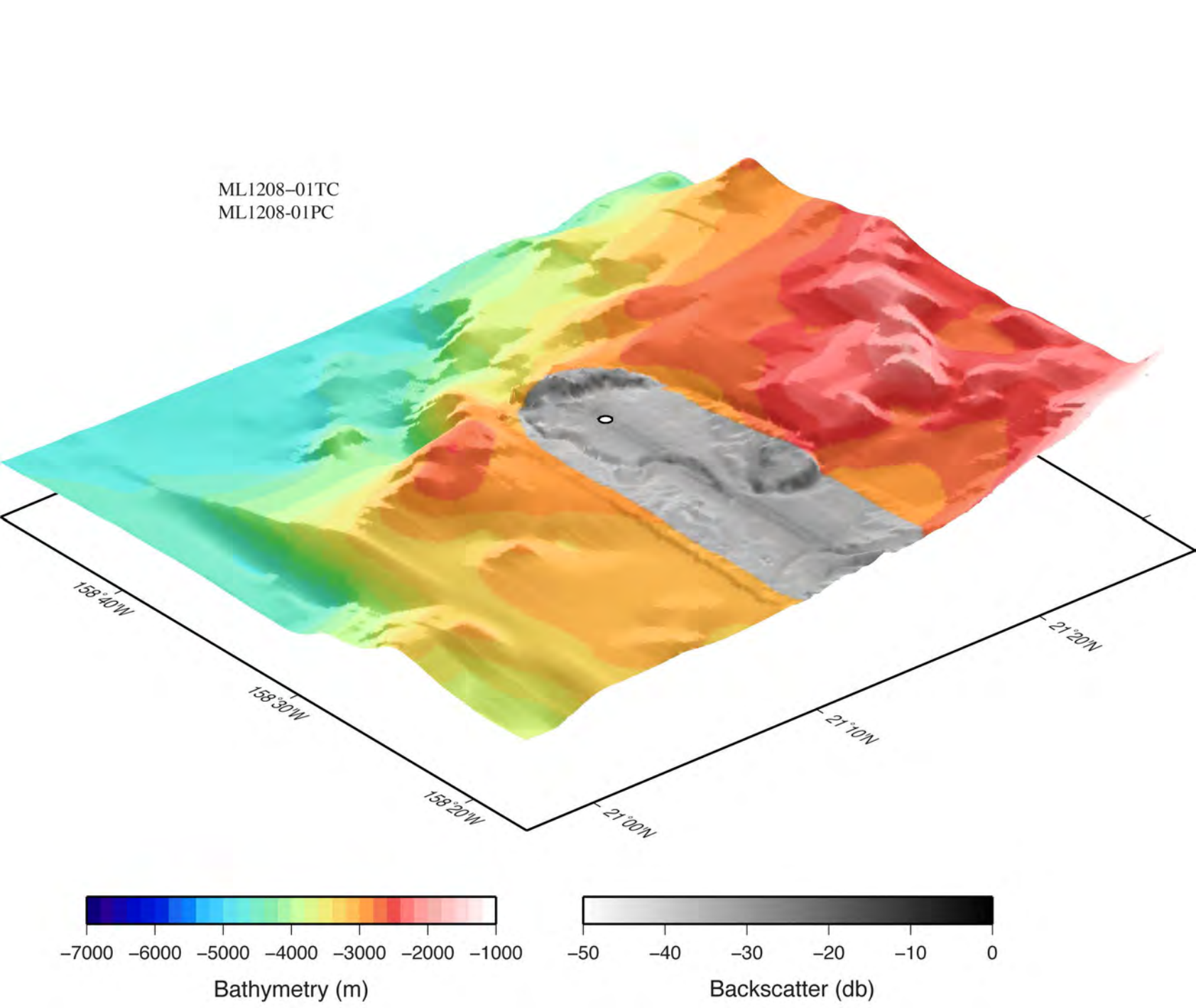
8°30'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)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ML1208-01PC
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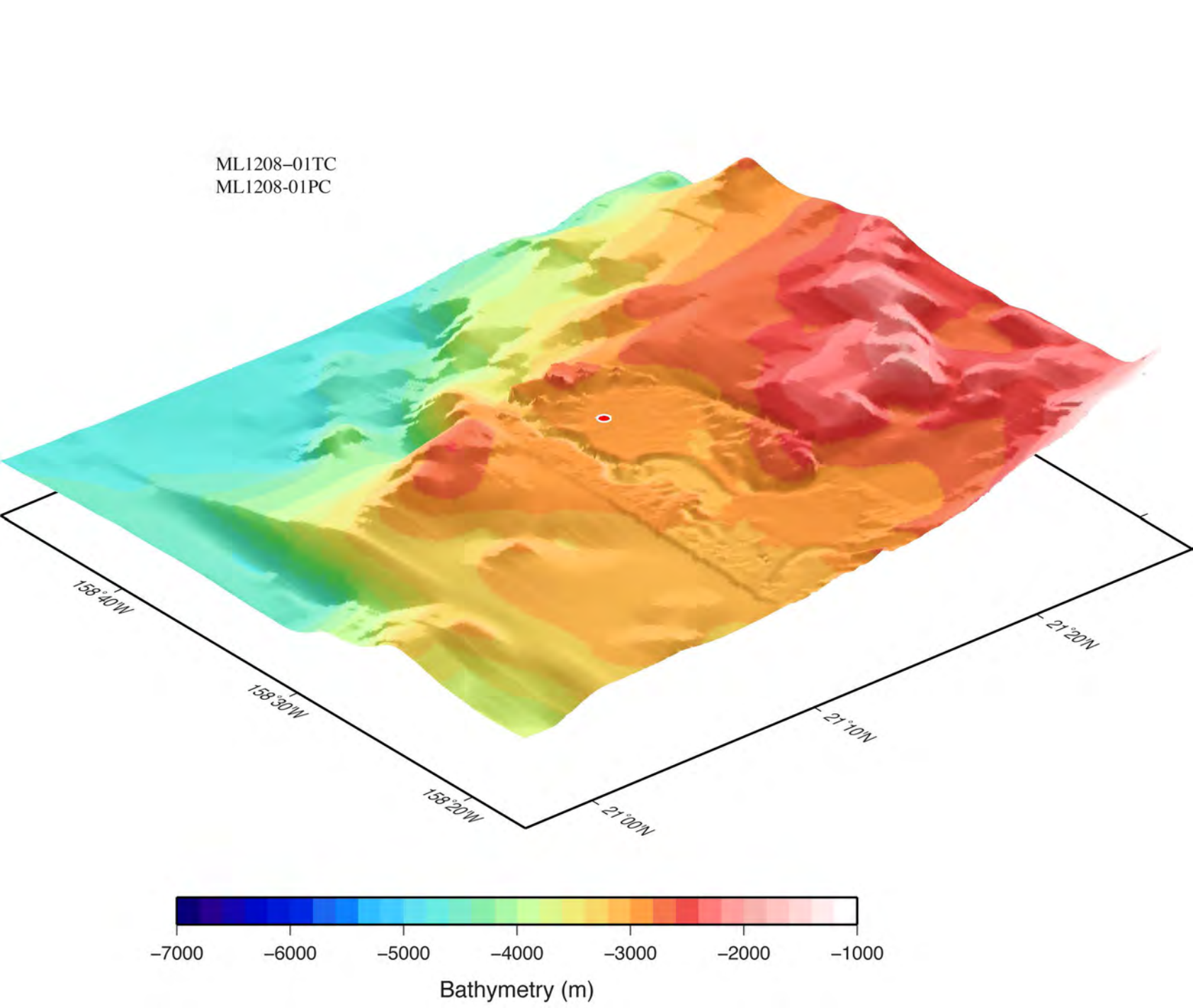
21°10'N
21°20'N
−7000 −6000 −5000 −4000 −3000 −2000 −1000
Bathymetry (m)
−50 −40 −30 −20 −10 0
Backscatter (db)


ML1208–01TC
ML1208-01PC
158°40'W
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158°20'W
21°00'N
21°10'N
21°20'N
−7000
−6000
−5000
−4000
−3000
−2000
−1000
Bathymetry (m)

Protocol for CTD Casts

Cruise MGL12-08
PJP revised 5/5/2012

I. Preparation

10 to 15 minutes before cast:

1. Review the cast plan, including the maximum cast depth, bottom depth and number of bottles to close and depths. Start filling out a new CTD data sheet. Each cast is named: ML1208-***nnn***CTD where '***nnn***' is a unique 3 digit number incremented for each CTD cast. Bottles are numbered as ML1208-***nnn***CTD-01 to ML1208-***nnn***CTD-24.
2. Remove freshwater rinse tubes attached to pumps.
3. Prepare the rosette bottles:
    a. Verify that all water samples have been obtained from the bottles from the previous cast.
    b. Prop each bottle open by stretching the spring loaded caps back and securing their nylon lanyards to the proper carousel position
    c. Check that bottle breather and sample drawing valves are closed

5 minutes before cast:

4. Record the water depth from the Knudsen (assumes 1500 m/s velocity) and bottom depth from multibeam (corrected for velocity profile).
5. After receiving word from the bridge that they are on station and ready to begin, untie the CTD and move it under the block. Have the winch operator remove any slack from the wire.
6. Notify the main lab that the CTD is ready for launch. When bridge, computer room and winch operator are ready (and you have permission to proceed), put the CTD into the water.

II. Deployment and Recovery

1. The CTD-rosette is launched and held just below the surface. Enough wire is paid out so that the bottle tops do not break the surface when the ship rolls.
2. The CTD is sent to 10 meters (winch readout). Turn on the deck unit, thumb wheel should be set to monitor CTD pumps. Once the pumps start, the SBE 11 will read 0011. Allow ~2 minutes to purge air from the system and let sensors stabilize and thermally equilibrate.
3. Bring the CTD to just below the surface, deep enough that the bottle tops do not break the surface when the ship rolls. One operator should remain on deck to help the winch operator see when to stop the CTD.
4. Request the winch operator to zero the winch readout (reset the pay out).
5. Start Seasave. Modify axis to assure proper depth and sensor ranges.

6. Select *Real Time -> Start data acquisition*. Change the file name to reflect the current station and cast number. Langseth file name nomenclature is currently 1208001 ([CruiseNum][Cast]) Fill out the software header.
7. Finish filling out the cast log and re-check the bottom depth.
8. Check the status line to verify that the CTD values are correct. The pressure should be the soaking depth of the CTD. Verify temperature, salinity correctness, agreement between primary and secondary pairs and with ships intake thermosalinograph (TSG). Log TSG and CTD temperature and salinity.

Downcast:

9. Call the winch operator and have them lower the CTD to targeted maximum depth (depth-permitting) at 30 m/min for the first 100 m and then 60 m/min to terminal depth. Maximum depths are 500 m for upper water column casts, just above the bottom (use altimeter, *not* wire out) for the deep casts and the chlorophyll maximum (depth a few meters above the base of the mixed layer) for the Chl max casts.
10. During the cast, closely monitor the CTD output for malfunctions. Sudden noise in a channel, periodic flashing error light on Deck Unit, modulo error count (on status line) provide an indication of a malfunction. Note any odd behavior on the cast sheet. If the cast is deep, monitor the bottom depth altimeter and slow to 30 m/min within 50 m of the bottom. Stop the cast no closer than 10 m off the bottom.

Upcast:

11. Raise the CTD to each target depth at 50 m/min:
    a. Target depths for the upper water column casts are: 500, 400, 300, 200, 175, 150, 125, 100, 75, 50, 25, 10 m with one (1) bottle fired at each depth. Extra bottles should be fired at chlorophyll max depth for POC sampling (depth a few meters above the base of the mixed layer).
    b. Target depths for deep casts are 12 depths from near the bottom to the surface with two (2) bottles fired at each depth (bottle depths will depend upon water depth).
    c. The single target depth for the Chl max casts is the chlorophyll maximum (depth a few meters above the base of the mixed layer) and all 24 bottles are fired at that depth.
12. When the CTD reaches the bottle target depth record the time, wire out, pressure and actual pressure depth, temperature and salinity. This usually takes 20-30 seconds, the minimum flushing time before closing a bottle.
13. Fire the bottle(s). Verify bottle closure by the 'bottles fired' field incrementing by one. Record confirmation time on the bottle record. When the <u>first</u> bottle of the rosette has closed, record the UTC time, latitude, longitude and bottom depth. These data become the station cast information for the bottle data.

End of Cast:

14. As the CTD approaches the surface have someone help spot for the winch operator. Stop the CTD below the surface. Fire the last bottle if it is a shallow depth.

15. Stop Seasave data acquisition. Seasave. Save settings.
16. Power off the CTD by securing the power to the SBE 11 deck unit.
17. When ready, recover the CTD. Avoid banging against the ship.

CTD Back on Board:

18. Move the CTD into its holding area and secure it. Fill the conductivity cell with DI and secure the filler device to the CTD frame.
19. Re-plot the data to look at any channels that were not displayed in real time. Verify that the data are good (at least to a first-order basis).

III. Water Sampling

Every water sample taken from the CTD rosette should be recorded on the CTD log sheet with the type of sample and sample identifier noted.

A. Upper Water Column Casts (500 m)

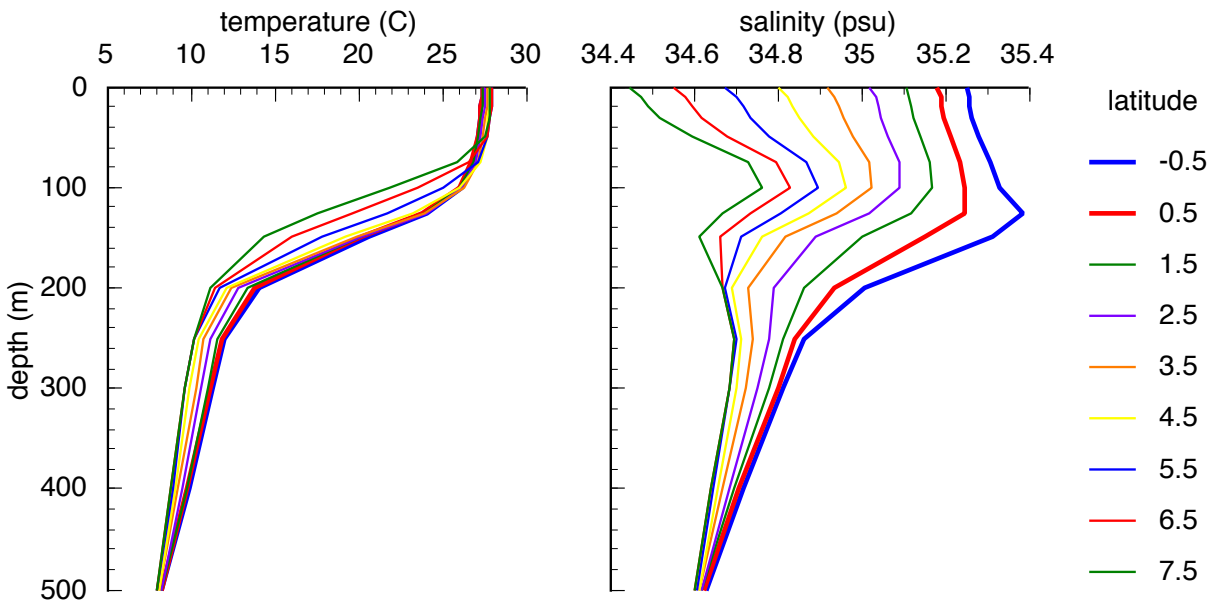
1. Dissolved inorganic carbon (DIC) and δ^{13}DIC samples from each unique depth.
2. Salinity samples from 4 depths (10, 100, 200 and 500 m).
3. Alkalinity samples from each unique depth.
4. Nutrient samples from each unique depth (*sample nutrients from shallowest to deepest bottle, e.g. from lowest to highest concentration*).
5. $\delta^{15}NO_3$ samples from each unique depth (*sample $\delta^{15}NO_3$ from shallowest to deepest bottle, e.g. from lowest to highest concentration*).
6. Isotope samples (δ^{18}O-δD) from each unique depth (1-dram crimp top vials).
7. Bottles fired at chlorophyll max are emptied into 5 gallon buckets and transferred to polyethylene drums for POC filtering.

B. Deep Casts

1. Isotope samples (δ^{18}O-δD) from each unique depth (1-dram crimp top vials).
2. Salinity samples taken from shallowest and deepest depth.
3. U-series samples from each depth. Samples are filtered directly from each bottle following Marcantonio protocol

C. Chl Max Casts (all bottle fired at 1 depth)

1. Dissolved inorganic carbon (DIC) and δ^{13}DIC samples from bottle 01.
2. Alkalinity samples from samples from bottle 01.
3. Nutrient samples from samples from bottle 01.
4. Isotope sample (δ^{18}O-δD) from bottle 01 (25 ml Nalgene SC bottle).
5. Remainder of bottle 01 and all of bottles 02-24 are emptied into 5 gallon buckets and transferred to polyethylene drums for POC filtering.



WOA mean annual temperature and salinity profiles at 160.5 °W.

Sampling Protocol for Dissolved Inorganic Carbon (DIC)

I. DIC Sampling Protocol

Safety Note: Wear gloves and take appropriate safety measures when handling mercuric chloride, a poison. All solid waste that has come in contact with mercuric chloride should be sealed in a ziplock $HgCl_2$ waste bag (kimwipes, pipette tips, gloves).

1. Label two 125 ml serum vials. Lay out sampling tools (rubber caps, aluminum seals, crimper, 5 ml syringe and tube, eppendorf pipette and tip, mercuric chloride solution).
2. Attach a tube directly to the ship's uncontaminated seawater line, CTD sample drawing valve or pump (for samples over the side of the boat).
3. Insert the tube to the bottom of each serum bottle and fill the bottle allowing water to overflow ~50 ml. Slowly withdraw the tube from the bottle being careful not to splash or cause turbulence that allows gas exchange.
4. Using a 5 ml plastic syringe and tube, remove 1 ml from the top of each bottle.
5. Add 100 µl of mercuric chloride solution to each bottle with eppendorf micropipettor (tips can be reused).
6. Place rubber septa on each vial with aluminum cap on top and crimp close. Invert the bottle several times to mix in the mercuric chloride.
7. Store in the refrigerator.

II. Sampling Frequency

A. Uncontaminated Seawater Line

a. During transits take a sample with every POC sample (POC sampling will be continuous). Time the sample so that the p_{CO2} machine is NOT in calibration mode.

b. During surveys take a sample with POC sample (POC sample will be as approaching or leaving each multicore site)

B. CTD casts

a. Upper water column CTD casts (upper 500 m, 12 depths), take a sample at each depth.

b. Chlorophyll maximum CTD casts (24 bottles at one depth), take a sample from one bottle.

C. Multicore Niskin Bottle

a. Take one sample from each multicore cast

D. Pumping

a. Take one sample from each pumping depth

III. Shipping

δ^{13}DIC samples will be packed in original boxes with padding and shipped to LDEO in the refrigerated core storage van.

Cruise MGL12-08
PJP revised 4/28/2012

Sampling Protocol for $\delta^{13}C$ of Dissolved Inorganic Carbon ($\delta^{13}DIC$)

I. $\delta^{13}DIC$ Sampling Protocol

Safety Note: Wear gloves and take appropriate safety measures when handling mercuric chloride, a poison. All solid waste that has come in contact with mercuric chloride should be sealed in a ziplock $HgCl_2$ waste bag (kimwipes, pipette tips, gloves).

1. Label two 4-dram screw cap vials. Lay out sampling tools (caps, parafilm squares, 5 ml syringe and tube, eppendorf pipette and tip, mercuric chloride solution).
2. Attach a tube directly to the ship's uncontaminated seawater line, CTD sample drawing valve or pump (for samples over the side of the boat).
3. Insert the tube to the bottom of each vial and fill the bottle allowing water to overflow ~5 ml. Slowly withdraw the tube from the bottle being careful not to splash or cause turbulence that allows gas exchange.
4. Using a 5 ml plastic syringe and tube, remove 0.2 ml from the top of each bottle.
5. Add 20 µl of mercuric chloride solution to each bottle with eppendorf micropipettor (tips can be reused).
6. Place a square of parafilm over the top of each vial and carefully screw on cap tightly. Wrap a piece of parafilm around the cap. Invert the bottle several times to mix in the mercuric chloride.
7. Store in the refrigerator.

II. Sampling Frequency

A. Uncontaminated Seawater Line

a. During transits take a sample with every POC sample (POC sampling will be continuous). Time the sample so that the p_{CO2} machine is NOT in calibration mode.

b. During surveys take a sample with POC sample (POC sample will be as approaching or leaving each multicore site)

B. CTD casts

a. Upper water column CTD casts (upper 500 m, 12 depths), take a sample at each depth.

b. Chlorophyll maximum CTD casts (24 bottles at one depth), take a sample from one bottle.

C. Multicore Niskin Bottle

a. Take one sample from each multicore cast

D. Pumping

a. Take one sample from each pumping depth

III. Shipping

δ^{13}DIC samples will be packed in original boxes with padding and shipped to LDEO in the refrigerated core storage van.

Cruise MGL12-08
PJP revised 4/28/2012

Sampling Protocol for Total Alkalinity (TA)

I. TA Sampling Protocol

Safety Note: Wear gloves and take appropriate safety measures when handling mercuric chloride, a poison. All solid waste that has come in contact with mercuric chloride should be sealed in a ziplock $HgCl_2$ waste bag (kimwipes, pipette tips, gloves).

1. Label three 125 ml serum vials. Lay out sampling tools (rubber caps, aluminum seals, crimper, 5 ml syringe and tube, eppendorf pipette and tip, mercuric chloride solution).
2. Alkalinity samples need to be filtered through 0.5 µm GF/F filters:
    a. Uncontaminated seawater line – sample the outflow from one of the GF/F filter housings.
    b. CTD/Multicore Niskin – attach a 142 mm GF/F filter assembly to the CTD drawing tube and use the effluent from gravity feeding the water through the filter.
    c. Pump – sample outflow from one of the GF/F filter housings.
3. Insert the tube to the bottom of each serum bottle and fill the bottle allowing water to overflow ~50 ml. Slowly withdraw the tube from the bottle.
4. Using a 5 ml plastic syringe and tube, remove 1 ml from the top of each bottle.
5. Add 100 µl of mercuric chloride solution to each bottle with eppendorf micropipettor (tips can be reused).
6. Place rubber septa on each vial with aluminum cap on top and crimp close. Invert the bottle several times to mix in the mercuric chloride.
7. Store in the refrigerator.

II. Sampling Frequency

A. Uncontaminated Seawater Line

a. During transits take a sample with every POC sample (POC sampling will be continuous). Time the sample so that the p_{CO2} machine is NOT in calibration mode.

b. During surveys take a sample with POC sample (POC sample will be as approaching or leaving each multicore site)

B. CTD casts

a. Upper water column CTD casts (upper 500 m, 12 depths), take a sample at each depth.

b. Chlorophyll maximum CTD casts (24 bottles at one depth), take a sample from one bottle.

C. Multicore Niskin Bottle

a. Take one sample from each multicore cast

D. Pumping

a. Take one sample from each pumping depth

III. Shipping

Alkalinity samples will be packed in original boxes with padding and shipped to LDEO in the refrigerated core storage van.

Cruise MGL12-08
PJP revised 4/28/2012

Sampling Protocol for Salinity

I. Salinity Sampling Protocol

1. Rinse out bottle 3x with 40mL of seawater sample. Only one bottle, no duplicates.
2. Fill to overflowing, then dump out enough water so bottle is filled to shoulder, (leave head space in neck of bottle).
3. Wipe off cap, neck with kimwipe so salt crystals don't form under cap, and then screw on taperseal cap.
4. Seal cap with parafilm strip.
5. Record bottle number, date, time sample was taken, vial number, sample type ('underway', 'CTD'), CTD cast number, niskin bottle number/depth.
6. Store samples in refrigerator.

II. Sampling Frequency

A. Uncontaminated Seawater Line

a. During transits and surveys take one (1) sample daily.

B. CTD casts

a. Upper water column CTD casts (upper 500 m, 12 depths), take one sample from four depths (10, 100, 200 and 500 m).

b. Deep CTD casts (surface to nr. sed-water interface, 2 bottles at each of 12 depths), take one sample from two depths (deepest and shallowest niskin bottle).

c. Record vial number, date, time, CTD cast number, niskin bottle #/depth in log book

C. Multicore Niskin Bottle

a. Take one sample from each multicore cast

b. Record vial number, date, time, multicore number, and depth in log book

III. Shipping

Put salinity bottles back in bottom of plastic packer with cardboard dividers. Store in reefer. Make sure everything is secure. Attach lid on box, secure with new zip ties (extras under lid with packing list, new address labels). Slide new address label in sheet on front. Make sure it gets to port shipping company once in HI for shipment to Georgia Tech.

Cruise MGL12-08
PJP revised 4/29/2012

Sampling Protocol A for $\delta^{18}O$-δD Isotopes

I. Isotope Sampling Protocol A (Cobb Lab)

1. Take samples in 3.5 mL glass crimp-top vials [Need: glass vials, gray butyl rubber stoppers, silver-colored Al seals, and the Wheaton EZ-crimper.]. When filling with water sample, fill to just above neck of vial. If filled above this level, flick top of vial with your finger to remove water until vial is filled to just above neck.

2. Take duplicates of each sample (2 vials per sample)
3. To seal water sample: place stopper in top of vial, then place Al seal on top of stopper. Holding vial down with one hand on a firm surface, place metal crimper over top of vial, and squeeze the crimper handle.
4. For each sample, record: vial number, date, time, sample type ('rain', 'underway', 'CTD'), and in accompanying 'rite in the rain' yellow logbook. Vials are pre-labeled with numbers. For CTD samples, also record cast#, niskin bottle #, and depth under comments.
5. Store samples in cold room in small, square VWR Cryo pro boxes.

II. Sampling Frequency

A. Rainwater

a. Take rainwater sample daily, if it rains

b. Place graduated cylinder beneath spout, pour out water to measure amount of rain precisely to 0.5 mL.

c. Make sure when emptying collector that you get a drop of oil out of separatory funnel. This will mean all the water has been extracted from the collector. If oil level becomes depleted in collector over time, refill.

d. Fill two, 3.5mL vials from the graduated cylinder, seal according to directions above, record vial number, date, time, and rain amount in log book.

e. Store vials back in box.

B. Uncontaminated Seawater Line

a. During transits and surveys take a sample three (3) times daily.

b. When anchored/coring in one place, sample once a day

C. CTD casts

a. Upper water column CTD casts (upper 500 m, 12 depths), take sample from every niskin bottle corresponding to a unique depth.

b. Deep CTD casts (surface to nr. sed-water interface, 2 bottles at each of 12 depths), take sample from every niskin bottle corresponding to a unique depth.

c. Record vial number, date, time, CTD cast number, niskin bottle #/depth in log book

D. Multicore Niskin Bottle

a. Take one sample from each multicore cast

b. Record vial number, date, time, multicore number, and depth in log book

III. Shipping

Put isotope vials back in boxes. Store in reefer. Make sure everything is secure. Attach lid on box, secure with new zip ties (extras under lid with packing list, new address labels). Slide new address label in sheet on front. Make sure it gets to port shipping company once in HI for shipment to Georgia Tech.

Cruise MGL12-08
PJP revised 4/29/2012

Sampling Protocol B for $\delta^{18}O$-δD Isotopes

I. Isotope Sampling Protocol B (paired with POC samples)

1. Label one 25 ml nalgene bottle.
2. Rinse bottle with sample water
3. Fill bottle completely with sample water making sure there are no air bubbles and a nice meniscus is present.
4. Lay a square of parafilm over the top of the bottle, tightly screw on the cap and wrap parafilm around the top.
5. Store in the refrigerator.

II. Sampling Frequency

A. Rainwater

a. Take rainwater sample daily, if it rains

b. Place graduated cylinder beneath spout, pour out water to measure amount of rain precisely to 0.5 mL.

c. Make sure when emptying collector that you get a drop of oil out of separatory funnel. This will mean all the water has been extracted from the collector. If oil level becomes depleted in collector over time, refill.

d. Fill two, 3.5mL vials from the graduated cylinder, seal according to directions above, record vial number, date, time, and rain amount in log book.

e. Store vials back in box.

B. Uncontaminated Seawater Line

a. During transits take a sample with every POC sample (POC sampling will be continuous). Time the sample so that the p_{CO2} machine is NOT in calibration mode.

b. During surveys take a sample with POC sample (POC sample will be as approaching or leaving each multicore site)

C. CTD casts

a. Chlorophyll maximum CTD casts (24 bottles at one depth), take a sample from one bottle

D. Pumping

a. Take one sample from each pumping depth

III. Shipping

Isotope (B) samples will be packed boxes with padding and shipped to LDEO in the refrigerated core storage van.

Cruise MGL12-08
PJP revised 04/29/2012

Sampling Protocol for Nutrients (NO_3, PO_4, Si)

I. Nutrient Sampling Protocol

1. Label two 15 ml centrifuge tubes.
2. Rinse syringe, filter and sample container (*be careful not to touch plunger, inside of syringe, syringe tip or filter fittings*)
    a. Rinse syringe and plunger 3x with sample water
    b. Fill syringe with sample water and attach leur-lock 0.2µm filter
    c. Expel ~5 ml of water through filter
    d. Rinse each centrifuge tube three times with filtered water (add 5 ml of water, cap, shake and discard)
3. Remove filter and fill syringe and refill syringe with sample water
4. Filter 12 ml of water into each **centrifuge** tube and cap
5. Place samples in Styrofoam rack and immediately freeze

II. Sampling Frequency

A. Uncontaminated Seawater Line

a. During transits take a sample with every POC sample (POC sampling will be continuous). Time the sample so that the p_{CO2} machine is NOT in calibration mode.

b. During surveys take a sample with POC sample (POC sample will be as approaching or leaving each multicore site)

B. CTD casts

a. Upper water column CTD casts (upper 500 m, 12 depths), take a sample at each depth. Sample bottles from shallow to deep (low to high nutrient concentration)

b. Chlorophyll maximum CTD casts (24 bottles at one depth), take a sample from one bottle

C. Multicore Niskin Bottle

a. Take one sample from each multicore cast

D. Pumping

a. Take one sample from each pumping depth

III. Shipping

Nutrient samples will be packed in coolers with dry ice and shipped frozen to LDEO via overnight freight.

Cruise MGL12-08
PJP revised 4/28/2012

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V MARCUS LANGSETH
Ship Station #
Cruise: MGL1208 Leg:
Core Name & Station # ML1208-001PC
Mo/Day/Yr 5 / 1 / 2012
Observer HLF

Latitude: launch 21 D 11 . 99 min (N) S
on bottom 21 D 11 . 97 min (N) S

Longitude: launch 158 D 31 . 50 min E (W)
on bottom 158 D 31 . 51 min E (W)

Navigation Type: Loran SatNav GPS PCODE other

	launched	on bottom	recovered	
Time:	0545	0700	0823 (trigger 0858 piston core surface)	(GMT)
Water Depth:	2960	2960	2960	Meters
Wire:	0	2950		Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

Piston Core Length: 20 40 60 80 100 other
Scope: 24 ft
Trigger Line Length: 42 ft
Safety Pin Size: or Actuating Depth:
Pinger (Meters above corehead): N/A

Tension:
At surface: 4300
Prior to trip: 5500
On Bottom: 5500
Pullout (max): 14,000 9464
Ascending: 9000

Other Samplers:
Type & No: Section Length:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	143.8		143.8	
2	154.4		298.2	
3	152.8		451.0	
4	150.8		601.8	
5	119.4		721.2	
TC				
1	77.6		77.6	
2	83.5		161.1	

Remarks:

NO PIGS
9 lead weights on TC

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station #

Cruise: ML1208 Leg:

Core Name & Station # ML1208 - 02 GC

Mo/Day/Yr 05 / 05 / 2012

Observer AWJ

Latitude: launch 08 D 12 . 255 min (N) S

on bottom 08 D 12 . 264 min (N) S

Longitude: launch 160 D 07 . 743 min E (W)

on bottom 160 D 07 . 748 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other C-NAV

	launched	on bottom	recovered	
Time:	12:21	13:00	13:47	(GMT)
Water Depth:	1349	1349	1349	Meters
Wire:	0	1350	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
(Gravity - GC)
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

Piston Core Length: 20 40 60 80 100 other

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead): 75

Tension:

At surface: 500
Prior to trip: ?
On Bottom: 2500?
Pullout (max): 2750
Ascending: 2400

Other Samplers:

Type & No:	Section	Length:
GC 02	1	0 m

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks

Remarks:

9 Pb rings on GC
No sediment recovered (0cm)
shell hash and foram pieces

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth — Ship Station #

Cruise: MV1208 — Leg: — Core Name & Station # ML1208-03GC

Mo/Day/Yr 05 / 06 / 2012 — Observer RX.

Latitude: launch 5 D 42 . 2234 min (N) S
on bottom 5 D 42 . 22 min (N) S

Longitude: launch 161 D 14 . 30316 min E (W)
on bottom 161 D 14 . 31 min E (W)

Navigation Type: Loran SatNav GPS PCODE other C-NAV

	launched	on bottom	recovered	
Time:	21:19	22:18	~~22:32~~ 23:25	(GMT)
Water Depth:	2088 ~~87~~	~2088	2088	Meters
Wire:	0	2082		Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other ____

~~Piston~~ Core Length: 20 40 60 80 100 other 10 ft

Scope: ____

Trigger Line Length: ____

Safety Pin Size: ____ or Actuating Depth: ____

Pinger (Meters above corehead): 75

Tension:

At surface:	440
Prior to trip:	3400
On Bottom:	~~3500~~ ~~3400~~ 2900
Pullout (max):	~~3988~~ 4097
Ascending:	3550

Other Samplers:

Type & No:	Section	Length:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
CC	2			FORAM STND

Remarks:

9 Pb rings on GC.
Sock in core ~~catcher~~ catcher.
No Sediment Recovered !!

CC 2cm
FORAM STND.

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth

Ship Station #

Cruise: ML1208 Leg:

Core Name & Station # ML1208-04GC

Mo/Day/Yr 05 / 07 / 2012

Observer

Latitude: launch 06 D 20 . 44 min (N) S

on bottom 06 D 20 . 42 min (N) S

Longitude: launch 161 D 01 . 61 min E (W)

on bottom 161 D 01 . 62 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other C-NAV

	launched	on bottom	recovered	
Time:	05:05	05:52	06:58	(GMT)
Water Depth:	1866	1866	1866	Meters
Wire:	0	1856	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
~~Benthos Corer-GC~~
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

Piston Core Length: 20 40 60 80 100 other 10ft

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead): ~~no~~ no pinger

Tension:

At surface: 520
Prior to trip: 3000
On Bottom: 2500
Pullout (max): Spike 4100
Ascending: 3600

Other Samplers:

Type & No: Section Length:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
CC	2			FORAM
				SAND

Remarks:

12 Pb ring
sock in core catcher
40m/min

ML1208-04GC recovered @ 06:58 ⇒
No sediment recovery.
Sediment washed out of
core barrel on recovery.

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth
Ship Station #
Cruise: 1208 Leg:
Core Name & Station # ML1208-05 ~~GC~~ BB
Mo/Day/Yr 05 / 07 / 12
Observer JH

Latitude:	launch	6°	D	20 . 426	min	(N)	S
	on bottom	6	D	20 . 44	min	N	S
Longitude:	launch	161°	D	1 . 637	min	E	(W)
	on bottom	161	D	01 . 65	min	E	W

Navigation Type: Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	8:47	9:32	1035	(GMT)
Water Depth:	1866	1863	1866	Meters
Wire:	0	1863	-7.8	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other 10 Ft.
Scope:_____
Trigger Line Length:_____
Safety Pin Size:_____ or Actuating Depth:_____
Pinger (Meters above corehead): _____

Tension:
At surface: 3300
Prior to trip: 5500
On Bottom: 2600
Pullout (max): 7400
Ascending: 6000

Other Samplers:
Type & No: Section Length:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks

No Recovery

Remarks:

No Pigs
No Pinger
1 10ft. long barrel
Piston corecatcher w/Sock
at 1700m ↑ speed to 50mpm

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH Ship Station #

Cruise: 1208 Leg: Core Name & Station # ML1208-06 BB

Mo/Day/Yr 05 / 07 / 2012 Observer SH

Latitude: launch 6 D 24 . 46 min (N) S
on bottom 6 D 24 . 48 min (N) S

Longitude: launch 161 D 00 . 44 min E (W)
on bottom 161 D 00 . 45 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other

	launched	on bottom	recovered	
Time:	1209	1254	1354	(GMT)
Water Depth: 2371	~~2371~~	~~2371~~	2371	Meters
Wire:	0	2360	-7.8	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
~~4" Gravity (Big Bertha)-GC~~ BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

~~Piston~~ Core Length: 20 40 60 80 100 other 10'

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead):

Tension:

At surface:	3767
Prior to trip:	6450
On Bottom:	3300
Pullout (max):	6600
Ascending:	

Other Samplers:

Type & No:	Section	Length:

Remarks:

10 FT barrel length
NO PIGS
NO PINGER

Piston cc w/ sock
50 m/min into bottom

~~Piston~~ BB Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	129.4	0	129.4	
2	103.3	129.4	232.7	

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth — Ship Station #

Cruise: 1208 — Leg: — Core Name & Station # ML1208-07 ~~BB GC~~ BB

Mo/Day/Yr 05 / 07 / 2012 — Observer RX

Latitude: launch 6 D 23 .88967 min (N) S

on bottom 6 D 23 .88755 min (N) S

Longitude: launch 160 D 46 .11082 min E (W)

on bottom 160 D 46 .11603 min E (W)

Navigation Type: Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	18:30	19:30	20:46	(GMT)
Water Depth:	3163	~~3170~~ 3163	3163	Meters
Wire:	0	3170	0	Meters

Sampler types
2.5" Piston Core - PC
~~4" Piston Core - JC~~
4" Gravity (Big Bertha)-~~GC~~ BB
~~Gravity - GC~~
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

~~Piston~~ Core Length: 20 40 60 80 100 other 10 ft

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	3500
Prior to trip:	7600
On Bottom:	4300
Pullout (max):	9180
Ascending:	7900

Other Samplers:

Type & No:	Section	Length:
~~GC~~		

~~GC~~ Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	50.3	0	50.3	
2	150.1	50.3	200.4	
3	146.2	200.4	346.6	

Remarks:

10 ft barrel length
No pigs
No pinger

Piston core catcher w/ sock.
50 m/min into bottom

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # ML1208-08 PC

Mo/Day/Yr 05 / 08 / 12

Observer

Latitude: launch 06 D 23 . 885 min (N) S
on bottom 06 D 23 . 88 min (N) S

Longitude: launch 160 D 46 . 119 min E (W)
on bottom 160 D 46 . 123 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other_____

Sampler types
~~12.5" Piston Core - PC~~
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GC~~ BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

	launched	on bottom	recovered	
Time:	00:35	01:58	04:02	(GMT)
Water Depth:	3163	3163	3163	Meters
Wire:	0.0	3154	0.0	Meters

Piston Core Length: 20 40 60 80 100 other 30

Scope: 12

Trigger Line Length: 42

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead):

Tension:

At surface: 4359
Prior to trip: 9000
On Bottom: 7400
Pullout (max): 19646 - 3rd try!
Ascending: 9500
off bottom: 02:28

Other Samplers:

Type & No: Section Length:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	36.5	0	36.5	
2	153.0	36.5	189.5	
3	153.9	189.5	343.4	
4	150.7	343.4	494.1	
5	120.5	494.1	614.6	
1	80.7	0	80.7	TC
2	158.5	80.7	239.2	TC

Indurated seds in core cutter.

Remarks:

Rigged to 30 ft.
0 Pigs
12 weights on trigger core

Winch tripped @ 16[illegible] lbs during pullout.
On 3rd try, winch pulled [illegible] out.
Core cutter pranged!

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # ML1208-09MC

Mo/Day/Yr 05 / 08 / 2012

Observer JKS

Latitude: launch 06 D 23 . 902 min (N) S

on bottom 06 D 23 . 895 min N S

Longitude: launch 160 D 46 . 138 min E (W)

on bottom 160 D 46 . 147 min E W

Navigation Type:
Loran SatNav GPS PCODE other C-Nav

	launched	on bottom	recovered	
Time:	0648	0811	0930	(GMT)
Water Depth:	3163	3163	3163	Meters
Wire:	0	3176	0	Meters

Sampler types
- 2.5" Piston Core - PC
- 4" Piston Core - JC
- 4" Gravity (Big Bertha)~~-GCBB~~
- Gravity - GC
- Benthos Corer-GC
- Kasten - K
- Box Core - BC
- (Multi Corer - MC)
- Dredge - DR
- Rock Core - RC
- Shipek Grab - SG
- Other _____

Piston Core Length: 20 40 60 80 100 other____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	1400
Prior to trip:	5800
On Bottom:	4630
Pullout (max):	6000
Ascending:	5350

Other Samplers:

Type & No: Section Length:

Remarks: ML1208-09MC on deck @ 09:30

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	28.4			
2	26.4			
3	7.4			
4	28.6			
5	26.8			
6	30.0			
7	27.6			
8	27.5			

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth
Ship Station #
Cruise: 1208 Leg:
Core Name & Station # ML1208-10GC
Mo/Day/Yr 05 / 09 / 2012
Observer RAP

Latitude: launch 05 D 11 . 90 min (N) S
on bottom 05 D 11 . 86 min (N) S
Longitude: launch 160 D 26 . 04 min E (W)
on bottom 160 D 26 . 04 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other CNAV

	launched	on bottom	recovered	
Time:	0215	0328	0455	(GMT)
Water Depth:	2934	2933	2933	Meters
Wire:	0	2944	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
(Gravity - GC)
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other____
Scope:_____
Trigger Line Length:_____
Safety Pin Size:_____ or Actuating Depth:_____
Stinger (Meters above corehead): _____

Tension:
At surface: ~600
Prior to trip: ~~4085~~ 4065
On Bottom: ~4000
Pullout (max): 5200
Ascending: 3400

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	106.2	0	106.2	
2	137.4	106.2	243.6	

Other Samplers:
Type & No: Section Length:

Remarks:

GC- 12 rings

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # MC1208-11GC

Mo/Day/Yr 05 / 10 / 2012

Observer AWJ

Latitude: launch 01 D 28 . 148 min (N) S

on bottom 01 D 28 . 145 min (N) S

Longitude: launch 157 D 37 . 822 min E (W)

on bottom 157 D 34 . 830 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other

	launched	on bottom	recovered	
Time:	10:21	11:34	12:53	(GMT)
Water Depth:	2939	2943	2945	Meters
Wire:	0	2943	6	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

Piston Core Length: 20 40 60 80 100 other

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead):

Tension:

At surface:	~575
Prior to trip:	~4,700
On Bottom:	4000
Pullout (max):	5170
Ascending:	4900

Other Samplers:

Type & No: Section Length:

~~Section~~ Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
sec 1	42.1	0	42.1	

Remarks:

12 Rings in at 40 m/minute

.6 m wire out

(Secondary launch)

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH — Ship Station #

Cruise: 1208 — Leg: — Core Name & Station # ML1208-12GC

Mo/Day/Yr 05 / 12 / 2012 — Observer HLF

Latitude:	launch	00	D 13	. 172	min	N (S)	
	on bottom	00	D 13	. 173	min	N S	
Longitude:	launch	155	D 57	. ~~673~~	min	E (W)	
	on bottom	155	D 57	. 674	min	E W	

Navigation Type: Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	04:15	05:30	0900	(GMT)
Water Depth:	3049	3050 3059	3049	Meters
Wire:	0	~~SE~~	0	Meters

Sampler types
- 2.5" Piston Core - PC
- 4" Piston Core - JC
- 4" Gravity (Big Bertha) ~~GCBB~~
- Gravity - GC
- Benthos Corer-GC
- Kasten - K
- Box Core - BC
- Multi Corer - MC
- Dredge - DR
- Rock Core - RC
- Shipek Grab - SG
- Other _____

Piston Core Length: 20 40 60 80 100 other 10

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	6000
Prior to trip:	4900
On Bottom:	~~4000~~ 3800
Pullout (max):	5800
Ascending:	

Other Samplers:

Type & No:	Section	Length:

Remarks:

Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
sec 1	109.5	0	109.5	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth — Ship Station #

Cruise: 1208 — Leg: — Core Name & Station # MGL1208-13BB

Mo/Day/Yr 05 / 12 / 2012 — Observer JKS

Latitude:	launch	00	D 13 . 172	min	N (S)	
	on bottom	00	D 13 . 176	min	N (S)	
Longitude:	launch	155	D 57 . 673	min	E (W)	
	on bottom	155	D 57 . 671	min	E (W)	

Navigation Type: Loran SatNav GPS PCODE other C-Nav 3050

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-~~GC~~BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

	launched	on bottom	recovered	
Time:	0827	0945	1109	(GMT)
Water Depth:	3050	3050	3050	Meters
Wire:	0	3030	0	Meters

~~Piston~~ Core Length: (20) 40 60 80 100 other 20

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	3879
Prior to trip:	7500
On Bottom:	4500
Pullout (max):	9683
Ascending:	8000

Other Samplers:

Type & No: Section Length:

~~PC~~ Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
sec 1	49.8	0	49.8	
sec 2	124.7	49.8	174.5	
sec 3	148.6	174.5	323.1	
sec 4	148.2	323.1	471.3	
sec 5	145.4	471.3	616.7	

Remarks:

20ft barrel / no pigs

No sock PC core catcher

4 Sections

↳ final section was brought vertical before closing the top

Winch in LOW range initially. Shifted to Hi range after pullout.

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # ML1208 - 14 MC

Mo/Day/Yr 05 / 12 / 2012

Observer AWJ

Latitude: launch 00 D 13 . 177 min N (S)

on bottom 00 D 13 . 177 min N S

Longitude: launch 155 D 57 . 670 min E (W)

on bottom 155 D 57 . 670 min E W

Navigation Type:
Loran SatNav GPS PCODE other

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

	launched	on bottom	recovered	
Time:	13:05	14:34	16:05	(GMT)
Water Depth:	3049	3049	3049	Meters
Wire:	0	3060	0	Meters

Piston Core Length: 20 40 60 80 100 other

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead):

Tension:

At surface: 1175
Prior to trip: 5200
On Bottom: 4000
Pullout (max): ~~4619~~ 4619
Ascending: 5500

Other Samplers:

Type & No: Section Length:

Remarks:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth
Ship Station #
Cruise: MGL12-08 Leg:
Core Name & Station # ML1208-15GC
Mo/Day/Yr 5 / 13 / 2012 UTC
Observer

Latitude:	launch	00	D 09	.870 min	N	S
	on bottom	00	D 09	.87 min	N	S
Longitude:	launch	156	D 07	.054 min	E	W
	on bottom	156	D 07	.046 min	E	W

Navigation Type: Loran SatNav GPS PCODE other

	launched	on bottom	recovered	
Time:	03:23	0452		(GMT)
Water Depth:	3610	3597		Meters
Wire:	0	3610		Meters

Piston Core Length: 20 40 60 80 100 other 10
Scope:
Trigger Line Length:
Safety Pin Size: or Actuating Depth:
Stinger (Meters above corehead):

Tension:

At surface:	6080
Prior to trip:	5429
On Bottom:	4746
Pullout (max):	6748
Ascending:	6160

Other Samplers:

Type & No: Section Length:

Remarks:

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
sec 1	133.5	0	133.5	
sec 2	~~146~~ 146.4	133.5	279.9	

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # ML1208-16BB

Mo/Day/Yr 05 / 13 / 2012

Observer ANJ

Latitude: launch 00 D 28 . 918 min (N) S
on bottom 00 D 28 . 917 min (N) S

Longitude: launch 156 D 26 . 884 min E (W)
on bottom 156 D 26 . 887 min E (W)

Navigation Type:
Loran SatNav (GPS) PCODE other

	launched	on bottom	recovered	
Time:	1040	1141	1246	(GMT)
Water Depth:	2926	2926	2923	Meters
Wire:	0	2926		Meters

Piston Core Length: 20 40 60 80 100 other 20

Scope: ✓

Trigger Line Length: ✓

Safety Pin Size: ✓ or Actuating Depth: ✓

Ringer (Meters above corehead): ✓

Tension:

At surface:	3700
Prior to trip:	7400
On Bottom:	4000
Pullout (max):	9885.0
Ascending:	7800

Other Samplers:

Type & No: Section Length:

Remarks:

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	69.0	0.0	69.0	
2	101.3	69.0	170.3	
3	147.7	170.3	318.0	
4	148.0	318.0	466.0	
5	140.9	466.0	606.9	

NO PISTON

In bottom @ 50m/min.

No sock

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # ML1208-17PC

Mo/Day/Yr 5 / 13 / 2012

Observer CAK

Latitude:	launch	00 D	28 . 91 min	(N) S
	on bottom	00 D	28 . 89 min	(N) S
Longitude:	launch	156 D	27 . 17 min	E (W)
	on bottom	156 D	26 . 89 min	E (W)

Navigation Type:
Loran SatNav (GPS) PCODE other

Sampler types
- 2.5" Piston Core - PC
- (4" Piston Core - ~~JC~~ PC)
- 4" Gravity (Big Bertha) ~~GC~~ BB
- Gravity - GC
- Benthos Corer-GC
- Kasten - K
- Box Core - BC
- Multi Corer - MC
- Dredge - DR
- Rock Core - RC
- Shipek Grab - SG
- Other

	launched	on bottom	recovered	
Time:	18:17	19:31	20:58	(GMT)
Water Depth:	2926	2926	2926	Meters
Wire:	0	2917	0	Meters

Piston Core Length: 20 40 60 80 100 (other) 30

Scope: 24

Trigger Line Length: 42 ft (12 ft longer [illegible] barrel)

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead):

Tension:

At surface: ~437
Prior to trip: ~~8400~~ 8300
On Bottom: 2400
Pullout (max): 10800
Ascending: 8600

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	51.7	0.0	51.7	
2	153.5	51.7	205.2	
3	155.8	205.2	361	
4	153.7	361	514.7	
5	152.4	514.7	667.1	
6	113.5	667.1	780.6	
			780.6	

Other Samplers:

Type & No:	Section	Length:
17TC	1	0 - 122.5cm
	2	122.5 - 264.0cm

Remarks:

No Pigs
[illegible] on TC

40m/min start
• marking winch
Set in low range
• low gear [illegible]

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth
Ship Station # B1
Cruise: 1208 Leg:
Core Name & Station # ML1208-18GC
Mo/Day/Yr 05 / 14 / 2012
Observer SCB

Latitude: launch 00 D 35 . 139 min (N) S
on bottom 00 D 35 . 133 min (N) S
Longitude: launch 156 D 39 . 546 min E (W)
on bottom 156 D 39 . 548 min E (W)
Navigation Type:
Loran SatNav GPS PCODE other C-Nav

	launched	on bottom	recovered	
Time:	01:03	02:32	04:09	(GMT)
Water Depth:	3362	3362	3362	Meters
Wire:	0.0	3391	0.0	Meters

Piston Core Length: 20 40 60 80 100 other 10
Scope:
Trigger Line Length:
Safety Pin Size: or Actuating Depth:
Pinger (Meters above corehead):

Tension:
At surface: 500
Prior to trip: 5400
On Bottom: 4800
Pullout (max): 6200
Ascending: 5100

Other Samplers:
Type & No: Section Length:

Remarks:
9 rings

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	59.6	0.0	59.0	
2	140.7	59.6	200.3	
			200.3	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth
Ship Station # B2
Cruise: ML1208 Leg: _____
Core Name & Station # ML1208-19GC
Mo/Day/Yr 05 / 14 / 2012
Observer JKS

Latitude:	launch	00	D 49 . 522	min	(N)	S
	on bottom	00	D 49 . 513	min	(N)	S
Longitude:	launch	156	D 52 . 030	min	E	(W)
	on bottom	156	D 52 . 031	min	E	(W)

Navigation Type: Loran SatNav GPS PCODE other C-NAV3050

	launched	on bottom	recovered	
Time:	0643	0758	0915	(GMT)
Water Depth:	2964	2956	~~2963~~ 2958 m	Meters
Wire:	0	2970	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

~~Piston Core Length~~: 20 40 60 80 100 other 10' GRAVITY CORE

Scope: _____
Trigger Line Length: _____
Safety Pin Size: _____ or Actuating Depth: _____
Pinger (Meters above corehead): _____

Tension:
At surface: 500
Prior to trip: 4400
On Bottom: 4500
Pullout (max): 5500
Ascending: 4800

Other Samplers:
Type & No: Section Length:

Remarks:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	87.7	0.0	87.7	
2	107.4	87.7	195.1	
			195.1	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH Ship Station #

Cruise: 1208 Leg: Core Name & Station # ML1208-SB20

Mo/Day/Yr 05 / 14 / 2012 Observer AWJ

Latitude: launch 01 D 16 . 45 min (N) S
on bottom 01 D 16 . 41 min (N) S

Longitude: launch 117 D 15 . 74 min E (W)
on bottom 157 D 15 . 71 min E (W)

Navigation Type:
Loran SatNav (GPS) PCODE other

	launched	on bottom	recovered	
Time:	16:15	17:08	18:23	(GMT)
Water Depth:	2844.9	2850	2846	Meters
Wire:	0	2850	0	Meters

Piston Core Length: (20) 40 60 80 100 other

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead):

Tension:

At surface:	4000
Prior to trip:	7300
On Bottom:	4,300
Pullout (max):	10,129
Ascending:	7400

Other Samplers:

Type & No: Section Length:

Remarks:

sock in core catcher
No Prop
in @ 50 m/min out @ 20m/min

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	70.0	0.0	70.0	
2	98.2	70.0	168.2	
3	141.7	168.2	309.9	
4	146.9	309.9	456.8	
5	142.4	456.8	599.2	
			599.2	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # ML1208-21MC

Mo/Day/Yr 5 / 14 / 2012

Observer RX

Latitude:	launch	01	D 16 . 412	min	(N)	S
	on bottom	01	D 16 . 414	min	(N)	S
Longitude:	launch	157	D 15 . 725	min	E	(W)
	on bottom	157	D 15 . 742	min	E	(W)

Navigation Type:
Loran SatNav GPS PCODE other C-Nav

	launched	on bottom	recovered	
Time:	19:29	20:44	22:03	(GMT)
Water Depth:	2842.8	2850	2850	Meters
Wire:	0	2850	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
(Multi Corer - MC)
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

Piston Core Length: 20 40 60 80 100 other

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead):

Tension:

At surface:	~~#~~ 1100
Prior to trip:	~~#~~ 5100
On Bottom:	3600
Pullout (max):	7420
Ascending:	5400

Other Samplers:

Type & No:	Section	Length:

Remarks:

~~PC~~ Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
TW	1329	0	1329	
B	4395	1329	2724	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth — Ship Station # B3

Cruise: 1208 — Leg: — Core Name & Station # MV1208-22PC

Mo/Day/Yr 05 / 15 / 2012 — Observer HLF

Latitude:	launch	18	D 16 . 422	min	N	S
	on bottom	1	D 16 . 426	min	N	S
Longitude:	launch	157	D 15 . 725	min	E	W
	on bottom	157	D 15 . 727	min	E	W

Navigation Type: Loran SatNav GPS PCODE other C-Nav

	launched	on bottom	recovered	
Time:	02:42	03:56	05:36	(GMT)
Water Depth:	2850	2850	2850	Meters
Wire:	0	2838	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GCBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other 30

Scope: 24ft

Trigger Line Length: 30ft

Safety Pin Size: _____ or Actuating Depth: _____

Pinger (Meters above corehead): _____

Tension:

At surface:	4500
Prior to trip:	8400
On Bottom:	2840
Pullout (max):	10,600
Ascending:	9400

Other Samplers:

Type & No:	Section	Length:
TC 1	137.9	
2	139.5	

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	58.9	0	58.9	
2	147.9	58.9	206.8	
3	154.9	206.8	361.7	
4	152.9	361.7	514.6	
5	151.9	514.6	666.5	
6	120.8	666.5	787.3	
			787.3	cm

Remarks:
9 rings on TC
no Pbs.

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH — Ship Station # B4

Cruise: 1208 — Leg: _____ — Core Name & Station # ML1208-23GC

Mo/Day/Yr 05 / 15 / 2012 — Observer JKS

Latitude: launch 01 D 20 . 690 min (N) S
on bottom 01 D 20 . 680 min (N) S

Longitude: launch 157 D 25 . 050 min E (W)
on bottom 157 D 25 . 032 min E (W)

Navigation Type: Loran SatNav GPS PCODE other C-Nav 3050

	launched	on bottom	recovered	
Time:	0855	10:09	11:28	(GMT)
Water Depth:	2994	2995	2996	Meters
Wire:	0	2995	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GGBB~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

~~Piston Core Length~~: 20 40 60 80 100 other 10'GC

Scope: _____
Trigger Line Length: _____
Safety Pin Size: _____ or Actuating Depth: _____
Pinger (Meters above corehead): _____

Tension:
At surface: 406
Prior to trip: 4600
On Bottom: 4000
Pullout (max): 5288
Ascending: 4500

Other Samplers:

Type & No:	Section	Length:

Remarks:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	32.8	0	32.8	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station # C-3

Cruise: 1208 Leg:

Core Name & Station # ML1208-24BB

Mo/Day/Yr 05/16/2012

Observer JKS + JH

Latitude: launch 02 D 27 .753 min (N) S
on bottom 02 D 27 .758 min (N) S

Longitude: launch 159 D 23 .678 min E (W)
on bottom 159 D 23 .712 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other C-Nav 3050

	launched	on bottom	recovered	
Time:	0739	0657	10:26	(GMT)
Water Depth:	3546	3538	3538	Meters
Wire:	0	3538	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GC~~ BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other

Piston Core Length: (20) 40 60 80 100 other

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead):

Tension:

At surface:	3225
Prior to trip:	9000
On Bottom:	4800
Pullout (max):	10300
Ascending:	8800

Other Samplers:

Type & No: Section Length:

Remarks:

no pgs
no Jock

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	131.9	0	131.9	
2	141.9	131.9	273.8	
3	147.5	273.8	421.3	
4	140.7	421.3	562.0	
			562.0 cm	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Langseth — Ship Station # C-3

Cruise: 1208 — Leg: _____ — Core Name & Station # ML1208-25BB

Mo/Day/Yr 5 / 16 / 12 — Observer _____

Latitude:	launch	02	D 27 . 76	min	N	S
	on bottom	02	D 27 . 76	min	N	S
Longitude:	launch	159	D 23 . 69	min	E	W
	on bottom	59	D 23 . 70	min	E	W

Navigation Type: Loran SatNav (GPS) PCODE other_____

	launched	on bottom	recovered	
Time:	16:09	17:18	18:47	(GMT)
Water Depth:	3541.6	3541.6	3539.4	Meters
Wire:	0	3551	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-~~GC~~ BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: (20) 40 60 80 100 other_____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	3400
Prior to trip:	3800
On Bottom:	4800
Pullout (max):	8200 10388
Ascending:	8800

Other Samplers:

Type & No:	Section	Length:

Remarks:

No Pics

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	122.2	0	122.2	
2	138.2	122.2	260.4	
3	148.4	260.4	408.8	
4	139	408.8	547.8	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # ML1208 - 26MC

Mo/Day/Yr 05 / 17 / 2012

Observer SCB

Latitude: launch 02 D 27 . 768 min (N) S

on bottom 02 D 27 . 764 min (N) S

Longitude: launch 159 D 23 . 691 min E (W)

on bottom 159 D 23 . 694 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other

	launched	on bottom	recovered	
Time:	2230	00:04		(GMT)
Water Depth:	3538	3545		Meters
Wire:	0	3559		Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
(Multi Corer - MC)
~~Dredge - DR~~
Rock Core - RC
Shipek Grab - SG
Other

Piston Core Length: 20 40 60 80 100 other

Scope:

Trigger Line Length:

Safety Pin Size: or Actuating Depth:

Pinger (Meters above corehead):

Tension:

At surface:	12000
Prior to trip:	6200
On Bottom:	4200
Pullout (max):	8000
Ascending:	

Other Samplers:

Type & No: Section Length:

Remarks: PINGER - ON

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	39.5			
2	30.5			
3	38.0			
4	ø			
5	37			
6	38			
7	30			
8	37			

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station #

Cruise: 1208 Leg:

Core Name & Station # ML1208-27BB

Mo/Day/Yr 05 / 17 / 2012

Observer

Latitude: launch 02 D 46 . 145 min (N) S

on bottom 02 D 46 . 142 min (N) S

Longitude: launch 159 D 17 . 481 min E (W)

on bottom 159 D 17 . 473 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	0423	0533	0704	(GMT)
Water Depth:	3330	3331	3332	Meters
Wire:	0	3340	0	Meters

Piston Core Length: (20) 40 60 80 100 other____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): N/A

Tension:

At surface: 3500

Prior to trip: 8000

On Bottom: 4200

Pullout (max): 9500

Ascending: _____

Other Samplers:

Type & No: Section Length:

Remarks:

Ø

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~-BC~~
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	48.5	0	48.5	
2	140.5	48.5	189.0	
3	146.8	189.0	335.8	
4	148.2	335.8	484.0	
5	147.3	484.0	631.3	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH
Ship Station #
Cruise: 1208 Leg:
Core Name & Station # ML1208-28BB
Mo/Day/Yr 05 / 17 / 2012
Observer AWJ

Latitude:	launch	02	D 58 . 306	min	(N)	S
	on bottom	02	D 58 . 309	min	(N)	S
Longitude:	launch	159	D 11 . 882	min	E (W)	
	on bottom	159	D 11 . 891	min	E (W)	

Navigation Type:
Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	1056	11:58	18:18	(GMT)
Water Depth:	3153	3153	3154	Meters
Wire:	0	3155	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-~~GC~~BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other____
Scope:_____
Trigger Line Length:_____
Safety Pin Size:_____ or Actuating Depth:_____
Pinger (Meters above corehead): _____

Tension:
At surface: 33000
Prior to trip: 75000
On Bottom: 4000
Pullout (max): 10807
Ascending: 8000

Other Samplers:
Type & No: Section Length:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	71.8	0	71.8	
2	106.2	71.8	178	
3	144.1	178	322.1	
4	149.5	322.1	471.6	
5	142.9	471.6	614.5	

Remarks:

NO PIGS

in at 50m/min out at 20m/min

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH — Ship Station # C1

Cruise: 1208 — Leg: _____ — Core Name & Station # ML1208-29MC

Mo/Day/Yr 05 / 17 / 2012 — Observer CAK/AEM

Latitude:	launch	02°	D 58	. 312	min	(N)	S
	on bottom	02	D 58	. 300	min	(N)	S
Longitude:	launch	159	D 11	. 889	min	E	(W)
	on bottom	159	D 11	. 890	min	E	(W)

Navigation Type: Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	14:07	15:37	17:10	(GMT)
Water Depth:	3154m	3152	3154	Meters
Wire:	0	3150	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
~~Dredge - DR~~
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other_____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	1170
Prior to trip:	5500
On Bottom:	4400
Pullout (max):	7855
Ascending:	5860

Other Samplers:

Type & No: Section Length:

_____

_____

_____

_____

Remarks:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	38.5			
2	30.5			
3	40			
4	0			
5	32.5			
6	32			
7	25.5			
8	32			

BIST 1415

Pinger on

*Nisken bottle got jammed by magnet leash
*bottle 4 didn't close

in @ 30 m/min
out @ 20 m/min

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH Ship Station # D2

Cruise: 1208 Leg: _____ Core Name & Station # ML1208-30BB

Mo/Day/Yr 05 / 18 / 2012 Observer _____

Latitude:	launch	04	D 19	. 351	min	(N)	S
	on bottom	04	D 19	. 348	min	N	S
Longitude:	launch	159	D 43	. 733	min	E	(W)
	on bottom	159	D 43	. 732	min	E	W

Navigation Type: Loran SatNav GPS PCODE other CNAV

	launched	on bottom	recovered	
Time:	02:25	03:21	4:30	(GMT)
Water Depth:	2660	2660	2653	Meters
Wire:	0	2671	0	Meters

Piston Core Length: 20 40 60 80 100 other 30

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	3300
Prior to trip:	9960
On Bottom:	2850
Pullout (max):	9732
Ascending:	7490

Other Samplers:

Type & No: Section Length:

Remarks:

no Pbs
no pinger

Sampler types
2.5" Piston Core - PC
4" ~~Piston Core - JC~~
4" Gravity (Big Bertha) - GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR

Rock Core - RC
Shipek Grab - SG
Other _____

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	47.8	0	47.8	
2	133	47.8	180.8	
3	144.3	180.8	325.1	
4	145.8	325.1	470.9	
5	127.9	470.9	598.8	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH Ship Station # D3

Cruise: 1208 Leg: _____ Core Name & Station # ML1208-31 BB

Mo/Day/Yr 05 / 18 / 2012 Observer ANJ

Latitude:	launch	04	D 40 . 973	min	(N)	S
	on bottom	04	D 40 . 972	min	(N)	S
Longitude:	launch	160	D 03 . 113	min	E	(W)
	on bottom	160	D 03 . 106	min	E	(W)

Navigation Type: Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	13:58	1453	16:12	(GMT)
Water Depth:	2857	2857	2857	Meters
Wire:	0	2865	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other_____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	3300 (3509?)
Prior to trip:	7300
On Bottom:	3800
Pullout (max):	10,317
Ascending:	7600

Other Samplers:

Type & No: Section Length:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	96.6	0	96.6	
2	148.4	96.6	245	
3	141.5	245.0	386.5	
4	141.9	386.5	528.4	
5	137.1	528.4	665.5	
				6.655 m

Remarks:

In at 50 m/min out at 20
No PKGS

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH Ship Station # D1

Cruise: 1208 Leg: _____ Core Name & Station # ML1208-32BB

Mo/Day/Yr 5 / 18 / 2012 Observer RX

Latitude: launch 05 D 11 . 862 min (N) S
on bottom 05 D 11 . 839 min N S

Longitude: launch 160 D 26 . 060 min E (W)
on bottom 160 D 26 . 059 min E W

Navigation Type: Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	21:41	22.46	00:15	(GMT)
Water Depth:	2927.14	2926.16	2932	Meters
Wire:	0	2948	0	Meters

Piston Core Length: (20) 40 60 80 100 other_____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	3300
Prior to trip:	74100
On Bottom:	4000
Pullout (max):	8600
Ascending:	84100

Other Samplers:

Type & No: Section Length:

Remarks:

Sampler types
2.5" Piston Core - PC
4" Piston Core - ~~JC~~
4" Gravity (Big Bertha)-~~GC~~ BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	11.7	0 0	11.7	
2	148.2	11.7	159.9	
3	148.7	159.9	308.6	
4	148.5	308.6	457.1	
5	140.0	457.1	597.1	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V LANGSETH

Ship Station # D1

Cruise: 1208 Leg: _____

Core Name & Station # MC1208-33 MC

Mo/Day/Yr 5 / 19 / 2012

Observer VC

Latitude: launch 05 D 11 . 85 min (N) S

on bottom 05 D 11 . 85 min (N) S

Longitude: launch 160 D 26 . 05 min E (W)

on bottom 160 D 26 . 07 min E (W)

Navigation Type:
Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	02:34	03:55	05:11	(GMT)
Water Depth:	2925	~~2944~~ 2933	2927	Meters
Wire:	0	2942	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
(Multi Corer - MC)
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface: 1150

Prior to trip: ~~14220~~ 4500

On Bottom: 3500

Pullout (max): ~~28000~~ 7700

Ascending: 5000

Other Samplers:

Type & No: Section Length:

Remarks:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	35			
2	33			
3	34			
4	37			
5	31			no water in top
6	36			
7	35			
8	32			

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Marcus G. Langseth — Ship Station # D6

Cruise: MGL1208 — Leg: _____ — Core Name & Station # MGL1208-34BB

Mo/Day/Yr 05 / 19 / 2012 — Observer JH

Latitude:	launch	05	D 37 . 431 min	(N)	S
	on bottom	05	D 37 . 418 min	(N)	S
Longitude:	launch	160	D 47 . 595 min	E	(W)
	on bottom	160	D 47 . 598 min	E	(W)

Navigation Type: Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	11:20	12:17	13:35	(GMT)
Water Depth:	2970	2963	2963	Meters
Wire:	0	2963	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
(4" Gravity (Big Bertha) - GC BB)
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Core Length: (20) 40 60 80 100 other_____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	9500
Prior to trip:	7300
On Bottom:	4000
Pullout (max):	10495
Ascending:	7700

Other Samplers:

Type & No: Section Length:

Remarks:

Down at 50m/min
Out at 20 m/min

NO PIGS

PC Section Number	Section Length (cm)	Curn Length (cm from top) Upper	Lower	Remarks
1	69.7	0	69.7	
2	143.1	69.7	218.8	
3	146.0	218.8	358.8	
4	142.8	358.8	501.6	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Marcus G. Langseth — Ship Station # E7

Cruise: MGL1208 — Leg: _____ — Core Name & Station # MGL1208-35BB

Mo/Day/Yr 05 / 20 / 2012 — Observer JH

Latitude: launch 06 D 40 . 187 min (N) S
on bottom 06 D 40 . 166 min (N) S

Longitude: launch 160 D 43 . 843 min E (W)
on bottom 160 D 43 . 842 min E (W)

Navigation Type: Loran SatNav GPS PCODE other_____

	launched	on bottom	recovered	
Time:	09:51	11:08	12:44	(GMT)
Water Depth:	~~3774.23~~	3777	3774	Meters
Wire:	0	3790	0	Meters

Piston Core Length: (20) 40 60 80 100 other_____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface: 3300
Prior to trip: 8500
On Bottom: ~~9285 8990~~ 5200
Pullout (max): 10884
Ascending: 9000

Other Samplers:

Type & No: Section Length:

Remarks:

40 m/min retrieval

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~-GC~~ BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	24.4	0	24.4	
2	147.9	24.4	172.3	
3	148.5	172.3	320.8	
4	140.5	320.8	461.3	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel R/V LANGSETH Ship Station # ES

Cruise: 1208 Leg: _____ Core Name & Station # ML1208-36BB

Mo/Day/Yr 5 / 20 / 2012 Observer RX

Latitude: launch 06 D 49 .619 mir (N) S
on bottom 06 D 49 .620 mir (N) S

Longitude: launch 161 D 02 .467 mir E (W)
on bottom 161 D 02 .466 mir E (W)

Navigation Type:
Loran SatNav GPS PCODE other C-Nav

	launched	on bottom	recovered	
Time:	16:50	17:46	18:55	(GMT)
Water Depth:	2855.72	2855	2854.6	Meters
Wire:	0	2870	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

~~Piston~~ Core Length: (20) 40 60 80 100 other____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead):_____

Tension:

At surface:	3400
Prior to trip:	7400
On Bottom:	4000
Pullout (max):	8885
Ascending:	7800

Other Samplers:

Type & No: Section Length:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	53.9	0.0	53.9	
2	120.7	53.9	174.6	
3	146.3	174.6	320.9	
4	142.1	320.9	463.0	
5	138.8	463.0	601.8	

Remarks:

No Pigs

In at 50min
Out at 20min
Sock on core catcher

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel R/V LANGSETH Ship Station # E9

Cruise: 1208 Leg: _____ Core Name & Station # ML1208-37BB

Mo/Day/Yr 5 / 29 / 2012 Observer HLF

Latitude: launch 07 D 02 . 607 mir (N) S
on bottom 07 D 02 . 616 mir (N) S

Longitude: launch 161 D 38 . 073 mir E (W)
on bottom 161 D 38 . 083 mir E (W)

Navigation Type:
Loran SatNav GPS PCODE other _____

	launched	on bottom	recovered	
Time:	01:27	02:39	03:50	(GMT)
Water Depth:	2805	2798	2798.56	Meters
Wire:	0	2812	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~BB~~ BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

~~Piston~~ Core Length: (20) 40 60 80 100 other ____

Scope: _____

Trigger Line Length: _____

Safety Pin Size: _____ or Actuating Depth: _____

Pinger (Meters above corehead): _____

Tension:

At surface:	~~4000~~ 3248
Prior to trip:	7200
On Bottom:	4280
Pullout (max):	8979
Ascending:	7806

Other Samplers:

Type & No: Section Length:

_____

_____

_____

_____

Remarks:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	17.8	0.0	17.8	
2	154.9	17.8	172.7	
3	154.6	172.7	327.3	
4	154.1	327.3	481.4	
5	131.5	481.4	612.9	

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel R/V Marcus G. Langseth Ship Station # E8

Cruise: MGL1208 Leg: _____ Core Name & Station # MGL1208-38MC

Mo/Day/Yr 05 / 21 / 2012 Observer JH / JS

Latitude: launch 06 D 49 . 608 mir (N) S
on bottom 06 D 49 . 608 mir (N) S
at sw 06 49.617
Longitude: launch 161 D 02 . 470 mir E (W)
on bottom 161 D 02 . 479 mir E (W)
at sw 161 02.491
Navigation Type: Loran SatNav GPS PCODE other C-NAV3050

	launched	on bottom	recovered	
Time:	0912	1030	1140	(GMT)
Water Depth:	2864	2859	2864	Meters
Wire:	0	2860	0	Meters

Sampler types
2,5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
grey. foram sd
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other____
Scope:_____
Trigger Line Length:_____
Safety Pin Size:_____ or Actuating Depth:_____
Pinger (Meters above corehead):_____

Tension:
At surface: 1200
Prior to trip: 5200
On Bottom: 4000
Pullout (max): 7986
Ascending: 5200

Other Samplers:
Type & No: Section Length:

Remarks:

~~PC~~ MC tube Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	0.0			
2	0.0			
3	0.0			
~~4~~	5.5			
5	0.0			
6	13.0			
7	14.5			
8	10.0			

IN @ 40 m/min
out @ 20 m/min
4 tubes recovered

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel R/V LANGSETH Ship Station # E8

Cruise: 1208 Leg: _____ Core Name & Station # MC1208-39 MC

Mo/Day/Yr 05 / 21 / 2012 Observer AMJ

Latitude: launch 06 D 49 .607 mir (N) S
on bottom 06 D 49 .604 mir (N) S

Longitude: launch 161 D 02 .476 mir E (W)
on bottom 161 D 02 .482 mir E (W)

Navigation Type:
Loran SatNav GPS PCODE other C-NAV 3050

	launched	on bottom	recovered	
Time:	12:11	13:30	14:50	(GMT)
Water Depth:	~~2854~~ 2859	2854	2859	Meters
Wire:	0	2860	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

Piston Core Length: 20 40 60 80 100 other _____

Scope: _____

Trigger Line Length: _____

Safety Pin Size: _____ or Actuating Depth: _____

Pinger (Meters above corehead): _____

Tension:
At surface: 1200
Prior to trip: 5100
On Bottom: ~~3800~~ 3800
Pullout (max): 7120
Ascending: _____

Other Samplers:

Type & No:	Section Length:

~~PC Section~~ MC Tube Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	19.5			
2	22.25			
3	37.5			
~~4~~				
~~5~~				
~~6~~				
~~7~~				
~~8~~				
5	21.5			

Remarks:

In @ 30m/min
Out @ 15m/min

4 tubes

ONLY SEC 1, 2, 3, 5 RIGGED FOR THIS DROP.

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Marcus G. Langseth — Ship Station # F3

Cruise: MGL1208 — Leg: _____ — Core Name & Station # MGL1208-40 BB

Mo/Day/Yr 05 / 22 / 2012 — Observer SH | JS

Latitude: launch 8 D 20 . 470 min (N) S

on bottom 8 D 20 . 458 min (N) S

Longitude: launch 159 D 41 . 827 min E (W)

on bottom 159 D 41 . 829 min E (W)

Navigation Type: Loran SatNav GPS PCODE other C-NAV 3050

	launched	on bottom	recovered	
Time:	8:15	9:20	10:39	(GMT)
Water Depth:	3002	2998	2998	Meters
Wire:	0	3005	0	Meters

Sampler types
- 2.5" Piston Core - PC
- 4" Piston Core - JC
- (4" Gravity (Big Bertha) ~~GC~~ BB)
- Gravity - GC
- Benthos Corer-GC
- Kasten - K
- Box Core - BC
- Multi Corer - MC
- Dredge - DR
- Rock Core - RC
- Shipek Grab - SG
- Other _____

Piston Core Length: (20) 40 60 80 100 other____ BB

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead): _____

Tension:

At surface:	3400
Prior to trip:	7000
On Bottom:	4200
Pullout (max):	11300
Ascending:	9000

Other Samplers:

Type & No: Section Length:

_____

_____

_____

_____

Remarks:

put oil in winch

~~PC~~ Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	38.1	0	38.1	(PLIOCENE)
2	146.5	38.1	184.6	

Revised 3/07

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel R/V MARCUS G. LANGSETH Ship Station # "R1" for Rob

Cruise: MGL1208 Leg: _____ Core Name & Station # MGL1208-41 BB

Mo/Day/Yr 05 / 23 / 2012 Observer AGP

Latitude: launch 08 D 15 .669 mir (N) S

on bottom 08 D 15 .654 mir ~~(N)~~ S

Longitude: launch 158 D 57 .975 mir E (W)

on bottom ~~158~~ D ~~57~~ .975 mir E (W)

Navigation Type:
Loran SatNav GPS PCODE other _____

	launched	on bottom	recovered	
Time:	03:58	05:35	07:35	(GMT)
Water Depth:	4708	~~4705~~	4707	Meters
Wire:	0	4712	0	Meters

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha) ~~GC~~ BB
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other_____

~~Piston~~ BB Core Length: (20) 40 60 80 100 other____

Scope:_____

Trigger Line Length:_____

Safety Pin Size:_____ or Actuating Depth:_____

Pinger (Meters above corehead):_____

Tension:

At surface: 3272 lbs

Prior to trip: 9500 lbs

On Bottom: 6~~0~~500 lbs

Pullout (max): 15,580 lbs

Ascending: 10,000 lbs

Other Samplers:

Type & No: Section Length:

_____

_____

_____

_____

Remarks:

~~PC~~ BB Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks
1	59.9	0	59.9	
2	131.5	59.9	194.3	
3	130.6	194.3	324.7	
4	150.8	324.7	472.5	
5	149.6	472.5	592.1	

OSU Oceanography
MARINE GEOLOGY CORING DATA SHEET

Vessel: R/V Marcus Langseth — Ship Station # Coring Test

Cruise: _____ Leg: _____ — Core Name & Station # MV1208 Test

Mo/Day/Yr 4 / 30 / 2012 — Observer SCB

Latitude:	launch	21	D 12 . 03	min	(N)	S
	on bottom	21	D 12 . 074	min	(N)	S
Longitude:	launch	158	D 31 . 46	min	E	(W)
	on bottom	158	D 31 . 459	min	E	(W)

Navigation Type:
Loran SatNav GPS PCODE other _____

Sampler types
2.5" Piston Core - PC
4" Piston Core - JC
4" Gravity (Big Bertha)-GC
Gravity - GC
Benthos Corer-GC
Kasten - K
Box Core - BC
Multi Corer - MC
Dredge - DR
Rock Core - RC
Shipek Grab - SG
Other _____

	launched	on bottom	recovered	
Time:	22:40	00:45	_____	(GMT)
Water Depth:	2916.2	N/A	_____	Meters
Wire:	0.0	2885.1	_____	Meters

~~Piston~~ Core Length: 20 40 60 80 100 other X 30m

Scope: N/A 2345

Trigger Line Length: N/A (125)

Safety Pin Size: _____ or Actuating Depth: _____

Pinger (Meters above corehead): 75m

Tension:
At surface: _____
Prior to trip: _____
On Bottom: _____
Pullout (max): _____
Ascending: _____

Other Samplers:
Type & No: Section Length:

_____
_____
_____
_____

Remarks:

PC Section Number	Section Length (cm)	Cum Length (cm from top) Upper	Lower	Remarks

Revised 3/07

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 - 01 CTD

GMT Date 05/08/12 GMT Time 10:08

LAT 06° 23.884 N LON 160° 46.155 W

Filename 1208091 Upcast filename same

Bottom Depth (Knudsen) 3177 m Corr. Bottom Depth (MB) _____

TSG T (C) 27.15 °C TSG S (psu) 34.91 psu

CTD soak T (C) _____ CTD soak S (psu) _____

Comments:

Upcast

GMT Date 5/9/12 GMT Time _____

LAT _____ LON _____

Target Depth (m)	Position	CTD				Time Fired (GMT)	Samples (Record # replicates)							
		Press.	Depth (m)	Temp (°C)	Salin. (psu)		DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
	1*					: :	2	2	3	2	1		1	2
	2					: :								
	3					: :								
	4					: :								
	5					: :								
	6					: :								
	7					: :								
	8					: :								
	9					: :								
	10					: :								
	11					: :								
	12					: :								
	13					: :								
	14					: :								
	15					: :								
	16					: :								
	17					: :								
	18					: :								
	19					: :								
	20					: :								
	21					: :								
	22					: :								
	23					: :								
	24					: :								

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 Cast ID: ML1208 - 02 CTD

GMT Date May 12 2012 GMT Time 11 46

LAT 06° 23.88 N LON 160° 46.15 W

Filename 1208002 Upcast filename same

Bottom Depth (Knudsen) 377 Corr. Bottom Depth (MB)

TSG T (C) 27.155 TSG S (psu) 34.919

CTD soak T (C) CTD soak S (psu)

Comments:

Upcast

GMT Date May 7, 2012 GMT Time 12:00

LAT 06 23.892 LON 160 45.168

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
10	1*	9.8	10.1	27.16	34.91	19 12:??	0							
25	2	24.0	25.1	27.16	34.91	8 12:31	0							
50	3	49.4	49.5	27.16	34.93	12:29	2	2	3	2	0		1	2
75	4	75.6	74.3	27.17	34.92	12:27	2	2	3	2	0		1	2
81	5					: :								
	6					: :								
	7					: :								
	8					: :								
	9					: :								
	10					: :								
	11					: :								
	12					: :								
	13					: :						POC		
	14					: :								
	15					: :								
81	16	81.8	80.9	27.16	34.92	: :	2	2	3	2	0		1	2
100	17	101	100.1	22.85	34.71	10:21	2	2	3	2	0		1	2
125	18	127	126	15.85	34.52	12:19	2	2	3	2	0		1	2
	19	151	150	12.63	34.49	12:17	2	2	3	2	0		1	2
175	20	176	174	11.14	34.69	12:15	2	2	3	2	0		1	2
200	21	203	199	10.62	34.66	12:14	2	2	3	2	0		1	2
300	22	302	301	9.54	34.66	12:08	2	2	3	2	0		1	2
400	23	403	398			12:04	2	2	3	2	0		1	2
500	24	503	498	7.69	34.59	12:0005	2	2	3	2	0		1	2

*Record the UTC time, LAT, LON as the station information for the bottle data.

1208002.btl

all others bottles were filtered onto a separate filter

[* ended up also taking a suite of surface (0 m) samples]

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 - 03 CTD

GMT Date 5/12/2012 GMT Time

LAT 00° 13.166'S LON 155° 57.668' W

Filename 1208003 Upcast filename same

Bottom Depth (Knudsen) Corr. Bottom Depth (MB) 3055

TSG T (C) 27.19 TSG S (psu) 35.36

CTD soak T (C) CTD soak S (psu)

Comments: Deep cast for Marcantonio u/7h

Upcast

GMT Date 12 May 2012 GMT Time 17:46

LAT 00° 13. ~~15~~ 188 LON 155° 57. ~~68~~ 67 W

12 from bottom ↓ Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
10 from bottom ~~25~~	1*	3079.4	3038	1.59	~~34~~.68	17:47 39								
10 from bottom ~~75 25~~	2	3079.4	3038	1.59	34.68	~~17~~ :								
2900 ~~1500 75~~	3	2937	2900.4	1.69	34.67	: :								
~~2800~~ 2750 ~~2500 150~~	4	2782	2748.6	1.72	34.67	: :								
2600 ~~50 300~~	5	2633	2602.0	1.81	34.66	: :								
2400 ~~500~~	6	2427.9	2400.8	1.91	34.66	: :								
2200 ~~500~~	7	2224.8	2200.3	2.08	34.65	: :								
2000 ~~1000~~	8	2020.4	2000.7	2.23	34.64	: :								
1800 ~~1200~~	9	1818.7	1800.8	2.42	34.63	: :								
1600 ~~1400~~	10	1615.0	1600.5	2.77	34.61	: :								
1400 ~~1600~~	11	1413.4	1399.9	3.19	34.59	: :								
1200 ~~1800~~	12	1210.3	1200.3	3.77	34.57	: :								
1000 ~~2000~~	13	1007.9	1001.8	4.41	34.56	: :								
800 ~~2200~~	14	806.8	801.1	5.49	34.54	: :								
500 ~~3400~~	15	502.9	499.5	7.98	34.61	: :								
300 ~~3600~~	16	302.5	301.1	11.32	34.81	: :								
150 ~~2000~~	17	148.5	147.6	18.36	35.15	: :								
75 ~~2000~~ ~~10 from bottom~~	18	78.8	79.2	26.82	35.38	: :								
25 ~~10 from bottom~~	19	24.7	25.4	27.18	35.37	: :								
25 ~~10 from bottom~~	20	24.7	25.4	27.18	35.37	: :								
↓	21	↓	↓	↓	↓	: :								
	22					: :								
↓	23					: :								
25	24	↓	↓	↓	↓	: :								

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 .

Cast ID: ML1208 - 04CTD

GMT Date 5/12/2012

GMT Time ~~STTE~~ 21:00

LAT 0° 13.178 S

LON 155 57.669 W

Filename 1208004

Upcast filename Same

Bottom Depth (Knudsen)

Corr. Bottom Depth (MB) 3058

TSG T (C) 27.23

TSG S (psu) 35.37

CTD soak T (C) 27.26

CTD soak S (psu) 35.37

Comments: Mixed layer cast for Polissar POC down to 200m

65

Upcast

GMT Date 5/12/2012 GMT Time 21:17

LAT 0° 13.184' S LON 155° 57.664' W

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
65	1*	62.78	62.14	27.03	35.37	21:17:00								
	2					: :						⊙		
	3					: :								
	4					: :								
	5					: :								
	6					: :								
	7					: :								
	8					: :								
	9					: :								
	10					: :								
	11					: :								
	12					: :								
	13					: :								
	14					: :								
	15					: :								
	16					: :								
	17					: :								
	18					: :								
	19					: :								
	20					: :								
	21					: :								
	22					: :								
	23					: :								
↓	24	63.5	63.5	27.02	35.37	21:23:15						↓		

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 - 05 CTD

GMT Date 5/12/2012 GMT Time 22:15

LAT 00 13.186 S LON 155 57.668 W

Filename 1208005 Upcast filename same

Bottom Depth (Knudsen) Corr. Bottom Depth (MB) 3057

TSG T (C) 27.30 TSG S (psu) 35.37

CTD soak T (C) 27.33 CTD soak S (psu) 35.36

Comments: 500 m cast

Upcast

GMT Date 5/12/12 GMT Time 22:28

LAT 00 13.179 S LON 155 57.676 W

Target Depth (m)	Position	CTD				Time Fired (GMT)	Samples (Record # replicates)							
		Press.	Depth (m)	Temp (°C)	Salin. (psu)		DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
500	1*	505.1	501.6	8.09	34.62	22:29:55								
400	2	402.8	399.7	9.26	34.68	: :								
300	3	301.9	299.4	11.37	34.82	22:39:								
200	4	200.1	198.8	13.99	35.01	22:42:								
175	5	174.8	175.6	15.34	35.04	22:43:								
150	6	148.0	145.8	18.51	35.15	22:45:								
125	7	123.4	121.8	23.83	35.64	22:47:								
100	8	101.8	100.8	25.53	35.57	22:48:								
75	9	75.5	76.8	26.56	35.37	22:51:								
65	10	66.7	65.3	26.87	35.37	22:54								
65	11					: :								
65	12					: :								
65	13					: :								
65	14					: :								
65	15					: :								
65	16					: :								
65	17					: :								
65	18					: :								
65	19					: :								
65	20					: :								
65	21	69.84	69.6	26.79	35.37	22:56:								
50	22	50.6	51.3	27.09	35.37	22:57:								
25	23	25.9	25.6	27.18	35.37	22:59:								
10	24	10.7	10.7	27.34	35.38	23:02:								

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 - 06 CTD

GMT Date 5/14/2012 GMT Time 22:45

LAT 01° 16.435N LON 157° 15.730 W

Filename 1208006 Upcast filename Same

Bottom Depth (Knudsen) Corr. Bottom Depth (MB) 2850

TSG T (C) 27.54 TSG S (psu) 35.29

CTD soak T (C) 26.52 CTD soak S (psu) 35.30

Comments: Down 200m up & fire all bottles in mixed layer for Rotosser POC

Upcast

GMT Date 5/14/2012 GMT Time 22:50

LAT 01° 16.425 N LON 157° 15.726 W

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
39.7	1*	39.79	39.64	27.39	35.31	: :								
	2					: :								
	3					: :								
	4					: :								
	5					: :								
	6					: :								
	7					: :								
	8					: :								
	9					: :								
	10					: :								
	11					: :								
	12					: :								
	13					: :								
	14					: :								
	15					: :								
	16					: :								
	17					: :								
	18					: :								
	19					: :								
	20					: :								
	21					: :								
	22					: :								
	23					: :								
	24					: :								

40m

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 - 07 CTD

GMT Date 5/14/2012 GMT Time 23:27

LAT 01 16.43al LON 157 15.73W

Filename 1208007 Upcast filename

Bottom Depth (Knudsen) 2850 Corr. Bottom Depth (MB)

TSG T (C) 27.59 TSG S (psu) 35.297

CTD soak T (C) 27.62 CTD soak S (psu) 35.30

Comments: 500m upper water colm

Upcast

GMT Date 5/14/2012 GMT Time 23:44

LAT 1° 16.43 N LON 157° 15.73' W

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
500	1*	504.19	500.5	7.80	34.60	23:46:14								
400	2	400.4	398	9.22	34.67	23:52:								
300	3	300.57	298.3	10.65	34.75	23:56:								
200	4	198.66	197.6	12.97	34.77	23:59:								
175	5	170.1	169.9	14.08	34.73	02:18:								
150	6	~~158~~ 152.04	151.92	16.18	34.72	05:00:								
125	7	125.4	124.7	21.96	34.97	0 :09:								
100	8	102.0	101.8	26.30	35.20	0 :11:								
75	9	~~77.88~~	~~77.92~~	~~27.10~~	~~35.35~~	0 :15:								
50	10	50.94	50.54	27.37	35.32	0 :17:04								
40	11	41.6	39.75	27.39	35.31	0 :18:53								
40	12	↓	↓	↓	↓	: :								
40	13	↓	↓	↓	↓	: :								
40	14	↓	↓	↓	↓	: :								
40	15	↓	↓	↓	↓	: :								
40	16	↓	↓	↓	↓	: :								
40	17	↓	↓	↓	↓	: :								
40	18	↓	↓	↓	↓	: :								
40	19	↓	↓	↓	↓	: :								
40	20	↓	↓	↓	↓	: :								
40	21	↓	↓	↓	↓	: :								
40	22	↓	↓	↓	↓	00:20:46								
25	23	24.23	25.0	27.41	35.30	00:22:29								
10	24	10.2	9.8	27.61	35.30	00:24:05								

(Margin note beside row 9:) depth 5.48; 76.76; 7.14C; 35.35 psu)

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 - 08 CTD

GMT Date 16 MAY 2012 GMT Time 19:47

LAT 02° 27.777 N LON 159° 23.717 W

Filename 1208008 Upcast filename 1208008

Bottom Depth (Knudsen) 3539.56 Corr. Bottom Depth (MB) 3546

TSG T (C) 27.56 TSG S (psu) 35.18

CTD soak T (C) 27.557 CTD soak S (psu) 35.16

Comments:

Upcast

GMT Date 16 MAY 2012 GMT Time 20:18

LAT 02° 27.771 N LON 159° 23.713 W

Target Depth (m)	Position	CTD				Time Fired (GMT)	Samples (Record # replicates)							
		Press.	Depth (m)	Temp (°C)	Salin. (psu)		DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
60	1*	60.19	60.03	27.56	35.19	: :								
	2					: :						✓		
	3					: :						✓		
	4					: :						✓		
	5					: :						✓		
	6					: :						✓		
	7					: :						✓		
	8					: :						✓		
	9					: :						✓		
	10					: :								
	11					: :								
	12					: :								
	13					: :								
	14					: :								
	15					: :								
	16					: :								
	17					: :								
	18					: :								
	19					: :								
	20					: :								
	21					: :								
	22					: :								
↓	23	↓	↓	↓	↓	: :						↓		
60	24	60.19	60.03	27.56	35.19	: :						✓		

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 - 09 CTD

GMT Date 16 MAY 2012 GMT Time 21:00

LAT 02°27.755 N LON 159° 23.695 W

Filename 1208009 Upcast filename 1208009

Bottom Depth (Knudsen) 3540.74 Corr. Bottom Depth (MB) _____

TSG T (C) 27.58 TSG S (psu) 35.18

CTD soak T (C) 27.59 CTD soak S (psu) 35.16

Comments:

Upcast

GMT Date 16 MAY 2012 GMT Time 21:19

LAT 02° 27.756 N LON 159° 23.697 W

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
500	1*	503.42	501.16	7.82	34.6	21:19:44								
400	2	404.4	401.5	9.55	34.68	21:24:14								
300	3	301.16	300.69	10.41	34.74	21:28:15								
200	4	200.00	201.54	11.07	34.78	21:33:04								
175	5	176.93	175.61	11.24	34.78	21:35:15								
150	6	150.54	150.66	13.46	34.57	21:36:46								
125	7	124.00	123.97	22.44	34.92	21:39:37								
100	8	101.79	101.26	25.66	35.03	21:41:45								
75	9	75.63	75.15	27.47	35.18	21:43:50								
60	10	60.30	60.25	27.56	35.19	21:45:40								
60	11	↓	↓	↓	↓	: :								
↓	12	↓	↓	↓	↓	: :								
↓	13	↓	↓	↓	↓	: :								
↓	14	↓	↓	↓	↓	: :								
↓	15	↓	↓	↓	↓	: :								
↓	16	↓	↓	↓	↓	: :								
↓	17	↓	↓	↓	↓	: :								
↓	18	↓	↓	↓	↓	: :								
↓	19	↓	↓	↓	↓	: :								
↓	20	↓	↓	↓	↓	: :								
60	21	60.30	60.25	27.56	35.19	21:46:40								
50	22	50.14	50.71	27.56	35.19	21:48:07								
25	23	24.96	25.35	27.57	35.19	21:50:02								
10	24	10.79	10.73	27.61	35.19	21:51:20								

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 .

Cast ID: ML1208 - 10 CTD

GMT Date 05/19/12

GMT Time 00:44

LAT 05 11.838 N

LON 160 26.051 W

Filename 1208010

Upcast filename 1208010

Bottom Depth (Knudsen) 2932

Corr. Bottom Depth (MB) 2925

TSG T (C) 27.33

TSG S (psu) 34.96

CTD soak T (C) 27.31

CTD soak S (psu) 34.97

Comments:

Upcast

GMT Date 19 May 2012 GMT Time 00:53

LAT 05 11.829 N LON 160 26.054 W

Target Depth (m)	Position	CTD				Time Fired (GMT)	Samples (Record # replicates)							
		Press.	Depth (m)	Temp (°C)	Salin. (psu)		DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
5800	1*	50.98	57.84	27.30	34.99	00:54:30								
	2					: :								
	3					: :								
	4					: :								
	5					: :								
	6					: :								
	7					: :								
	8					: :								
	9					: :								
	10					: :								
	11					: :								
	12					: :								
	13					: :								
	14					: :								
	15					: :								
	16					: :								
	17					: :								
	18					: :								
	19					: :								
	20					: :								
	21					: :								
	22					: :								
	23					: :								
5800	24					00:57:22								

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 .

Cast ID: ML1208 - 011 CTD

GMT Date 05/19/12

GMT Time 01:22

LAT 05 11.83

LON 160 26.049

Filename 1208011

Upcast filename 1208011

Bottom Depth (Knudsen) 2932

Corr. Bottom Depth (MB)

TSG T (C) 27.32

TSG S (psu) 34.96

CTD soak T (C) 27.31

CTD soak S (psu) 34.98

Comments:

Upcast

GMT Date 2012:05:19 GMT Time 01:42:24

LAT 05 11.840 N LON 160 26.051 W

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
500	1*	502.0	500.07	8.06	34.100	01:42:24								
400	2	401.72	398.	8.57	34.62	1:45:09								
300	3	301.2	299.79	9.19	34.65	1:48:17								
200	4	200.41	~~199.08~~ 199.0	11.22	34.65	1:51:34								
175	5	176.82	175.4	13.64	34.62	1:53:34								
150	6	150.51	150.20	15.97	34.54	1:55:10								
125	7	126.1	125.08	19.61	34.73	1:56:12								
100	8	100.9	100.2	26.29	34.98	1:57:57								
75	9	76.12	75.69	27.22	35.03	1:59:10								
58	10	58.74	58.22	27.28	35.04	2:01:18								
	11					: :								
	12					: :								
	13					: :								
	14					: :								
	15					: :								
	16					: :								
	17					: :								
	18					: :								
	19					: :								
	20					: :								
58	21	52.3	51.30	27.30	34.98	2:04 11								
50	22					: :								
25	23	26.92	26.77	27.32	34.98	2:05 30								
10	24	11.92	11.90	27.31	34.98	2:07 11								

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 .

Cast ID: ML1208 - 12 CTD

GMT Date 22 May 2012

GMT Time 15:22

LAT 08° 19.989 N

LON 159° 18.000 W

Filename 1208012

Upcast filename 1208012

Bottom Depth (Knudsen) 4615.3 m

Corr. Bottom Depth (MB) 4618

TSG T (C) 27.04°C

TSG S (psu) 34.92

CTD soak T (C) 27.04°C

CTD soak S (psu) 34.93

Comments:

Upcast

GMT Date 2012:05:22 GMT Time 16:54

LAT 08°20.007 N LON 159°18.010 W

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
10 from bottom (-10.8 from bottom)	1*	4678.9	4601.8	1.37	34.70	: :								
10 from bottom	2	4678.9	4601.8	1.37	34.70	: :								
4400	3	4470.0	4400.1	1.38	34.70	: :								
4200	4	4267.5	4201.4	1.37	34.70	: :								
3900	5	3960.0	3900.7	1.39	34.69	: :								
3600	6	3651.4	3600.5	1.48	34.69	: :								
3300	7	3345.9	3300.7	1.57	34.68	: :								
3000	8	3042.0	3001.7	1.68	34.68	: :								
2700	9	2731.7	2700.5	1.81	34.67	: :								
2400	10	2427.0	2399.3	1.92	34.66	: :								
2100	11	2123.2	2100.0	2.07	34.65	: :								
1800	12	1818.1	1800.4	2.48	34.63	: :								
1500	13	1515.7	1500.5	3.02	34.60	: :								
1200	14	1211.2	1200.3	3.75	34.58	: :								
900	15	908.7	899.8	5.05	34.55	: :								
500	16	502.4	499.4	8.45	34.61	: :								
100	17	99.3	99.8	26.61	34.89	: :								
90~~50~~	18	89.83	89.13	27.04	34.93	19:16:17								
90~~45~~	19	↓	↓	↓	↓	19:17:14								
90~~25~~	20	↓	↓	↓	↓	19:17:39								
90	21	89.83	89.13	27.04	34.93	19:18:~~46~~								
~~3~~50	22	49.6	49.7	27.06	34.93	: :								
25	23	25.1	24.5	27.06	34.93	: :								
25	24	25.1	24.5	27.06	34.93	: :								

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 - 013CTD

GMT Date 5/22/12 GMT Time 21:09

LAT 8° 19.991N LON 159 18.005W

Filename 1208013 Upcast filename same

Bottom Depth (Knudsen) — Corr. Bottom Depth (MB) 4618

TSG T (C) 27.08 TSG S (psu) 34.92

CTD soak T (C) 27.00 CTD soak S (psu) 34.93

Comments: 100 m only s/c already know bottom of mixed layer from 012 CTD.

Upcast

GMT Date 5/22/12 GMT Time 21:15

LAT 8° 20.003 N LON 159° 18.009 W

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
90	1*	90.26	90.5	27.07	34.93	21:15:30								
	2					: :								
	3					: :								
	4					: :								
	5					: :								
	6					: :								
	7					: :								
	8					: :								
	9					: :								
	10					: :								
	11					: :								
	12					: :								
	13					: :								
	14					: :								
	15					: :								
	16					: :								
	17					: :								
	18					: :								
	19					: :								
	20					: :								
	21					: :								
	22					: :								
	23					: :								
	24					: :								

*Record the UTC time, LAT, LON as the station information for the bottle data.

CTD/Rosette Sheet

Cruise MGL12-08
PJP revised 5/4/2012

Cruise MGL12-08 . Cast ID: ML1208 -014 CTD

GMT Date 22 May 2012 GMT Time 21:56

LAT 08 19.987 N LON 159 18.003 W

Filename 1208014 Upcast filename 1208014

Bottom Depth (Knudsen) 4623 Corr. Bottom Depth (MB) 4638

TSG T (C) 27.10 TSG S (psu) 34.92

CTD soak T (C) 27.11 CTD soak S (psu) 34.93

Comments:

Upcast

GMT Date 22 May 2012 GMT Time 22:13

LAT 08° ~~00~~. 19.982 ~~4~~ N LON ~~159° 17.994 W~~ 159° 18.0024

Target Depth (m)	Position	CTD Press.	CTD Depth (m)	CTD Temp (°C)	CTD Salin. (psu)	Time Fired (GMT)	Samples (Record # replicates) DIC	d13 DIC	TA	NUT	ISO B	POC	d15 NO3	ISO
500	1*	503.53	500.05	8.44	34.60	22:13:01								
400	2	403.39	400.80	9.26	~~34.64~~ 34.64	22:18:24								
300	3	302.50	300.17	10.00	34.68	22:21:52								
200	4	202.74	200.94	11.36	34.68	22:25:20								
175	5	176.4	175.7	11.73	34.62	2227:15								
150	6	150.2	150.7	13.10	34.48	22:29:03								
125	7	126.9	125.9	16.86	34.52	22:30:40								
100	8	100.32	99.75	24.33	34.81	22:32:23								
90	9	91.8	90.2	26.17	34.88	22:34:10								
	10					: :								
	11					: :								
	12					: :								
	13					: :								
	14					: :								
	15					: :								
	16					: :								
	17					: :								
	18					: :								
	19					: :								
90	20	92.79	90.09	26.18	34.87	22:35:50								
75	21	75.99	76.59	27.07	34.93	22 37:48								
50	22	51.9	51.2	27.08	34.93	22 39:52								
25	23	27.66	26.5	27.10	34.93	22:41:32								
10	24	11.48	11.33	27.15	34.93	22:43:02								

*Record the UTC time, LAT, LON as the station information for the bottle data.