GSA Data Repository 2017261

Kuhn, T., et al., 2017, Widespread seawater circulation in 18–22 Ma oceanic crust: Impact on heat flow and sediment geochemistry: Geology, doi:10.1130/G39091.1

FIGURE CAPTIONS SUPPLEMENTARY DATA

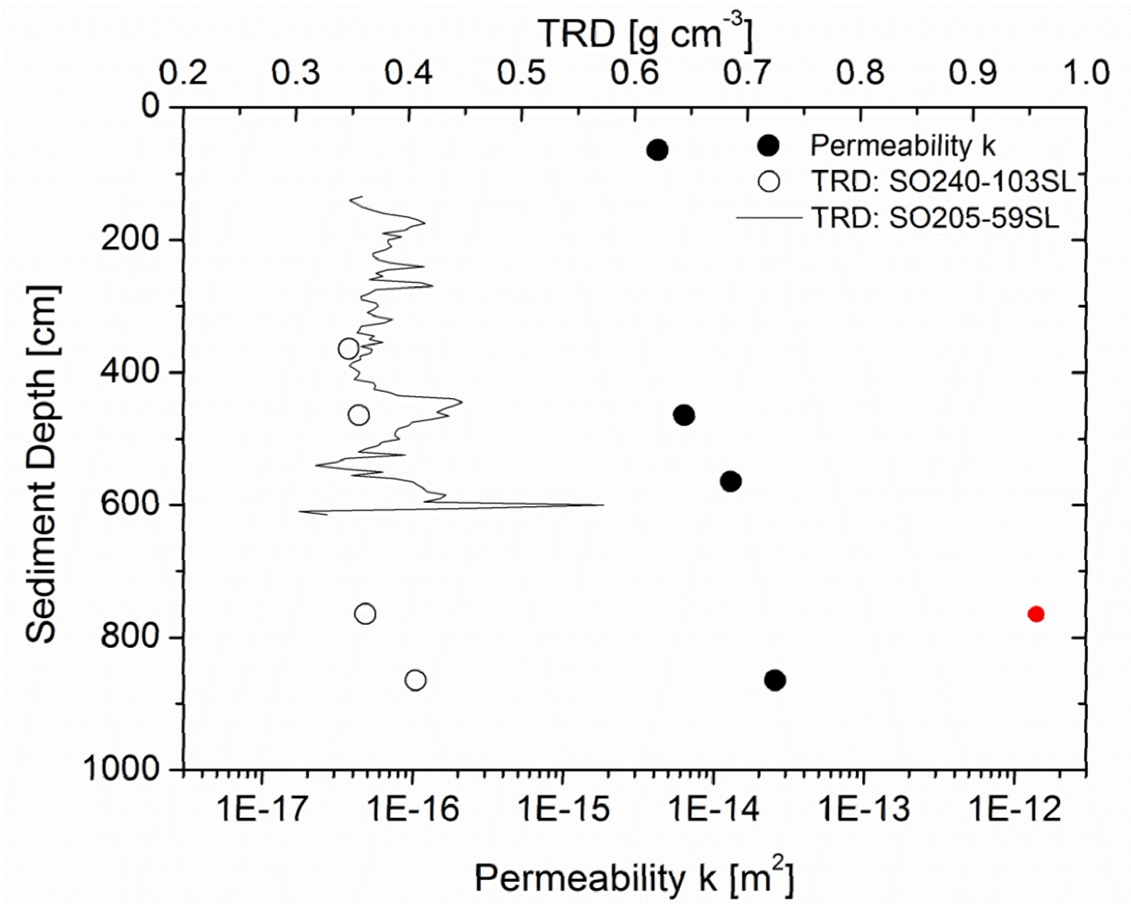

Figure DR1: Permeability versus depth in sediment core 103SL as well as dry bulk density of this core and of core SO205/59SL from the same working area for comparison (Rühlemann et al., 2010).

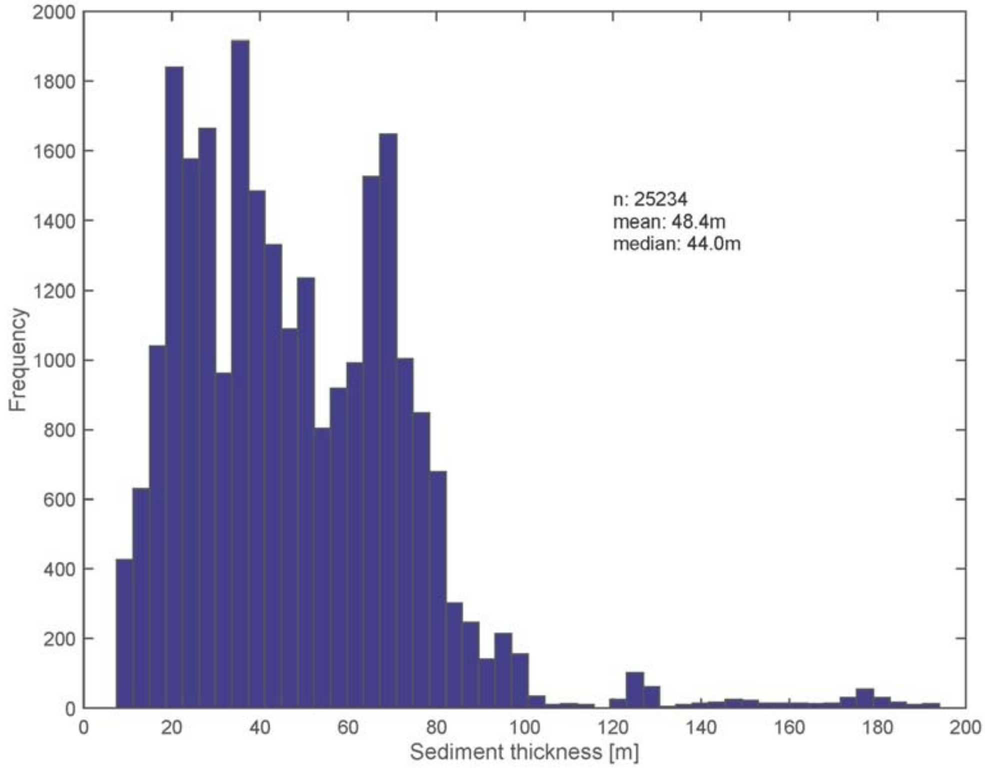

Figure DR2: Histogram of the sediment thickness detected along the seismic lines run during SO240 with a mean thickness of 48 m. The “picked sediment thickness” is based on a few seismic lines in the working area but we are confident that they give a realistic impression on the sediment thickness in general.

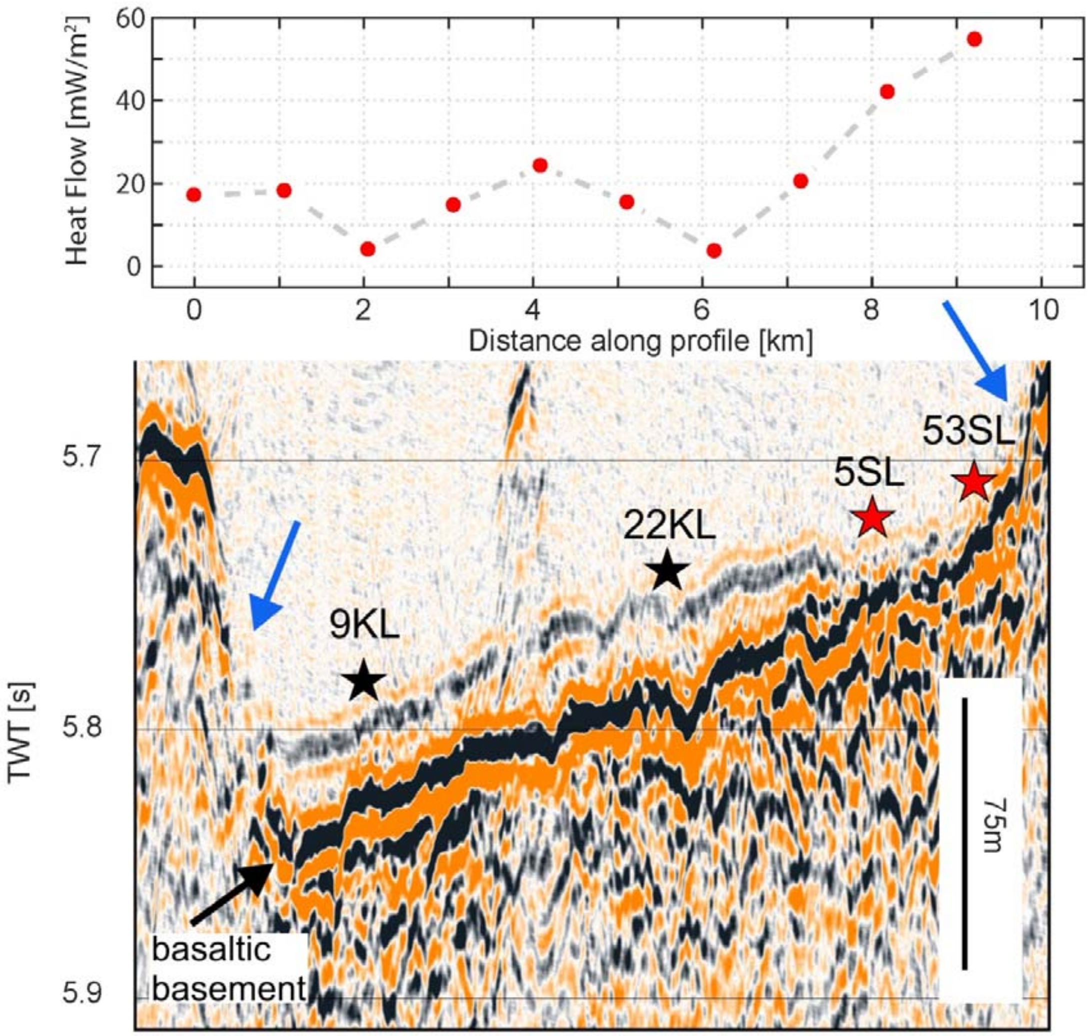

Figure DR3: Seismic profile and heat flow values at the locations of sediment cores 9KL, 22KL, 5SL, and 53SL east of the Teddy Bare seamount (see Fig. 1 for location). Red stars mark sediment cores which are oxic throughout, black stars mark cores which are suboxic at depth. Note the increasing sediment thickness from E to W. Blue arrows indicate outcropping basaltic crust where seawater may recharge and discharge. Seawater may laterally flow in the basalts underneath the sediments.

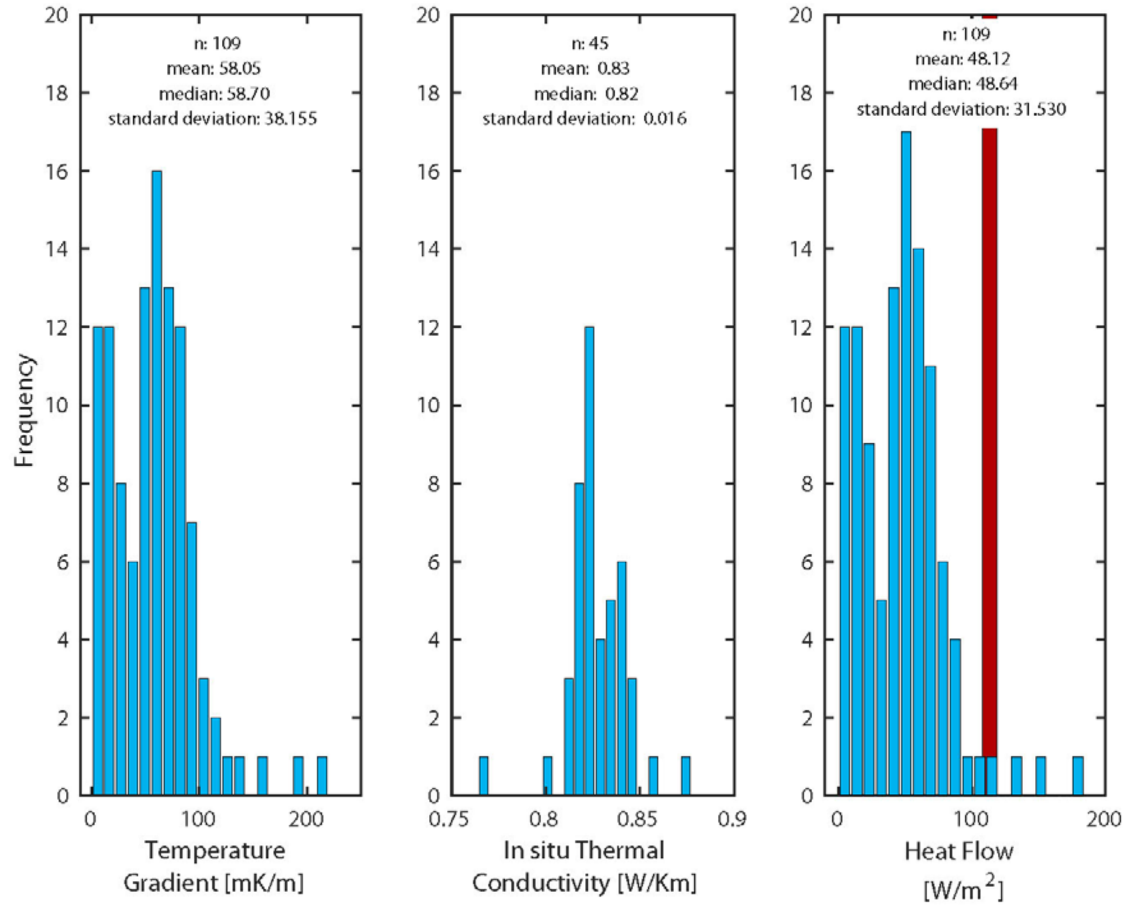

Figure DR4: Compilation of all in-situ measured heat flow and conductivity data as well as the calculated temperature gradient (see Kuhn et al., 2015). The red column marks the heat flow from lithospheric conductive cooling predictions which is between ~108 and 119 mW/m^2 for 18 to 22 Ma old oceanic crust (Hasterock, 2013).

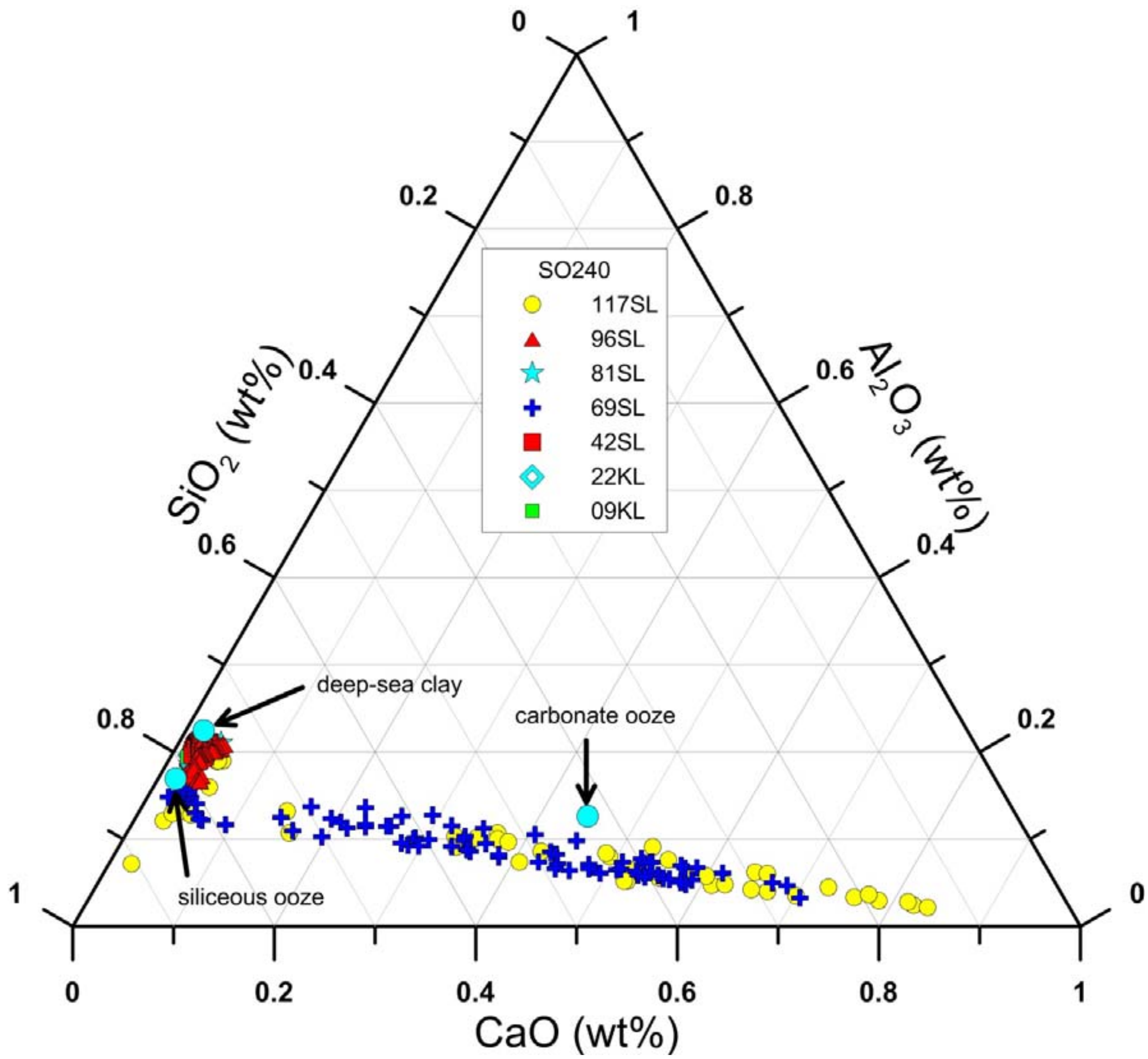

Figure DR5: SiO_2-CaO-Al_2O_3 ternary diagram of sediments from seven sites in the working area (N=755; XRF data, analyses at BGR). Note that all sediments from stations 09, 22, 42, 81, and 96 are mixtures between siliceous ooze and deep-sea clay, whereas the deep parts of cores 69SL and 117SL contain significant fractions of carbonate. Literature data are average values from Chester (2000; Table 13.3, 13.4).

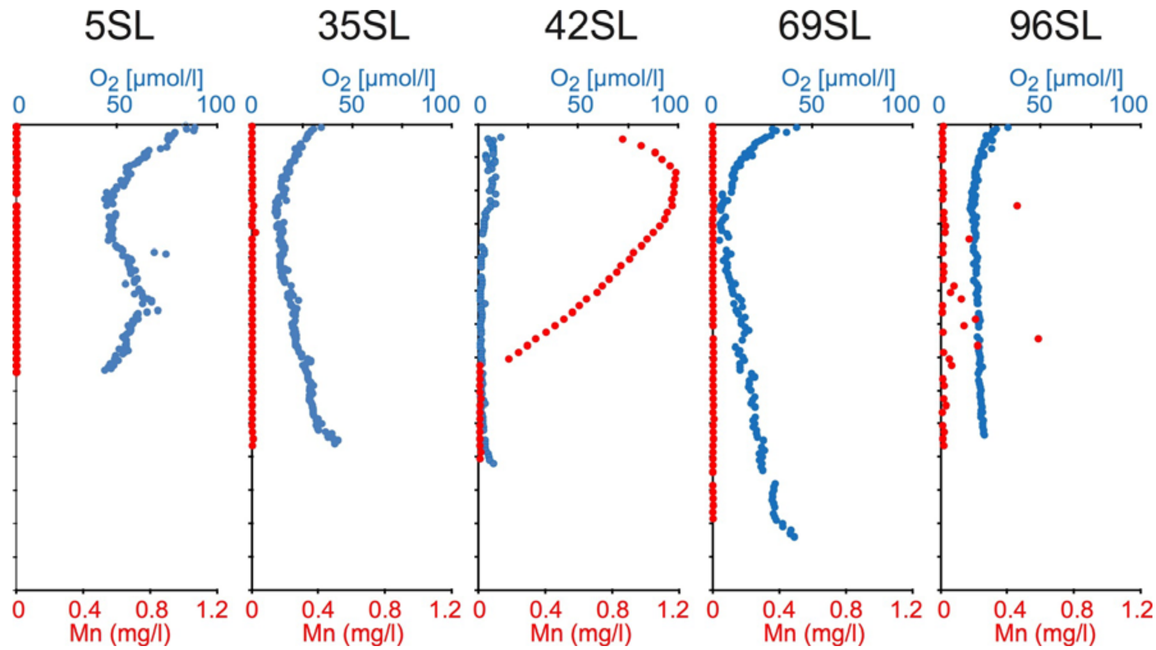

Figure DR6: Pore-water concentration profiles of O_2 and Mn^{2+} for sediment cores not shown in the main article. See Figure 1 of the main article for location of cores.

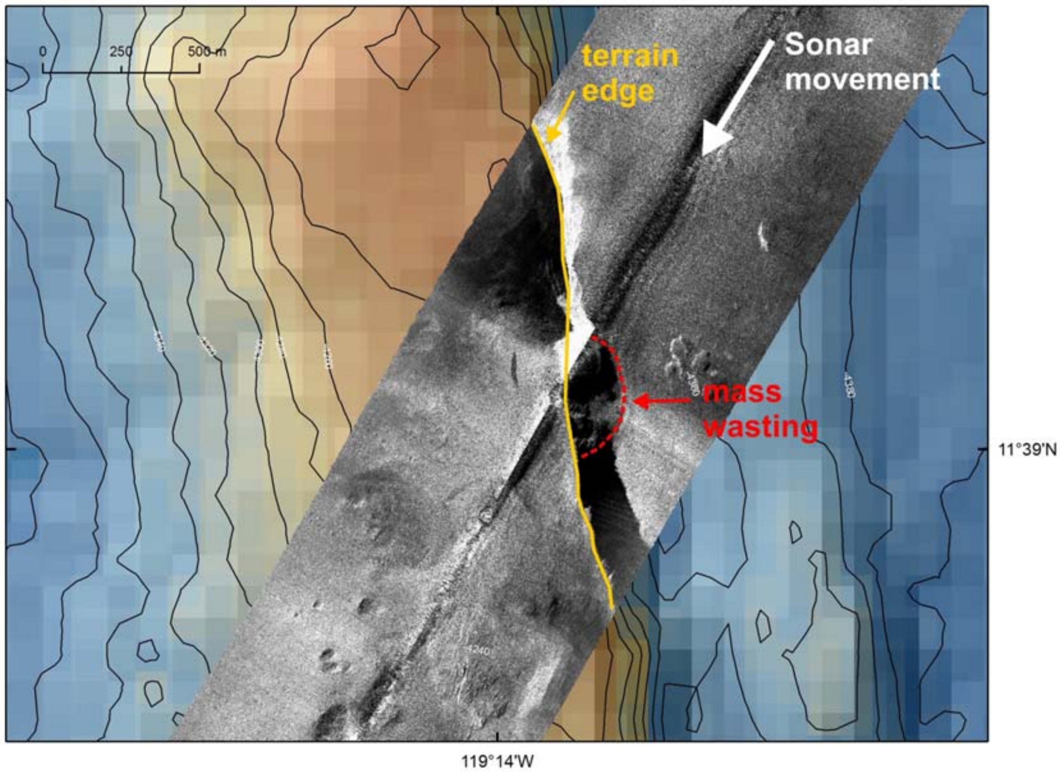

Figure DR7: Side-scan sonar track on top of the bathymetry over a N-S oriented ridge. Side-scan data are presented as 8-bit grey values with white colour indicating high backscatter. Vehicle movement (IMI-120A from University of Hawaii) was from NE to SW during cruise MANGAN-2009 with R/V Kilo Moana (Wiedicke-Hombach et al., 2010). Strong white area facing towards the vehicle during by-pass on its lower side is interpreted as vertical cliff running parallel to the bathymetric ridge. This cliff forms shadows when the vehicle passes it from the top side. High backscatter suggest outcropping hard rocks. Height of the cliff is 80 – 100 m.

REFERENCES (not cited in the main article)

Chester, R., 2000, Marine Geochemistry, Wiley-Blackwell, 520 pp.

Rühlemann, C. and Shipboard Scientific Party, 2010, Microbiology, Paleoceanography and Biodiversity in the Manganese Nodule Belt of the Equatorial NE Pacific, Cruise Report SO205/MAGAN: Hannover, Germany, 112 p.

Wiedicke-Hombach, M. and Shipboard Scientific Party, 2010, Campaign to the German Contract Area for Polymetallic Nodule Exploration (RV Kilo Moana Cruise MANGAN-2009), Hannover, 64 pp.

TABLE DR1. PISTON (KL) AND GRAVITY (SL) CORER LOCATIONS OF THIS STUDY

Corer ID	Location		Water depth (m)	Corer length (m)	Recov-ery (cm)	O_2 at base	Sediment cover (m)	Fault
	Lat (°N)	Long (°W)						
05SL	13°10.53’	118°06.71’	4287	10	756	Yes	<10	Yes
09KL	13°10.52’	118°10.10’	4335	15	1187	No	23	No
22KL	13°10.53’	118°07.66’	4319	15	1161	No	22	?
35SL	12°54.13‘	118°24.79‘	4319	10	982	Yes	18	No
53SL	13°10.51’	118°06.11’	4273	5	482	Yes	<10	No
69SL	12°39.86’	119°13.37’	4275	15	1265	Yes	51	Yes
81SL	11°50.06’	116°32.89’	4355	15	1346	Yes	73	Yes
103SL	11°49.25’	117°03.85’	4137	15	977	---	37	Yes
108SL	11°48.80’	116°31.77’	4326	15	1038	No	20	No
117SL	13°11.10’	118°05.99’	4271	15	600	Yes	<10	No