

CRUISE REPORT SONNE 257



WACHEIO

WESTERN AUSTRALIAN CLIMATE HISTORY FROM EASTERN INDIAN OCEAN SEDIMENT ARCHIVES

Darwin-Fremantle
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1. Cruise summary / Zusammenfassung

1.1. German / Deutsch

Durch die Analyse einer Suite von Sedimentkernen als hochauflösende Klimaarchive entlang des westaustralischen Kontinentalrandes zwischen 15° und 32° südlicher Breite und Entwicklung einer hochauflösenden Chronologie auf der Basis von radiometrischen (^{14}C) Datierungen und stabiler Isotopen sollen Beiträge zu drei fundamentalen Fragen der tropischen Klima-Entwicklung im australasiatischen Raum geleistet werden: (1) der Hypothese einer Süd-Verschiebung der Westwindzone und des Südrandes des tropischen Monsungürtels aufgrund südhemisphärischer Erwärmung; (2) der Hypothese einer abgeschwächten tropischen Konvektion und Walker-Zirkulation während der globalen Erwärmung und deren Konsequenzen für die Vorhersage der Niederschlagsentwicklung in den Tropen und Subtropen bei fortschreitender globaler Erwärmung, (3) dem Einfluß von tropischer/südhemisphärischer Erwärmung auf die Klimaphänomene des "Indischen Ozean-Dipols" und der "Southern Annual Mode" entlang der Westküste Australiens. Um diese Ziele zu erreichen sollen Verschiebungen in den Klimagürteln entlang der westaustralischen Küste während verschiedener Erwärmungsphasen der Südhemisphäre in den letzten 135 000 Jahren untersucht werden.

1.2. English / Englisch

Based on the analysis of high-resolution climate archives from a suite of sediment cores retrieved along the continental margin of Western Australia (between 15° and 32°S) and on the development of a high-resolution chronology, using radiometric dating and benthic isotope stratigraphy, we will: (1) test the hypothesis of southward (northward) shifts of the westerlies and the southern margin of the tropical rainbelt during Southern Hemisphere warming (cooling) events; (2) test the hypothesis of a reduction in tropical convection and weakening of the Walker circulation during tropical warming, thus evaluating consequences for the prediction of tropical rainfall during future global warming; (3) explore the effects of tropical and Southern Hemisphere warming on the "Indian Ocean Dipole" and "Southern Annual Mode" along the coast of Western Australia. To achieve these goals, we will reconstruct the displacement of climatic belts along the western coast of Australia during main Southern Hemisphere warming/cooling phases within the last 135 000 years.



2. Participants / Teilnehmer

a. Pricipal investigators / Leitende Wissenschaftler

Kuhnt	Max Wolfgang	IfG, Kiel University
Holbourn	Ann Elizabeth Lucette	IfG, Kiel University
Schönfeld	Joachim Erhard Felix	Geomar, Kiel

b. Scientific party / wissenschaftliche Fahrtteilnehmer

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Hingst	Johanna	IfG, Kiel University
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Heinrich	Sven Timo	IfG, Kiel University, Geophysik
Jöhnck	Janika	IfG, Kiel University
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Steffen	Sebastian	IfG, Kiel University
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Gallagher	Stephen John	The University of Melbourne, Australia
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Zhang	Peng	NW-University Xi'an, China
Sadekov	Aleksey	UWA, Australia
Keep	Myra	UWA, Australia
Fabian	Stanislaus Glenndy	The University of Melbourne, Australia
Manceau	Rose	RSES, ANU, Australia
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Gonzales	Jennifer Lynn	Moss Landing Marine Laboratories, California Stae University, USA

c. Crew / Mannschaft

Meyer	Oliver	Kapitän
Aden,	Niels	Ltd. Naut. Off.
Hoffsommer	Lars	1. Naut. Off.
Büchele	Hans-Ulrich	2. Naut. Off.
Walther	Anke	Schiffsarzt
Schüler	Achim	Leiter der Maschine
Stegmann	Tim	2. Techn. Off.
Kasten	Stefan	2. Techn. Off.
Schmidt	Hendrik	Elektriker
Adam	Patrick	Elektriker
Leppin	Jörg	Ltd. Elektroniker
Plöger	Miriam	Elektroniker
Grossmann	Matthias	System Manager
Blohm	Volker	Deckschlosser
Hoffmann	Georg	SM/MotM
Bredlo	Björn	SM/MotM
Bierstedt	Torsten	Bootsmann
Koch	Stefan	SM/Matrose
Fischer	Sascha	SM/Matrose
Ernst	Arnold	SM/Matrose
Papke	Rene	SM/Matrose
Doliwa	Jannik	SM/Matrose
Kruszona	Torsten	SM/Matrose
Vogel	Dennis	SM/Matrose
Spieler	Andreas	Koch
Stöcker	Frank	2. Koch
Lemm	Rene	1. Steward
Steep	Maik	Steward
Carolino	Bernard	Steward
Kroeger	Sven	Steward

3. Narrative of the cruise / Ablauf der Forschungsfahrt

R/V Sonne departed for Cruise SO257 on May 12 at 11:00 local time from the Fort Hill Wharf in the Port of Darwin (NW Australia). Following a two-day transit, we arrived on May 14 at 10:00 local time in the first work area on the NW Australian continental margin, NE of the Rowley Shoals at 14.97°S/120.48°. In the following five days we deployed the CTD, multicorer, gravity- and piston-corer along a route starting from IODP Site U1482 cored during IODP Expedition 363, NW of the Rowley Shoals to the NE part of the Exmouth Plateau. CTD- und Multicorer delivered water property measurements and samples for oxygen isotope stratigraphy of water masses as well as core top samples for calibration of geochemical and micropaleontological proxies for water temperature, salinity and productivity. In this first part of the survey we had 13 successful multicore deployments each with full recovery of 12 core tops as well as 5 piston cores and six gravity cores, which recovered 11.3 to 19.6 m sediment from water depths of 500 to 2400 m. Except for one, all cores were undisturbed with well preserved sediment that are correlative to the mud line in the multicores. All cores were immediately split into working and archive halves. Initial shipboard stratigraphic analyses (sediment description, magnetic susceptibility, digital photography, spectrophotometry, smear slides and micropaleontologic analyses of the core catcher) were carried out immediately after the cores were split. The scientific highlight in the first phase of the expedition was the discovery of a late Pleistocene tephra layer, which could be identified in three cores and, thus, provides a distinctive marker horizon for stratigraphic correlation. In total, we recovered 165 m of gravity- and piston cores in this area, which are all of excellent quality (which was also partially due to clement weather and smooth seas). We also ran seismic profiles with high resolution multichannel-seismic and penetration of over 500 m in the vicinity of IODP Sites U1482, U1464 und U1463 cored during IODP Expeditions 356 and 363. Preliminary shipboard analyses already provided new insights on the Neogene to recent mass deposits along the NW Australian continental margin.

After finishing operations NW of the Rowley Shoals and along the northeastern part of the Exmouth Plateau we focused our research in the second week on the central and southwestern part of the Exmouth Plateau. We occupied 16 stations in this area and sampled them with CTD, multicorer, giant box corer, gravity and piston corer following parasound and multibeam echosounder survey. In total we deployed three CTDs, one giant box core, 12 multicores and ten gravity and piston cores with a total core length of 164 m. Eight of the ten long cores are of excellent quality and only two cores exhibit short sections of imploded core liner in the upper part, which needed special attention during cutting and curation. As on the first part of the cruise we split all cores immediately after retrieval in archive and work halves and performed initial stratigraphic, micropaleontologic and sedimentologic analyses. Using the advanced positioning capabilities of R/V Sonne we were able to retrieve a multicorer directly from the central part of a pockmark, a crater-shaped fluid and gas escape structure at the margin of the giant Gordon submarine landslide. Another highlight of the second phase expedition week were high resolution seismic images of submarine sediment gravity deposits and their transition into undisturbed pelagic sedimentation, which were obtained during routine surveys carried out at night in order to find optimum positions for gravity and piston coring for the following days. As for the first week all coring operations were successful during the second part of the cruise. During the second week we retrieved a total length of long piston and gravity cores of 164 m, which brings the total recovery of long cores during the first two weeks of the SO-257 expedition to 329 m. Additionally, we were able to obtain six long lines of high-resolution multichannel seismic, including lines over IODP Sites U1461 and 1462 cored during IODP Expedition 356 on the Northwest Shelf. The stratigraphic records of these sites will, thus, allow a precise calibration of seismic reflectors to better constrain long-term sediment deposition along the Northwest Shelf. Weather conditions remained favourable, even though the wind conditions deteriorated slightly after leaving the Northwest Shelf rendering operations more difficult.

After the successful operations in the Exmouth Plateau area, we embarked on the last phase of the expedition in the southern work areas, offshore Shark Bay and the Houtman-Abrolhos Islands. As anticipated, it proved more difficult to find expanded sediment archives in this region and the maximum core lengths considerably decreased within the last week of the expedition. Sediments were characterized by high carbonate content due to reduced river

discharge of terrigenous clastics offshore and deploying the long gravity corer was less effective than in previous areas. However, the 10 m piston corer, proved very successful to recover excellent quality cores, even in stiff carbonate-rich sediments. In total we occupied 17 stations, which were sampled with CTD, multicorer, gravity and piston corer after surveys with multibeam-echosounder and parasound. In addition to four CTD deployments, we obtained 13 multicorer samples, two gravity and five piston cores. The piston cores achieved an average length of 7 m, while two gravity cores had insufficient penetration with low core recovery of only 2.5 and 4.5 m. As in the previous work areas, all cores were immediately split after retrieval, curated and the sedimentology and stratigraphy were analyzed and documented. High resolution parasound and seismic surveys concentrated on the seaward extend of reef structures along transects in the vicinity of IODP Sites U1458, U1459 and U1460, which had been cored during IODP Expedition 356. These surveys obtained excellent records of the transition between shallow water reef-carbonate systems that were drilled during IODP Expedition 356 and the hemipelagic deep-water sediments, which we cored during SO-257. After the successful coring during the third phase of the expedition the total recovery of long cores during expedition SO-257 was 369 m in 13 deployments of the piston corer and 15 deployments of the gravity corer. In addition, we recovered 38 multicores and one giant spade boxcore as well as data and water samples from ten CTD deployments. The survey and coring operations were terminated at 6:00 on June 3rd, when we started the transit to Fremantle, which we reached in the morning of June 4th. On the same day we were able to transfer the sediment cores and multicorer samples into a pre-cooled reefer, which was waiting for us on the pier in Fremantle. On June 5th R/V Sonne had an open ship event, organized by the German Embassy in Canberra and the consulate in Perth, which attracted more than 3200 interested visitors.

4. Aims of the Cruise / Zielsetzung der Forschungsfahrt

Motivation

Western Australia is located at the southern limit of the seasonal (austral summer) displacement of the Intertropical Convergence Zone (ITCZ) and is marginally affected by the Australasian monsoon system today. There is evidence, however, that the latitudinal displacement of the ITCZ has considerably altered over the last 20 kyr and that the impact of the monsoon over Western Australia changed substantially in relation to interhemispheric temperature fluctuations. Western Australia's climate is also fundamentally influenced by the Indonesian Throughflow (ITF), which transfers surface and intermediate waters from the Pacific Ocean, thus regulating the heat and freshwater budgets of tropical water masses and affecting regional and global climate. The region targeted in this proposed cruise, therefore, represents a key area to chart the temporal variability of the tropical convection and to monitor ITF variability and potential relationships to high and low latitude climate change. In particular, we intend to address the following scientific questions:

Southern Hemisphere deglacial warming and its phase relationship to atmospheric carbon dioxide increase: High-resolution Southern Hemisphere sea surface temperature records over the Last Glacial Termination and Holocene

A growing body of high-resolution proxy temperature reconstructions for the last 20 kyr encouraged the compilation of global sea surface temperature (SST) time series (Shakun et al., 2012). These first temperature stacks already indicate significant differences in the deglacial warming patterns between hemispheres and in the phase relationships between atmospheric carbon dioxide increase and global warming. However, these records are still geographically too scattered to resolve regional, and in particular meridional, differences in deglacial global warming (Fig. 4-1). One major white spot on the map of high-resolution deglacial SST record is the eastern Indian Ocean. The only records outwith the Indonesian archipelago, which were included in the global compilation by Shakun et al. (2012), are Mg/Ca temperature reconstructions in the Timor Sea (Xu et al., 2006, 2008, 2010). These reconstructions are still strongly influenced by the Australian Monsoon and the ITF and may, thus, inherit some Northern Hemisphere signature, such as a relatively warm Bølling/Allerød interval, as shown in the more northeasterly core SO185-18462 from the Timor Strait (Holbourn et al., 2011)(Fig. 4-2).

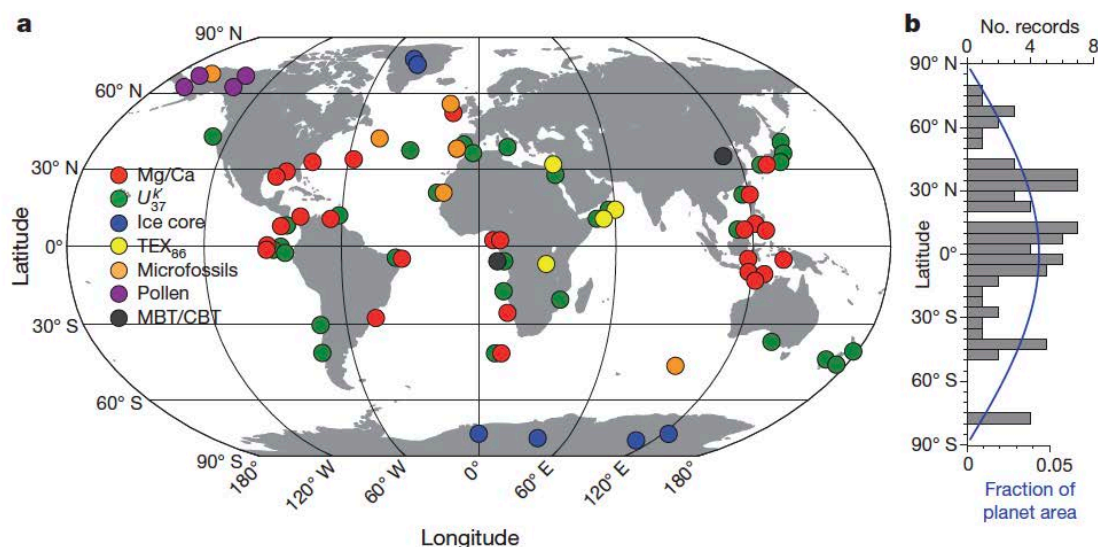


Fig. 4-1: **a.** Existing high-resolution proxy temperature records for the last glacial termination and Holocene from Shakun et al. (2012). MBT/CBT: methylation index of branched tetraethers/cyclization ratio of branched tetraethers; TEX86, tetraether index of tetraethers consisting of 86 carbon atoms; Uk'37, alkenone unsaturation index. **b.** Distribution of the records by latitude (grey histogram) and areal fraction of the planet in 5° steps (blue line). Note that subtropical Southern Hemisphere temperature estimates are entirely based on records from South America and Africa, while Australasian records are

limited to the tropics and the Northern Hemisphere.

Existing deglacial and Holocene climate records from marine cores off Western Australia (Bé and Duplessy, 1976; Wells and Wells, 1994; van der Kaars and DeDeckker, 2002; Spooner et al., 2011) are either of very low resolution or are based on semi-quantitative proxies, which only suggest poorly constrained warming or cooling trends (planktonic foraminiferal oxygen isotopes, foraminiferal assemblage counts and pollen data). New records from the Western Australian margin are, thus, required to clarify and establish some key features of Southern Hemisphere deglacial warming (Fig. 4-2). Key issues to be investigated are: (1) an early start for deglacial warming at ~19 ka; (2) a strong influence of the Antarctic Cold Reversal (ACR) instead of the Bølling/Allerød (B-A) warming (3) the absence of a Younger Dryas (YD) cooling (4) a possible 8.2 ka cooling event also in the Southern Hemisphere. The Timor Sea SST records also suggest the startup of a regional cooling around 6 ka, which may be related to changes in the intensity of the Australian monsoon. Whether or not this middle Holocene cooling trend reaches into the subtropics is an additional crucial question that can be only resolved with new Western Australian high-resolution SST records.

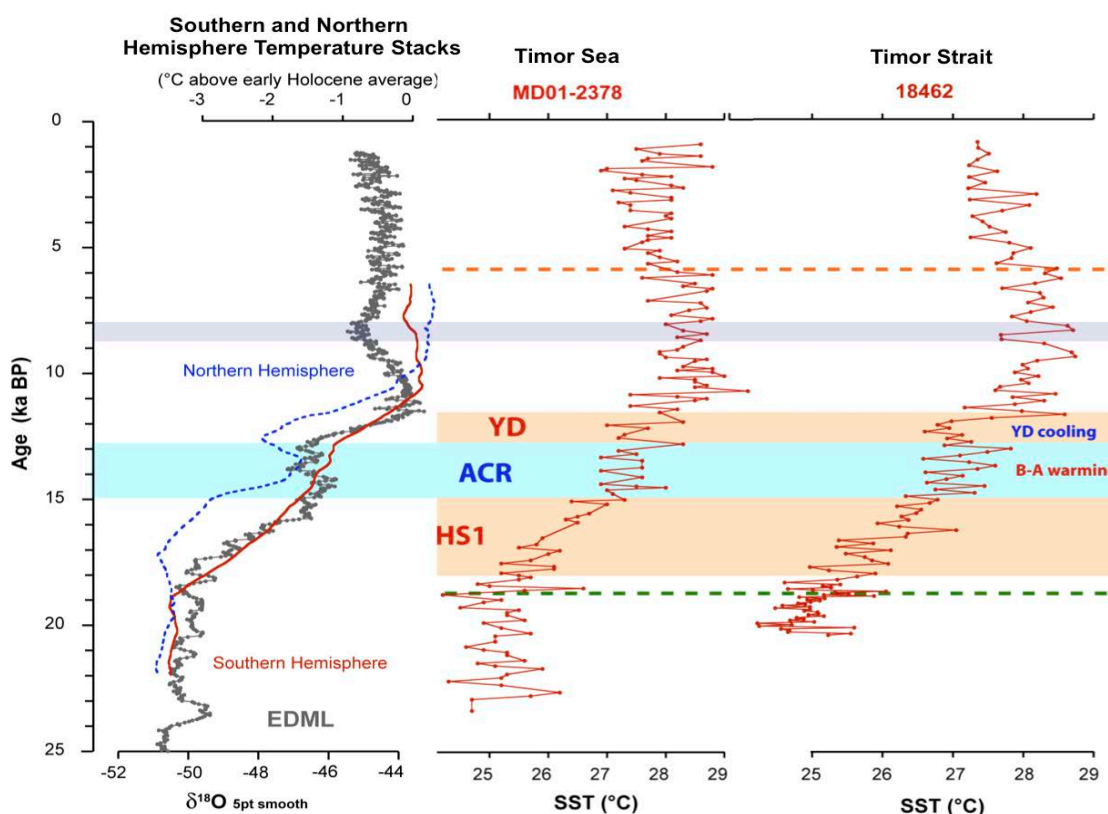


Fig. 4-2: Stacked Southern and Northern Hemisphere SST records (Shakun et al., 2012), Antarctic climate evolution from EDML ice core (EPICA Community Members, 2006) and SST records from the northern Australian margin (Timor Strait and Timor Sea NE of the Scott Plateau, from Holbourn et al., 2011 and Xu et al., 2008). The more northeasterly core SO185-18462 from the Timor Strait clearly displays a Northern Hemisphere signature.

Variability of the Leeuwin Current and its relation to the El Niño-Southern Oscillation (ENSO) and Western Australian climate

The Leeuwin Current is an unusual warm, southward flowing ocean boundary current off the western coast of Australia, which is driven by the meridional pressure gradient in the southeast Indian Ocean, mainly as a result of the ITF (Feng et al., 2009). Mesoscale eddies are characteristic features of the Leeuwin Current (Fig. 4-3) and its heat budget is dominantly balanced by the current's meridional heat transport and the heat released to the atmosphere, thus warming the southwest Australian continent (Feng et al., 2008). The Leeuwin Current is strongly influenced by the seasonal change in atmospheric circulation, with weaker current transport during the austral summer (November-March) when the southerly trades are strong (Fig. 4-4). During this season even sporadic wind-driven northward currents and ephemeral

coastal upwelling events occur in limited shelf areas off the western coast of Australia (Feng et al., 2009).

The Leeuwin Current is particularly strong during La Niña phases in austral winter. A possible teleconnection between eastern Indian Ocean SST near Australia during January–February and subsequent ENSO development has been postulated by Terray and Dominiak (2005). The exact mechanisms for such a triggering of ENSO from the Indian Ocean are unclear, but if the speculation that eastern Indian Ocean SST anomalies initiate air-sea interaction over the tropical Indian Ocean and then influence the Pacific Ocean is correct, these mechanisms may also operate on longer than seasonal/ENSO timescales. A detailed set of SST data from the eastern Indian Ocean over the last glacial cycle would, thus, allow to test the hypothesis that unusually warm SST in the eastern Indian Ocean trigger or are associated with El Niño phases in the Pacific Ocean.

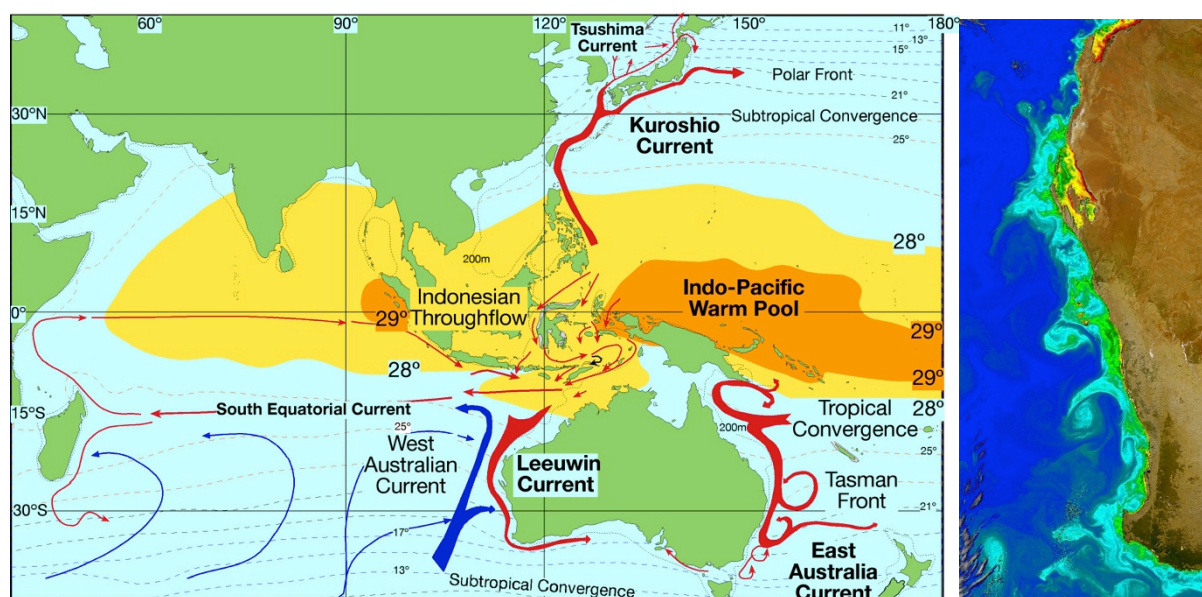


Fig. 4-3: Leeuwin Current (from Gallagher, 2009) and Leeuwin Current eddies, reflected by Seawifs chlorophyll satellite records (April 2002).

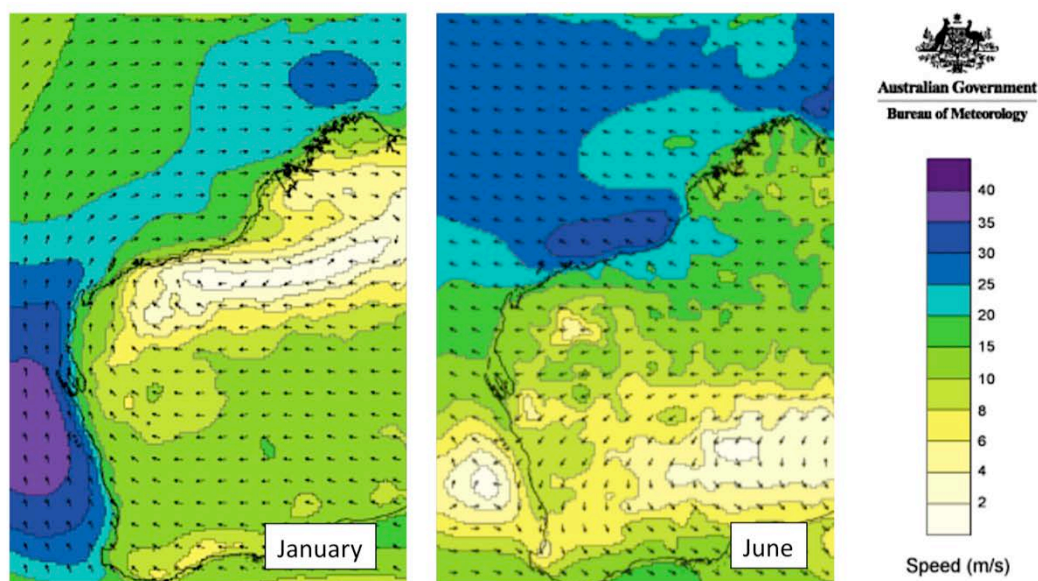


Fig. 4-4: Average wind velocity (m/s) over Western Australia at 00 UTC,Z, based on MesoLAPS_125 Model data 2004 to 2008. Source: Australian Government, Bureau of Meteorology. Note dominance of southeasterly trades over Northwestern Australia, which carry dust from central Northwestern Australia in May to September. The period October–April is characterized by strong southerly trades along the western Australian coast, which change into a westerly direction along the northwestern Australian coast.

Response of the Intertropical Convergence Zone and Australian monsoon to high-latitude temperature fluctuations

The response of the Australian monsoon to high-latitude temperature fluctuations on centennial to millennial timescales is still poorly understood due to the scarcity of continuous high-resolution precipitation and runoff records from the Australian continent. Climate models predict drier subtropics in the Southern Hemisphere during interstadials (Broccoli et al., 2006; Chiang et al., 2008) due to northward shift of the ITCZ during Northern Hemisphere warming (B-A, 15-12.9 ka) and intensification of the austral summer monsoon during Northern Hemisphere cooling (Heinrich Stadial 1 (HS 1), 18-15 ka and YD, 12.9-11.7 ka). However, model predictions of a hemispherical seesaw during the last glacial termination are not fully supported by climate proxy data, which are still scarce for the Southern Hemisphere (Denton et al., 2010; Shakun et al., 2012; De Deckker et al., 2012) and remain contradictory in particular for the earliest part of the last deglaciation (HS 1).

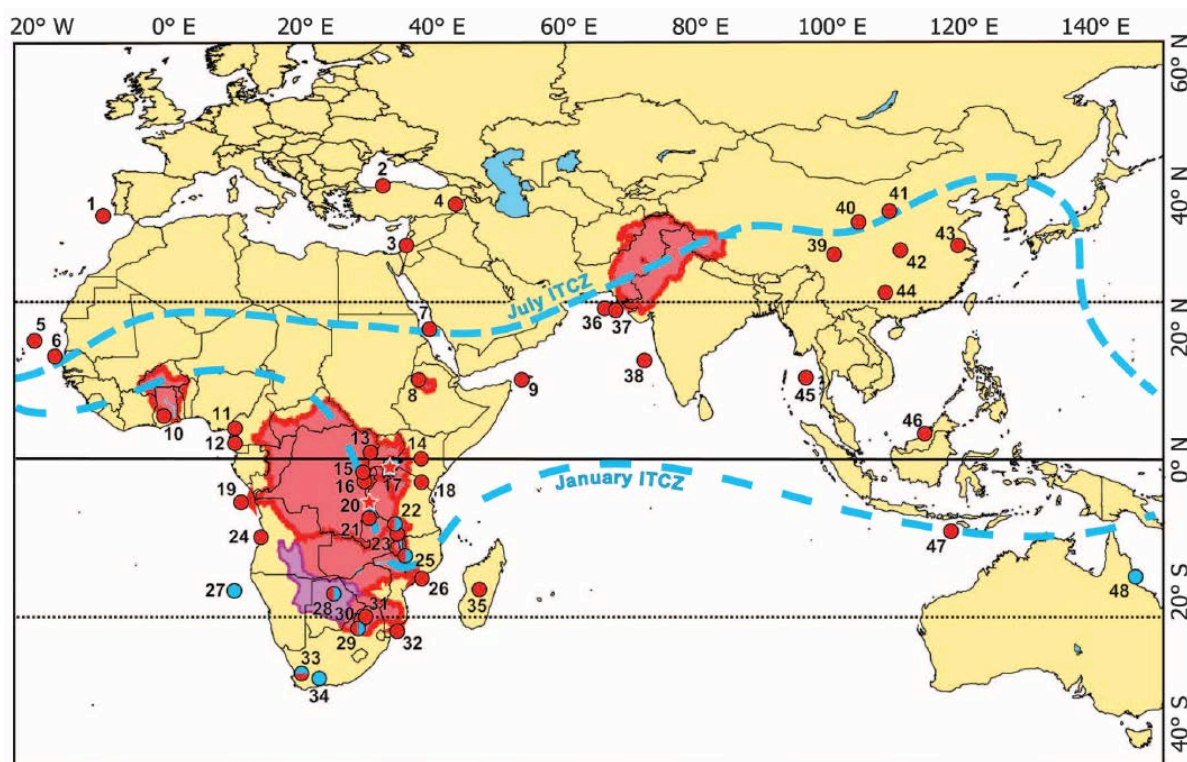


Fig. 4-5: ITCZ flip-flop or global catastrophic drought? Compilation of climate records, that support global catastrophic drought in the Afro-Asian monsoon region during Heinrich Event 1 (red points: drought, blue points: wet conditions) from Stager et al (2011). Note the lack of records from Western Australia.

Substantial regional cooling in the Northern Hemisphere, with widespread drying in the subtropics and tropics was originally attributed to a southward shift of the ITCZ and associated tropical rainbelt (Claussen et al., 2003; Chiang and Bitz, 2005; Chiang et al., 2003, 2008; Broccoli et al., 2006; Muller et al., 2008, 2012). However, a recent data compilation (Fig. 4-5) demonstrated that the height of this stadial, at about 16-17 ka (HS 1), coincided with an extreme and widespread megadrought, which also affected the Southern Hemisphere (Stager et al., 2011). Thus, the widespread geographic range of the HS 1 megadrought suggests a severe weakening of the tropical rainfall systems, probably as a response to sea surface cooling. Salinity and runoff record from the proposed transect along the northwestern and western coast of Australia would provide crucial evidence to test these conflicting hypotheses.

Variability of the Western Australian Dust Belt

Variations in the input of aeolian dust carried into the Indian Ocean south of the Australian monsoon area have high potential to monitor changes in the aridity of Western Australian climate in relation to interhemispheric temperature fluctuations. High-resolution dust records (XRF-scanner derived elemental data in association with grain size measurements) have high potential to test model predictions of drier subtropics in the Southern Hemisphere during interstadials (Claussen et al., 2003; Chiang and Bitz, 2005; Chiang et al., 2003, 2008; Broccoli et al., 2006). In particular, the predicted northward shift of the ITCZ during Southern Hemisphere cooling (Antarctic Cold Reversal (ACR) and Northern Hemisphere warming (Bølling-Allerød (B-A), 15-12.9 ka) must have left a significant imprint on the dust records off Western Australia. The evolution of the Indonesian-Australian monsoon during the B-A and mid-Holocene Northern Hemisphere warming, thus, provides a test case to evaluate the impact of changes in the interhemispherical temperature gradient on the ITCZ position (Fig. 4-6) and the northern limit of the Western Australian dust belt.

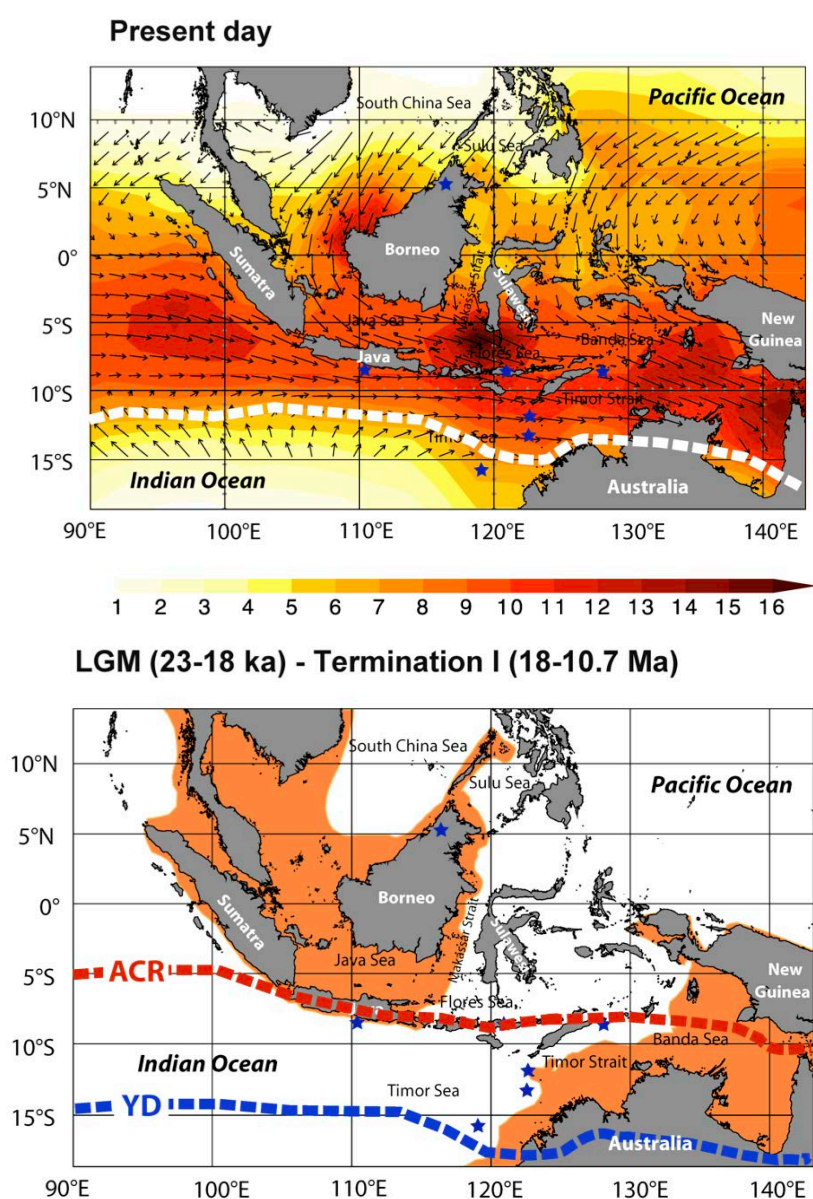


Fig. 4-6: Present day position of the southern limit of the tropical rainbelt and the extreme northerly and southerly positions during the ACR and YD, suggested by riverine flux records in the Timor Strait and Timor Sea (from Kuhnt et al., 2015).

The B-A Northern Hemisphere warming occurred during a major cooling period in Antarctica (ACR) and the subsequent rapid warming of Antarctica at the end of the ACR resulted in the sharpest interhemispheric thermal gradient over the entire last glacial cycle (Shakun et al., 2012). This massive switch towards a warmer Southern Hemisphere was

accompanied by a rapid rise in atmospheric CO₂ (Monnin et al., 2001), which in turn increased summer insolation forcing over the Australian continent, in a manner similar to scenarios of future climate change (Hughes, 2003).

XRF-scanner and grain-size-based riverine runoff and aeolian dust flux data along a NE SW transect from the northern edge into the center of the Western Australian dust belt will allow monitoring of deglacial runoff patterns and dust fluxes from Western Australia (Fig.4- 7). This will allow a better understanding of the variability of the tropical convection along the ITCZ southernmost displacement (austral summer; Fig. 4-6) and of the complex interactions between forcing factors such as the interhemispheric temperature gradient, intensity of the Walker circulation and sea level change.

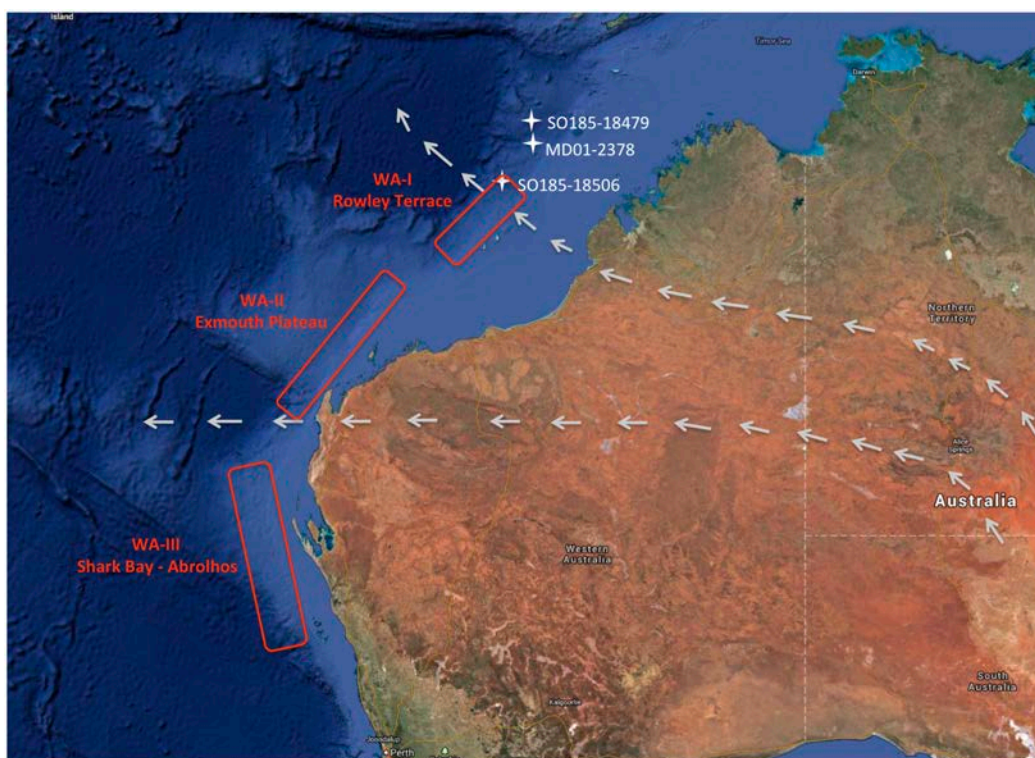


Fig. 4-7: Location of the three proposed working areas at the northern edge, in the center and at the southern margin of the Western Australian dust belt. The northern and southern limits of the main Western Australian dust paths are indicated by arrows (after Hesse and McTainsh, 2003). Stars indicate key core locations of SO-185 and MD01 cruises.

Influence of the Indian Ocean Dipole and Southern Annual Mode on Western Australian climate

The most challenging new concept in understanding the climate variability in the eastern Indian Ocean was initiated by the discovery of the Indian Ocean Dipole (IOD, Saji et al., 1999). IOD events are defined as unusual cool (warm) SST and suppressed (enhanced) precipitation anomalies in the eastern (western) Indian Ocean. Anomalous trade winds occur in association with IOD events, which reach their peak in boreal fall, when the thermocline is sufficiently shallow off Sumatra and Java to allow upwelling of cool subsurface water (Schott et al., 2009), Walker Circulation anomalies over the equator and a deep modulation of Australasian Monsoon westerlies (Saji and Yamamoto, 2003). The relation of IOD to ENSO remains still a matter of discussion, since about half of the documented IOD events over the past several decades occurred independently of ENSO (Meyers et al., 2007).

The IOD does not have a direct impact on SST variability off Western Australia, but it has a teleconnection off the southwest coast of Australia, with reduced winter westerly winds and storm activity, which may affect air-sea fluxes, vertical mixing and productivity patterns off Western Australia (Feng et al., 2009). On longer timescales, the frequency of occurrence of IOD events appears related to Indian Ocean temperatures with a decreasing trend during colder periods (Cai et al., 2009).

The Southern Annular Mode (SAM) describes the north–south movement of the westerly

wind belt, which is the most important atmospheric influence in the middle to higher latitudes of the Southern Hemisphere (Gong and Wang, 1999; Kidson, 1999) and a main driver of rainfall variability in southwestern Australia. In a positive SAM event, when air pressure over Antarctica is lower than normal, the belt of strong westerly winds shifts southwards towards Antarctica resulting in weaker westerly winds and reduced autumn and winter rainfall over southwestern Australia. Today, this positive phase of SAM dominates during warming periods, when the pressure difference between Antarctica and the mid-latitudes is relatively high (Gong and Wang, 1999). In analogy, we would expect a dominance of negative SAM mode during periods of cooler climate with intensified westerlies and rainfall over southern Australia. On longer timescales, evidence for northward/southward shifts of the westerlies in relation to Southern Hemisphere atmospheric cooling/warming was provided by records from sediment cores in the Tasman Sea, south of Australia (Sikes et al., 2009; De Deckker et al., 2012). However, proxy records of the SAM longterm variability and its influence on the atmospheric and ocean circulation system (i.e. intensity of the Leeuwin Current) in the eastern Indian Ocean off Western Australia are still missing.

With an expected time resolution of 50-100 years in our sediment archives we will not capture the variability of IOD and SAM on seasonal or decadal timescales. However, longterm changes in IOD mode and SAM may be an important component in the variability of SST, productivity (vertical mixing), wind and precipitation patterns, derived from reconstructions of climate variability along the coast of Western Australia.

Main scientific objectives of SO-257 were:

- Test hypothesis of southward (northward) shifts of westerlies and southern margin of the tropical rainbelt during warming (cooling) events in the Southern Hemisphere
- Test hypothesis of a reduction in tropical convection and weakening of the Walker circulation during tropical warming (DiNezio et al., 2011)
- Explore the effects of tropical/Southern Hemisphere warming on the Indian Ocean Dipole and Southern Annual Mode along the coast of Western Australia

Specific objectives were:

- Develop a high-resolution chronology based on radiometric dating and benthic isotope records. Independent age models for each core will be established using ^{14}C AMS dates (0-30 ka) and tuning of the benthic oxygen isotope curve to the EDML ice core oxygen isotope records of Antarctica, correlated to the Greenland Ice Core Chronology (GICC05) timescale (EPICA Community Members, 2006). This tuning approach is consistent to MIS 3 chronologies for other high-resolution sediment archives within the Indo-Pacific Warm Pool (Dürkop et al., 2008; Zuraida et al., 2009; Bolliet et al., 2010).
- Generate intermediate (1 kyr) and high-resolution (centennial) epibenthic (*Cibicidoides wuellerstorfi*) surface (*Globigerinoides ruber*) dwelling and thermocline dwelling (*Pulleniatina obliquiloculata*) foraminiferal $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ records over the last glacial cycle. Centennial resolution will target critical intervals of climate warming during the Holocene, the last glacial termination and over Dansgaard-Oeschger Cycles during Marine Isotope Stage 3.
- Establish first high-resolution SST records based on Mg/Ca in surface and thermocline dwelling planktonic foraminifers (following approaches in Xu et al., 2006, 2008, 2010; Sadekov et al., 2009; Zuraida et al., 2009, and Bolliet et al., 2010) and alkenone saturation indices (Uk37, cooperation with working group of R. Schneider, Kiel) for Southern Hemisphere subtropics along a latitudinal transect off Western Australia.
- Develop and apply regional planktonic foraminiferal transfer functions to establish additional SST proxy along the western Australian margin (cooperation with Jian Xu, NW University, Xi'An, China)
- Establish local SST core-top calibration data set for Mg/Ca, alkenone and foraminiferal transfer functions, based on multicorer core tops and plankton tows along a latitudinal transect along the western Australian margin, which covers a temperature range from the tropics to the cool subtropics.
- Use clumped isotope paleotemperature estimates as a tool to reconstruct deglacial warming and the temporal and spatial variability of the Leeuwin Current (cooperation, with Thomas Leutert, University of Bergen, Norway).

- Investigate the timing and amplitude of salinity changes, using paired Mg/Ca and $\delta^{18}\text{O}$ measurements in the near surface dwelling foraminifer *Globigerinoides ruber*. A local salinity- $\delta^{18}\text{O}_{\text{seawater}}$ calibration will be established, based on 24 CTD stations sampled during the cruise.
- Develop a Pleistocene high-resolution sequence stratigraphy of the western Australian margin based on parasound and local high-resolution airgun seismic profiles (In cooperation with working groups at Melbourne and Kiel Universities (Stephen Gallagher, Sebastian Krastel)
- Reconstruct terrigenous runoff (riverine and aeolian dust) from Western Australia into the eastern Indian Ocean from high-resolution sediment archives using XRF-scanner derived geochemical records (work package of Kuhnt/Holbourn IfG Kiel) and grain size distribution curves (work package of J. Schönfeld, GEOMAR, Kiel). Decadal to centennial (0.2 to 1 cm resolution) XRF scanner records will be established using elemental log-ratios of main riverine and aeolian transported terrigenous elements (K, Fe, Ti, Al, Si and Zr).
- Use benthic foraminiferal assemblages and isotope signals for stratigraphic correlation and estimates of changes in intermediate water masses and carbon export flux to the sea floor
- Evaluate influences of monsoonal wind strength, rainfall and runoff on radiolarian species abundance
- Use clay mineral, Nd isotope signals of bulk sediment and pollen assemblage distribution to supplement terrigenous runoff studies (cooperation with Martin Frank, GEOMAR, Kiel and partners from ANU, Canberra)
- Integrate new data from Sonne cores with land precipitation records currently being analyzed at ANU, Canberra and fully coupled (AGGCM) experiments that span the past 300,000 years (50°N to 50°S) using accelerated forcing and realistic boundary conditions including ice volume, greenhouse gasses and sea level (cooperation with Steve Clemens, Brown University).

A meridional transect of high-resolution Holocene to late Pleistocene sediment archives along the northwestern Australian margin provides crucial information to explore the spectrum of natural climate variability and to untangle dynamic processes and feedbacks controlling climate evolution in relation to high latitude climate change. These will additionally be useful to constrain modeling experiments of past and future climate change. Finally, this project was integrated within a broader research framework targeting the temporal evolution of monsoonal climate sub-systems. Our investigation on sedimentation and sea-level fluctuations along the northwestern Australian margin and Australian climate evolution through the Neogene complements research on newly drilled IODP Expeditions in the Eastern Indian Ocean (IODP Expeditions 353, Chief Scientists: Steve Clemens/Wolfgang Kuhnt, and 356, Chief Scientists: Stephen Gallagher/Craig S. Fullthorpe) and the Indo-Pacific Warm Pool IODP Expedition 363 (Chief Scientists: Yair Rosenthal/Ann Holbourn).

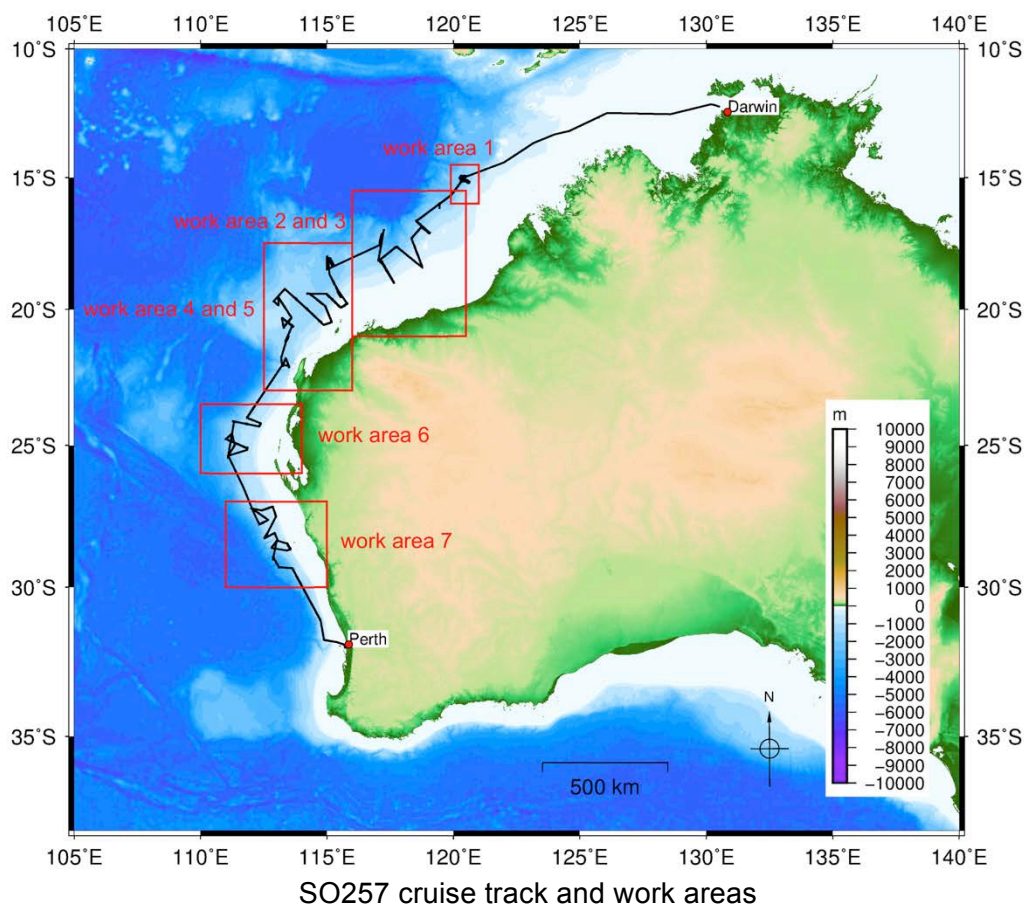
5. Agenda of the cruise / Programm der Forschungsfahrt

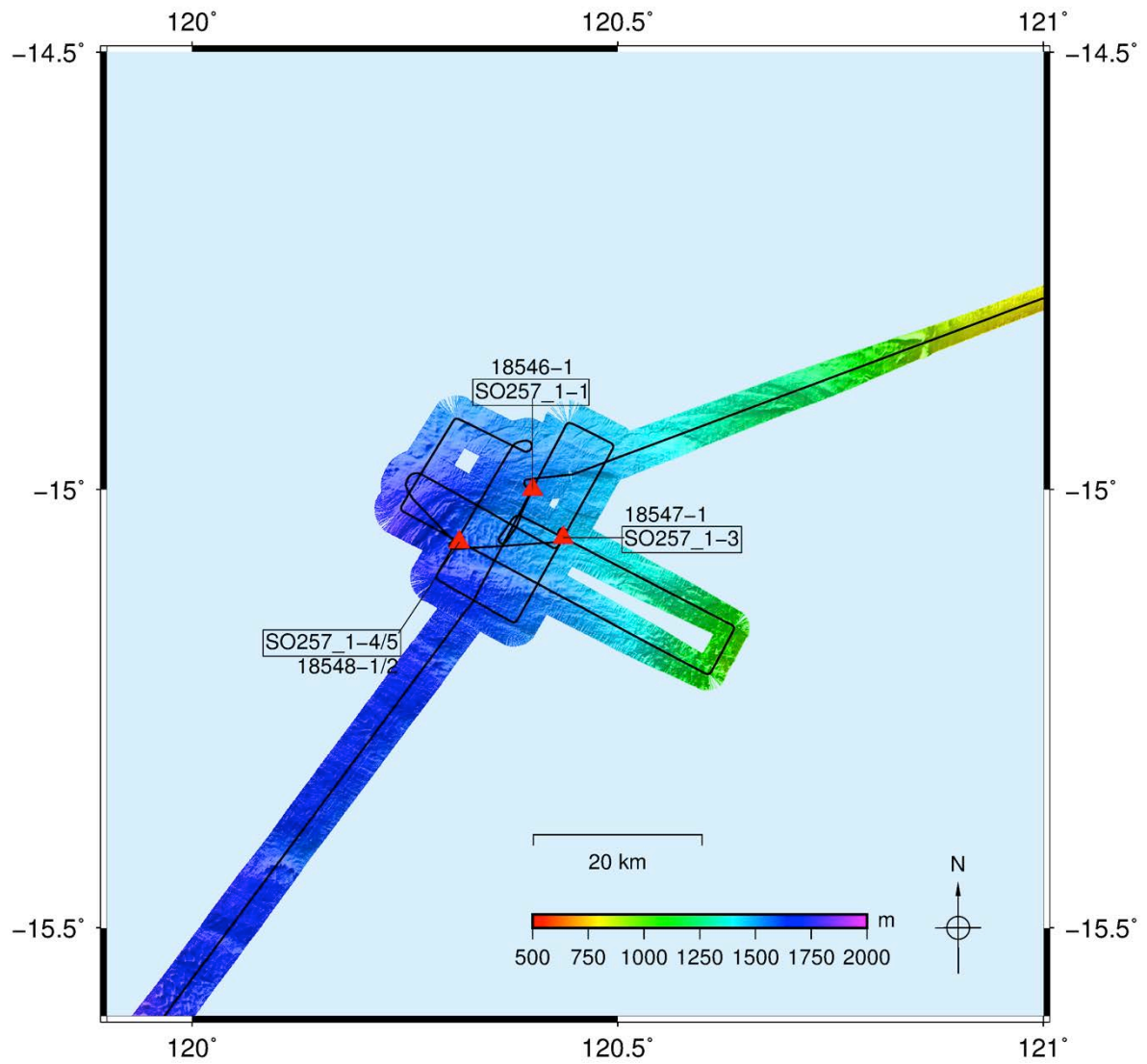
The targeted research area is situated along a latitudinal transect between 15°50' S / 119° 35' E (northernmost station) and 30° 05' S / 114° 20' E (southernmost station)(see Fig. 5-1). Along this transect we concentrated on three main work areas, which are detailed in Fig. 5-2a-c.

Work Areas 1-3 (Rowley Terrace): Swath bathymetry and Parasound-survey with deployments of CTD and multicorer at 13 stations, gravity and/or piston corer at 10 stations. Surveys were carried out with a speed of 5-10 kn, depending on weather conditions, required station times ranged between 2 hours (CTD and/or multi-corer/box corer) and 6 hours (CTD, multi-corer/gravity corer/piston corer). Surveys and stations were concentrated along three down-dip transects in the vicinity of IODP Sites 356-U1464 and U1463 and a more detailed airgun seismic survey was carried out around IODP Site U1482.

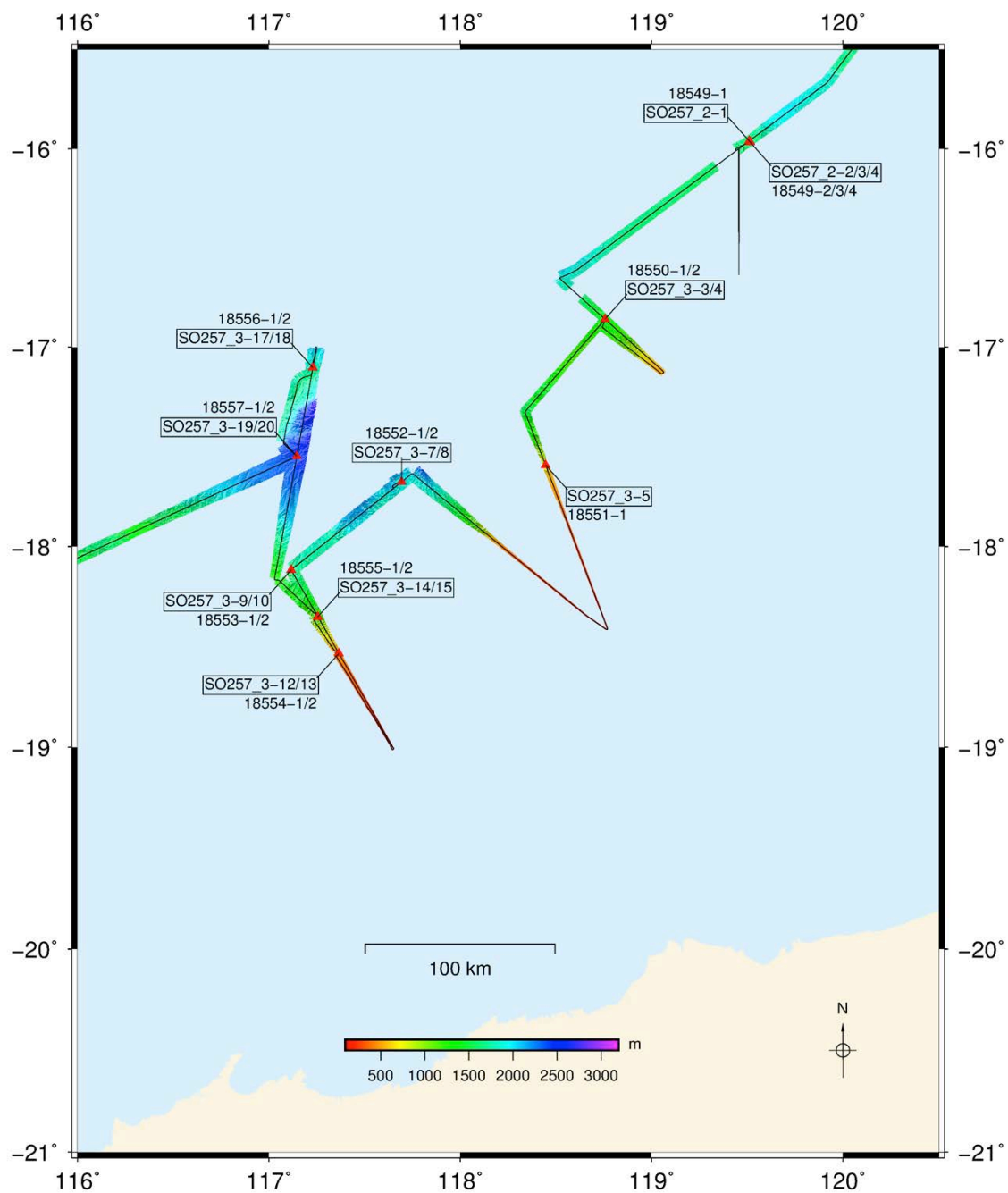
Work Areas 4-5 (Exmouth Plateau): Swath bathymetry, parasound and seismic survey with deployments of CTD, multicorer or box corer at 16 stations, gravity and/or piston corer at 10 stations. Survey and stations were concentrated along three down-dip transects: (1) NW' IODP U1464, (2) NW' IODP Site U1463, (3) 3. N' Images coring site MD98-2361.

Work Areas 6-7 (Shark Bay - Abrolhos): Swath bathymetry, parasound and seismic survey with deployments of CTD and/or multicorer at 16 stations, gravity and/or piston corer at 6 stations, finally transit to Fremantle. Survey and stations were concentrated along three down-dip transects: (1) W' Shark Bay (Work Area 6) and (2) offshore the Abrolhos Islands (Work Area 7, in the vicinity of IODP Expedition 356 Sites U1458, U1459 and U1460).

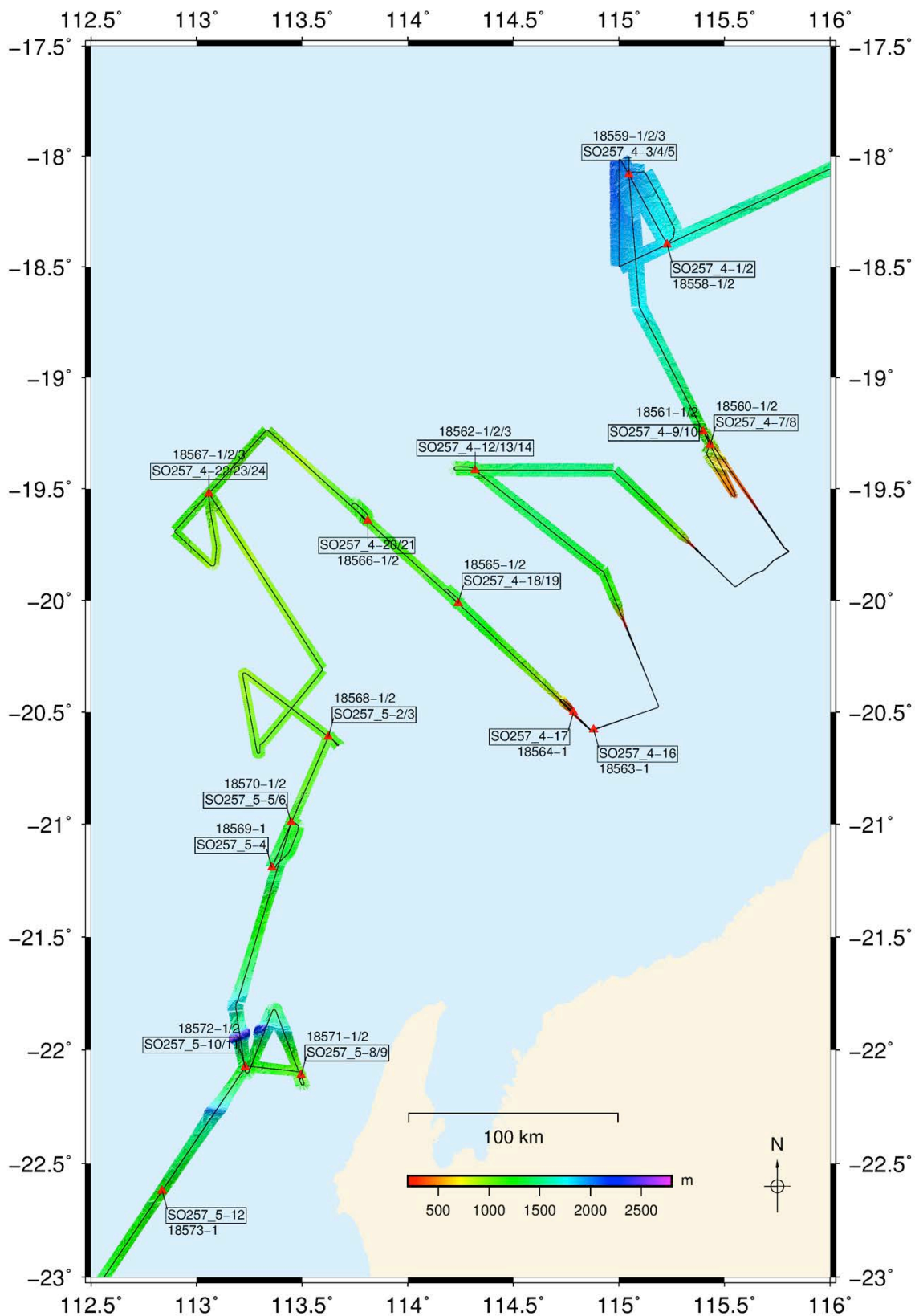




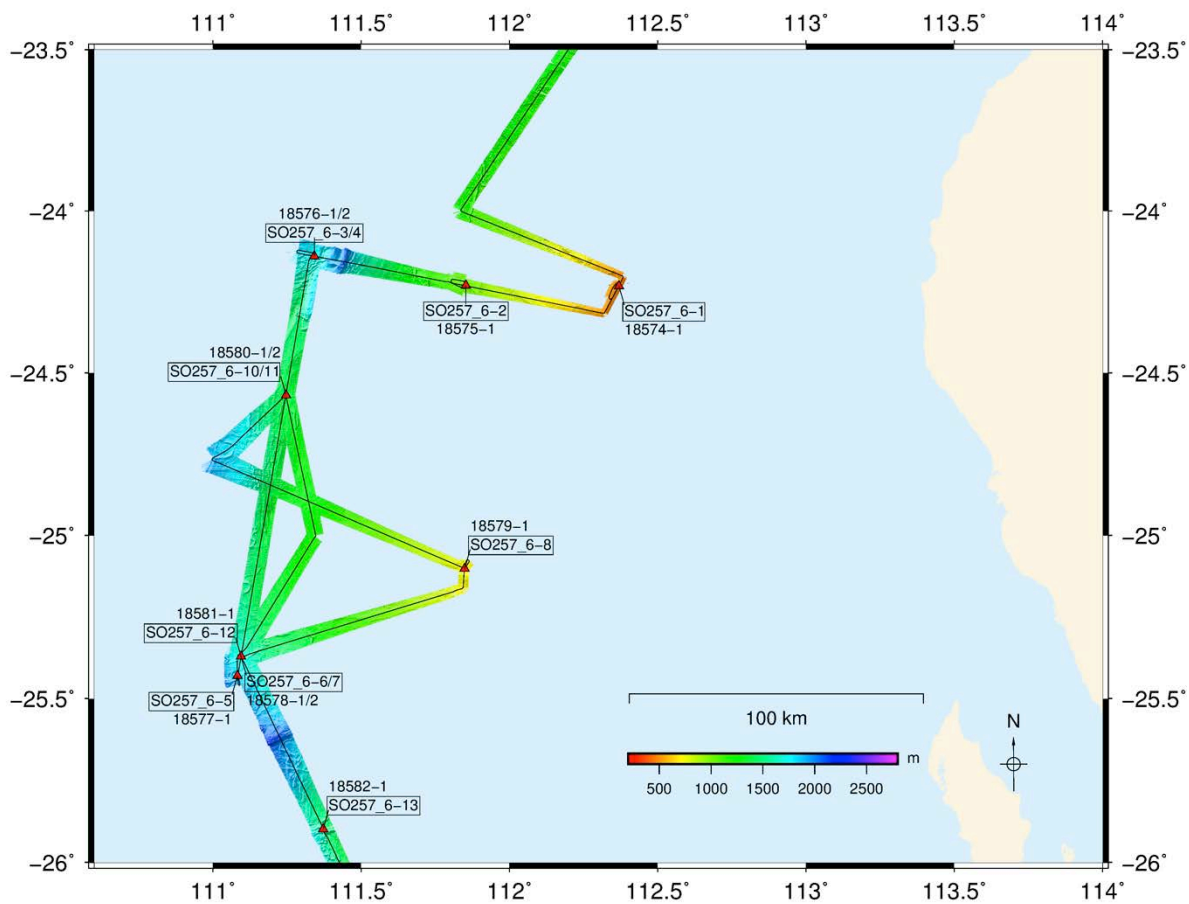
SO257 cruise track and stations in work area 1 (vicinity of IODP Expedition 363, Site U1482).



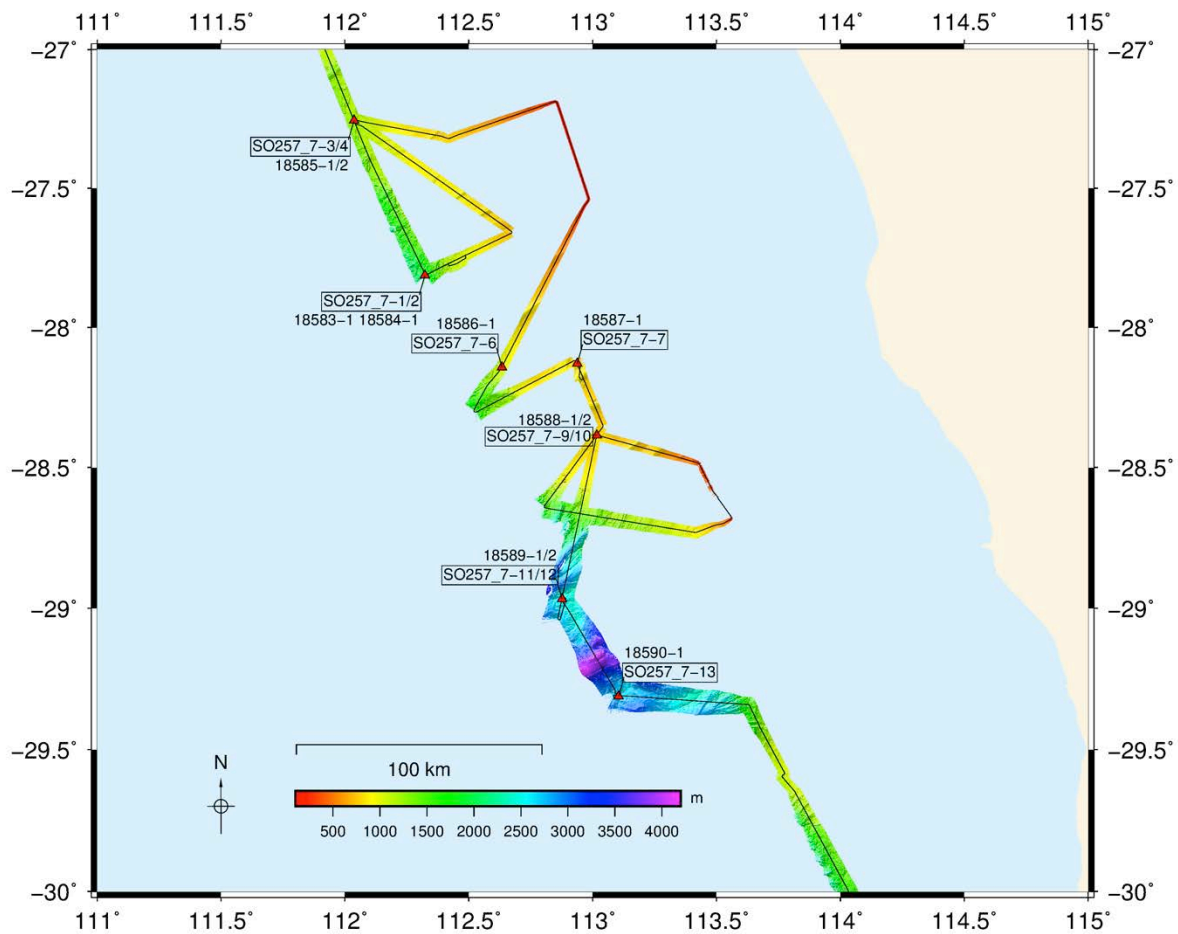
SO257 cruise track and stations in work areas 2 and 3 (vicinity of IODP Expedition 356, Sites U1464 and U1463), Rowley Terrace.



SO257 cruise track and stations in work areas 4 and 5, Exmouth Plateau



SO257 cruise track and stations in work area 6, offshore Shark Bay (vicinity of IODP Expedition 356, Sites U1461 and U1462).



SO257 cruise track and stations in work area 7, offshore Abrolhos (vicinity of IODP Expedition 356 Sites U1458, U1459 and U1460).

6. Description of the working area / Beschreibung des Arbeitsgebiets

Sediment pathways and sedimentation patterns along the northwestern Australian Shelf: Where can we find high-resolution sedimentary climate archives off Western Australia?

One of the main difficulties in providing high-resolution climate reconstructions offshore Western Australia arises from the trend of NE-SW decreasing Pleistocene-Holocene sedimentation rates along the NW and W margins of Western Australia. This trend is explainable by decreasing rates of tectonic subsidence with distance from the northern Australian plate margin in conjunction with decreasing monsoon derived riverine sediment input. Understanding these sedimentation-subsidence patterns on the northwestern Australian shelf was one of the objectives of the recent IODP Expedition 356 (Gallagher et al., 2017). This expedition is highly complementary to SO257, as it targets sedimentation patterns in shallow waters (< 250m) on the western Australian shelf. These patterns ultimately influence sediment delivery to the continental margin settings targeted during the Sonne cruise. We positioned most of our survey lines and coring sites along transects seaward of the IODP drilling sites (see Fig. 6-1), which provided the opportunity not only to core positions with elevated sedimentation rates, but also to better understand the sediment transport and depositional systems off Western Australia.

The seismic data compilation of Geoscience Australia gives a first order overview of the distribution of areas with elevated Plio-Pleistocene sedimentation rates along the northwestern Australian continental margin (working areas Rowley Terrace and Exmouth Plateau, examples of interpreted seismic lines are given in Fig. 6-2). According to these data, sediment packages with elevated thicknesses above the late Miocene reflector (Imio) are preferably situated directly below the relatively steep shelf margin along a submarine terrace in water depths of 1200 to 2000 m. A valid correlation between expanded Pleistocene-Pliocene sediment packages on industrial seismic records and late Pleistocene sedimentation rates has been demonstrated in the comparison of piston cores and seismic records at the NE end of our work area (Rosenthal et al., 2017, IODP Expedition 363 preliminary report).

An extensive bathymetric survey along the northwestern Australian margin was conducted by Geoscience Australia using R/V Sonne in 2006-2007. The bathymetric data of this survey were extremely useful to select coring locations in the working areas of the Exmouth Plateau and west of Shark Bay – Abrolhos. According to these data (Fig. 6-3), the area below ~1800 m water depth is characterized by numerous submarine canyons, which make it unsuitable for obtaining high-resolution sedimentary archives. An exception is the area west of Shark Bay between 24° S and 25° 30' S, which exhibits a flat sea floor morphology. We, thus, targeted this area and concentrated our parasound survey in this location. A compilation of late Pleistocene sedimentation rates closely reflects the pattern that arises from Geoscience Australia's seismic data for the Plio-Pleistocene sedimentation. Virtually all cores from the northwestern and western Australian margins with sedimentation rates above 4 cm/kyr originate from the morphologic terrace between 1100 and 1800 m water depth. We consequently concentrated our coring efforts in these areas. This had the additional advantage that carbonate dissolution, which is a problem for Mg/Ca paleothermometry, is minimized in these relatively shallow water depths.

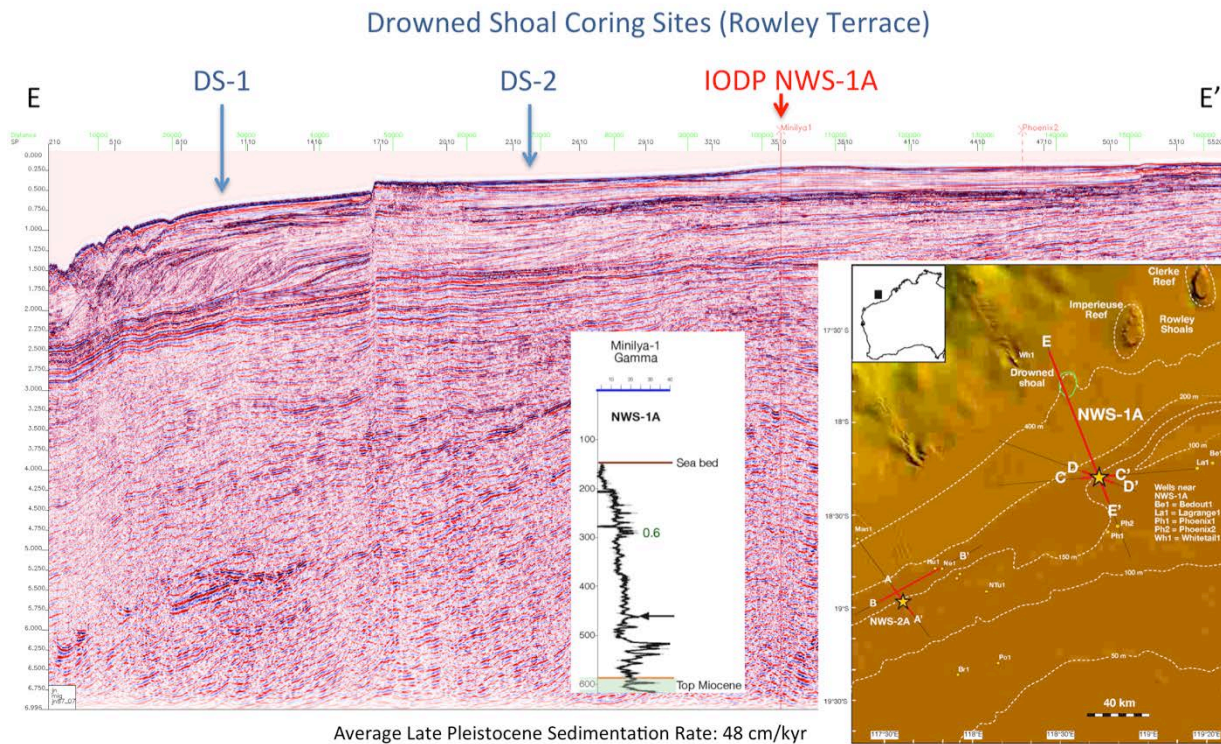


Fig. 6-1: Proposed Sonne-Stations DS1 and DS2, located along a transect offshore IODP NWS-1A in water depths of ~900 and 350 m, have high potential to retrieve high-resolution late Pleistocene and Holocene sedimentary climate archives with sedimentation rates in the order of 20-40 cm/kyr (evaluated from sedimentation rates at NWS-1A, retrieved in commercial well Minilya-1).

However, cores including SO08-14807, FR10/95-17 and MD2361 demonstrate higher sedimentation rates. In addition, there is evidence for rapid subsidence along the northwestern Australian shelf during the late Pleistocene, caused by interaction of the northward plate motion and convection within the Earth's mantle (Gallagher et al., 2017, IODP Expedition 356 Preliminary Report), which will permit recovery of cores with exceptionally high accumulation rates in this area. The combination of shallow seismic data and stratigraphic analyses of cores from the Sonne-08 cruise together with complementary data provided by Stephen Gallagher (co-chief scientist on IODP Expedition 356) together with the bathymetric mapping and the Parasound capabilities of R/V Sonne allowed to retrieve cores with sedimentation rates exceeding 5 cm/kyr in each of the targeted working areas, except the southwesternmost part of the Shark-Bay–Abrolhos work area (Fig. 6-3).

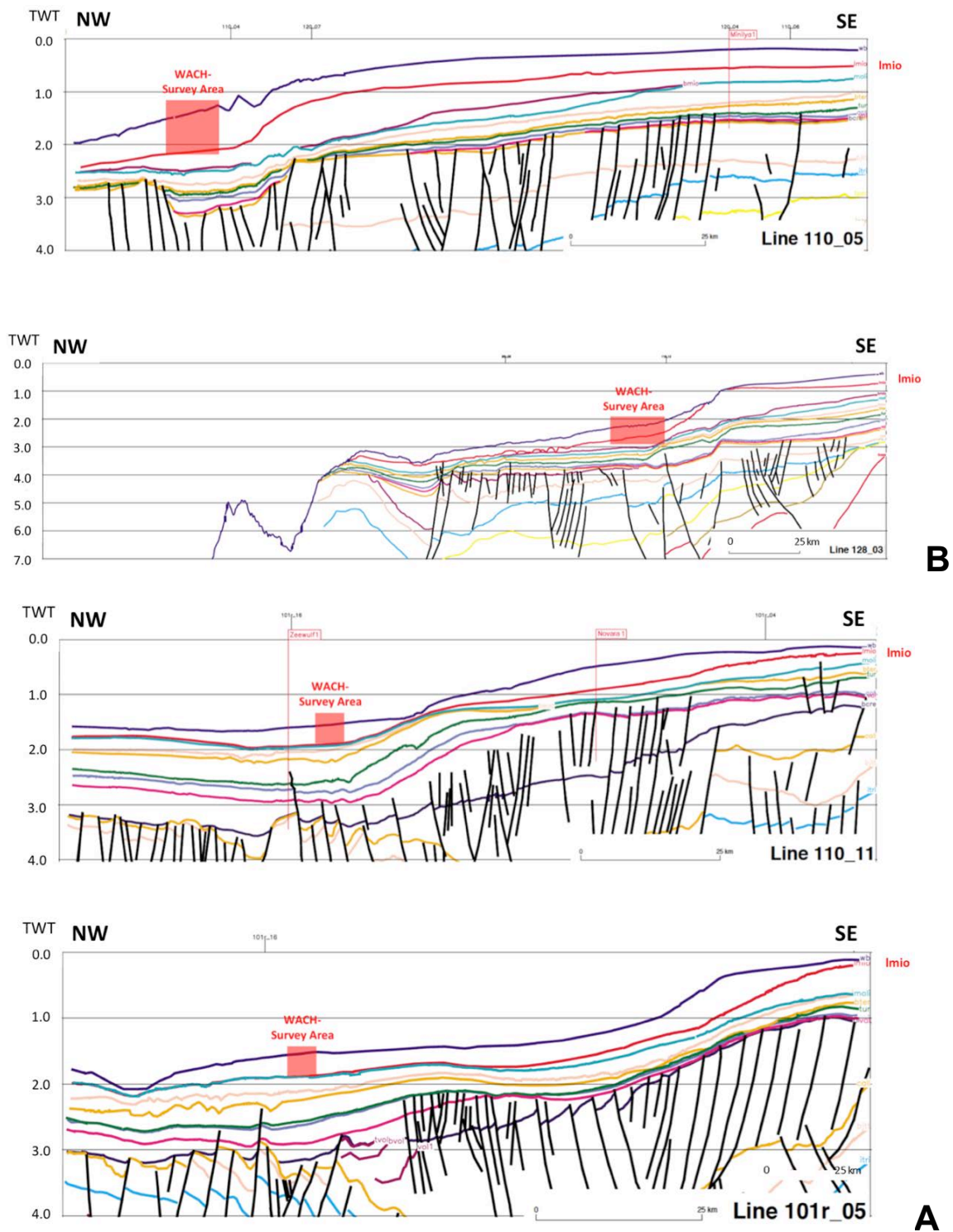


Fig. 6-2: Seismic lines within work area I (Rowley Terrace at 18°S and 15°S, **A**) and work area II (Exmouth-transect at 21°S, **B**). The survey area of the proposed cruise is marked and corresponds to the area of maximum Plio-Pleistocene sediment accumulation (data source: Geoscience Australia).

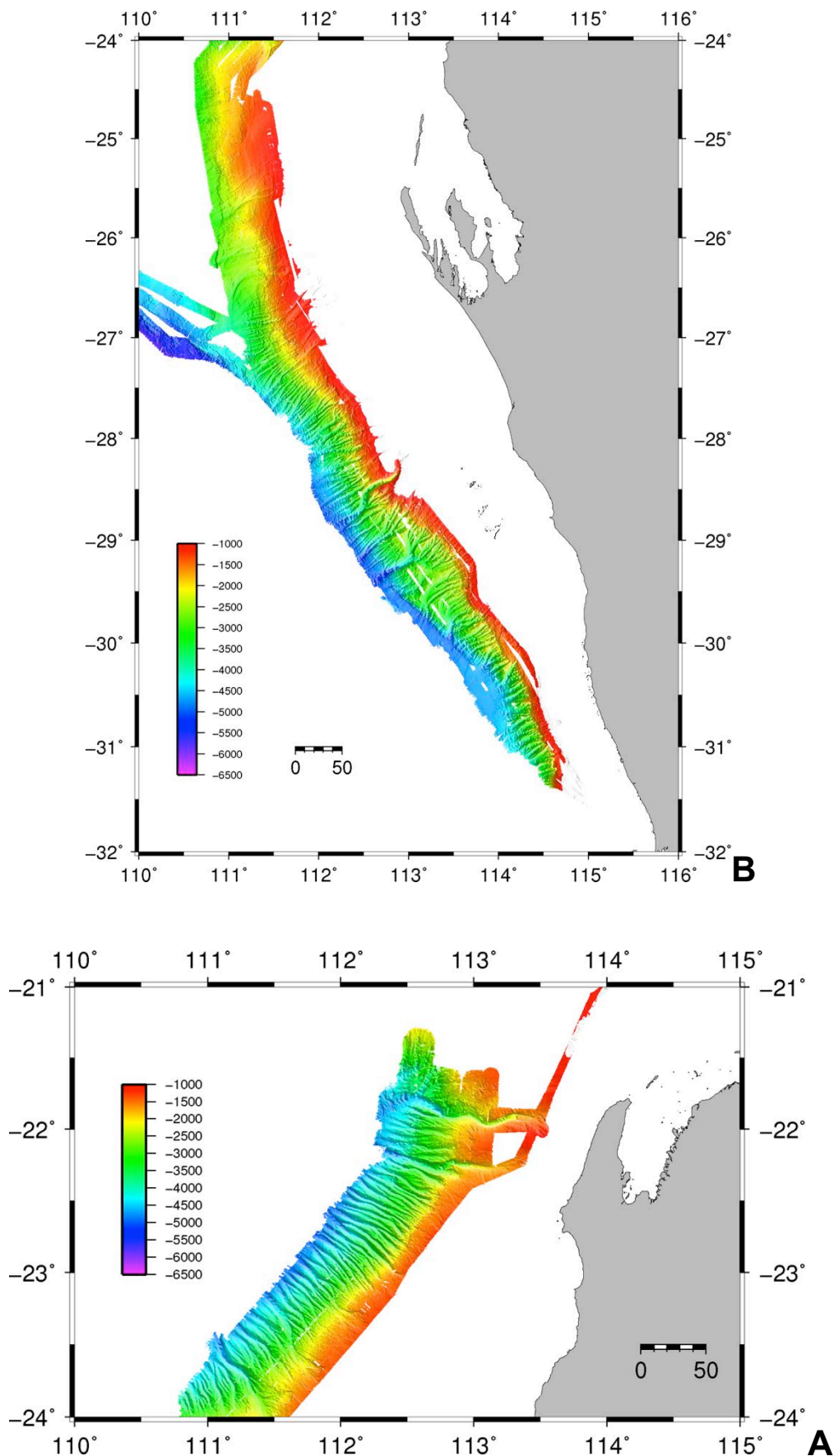


Fig. 6-3: High-resolution multibeam-bathymetry in working areas II (A) and III (B) along the western Australian continental margin (data source: Geoscience Australia).

7. Work details and first results / Beschreibung der Arbeiten im Detail einschließlich erster Ergebnisse

7.1 Hydroacoustics

Bathymetric mapping

During Cruise SO257, the hull-mounted Kongsberg Simrad system EM122 was used for bathymetric mapping. The deep water system EM122 was operated continuously in a 24-hour schedule. The EM122 system allows an accurate bathymetric mapping down to full ocean depth. Basic components of the system are two linear transducer arrays in a Mills cross configuration with separate units for transmitting and receiving.

The nominal sonar frequency is 12 kHz with an angular coverage sector of up to 150° and 864 soundings per ping. The EM122 has a dual swath capacity, hence one ping consists of two swathes of up to 432 soundings each. The dual swath capacity increases the track resolution of the multibeam data. Depths in our study area varied in between very shallow 100 m down to 2900 m. As the main objectives of the cruise were core sampling, we did not map larger areas but rather several lines along the cruise track. Velocities range between 4 and 15 kn, while acquiring multichannel seismic data and transits, respectively. The achievable swath width on a flat bottom is normally up to six times the water depth. However, we limited the swath width to 15 km and 65° in order to guarantee high resolution across the track path in deep water.

The angular coverage sector and beam pointing angles may be set to vary automatically with depth according to achievable coverage. This maximizes the number of usable beams. The beam spacing was set to equidistant. Using the detected two-way-travel-time and the beam angle known for each beam, and taking into account ray bending due to refraction in the water column due to sound speed variations, depths are calculated for each beam. A combination of amplitude (for the central beams) and phase (slant beams) is used to provide a measurement accuracy independent of the beam pointing angle.

In addition to the depth values, the EM122 provides also backscatter information, pseudo-side-scan images and water column imaging (WCI) capabilities. WCI data were recorded for a large part of the survey, but were not recorded continuously. Preliminary bathymetric and amplitude grids were created using the MBSYSTEM software. Preliminary processing included general quality checks (navigation, attitude data, sound velocity profiles), the generation of surfaces, the correction of angular effects on backscatter strength and the conservative automatic removal of spikes and turns. All grids and images created during this cruise are stored in geographic coordinates with the WGS84 ellipsoid. All data were imported in the Global Mapper software.

Sediment Echo Sounding

The Atlas PARASOUND system P70 uses the parametric effect, which occurs when very high (finite) amplitude sound waves are generated. If two waves of similar frequencies are generated simultaneously, the sum and the difference of the two primary frequencies are emitted. For the PARASOUND System, 18 kHz is one fixed primary frequency, which is generated by a transducer of ~ 1m length within a beam of 4.5°. The second primary frequency can be varied between 18.5 and 24 kHz, resulting in difference frequencies from 0.5 to 6.0 kHz. This signal travels within the 18 kHz beam, which is much narrower than e.g. a 4

kHz signal, emitted directly from the same transducer (30°). Therefore, a higher lateral resolution can be achieved, and imaging of small-scale structures on the sea floor is superior compared to conventional systems. As another consequence, the signal bandwidth is also increased, and much shorter signals can be generated with improved vertical resolution. Due to the narrow beam, it is necessary to control the beam direction, to compensate for the ship's movement, and to send the energy vertically downwards. The system treats three signals separately: the primary high frequency signal (18 kHz; PHF), the secondary low frequency signal (selectable 0.5 to 6.0 kHz; SLF) and the secondary high frequency (selectable 36.5 to 42 kHz; SHF). We selected 4 kHz as SLF and 40 kHz as SHF.

The PARASOUND system uses a minimum of three different computer systems. Two of them control real-time signal generation and data acquisition through a Linux and a Windows system. The third PC is available for the operator. This Operator-PC hosts the Hydromap Database Server, the Hydromap Control Software and the ParaStore 3 Software. The Hydromap Control Software is responsible for all system settings and for communication with the real-time computers. The ParaStore Software Package is used for visualization, online processing, and data storage. Data can be stored in the PARASOUND ASD format, but also in the more common PS3 or SEG-Y formats. Several windows can be opened to display different signals (PHF, SLF, SHF) with different scaling and/or processing parameters. This allows optimizing of the windows for specific purposes, as e.g. imaging of the upper 20 m of sediments to select optimal coring locations, to choose a full penetration plot, which also allows coverage of the topography, or to study the complete water column. The system can be used in the single pulse mode, when a single pulse is emitted and the water column and sediment response are recorded before the next pulse is sent, or in the pulse train or quasi-equidistant mode, by which the two-way travel time of the signal in the water column is used to emit additional signals. Depending on water depth, the signal density can be increased by as much as a factor of 16. We operated the system mainly in the quasi-equidistant mode, which worked very well during the cruise. Raw ASD data were collected for the PHF, SHF, and SLF signal. In addition, we recorded PS3 data of the PHF and SHF signals over a time window between 200 and 300 m. The PHF depth was used as system depth for most of the time. The system was very reliable during the cruise and we only had a very small number of system crashes. Data gaps are therefore small. PS3 data for the SLF data were converted to SGY-data covering one profile or 2h – 4h using the software ps32sgy (Hanno Kiel, Bremen University). These data were then loaded to IHS Kingdom for immediate analysis, especially in order to select coring locations.

High resolution 2D multichannel seismic profiling

During Cruise SO257, a Geometrics GeoEel streamer consisting of four solid state sections (32 channels) and one standard 1.7L GI-gun were used to acquire high-resolution multichannel seismic data. The aim was to acquire high-resolution shallow seismic data across a number of transects during the cruise. During seismic surveying, one standard GI-Gun was used as source, shot in a harmonic mode (1 * 1.7 I). The GI-Gun was connected in line to one gun-hanger 205 cm apart, hanging on two chains 70 cm beneath. The GI-Gun was deployed with the starboard side crane and towed ~20 m behind the ship's stern. The gun had an elongated buoy connected to the gun-hanger by two rope loops which stabilized the gun in a horizontal position at ~2 m depth. The Injector of the GI gun was triggered with a delay of 42 ms with respect to the Generator signal, which basically eliminated the bubble signal. The gun

was shot between 150 to 163 bar. Shooting intervals varied between 6 and 8.5 s (depending on water depth) resulting in a shot point distance between ~15 and ~20 m at 4.5 knots. The gun worked reliably for most of the cruise, but failed for one seismic profile, and had to be serviced. Data from this profile are of lower resolution than similar lines as one chamber of the airgun did not fire. A Long Shot was used as gun controller. The arming point for the gun was set to 60 ms. A trigger was generated by a custom-made unit allowing to adjust shooting rates and delay times based on the water depth.

A digital streamer (Geometrics GeoEel) was used for receiving the seismic signals. The system consists of a tow cable (~50 m, with variable length in the water, one vibration isolation section (10 m long) at the end of the active part of the streamer, and up to 4 active sections (each 12.5 m long). An active section contains eight channels (channel spacing of 1.56 m, total length of 12.5 m) resulting in 32 channels for the entire streamer. Initial lines used only 3 active sections, but repair of a fourth section mid-way during the cruise allowed 4 active sections for the remainder of the cruise.

One A/D converter module belongs to each active section. These A/D converter modules are small Linux computers. Communication between the A/D converter modules and the recording system in the lab is via TCP/IP. A repeater was located between the deck cable and the tow cable (Lead-In). The SPSU manages the power supply and communication between the recording system and the A/D converter modules.

Data were recorded using acquisition software provided by Geometrics. The analogue signal was digitized with 2 kHz. The data were recorded as multiplexed SEG-D files. One file was generated per shot. The acquisition PC allowed online quality control by displaying shot gathers, a noise window, and the frequency spectrum for each shot. The cycle time of the shots is displayed as well. The software also allows online NMO-Correction and stacking of data for selectable stacked sections. Several logfiles record parameters such as shot time and position. A first processing step included the conversion of SEG-D into SEG-Y files and a setup of the delay value in the header of the SEG-Y files.

First results and highlights

Parasound data were recorded along all seismic profiles and on all transits, therefore the extent of the Parasound data mirrors the ship track. Two examples are shown below, one 40 km northwest of Barrow Island near IODP Site U1461 in the northern Carnarvon Basin, and another 50 km southwest of the Rowley Shoals near IODP Site U1464 in the Roebuck Basin.

The Barrow Island section shows a carbonate reef dominating the topography on the SE (right hand) side of the line in Fig. 7-1-1. Overlying sediments on the NW (left hand) side of the reef decrease in thickness downslope, eventually thinning to a surface notch above what may be a buried section of a fossil reef. On the upslope (right hand) side, landward of the reef, sediments represent back reef lagoonal conditions.

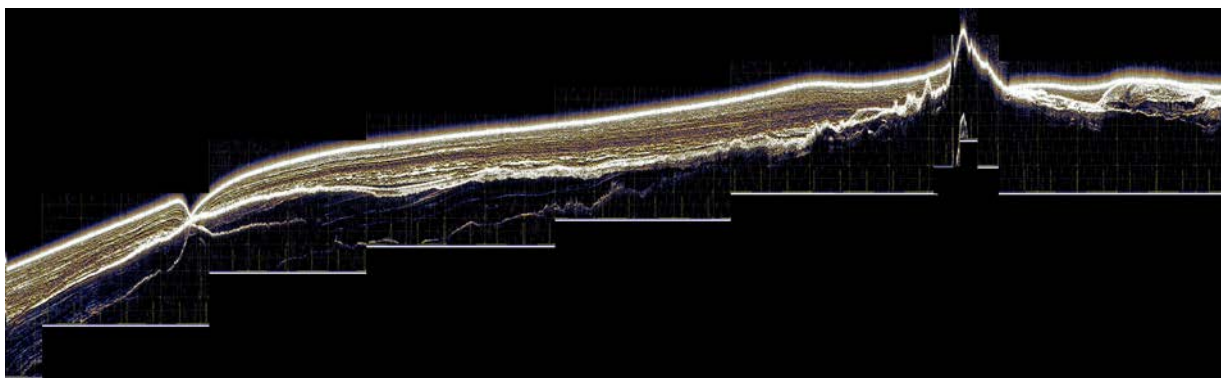


Fig. 7-1-1. Parasound profile across the Barrow Island area near IODP Site U1461 in the northern Carnarvon Basin, NW to the left and SE to the right. The horizontal scale is ~40 km and the vertical scale is 120 m.

The Parasound line southwest of the Rowley Shoals shows distinctive topographic break (scarp) to the NW (left hand) side of the profile representing a drowned Rowley Shoal at the seafloor (Figs. 7-1-2 and 7-1-3). To the SE (right hand) side of the line an unconformity can be seen with near-surface layers truncated by the present seafloor



Fig. 7-1-2. Parasound profile near IODP Site U1464, NW to the left and SE to the right. The horizontal scale is ~130 km the vertical scale is ~660 m.

Seafloor features

The Parasound also reveals a number of sub-seafloor sediment geometries. For example, a close up of the southeast edge of the drowned Rowley Shoal (shown in Fig. 7-1-2) shows onlapping lagoonal and deeper water strata recording reef drowning history (Fig. 7-1-3).

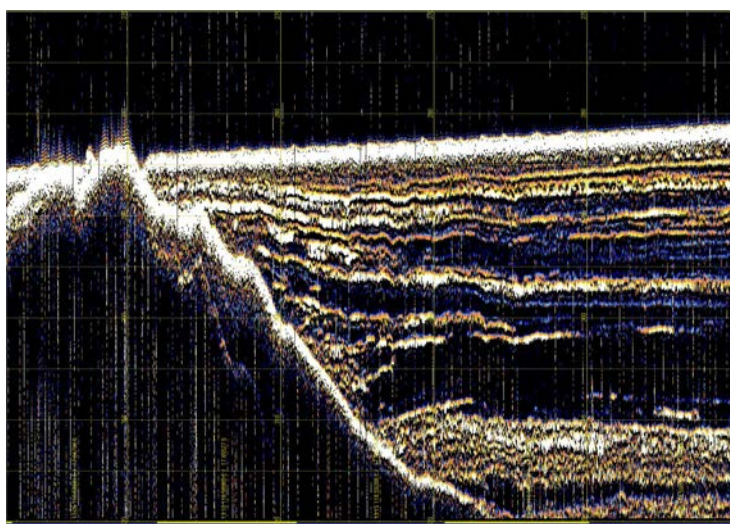


Fig. 7-1-3. Parasound image over southwestern corner the drowned Rowley Shoal in Fig. 7-1-2, NW to the right, SE to the left. Horizontal scale is 5 km and the vertical is 45 m.

Landward of the drowned shoal, seafloor mega-ripples up to 5m in height are imaged on

Parasound and seafloor bathymetric data, indicating significant current activity in this area (Figs. 7-1-4 and 7-1-5).

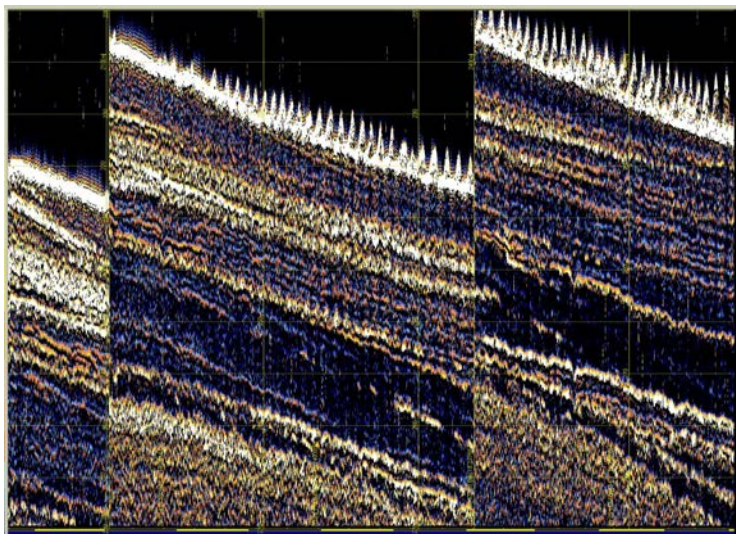


Fig. 7-1-4. Parasound image of ripple features on the seafloor, approximately 5 m high. Horizontal scale is ~5 km.

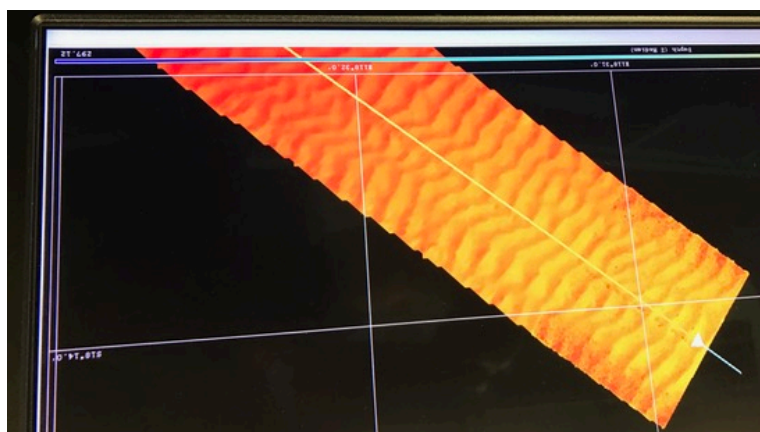


Fig. 7-1-5. Seafloor bathymetry along the line of the ripples in Fig. 7-1-4.

As well as dip sections across features, the ship track also recorded a number of “strike” oriented profiles, that allowed detailed images across drainage systems. The section shown in Fig. 7-1-6, parallel to the coast near the Abohos Islands and IODP Site U1459 displayed cross sections through the submarine channels/canyons near the shelf edge. Significant seafloor topography includes steep scarps (possibly a cemented carbonate platform) and overlying sediment drape on the margins of the topographic high (right hand side).

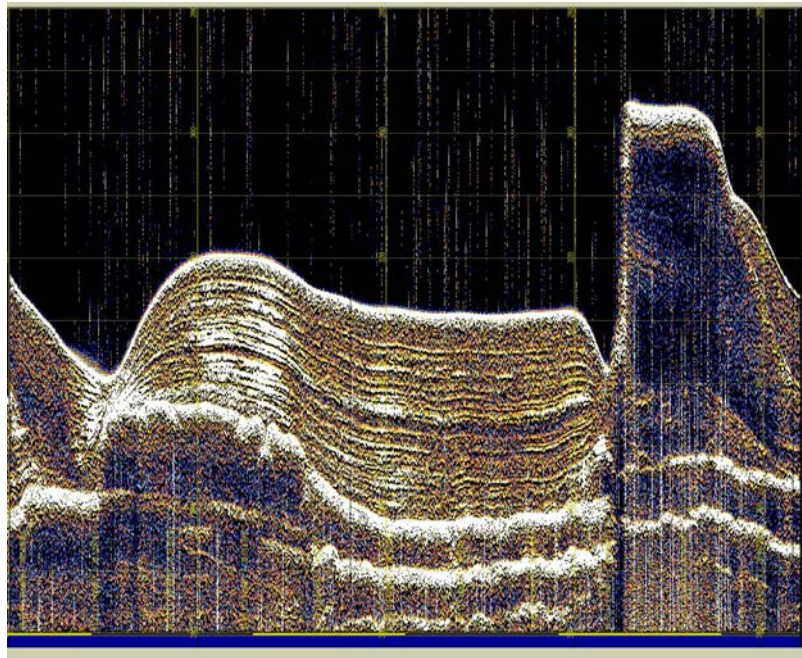


Fig. 7-1-6. Parasound image of seafloor parallel to the coast near the Houtman-Abrolhos Islands and IODP Site U1459. Horizontal scale is 5 km and vertical scale is ~100 m.

Seafloor bathymetric traverses on the Exmouth Plateau, revealed significant mass transport deposits, with areas of disrupted seafloor topography and boulder fields. In particular a region 40 km southwest of IODP Site U1461 also included a large number of fluid-generated pockmarks (Fig. 7-1-7). We took the opportunity to take a multi-core at the location of one of the bigger and deeper pockmarks, to investigate sediment in the pockmark (SO257-18564).

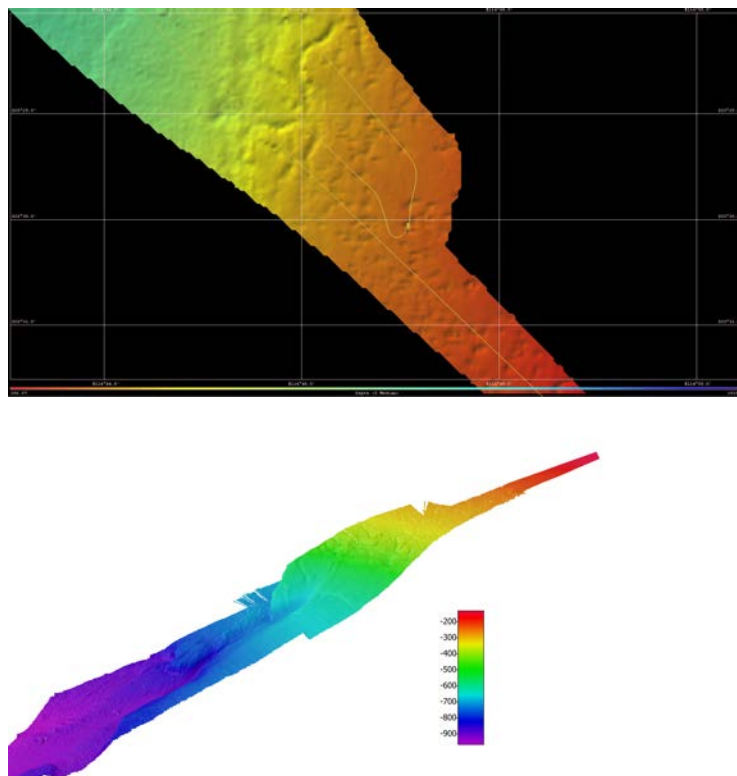


Fig. 7-1-7. Bathymetry over boulder field and pockmarks near SO257-18564 on the Exmouth Plateau.

Thirty seismic profiles were acquired during the cruise. The shallow parts of these data reveal much higher resolution imaging of the strata compared to industry multichannel seismic

data (Fig. 7-1-8).

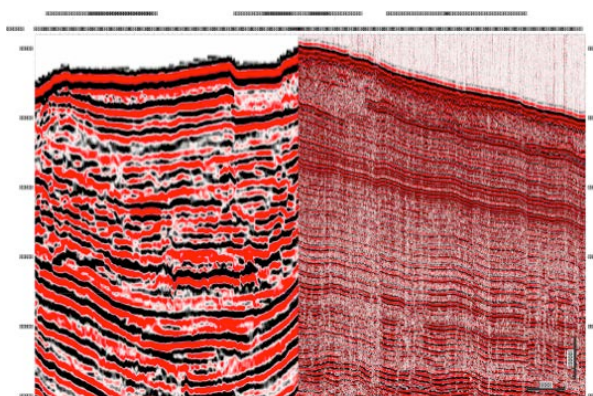


Fig. 7-1-8. A comparison of industry seismic (left of image) and new seismic data acquired on SO257 (near Sites SO257-18546 to 18548) showing enhanced resolution of shallow section. Vertical scale is milliseconds TWT (Two Way Travel time).

Seismic reflection profiles imaged a number of submarine mass transport features, including head scarps and slump complexes around the margin. Whilst final processing is not complete, initial processing of the images shows disrupted seafloor with irregular to chaotic reflections on parts of the seafloor. Potential faults are imaged on several profiles (Fig. 7-1-9).

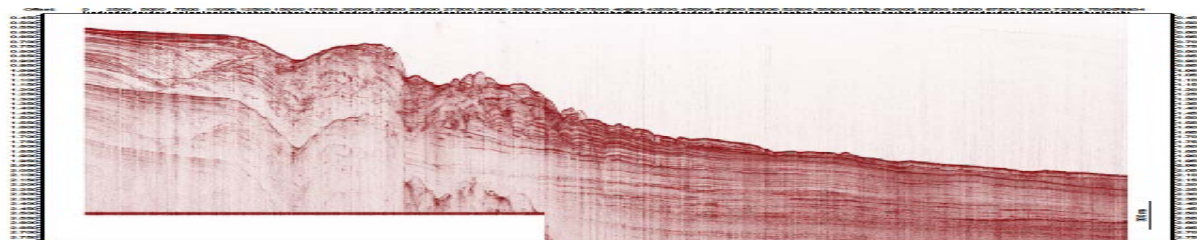


Fig. 7-1-9. Seismic profile showing disrupted seafloor reflectors down dip from IODP Site U1462.

7.2. Plankton net samples

Planktonic foraminifers and radiolarian were collected twice a day from pumped sea water using 100 μm and 40 μm mesh size plankton nets. Seawater was pumped into the ship from a water depth of approximately 5 m using a rotational pump ('Kreiselpumpe'). After collection, samples (<100 μm) were checked using a binocular microscope, then preserved in methanol for further geochemical measurements at the University of Western Australia. Examples of marine plankton recovered are shown in Fig. 7-2-1.

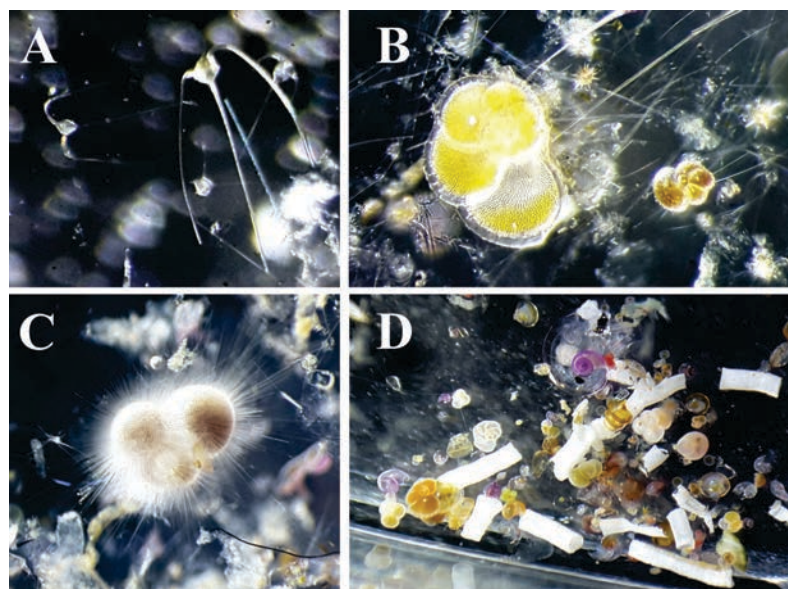


Fig. 7-2-1. Different groups of marine plankton recovered from the plankton net samples. A) Dinoflagellates were abundant only in shallow water stations/ closer to continental shelf; **B and C)** Planktonic foraminifera were present in low numbers through the cruise. The assemblage was dominated by tropical species such as *Trilobatus sacculifer* (**C**) and *Globorotalia menardii* (**B**); **D**) Pteropods shells were also common throughout the cruise.

7.3. Physical Properties and Sediment Description

Prior to core analysis and description, the split cores halves were scraped, if necessary, so the sediment surface was even. Five analyses of the sediment cores were performed:

- 7.3.1. Photography
- 7.3.2. Spectrophotometry
- 7.3.3. Magnetic Susceptibility
- 7.3.4. Visual Core Description
- 7.3.5. Smear Slides
- 7.3.6. Site Correlation and Preliminary Interpretation

7.3.1. Core Photographs

Sediment cores were photographed with a SONY NEX-7 camera with NEX/LER Novoflex, super-angulon 1:4 /21 (Leitz wetzlar 2397533) lens with a wide-angle lens hood (72mm). Both the camera and the lens were made in Germany. The camera was mounted on a stand that was positioned 46 cm above the surface on which the core sits. Two stands with light bulbs were attached to the table 40 cm on either side of the center of the camera stand. Two light bulbs (one on each stand) were pointed straight up so that the light on the core was diffuse and as even as possible across the core surface. The overhead lab lights were turned off and natural light blocked from the room when the photograph was taken. The camera was used in manual mode with a 1/40th second shutter speed, F4 aperture setting, and 1600 ISO.

Up to four photos of each section were taken. The photos were centered on 15 cm, 40 cm, 60 cm, and 85 cm from the top of each section. The intervals taken from each of the four photos were 0-30 cm, 25-55 cm, 50-75 cm, and 70 cm to the end, respectively. The 5 cm overlapping interval in the photos of the same section were blended together. The section photos were spliced together to create a continuous photograph of the entire core using macros packages for the software Igor that were developed by Roy Wilkens and optimized for the data collected during this SONNE cruise.

7.3.2. Spectrophotometry

Reflectance (%) of visible light wavelengths (400-700 nm) was measured with a CM-700d spectrophotometer manufactured by Konica Minolta Sensing, Inc. The instrument automatically calculated the lightness (L^*), the ratio of red to green reflectance (a^*), and the ratio of yellow to blue reflectance (b^*). Additionally, the instrument calculated Munsell Hue, Value, and Chroma, which were added to the core descriptions.

At the beginning of the cruise, a zero calibration was performed with the black cap secured over the instrument sensor. Before each section was analyzed, a white calibration was performed prior to analysis using the lens cap with the white calibration cap.

The section was covered with a plastic wrap that had optical properties that did not change the color nor magnetic susceptibility of the sediment. When the white calibration cap was analyzed as an unknown with and without the plastic wrap, both analyses showed the same patterns across all wavelengths, but the reflectance with the plastic wrap was reduced by ~1% at all wavelengths. When the same section was scanned twice by two different users, the % reflectance profiles proved to be reproducible (under 2% difference).

After the sediment surface was covered with plastic wrap, the spectrophotometer measurements were taken every 1 cm of the section. After analysis of each section, the data were downloaded to a MacBook running Windows XP using Color Data Software CM-S100w SpectraMagic™ NX (version 1.91) and backed up on the SONNE's server.

7.3.3. Magnetic Susceptibility

Magnetic susceptibility was measured with an SM-30 magnetic susceptibility meter manufactured by ZH instruments (user manual publication date May 2009). The "scanning mode" was used for core analysis, which begins with a measurement of air away from the core (i.e. a blank, a baseline, or the "compensation step") followed by up to 20 measurements of sediment core and finished with another air measurement. The meter then calculates the instrument drift between the first and last air measurement and drift corrects the values measured in between these two points.

At the beginning of the cruise, magnetic susceptibility was measured every 1 cm for the length of the core in the middle of the core, and the drift was corrected for every 20 or less core surface measurements. After each section of sediment, the data were downloaded from the instrument using the SM-30W software (version 1.2), saved as a program file, and exported as a tab delimited text file. Since the scanned cores did not present significant changes in magnetic susceptibility values, one additional core was analyzed per region (Rowley Terrace (Core SO257-18549), Exmouth Plateau (Core SO257-18558) and Shark Bay (Core SO257-18578)). If an ash layer was observed, magnetic susceptibility was measured on that section (Cores SO257-18556, SO257-18557, SO257-18562).

7.3.4. Visual Core Description

Visual core descriptions (VCD) were recorded in AppleCORE software (version 8) on an iBook G4 computer running Mac OS X version 10.4.11. Cores were cut into one-meter sections and split vertically using a fine wire, from top to bottom. VCD's are based on examination of the split core face (archive half). If splitting caused significant disturbance to the core face, the surface was cleaned by scraping along the bedding plane. VCD parameters include (1) primary lithologies (biogenic and/or clastic; visual only, not informed by quantitative smear slide analysis), (2) nature of contact between lithologies, (3) physical structures, (4) lithological accessories, (5) fossils and ichnofossils, (5) relative amount of bioturbation, and (6) core disturbance.

Description of color is both subjective when written as text (determined by eye; e.g. light

olive green) and objective when given alphanumerically (e.g. 9Y 6.2/0.9), determined using the Minolta CM-700d spectrophotometer. Thus the color described in the VCD text does not correspond directly to Munsell colors from the Minolta. The alphanumeric colors included in the VCD text are either rough averages of the Minolta data for a specified interval or specific to a given depth, if so indicated. To reduce clutter, the 'mottling' symbol was used only once per section, indicating that that section was mottled by bioturbation. If mottling in a specific section is relatively enhanced or reduced it is so noted in the accompanying text.

7.3.5. Smear Slides

Smear slides were made on R/V Sonne using Corning slides (2948-75x25) and Fisherbrand Microscope Cover Glass (12-542-C). Microscope cover glass was applied with Norland Optical Adhesive 61. The slides were analyzed with a Carl Zeiss petrographic microscope at 40x zoom. Smear slides were prepared by taking a pin-sized amount of sediment from the core face in the archive half. The sample was smeared onto a slide and 1-2 drops of water were added to the consolidated sediment. The slide was then placed into an oven at 60°C for ~2-3 minutes. After drying, Norland optical adhesive was added and cover glass was placed on top. The slide was then placed back into the oven at 60°C for ~10 minutes. The slides were then treated in the window for the UV light for ~2-3 hours.

Smear slides were characterized based on biogenic vs. non-biogenic components, opaques, volcanics and clay content (Table XXX). A total of three counts were done at 40x zoom based on the field of view. First, a total coverage area value was determined under plane and polarized light ranging from 1-50%. Then percentages were allotted towards each category (eg. 2%) and input into an excel spreadsheet. An average was taken from the three counts in order to quantify the percentage of components in each slide. Average percentages were then normalized.

7.3.6. Site Correlation and Preliminary Interpretation

Preliminary core-to-core correlations were established on the basis of color/lightness (L^* parameter) measured using the Minolta spectrophotometer, preliminary planktonic foraminifer biostratigraphy (core catcher pink *G. ruber* and *G. flexuosa*), and ash layers (which were visually identified in only two cores; SO257-18556 section 12 and SO257-18557 section 16. Four reference cores were chosen as representative, in the sense that most other cores could be reasonably correlated to them. These reference cores are SO257-18557, -18561, -18567, and -18580 (note, however, that core 18568 is actually longer than 18567 and 18559 is longer than 18557; thus, 68 and 59 would better serve as reference cores but time does not permit redoing all the correlations).

Correlations were largely subjective, using Analyseries software to establish correlative tie points to the four specific reference cores. The general strategy is to use a minimum number of tie points (approximately 4 to 6 per core), so as to not induce large (artificial) changes in sedimentation rates.

The light and dark layers at each site are likely caused by changing relative proportions of biogenic carbonate and terrigenous material (eolian and/or riverine input). Diagenetic reactions (e.g., subseafloor redox) may also influence the color of the sediment, especially within the top few centimeters to approximately one meter. Future work will provide age constraints for these cores, quantify the flux of carbonates and terrigenous deposition, and identify the provenance and/or transport mechanisms of the terrigenous material as a function of fluvial and eolian deposition.

Based on the downcore patterns of lightness (L^* , Fig. 7-3-6-1) the sites can be divided into four groups. Each group shares similar trends in light and dark layers downcore. A reference core was selected to represent each of the groups. Within each group, each core was correlated (see methods) to the selected reference core depth scale (Fig. 7-3-6-2).

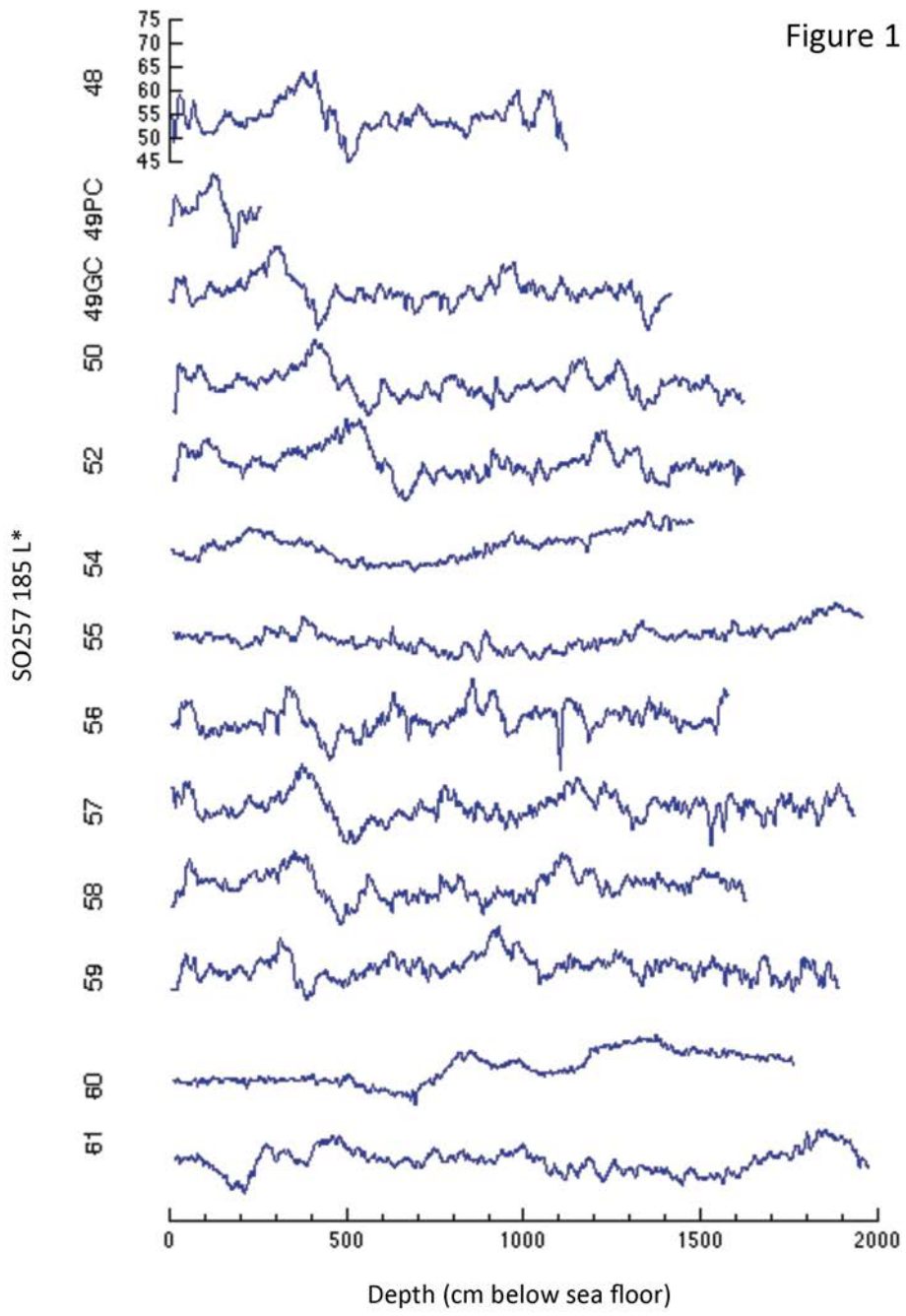
The first group (Sites 18548 to 18558, excluding Site 18549) is referenced to Site 18557 (Fig. 7-3-6-2A). If these sites are similar to Site MD01-2378 to the north (Holbourn et al 2005), we anticipate that the darker sediment accumulated during glacial cycles and lighter sediment during interglacial cycles.

The second group (Sites 18560 and 18561) (Fig. 7-3-6-2B) shows a unique lightness pattern relative to the other core groups but correlate well with one another.

The third group (Sites 18562 to 18576) is referenced to Site 18567 (Fig. 7-3-6-2C). This group appears to be anti-correlated with the first group (i.e. the lighter intervals reflect glacials and darker intervals reflect interglacials). These relationships would be consistent with cores previously recovered from the Exmouth Plateau (Stuut et al., 2014, Gallagher et al. 2014).

The fourth group of cores (18578, through 18585) is referenced to 18580 (Fig. 7-3-6-2D). Like group 2, these cores also have a unique lightness pattern.

Cores 18549, 18588, and 18589 are not included in Figure 7-3-6-2. Core 18549 because it is individually unique and the remaining two because time constraints at the end of the cruise prevented analysis.



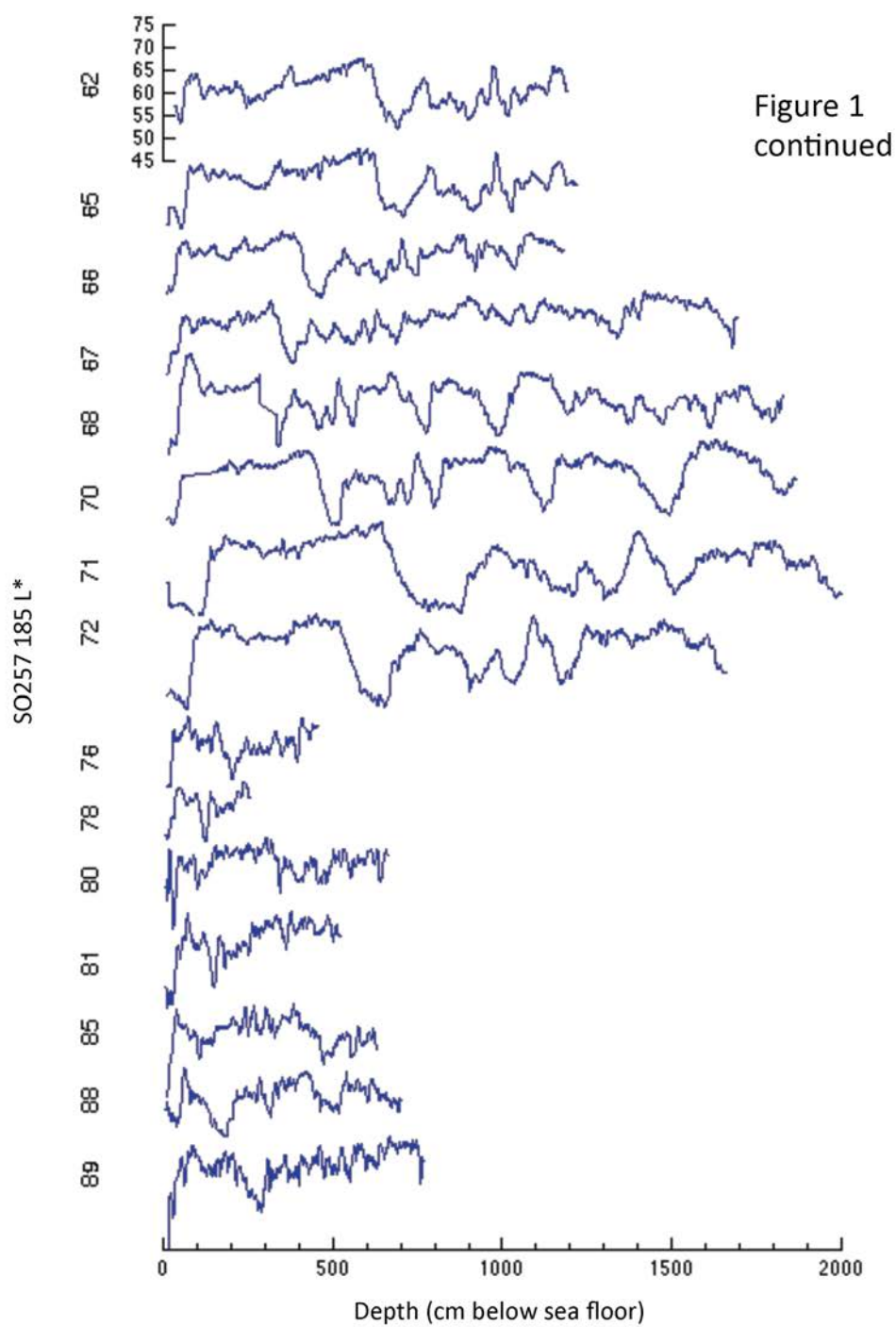


Fig. 7-3-6-1. L* plotted as a function of depth for all piston and gravity cores.

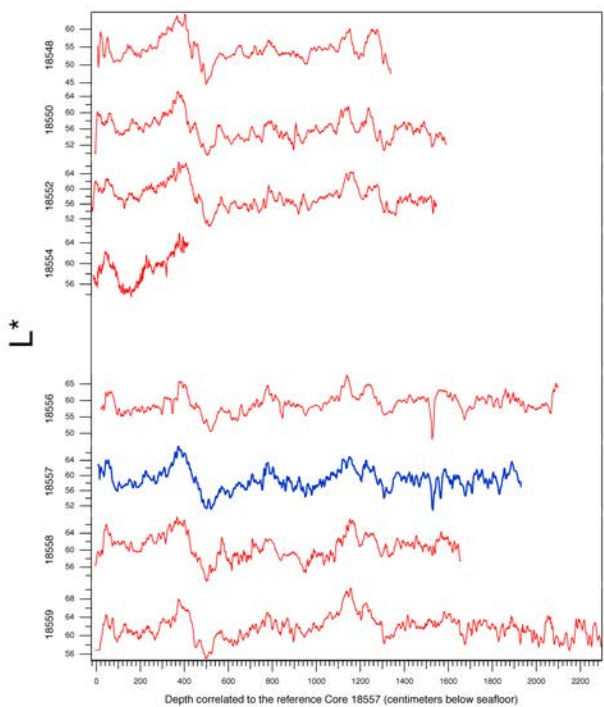
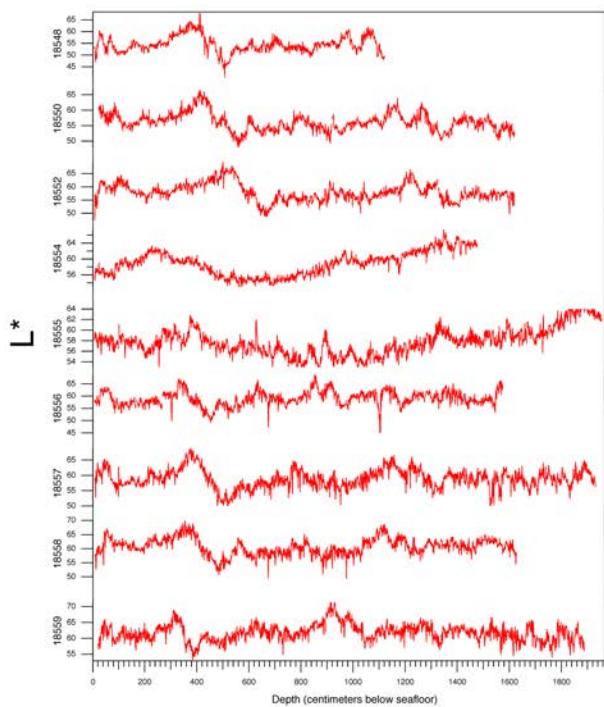


Fig. 7-3-6-2A

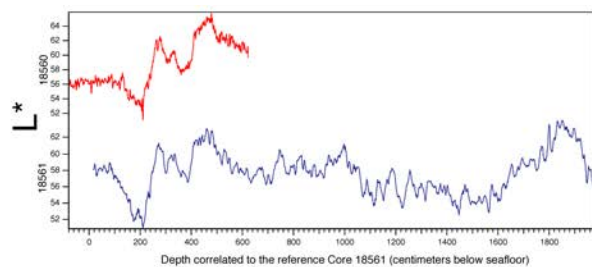
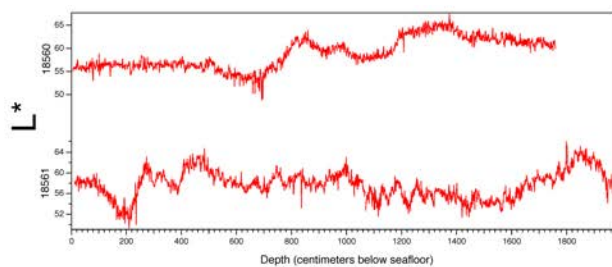


Fig. 7-3-6-2B

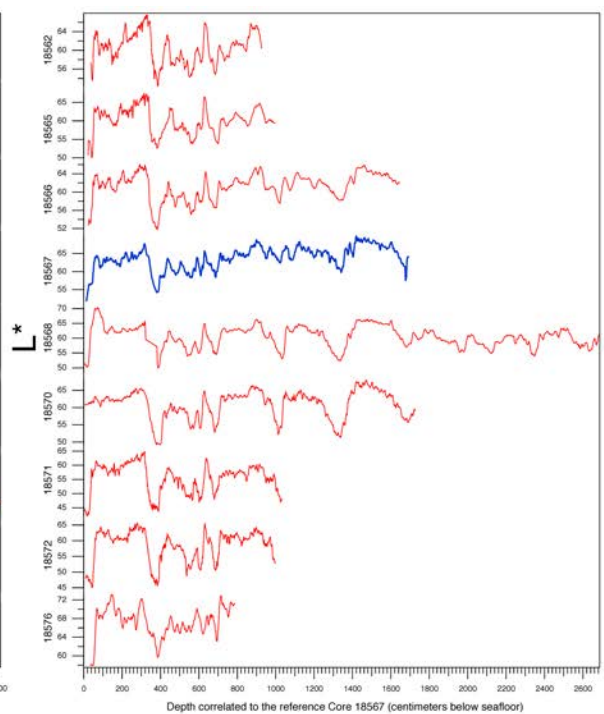
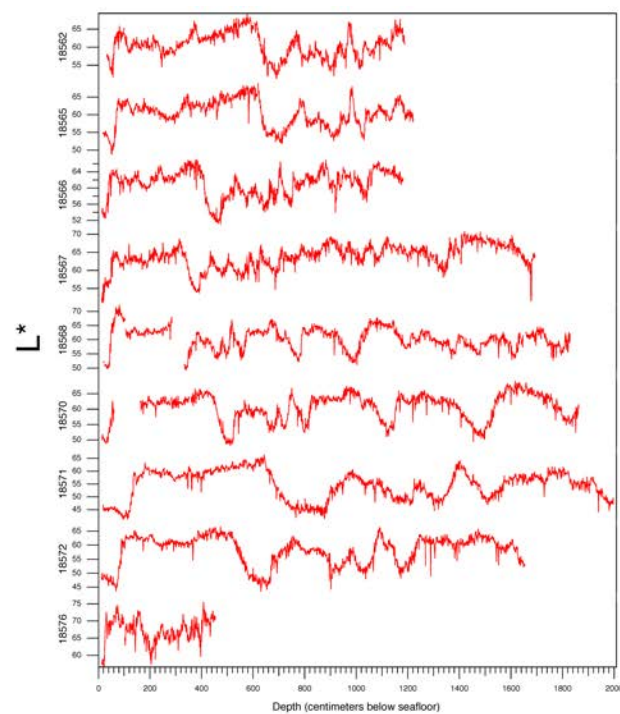


Fig. 7-3-6-2C

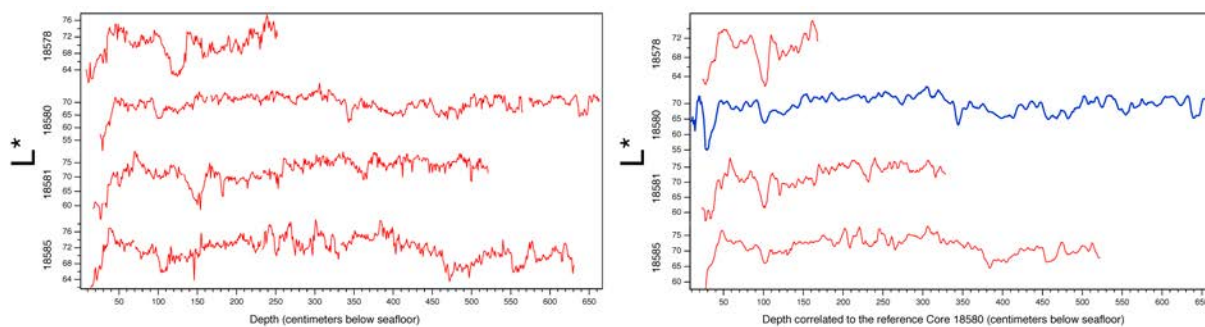


Fig. 7-3-6-2D

Fig. 7-3-6-2A-D. L* and correlated L* records for the four groupings of cores with similar variability. Left panels in each plot shows cores plotted each on their own depth scale, as in Fig. 7-3-6-1. Right panels show the same cores correlated to the depth scale of the reference core from each group (shown in blue).

7.3.7. Smear Slides Interpretation

Smear slides were analyzed for cores 18548, 18549, 18550, 18552, 18554, 18556, 18557-18560, 18562, 18565, 18567, 18568, 18570-18572, 18576, 18578, 18581, and 18589 at selective intervals in the archive half. It is apparent that cores 18548 to 18554, as mentioned above, contain minimal traces of volcanoclastic grains. Volcanoclastic grains are a mixture of minerals, mineraloids, or rock fragments introduced into a sedimentary environment through submarine or terrestrial volcanism. Percentages of volcanic material varied from 0 to 18.62% in cores 18548-18554. Subsequently, in core 18556 and 18557 an ash layer was characterized. The ash layers were well-defined in section 12 at 88 cm in core 18556 and section 16 at 88 cm in core 18557. These ash layers were analyzed microscopically and were found to contain $\geq 54\%$ of vitric shards and pumice, an indicator of pyroclastic activity. Also present were trace amounts of glauconite, oxidized vitric shards, and distinctive pyrite framboids. It should be noted that several of the sections prior had slightly oxidized vitric shards with banding and tiny bubbles, which were not present in either of the ash layers. Vitric material begins to decrease in subsequent cores and eventually disappear in core 18560.

Siliciclastic material was present in most cores. In marine sediment, siliclastics are a mixture of minerals and lithic grains derived from weathering in terrestrial environments. Fine-grained calcareous grains were included in the siliciclastic estimates. The presence of siliciclastic grains varied between 0-39.53% at the selected intervals. It appears that terrigenous input is more-or-less constant until core 18558. Terrigenous input steadily increases in core 18558, and in subsequent cores up until a maximum percentage of 39.53% in section 4 at 60 cm. Siliciclastic material remained constant until core 18581. All cores consistently contained opaque minerals, ranging from 4.11 to 25.00%, which are a combination of oxide and sulphide-bearing minerals. Clay content was not heavily characterized in the percentage counts, as it was difficult to estimate in most smear slides.

Biogenic material, which may be a combination of pelagic and neritic grains were prevalent throughout all cores. These include fragments of foraminifera tests, radiolarians, diatoms, calcareous nannofossils, sponge spicules, dinoflagellates and shell fragments. Most intervals were dominated by calcareous nannofossils, namely coccolithophores. Various species of calcareous nannofossils were present in several sections, including coccoliths, helicoliths and ceratoliths. Abundances of calcareous nannofossils ranged from 20.31 to 78.95%, excluding the ash layer in section 12 with negligible biogenic components. Foraminifera, radiolarians, and calcareous sponge spicules were consistent throughout all cores. Diatoms, pennate and centric, were a rare occurrence in all cores. However, abundant pennate diatoms were recorded in core 18589 in section 6 at 60 cm (21.43%) and section 8 at 92 cm (20.00%).

7.4 Preliminary biostratigraphy of core catchers

A few grams of sediment from the base of each core catcher were taken. These were washed in warm water with detergent and sieved with a 63 μm sieve. The wet residues were transferred to plastic containers and then analysed as wet samples on petri dishes with a binocular reflected light microscope. The samples were searched for biostratigraphically significant planktic foraminifera. We use the GTS 2012 (Gradstein et al., 2012) biochronology to estimate the age of the core catchers.

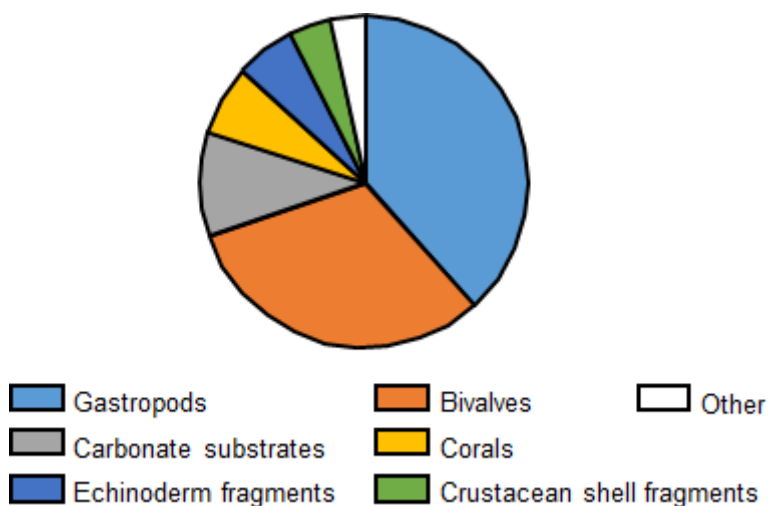
Planktic foraminifera are abundant and well preserved in all core catchers, typical subtropical to tropical taxa are present and include: *Globigerinoides ruber*, *G. sacculifer*, *Globorotalia tumida*, *G. truncatulinoides* and *Pulleniatina obliquiloculata*.

In total, 22 core catchers were analysed. Seven of these (18552, 18556, 18562, 18571, 18572, 18576, 18578) yielded two significant species: *Globigerinoides ruber* (pink) and *Globorotalia flexuosa*. These two taxa first appear at ~400 kyr BP (Gradstein et al., 2012). The last occurrence of *G. ruber* (pink) is at ~120 kyr BP. The last occurrence of *G. flexuosa* is at 70 kyr BP. Therefore, the maximum age for the base of these cores is 400 kyr BP with a minimum of 120 kyr BP. The occurrence of *G. ruber* (pink) in cores 18557 and 18585 suggests a 120-400 kyr age range. The presence of *G. flexuosa* in core 18588 suggests a 120-400 kyr age range. The occurrence *Globorotalia tosaensis* at the base of cores 18568 and 18581 suggests a minimum age of 610 kyr BP (Gradstein et al., 2012). These taxa are absent at the base of all other cores taken, suggesting that their bases are either older than 400 kyr BP (likely) or younger than 70 kyr BP.

7.5. Macrofauna of box core SO257-18563-1 GKG

Half of the box core was placed in buckets, rinsed with fresh water several times, and the suspension decanted. The washed residue mainly consisted of pteropods and pteropod fragments. Other macrofaunal were rare. Shells larger ca. 3 to 4 mm were removed, cleaned and dried, sorted and counted. The following groups were recorded:

	no. of specimens	Group total
Gastropods ¹	41	57
Gastropod fragments	16	
Bivalves, epibenthic ²	9	47
Bivalves, endobenthic ³	33	
Bivalve fragments		
Corals, solitary ⁴	8	10
Corals, branches	2	
Echinoderm fragments	9	9
Crustacean shell fragments	6	6
Pogonophore tubes	2	2
Carbonate substrates	15	15
(shell debris with overgrowth of serpulids and corals)		
Other	3	3



¹Gastropod taxa

Cassidae
Conus spp.
Cypraea spp.
 Fascinariidae (3 species)
 Marginullidae
 Tomidae
 Turbinellidae
 Turritinilidae (3 species)

⁴Coral Taxa

Carophyllia
 spp.
Flabellum
parvonium
 Indet corals

^{3,2}Bivalve taxa

Archidae
 Carditidae
 Glycymeriidae
 Lucinidae
 Nuculanoidea
 Ostreidae
 Pectinidae

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10. Abbreviations /Abkürzungen

CTD	CTD rosette for water sampling and in-situ measurements of conductivity, temperature and depth
MUC	multicorer
PC	piston corer / KL Kolbenlot
GC	gravity corer / SL Schwerelot
BC	box corer / GKG Großkastengreifer

11. Appendices /Anhänge

A) Participating Institutions /Liste der teilnehmenden Institutionen

Institute of Geosciences (IfG)
Kiel University
D-24118 Kiel / Germany

GEOMAR
Helmholtz Centre for Ocean Research Kiel
D-24148 Kiel / Germany

University of Melbourne
School of Earth Sciences
McCoy Building/Earth Sciences, Parkville
The University of Melbourne
Melbourne / Australia

Research School of Earth Sciences (RSES)
Australian National University (ANU)
Canberra / Australia

School of Earth and Environment
University of Western Australia (UWA)
35 Stirling Highway
Crawley WA 6009 / Australia

Woods Hole Oceanographic Institution (WHOI)
Woods Hole, Massachusetts / USA

Department of Earth, Environmental, and Planetary Sciences
Brown University
Providence, Rhode Island / USA

Department of Earth Sciences
University of Bergen,
Bergen / Norway

Moss Landing Marine Laboratories
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Hawaii Institute of Geophysics and Planetology (HIGP)
School of Ocean and Earth Science and Technology
University of Hawaii
Manoa, Hawaii / USA

Department of Geology
Northwest-University
Xi'an / China

Appendix B

Station List / Stationsliste

Station/Device Operation	date time	Device	Device Code	Action	GIK Code	Latitude	Longitude	Depth (m)	Speed (kn)	Wind Dir	Wind Speed (m/s)	Course
SO257_1--1	2017/05/14 02:00:49.000	CTD	CTD	station start	18546---1	15° 0.012' S	120° 23.958' E	1532.6	1.9	94.3	5.7	108.2
SO257_1--1	2017/05/14 02:03:41.000	CTD	CTD	in the water	18546---1	15° 0.017' S	120° 23.971' E	1531.3	0.3	94.5	4.9	252.1
SO257_1--1	2017/05/14 02:46:35.000	CTD	CTD	max depth/on ground	18546---1	14° 59.995' S	120° 24.003' E	1534.5	0.1	116.1	4.5	94.2
SO257_1--1	2017/05/14 02:48:12.000	CTD	CTD	hoisting	18546---1	14° 59.995' S	120° 24.003' E	1533.4	0.1	113.7	4.3	224.5
SO257_1--1	2017/05/14 03:23:10.000	CTD	CTD	on deck	18546---1	14° 59.995' S	120° 24.003' E	1534	0.2	119	4.2	196.9
SO257_1--1	2017/05/14 03:25:26.000	CTD	CTD	station end	18546---1	14° 59.995' S	120° 24.002' E	1533.8	0.4	101.1	4.2	210.7
SO257_1--2	2017/05/14 03:39:00.000	Seismic Towed Receiver	SEISTR	station start		15° 0.193' S	120° 23.966' E	1533.2	2.1	111.5	4.3	233.3
SO257_1--2	2017/05/14 03:52:46.000	Seismic Towed Receiver	SEISTR	Airgun in water		15° 0.652' S	120° 23.681' E	1537.2	3.5	135.9	4.8	209.7
SO257_1--2	2017/05/14 04:09:08.000	Seismic Towed Receiver	SEISTR	information		15° 1.793' S	120° 23.178' E	1525.3	2.9	121.8	4.6	188.4
SO257_1--2	2017/05/14 04:13:11.000	Seismic Towed Receiver	SEISTR	in the water		15° 1.961' S	120° 23.123' E	1521.6	2.4	125.9	4.8	201
SO257_1--2	2017/05/14 04:22:30.000	Seismic Towed Receiver	SEISTR	information		15° 2.494' S	120° 22.892' E	1531	4.8	111.5	5	199
SO257_1--2	2017/05/14 05:19:00.000	Seismic Towed Receiver	SEISTR	profile start		15° 1.817' S	120° 23.124' E	1524.6	4.6	118.2	4.5	108.1
SO257_1--2	2017/05/14 08:45:11.000	Seismic Towed Receiver	SEISTR	alter course		15° 9.314' S	120° 38.093' E	1061.3	4.7	129.8	2.9	134.8
SO257_1--2	2017/05/14 09:31:33.000	Seismic Towed Receiver	SEISTR	alter course		15° 12.610' S	120° 36.487' E	1079.3	4.5	127.7	2.6	242.7
SO257_1--2	2017/05/14 14:40:10.000	Seismic Towed Receiver	SEISTR	alter course		15° 1.496' S	120° 14.852' E	1722.2	4.5	105.2	3.7	312.9
SO257_1--2	2017/05/14 16:12:10.000	Seismic Towed Receiver	SEISTR	alter course		14° 55.296' S	120° 18.417' E	1540	4.8	123.7	4	35
SO257_1--2	2017/05/14 17:24:11.000	Seismic Towed Receiver	SEISTR	alter course		14° 57.388' S	120° 23.407' E	1551.7	4.5	115.9	3.2	105
SO257_1--2	2017/05/14 17:53:47.000	Seismic Towed Receiver	SEISTR	information		14° 56.981' S	120° 22.641' E	1542.8	4.3	120.8	4.4	222
SO257_1--2	2017/05/14 20:12:44.000	Seismic Towed Receiver	SEISTR	alter course		15° 5.944' S	120° 17.226' E	1687.7	4.2	84.7	3.4	184.8
SO257_1--2	2017/05/14 21:39:15.000	Seismic Towed Receiver	SEISTR	alter course		15° 9.105' S	120° 22.668' E	1576.3	4	75.3	2.7	84.2
SO257_1--2	2017/05/14 23:11:23.000	Seismic Towed Receiver	SEISTR	profile end		15° 3.291' S	120° 26.181' E	1457.4	3.6	101.7	5.4	28.8
SO257_1--2	2017/05/14 23:18:42.000	Seismic Towed Receiver	SEISTR	information		15° 3.021' S	120° 26.339' E	1462.1	1.8	96.3	5.5	26.8
SO257_1--2	2017/05/14 23:22:40.000	Seismic Towed Receiver	SEISTR	information		15° 2.916' S	120° 26.387' E	1463.7	2.1	112.9	3.9	11.1
SO257_1--2	2017/05/14 23:27:00.000	Seismic Towed Receiver	SEISTR	station end		15° 2.672' S	120° 26.113' E	1472.2	8.6	103.9	3.8	264.9
SO257_1--3	2017/05/14 23:44:01.000	Multi Corer	MUC	station start	18547---1	15° 3.309' S	120° 26.169' E	1460.3	0.3	102.8	3.7	84.6
SO257_1--3	2017/05/14 23:46:13.000	Multi Corer	MUC	in the water	18547---1	15° 3.306' S	120° 26.174' E	1460.5	0.1	117.6	3.9	288.9
SO257_1--3	2017/05/15 00:17:19.000	Multi Corer	MUC	max depth/on ground	18547---1	15° 3.309' S	120° 26.172' E	1462.1	0.1	113.3	3.5	352.2
SO257_1--3	2017/05/15 00:18:21.000	Multi Corer	MUC	hoisting	18547---1	15° 3.309' S	120° 26.171' E	1461.3	0.1	125.7	3.2	59.6
SO257_1--3	2017/05/15 00:47:52.000	Multi Corer	MUC	on deck	18547---1	15° 3.302' S	120° 26.177' E	1460	0.1	160.1	3.6	34.9
SO257_1--3	2017/05/15 00:48:58.000	Multi Corer	MUC	station end	18547---1	15° 3.301' S	120° 26.176' E	1458.8	0.2	168.7	3.4	346.3
SO257_1--4	2017/05/15 01:58:44.000	Multi Corer	MUC	station start	18548---1	15° 3.591' S	120° 18.848' E	1608.2	0.8	168.4	2.4	77.1
SO257_1--4	2017/05/15 02:01:23.000	Multi Corer	MUC	in the water	18548---1	15° 3.595' S	120° 18.840' E	1610.1	0.1	177.4	2.6	128.8
SO257_1--4	2017/05/15 02:34:50.000	Multi Corer	MUC	max depth/on ground	18548---1	15° 3.589' S	120° 18.854' E	1609.3	0.1	122.8	2.9	330.3
SO257_1--4	2017/05/15 02:35:35.000	Multi Corer	MUC	hoisting	18548---1	15° 3.589' S	120° 18.854' E	1608.3	0.1	119.7	2.3	48.8
SO257_1--4	2017/05/15 03:08:04.000	Multi Corer	MUC	on deck	18548---1	15° 3.586' S	120° 18.853' E	1607.3	0.3	92.8	3.5	210.2
SO257_1--4	2017/05/15 03:10:16.000	Multi Corer	MUC	station end	18548---1	15° 3.586' S	120° 18.853' E	1609.6	0	115.7	3.6	145.4
SO257_1--5	2017/05/15 03:12:07.000	Piston Corer	PC	station start	18548---2	15° 3.586' S	120° 18.853' E	1606.8	0.3	116.7	2.7	210.1
SO257_1--5	2017/05/15 03:50:34.000	Piston Corer	PC	in the water	18548---2	15° 3.584' S	120° 18.858' E	1608.9	0.1	86.6	3	70.7
SO257_1--5	2017/05/15 04:25:56.000	Piston Corer	PC	max depth/on ground	18548---2	15° 3.585' S	120° 18.859' E	1607.7	0	63.5	3.1	95.7
SO257_1--5	2017/05/15 04:26:07.000	Piston Corer	PC	hoisting	18548---2	15° 3.585' S	120° 18.859' E	1607.7	0.1	77.8	3.9	123.8
SO257_1--5	2017/05/15 05:16:21.000	Piston Corer	PC	on deck	18548---2	15° 3.584' S	120° 18.852' E	1608.5	0.1	84.3	3	194.8
SO257_1--5	2017/05/15 05:21:33.000	Piston Corer	PC	station end	18548---2	15° 3.583' S	120° 18.855' E	1608.6	0.2	91.5	2.8	187.8
SO257_1--6	2017/05/15 05:33:07.000	Seismic Towed Receiver	SEISTR	station start		15° 3.739' S	120° 18.675' E	1613.2	2.5	95	3.4	317.5
SO257_1--6	2017/05/15 05:34:47.000	Seismic Towed Receiver	SEISTR	information		15° 3.684' S	120° 18.621' E	1617	2.9	84.8	3.3	330.8
SO257_1--6	2017/05/15 05:41:07.000	Seismic Towed Receiver	SEISTR	information		15° 3.469' S	120° 18.401' E	1620.2	2.6	92.5	2.5	317.1
SO257_1--6	2017/05/15 05:42:10.000	Seismic Towed Receiver	SEISTR	information		15° 3.438' S	120° 18.367' E	1618.5	2.6	80.2	2.3	317.9
SO257_1--6	2017/05/15 05:44:15.000	Seismic Towed Receiver	SEISTR	in the water		15° 3.374' S	120° 18.297' E	1620.5	3.1	80.8	2.2	307.1
SO257_1--6	2017/05/15 05:49:02.000	Seismic Towed Receiver	SEISTR	information		15° 3.126' S	120° 18.028' E	1629.8	5.4	67.7	2.9	315.3
SO257_1--6	2017/05/15 07:04:08.000	Seismic Towed Receiver	SEISTR	profile start		14° 58.924' S	120° 16.060' E	1658	4.7	52.7	3.2	111.4
SO257_1--6	2017/05/15 09:29:04.000	Seismic Towed Receiver	SEISTR	alter course		15° 4.020' S	120° 25.582' E	1473.1	4	92.3	3.1	80.5
SO257_1--6	2017/05/15 11:20:39.000	Seismic Towed Receiver	SEISTR	alter course		14° 57.111' S	120° 29.688' E	1446.4	3.8	107.5	3.1	2.3
SO257_1--6	2017/05/15 12:00:36.000	Seismic Towed Receiver	SEISTR	alter course		14° 55.527' S	120° 26.886' E	1480	5	87.9	2.2	293.1
SO257_1--6	2017/05/15 14:48:01.000	Seismic Towed Receiver	SEISTR	profile end		15° 7.701' S	120° 19.794' E	1639	3.9	148.1	2.6	209.2
SO257_1--6	2017/05/15 14:53:22.000	Seismic Towed Receiver	SEISTR	on deck		15° 7.923' S	120° 19.631' E	1639.6	2.5	114.6	3.2	216.7

SO257_1--6	2017/05/15 14:56:38.000	Seismic Towed Receiver	SEISTR	on deck		15° 8.032' S	120° 19.549' E	1639.3	2.4	100.8	2.8	215.6
SO257_1--6	2017/05/15 14:59:23.000	Seismic Towed Receiver	SEISTR	station end		15° 8.114' S	120° 19.483' E	1639.6	2.1	102	2.3	218.7
SO257_1--7	2017/05/15 15:00:10.000	KONGSBERG EM122	EM122	station start		15° 8.137' S	120° 19.464' E	1640.1	2.1	103.8	2.3	220.5
SO257_1--7	2017/05/15 15:01:27.000	KONGSBERG EM122	EM122	profile start		15° 8.175' S	120° 19.432' E	1640.1	2.7	119.9	3.5	224.8
SO257_1--7	2017/05/15 19:00:33.000	KONGSBERG EM122	EM122	alter course		15° 39.922' S	119° 55.064' E	1861.2	9.9	156.1	2.3	216
SO257_1--7	2017/05/15 22:25:19.000	KONGSBERG EM122	EM122	profile end		16° 0.445' S	119° 26.753' E	1643.6	10	340.2	0.5	249.4
SO257_2--1	2017/05/15 22:59:15.000	CTD	CTD	station start	18549--1	15° 58.040' S	119° 30.978' E	1620.8	0.3	276.9	1.3	38.3
SO257_2--1	2017/05/15 23:00:45.000	CTD	CTD	in the water	18549--1	15° 58.035' S	119° 30.980' E	1621.3	0.2	264	0.4	246.4
SO257_2--1	2017/05/15 23:45:17.000	CTD	CTD	max depth/on ground	18549--1	15° 58.032' S	119° 30.965' E	1619.5	0.2	194.1	0.1	210.2
SO257_2--1	2017/05/16 00:26:31.000	CTD	CTD	on deck	18549--1	15° 58.034' S	119° 30.965' E	1618.1	0.3	6	0.7	38.1
SO257_2--1	2017/05/16 00:27:08.000	CTD	CTD	station end	18549--1	15° 58.033' S	119° 30.965' E	1618.4	0	352	0.8	67.6
SO257_2--2	2017/05/16 00:55:55.000	Multi Corer	MUC	station start	18549--2	15° 57.691' S	119° 30.583' E	1626.2	0.6	283.4	1.7	291.1
SO257_2--2	2017/05/16 01:00:40.000	Multi Corer	MUC	in the water	18549--2	15° 57.689' S	119° 30.580' E	1628.5	0.1	305.5	1	317
SO257_2--2	2017/05/16 01:31:02.000	Multi Corer	MUC	max depth/on ground	18549--2	15° 57.693' S	119° 30.580' E	1627.2	0.2	308.2	1.2	10.7
SO257_2--2	2017/05/16 01:32:03.000	Multi Corer	MUC	hoisting	18549--2	15° 57.693' S	119° 30.581' E	1627.6	0.1	276.8	1.1	39.2
SO257_2--2	2017/05/16 02:05:30.000	Multi Corer	MUC	on deck	18549--2	15° 57.689' S	119° 30.579' E	1626.7	0.3	238.5	0.7	192
SO257_2--2	2017/05/16 02:06:03.000	Multi Corer	MUC	station end	18549--2	15° 57.689' S	119° 30.579' E	1626.2	0	251	0.7	150.7
SO257_2--3	2017/05/16 02:07:06.000	Piston Corer	PC	station start	18549--3	15° 57.689' S	119° 30.579' E	1625.7	0.1	243	0.8	77.7
SO257_2--3	2017/05/16 02:31:10.000	Piston Corer	PC	in the water	18549--3	15° 57.693' S	119° 30.579' E	1628.1	0.1	291.3	0.8	219.1
SO257_2--3	2017/05/16 03:07:05.000	Piston Corer	PC	max depth/on ground	18549--3	15° 57.689' S	119° 30.580' E	1627.2	0.2	203.9	1.9	23.3
SO257_2--3	2017/05/16 03:08:32.000	Piston Corer	PC	hoisting	18549--3	15° 57.688' S	119° 30.580' E	1626.3	0.1	223.6	2.1	184
SO257_2--3	2017/05/16 03:53:43.000	Piston Corer	PC	on deck	18549--3	15° 57.688' S	119° 30.578' E	1628.3	0.3	220.7	3.7	199.1
SO257_2--3	2017/05/16 03:58:39.000	Piston Corer	PC	station end	18549--3	15° 57.687' S	119° 30.580' E	1627.8	0.4	221.2	1.9	188
SO257_2--4	2017/05/16 05:00:04.000	Gravity Corer	GC	station start	18549--4	15° 57.688' S	119° 30.581' E	1628.1	0.1	210.3	2.7	140.1
SO257_2--4	2017/05/16 05:05:10.000	Gravity Corer	GC	in the water	18549--4	15° 57.688' S	119° 30.581' E	1626.5	0.1	204.1	2.7	211
SO257_2--4	2017/05/16 05:35:12.000	Gravity Corer	GC	max depth/on ground	18549--4	15° 57.688' S	119° 30.581' E	1627	0.2	211.3	1.2	128.5
SO257_2--4	2017/05/16 05:35:35.000	Gravity Corer	GC	hoisting	18549--4	15° 57.688' S	119° 30.581' E	1628	0.2	197.8	1.3	356.2
SO257_2--4	2017/05/16 06:17:03.000	Gravity Corer	GC	on deck	18549--4	15° 57.685' S	119° 30.582' E	1629.8	0.2	200.8	2.7	207.1
SO257_2--4	2017/05/16 06:21:32.000	Gravity Corer	GC	station end	18549--4	15° 57.685' S	119° 30.582' E	1627	0.3	203.4	2.7	21.1
SO257_3--1	2017/05/16 06:24:19.000	Parasound P70	PS	station start		15° 57.688' S	119° 30.555' E	1628.8	1.4	206	2.2	253.4
SO257_3--1	2017/05/16 06:24:30.000	Parasound P70	PS	profile start		15° 57.689' S	119° 30.551' E	1627.1	1.4	199.4	3	243.3
SO257_3--1	2017/05/16 11:37:50.000	Parasound P70	PS	profile end		16° 39.113' S	118° 31.188' E	1879.8	5.8	165.5	5	200.7
SO257_3--2	2017/05/16 11:41:24.000	Seismic Towed Receiver	SEISTR	station start		16° 39.318' S	118° 31.238' E	1871.7	2.1	180.6	4.9	126
SO257_3--2	2017/05/16 11:45:23.000	Seismic Towed Receiver	SEISTR	SCS in water		16° 39.392' S	118° 31.372' E	1865.1	2.6	192.7	5	135.6
SO257_3--2	2017/05/16 11:48:59.000	Seismic Towed Receiver	SEISTR	in the water		16° 39.487' S	118° 31.489' E	1861	2.5	174.3	4.3	130
SO257_3--2	2017/05/16 11:51:55.000	Seismic Towed Receiver	SEISTR	profile start		16° 39.598' S	118° 31.614' E	1857.4	4	189	5.5	132.7
SO257_3--2	2017/05/16 20:37:41.000	Seismic Towed Receiver	SEISTR	profile end		17° 6.703' S	119° 2.958' E	537	4.6	161.6	2	135.5
SO257_3--2	2017/05/16 20:44:29.000	Seismic Towed Receiver	SEISTR	on deck		17° 6.966' S	119° 3.255' E	529.8	2.8	162.5	1.7	129.5
SO257_3--2	2017/05/16 20:49:02.000	Seismic Towed Receiver	SEISTR	on deck		17° 7.101' S	119° 3.420' E	527.2	2.7	173.9	2.5	123.4
SO257_3--2	2017/05/16 20:53:26.000	Seismic Towed Receiver	SEISTR	station end		17° 7.305' S	119° 3.633' E	522.7	5.4	148.2	2.7	146.4
SO257_3--3	2017/05/16 23:38:07.000	Multi Corer	MUC	station start	18550--1	16° 51.552' S	118° 45.420' E	1388	0.6	189.4	3.1	34.8
SO257_3--3	2017/05/16 23:41:03.000	Multi Corer	MUC	in the water	18550--1	16° 51.556' S	118° 45.423' E	1388	0.2	189.9	2.8	190.6
SO257_3--3	2017/05/17 00:11:25.000	Multi Corer	MUC	max depth/on ground	18550--1	16° 51.572' S	118° 45.421' E	1388.5	0.2	164.7	3.6	62.1
SO257_3--3	2017/05/17 00:12:00.000	Multi Corer	MUC	hoisting	18550--1	16° 51.571' S	118° 45.421' E	1387.4	0.2	157.8	3.4	321.8
SO257_3--3	2017/05/17 00:41:09.000	Multi Corer	MUC	on deck	18550--1	16° 51.571' S	118° 45.415' E	1386.5	0.1	172	3.9	157.1
SO257_3--3	2017/05/17 00:42:24.000	Multi Corer	MUC	station end	18550--1	16° 51.571' S	118° 45.415' E	1387.7	0.1	166.7	4.1	295.5
SO257_3--4	2017/05/17 00:43:29.000	Piston Corer	PC	station start	18550--2	16° 51.571' S	118° 45.415' E	1387.9	0.2	149.4	4.2	213.9
SO257_3--4	2017/05/17 01:10:00.000	Piston Corer	PC	in the water	18550--2	16° 51.569' S	118° 45.420' E	1387.9	0.1	NaN	NaN	40.2
SO257_3--4	2017/05/17 01:39:50.000	Piston Corer	PC	max depth/on ground	18550--2	16° 51.569' S	118° 45.420' E	1387	0.1	186	4.2	158.6
SO257_3--4	2017/05/17 01:40:33.000	Piston Corer	PC	hoisting	18550--2	16° 51.569' S	118° 45.419' E	1387.5	0.1	195.2	4.3	200
SO257_3--4	2017/05/17 02:30:20.000	Piston Corer	PC	on deck	18550--2	16° 51.573' S	118° 45.416' E	1388.7	0.1	156.6	4.6	126.5
SO257_3--4	2017/05/17 02:38:24.000	Piston Corer	PC	station end	18550--2	16° 51.572' S	118° 45.417' E	1388.3	0.1	156.2	4.3	44.7
SO257_3--5	2017/05/17 07:38:23.000	Multi Corer	MUC	station start	18551--1	17° 35.493' S	118° 26.751' E	669.2	0.6	159.9	4.3	299.4
SO257_3--5	2017/05/17 07:40:57.000	Multi Corer	MUC	in the water	18551--1	17° 35.493' S	118° 26.747' E	668.8	0.2	160.2	3.8	150.5

SO257_3---5	2017/05/17 07:56:36.000	Multi Corer	MUC	max depth/on ground	18551---1	17° 35.493' S	118° 26.741' E	668.5	0.1	144.8	4.8	232.1
SO257_3---5	2017/05/17 07:56:40.000	Multi Corer	MUC	hoisting	18551---1	17° 35.493' S	118° 26.741' E	668.2	0	146.4	4.6	0.6
SO257_3---5	2017/05/17 08:13:06.000	Multi Corer	MUC	on deck	18551---1	17° 35.491' S	118° 26.749' E	667.9	0.1	128.5	2.8	169.6
SO257_3---5	2017/05/17 08:15:12.000	Multi Corer	MUC	station end	18551---1	17° 35.490' S	118° 26.747' E	668.4	0.3	136.5	3.9	259.7
SO257_3---6	2017/05/17 08:19:11.000	Seismic Towed Receiver	SEISTR	station start		17° 35.551' S	118° 26.762' E	666	1.8	131.1	4.2	171.4
SO257_3---6	2017/05/17 08:23:26.000	Seismic Towed Receiver	SEISTR	SCS in water		17° 35.714' S	118° 26.848' E	659	2.9	150.6	2.8	155.3
SO257_3---6	2017/05/17 08:25:59.000	Seismic Towed Receiver	SEISTR	in the water		17° 35.831' S	118° 26.899' E	653.9	3	123.4	4.6	155.9
SO257_3---6	2017/05/17 08:29:28.000	Seismic Towed Receiver	SEISTR	profile start		17° 36.031' S	118° 26.978' E	646.2	4.4	128.9	2.9	164.3
SO257_3---6	2017/05/17 18:47:09.000	Seismic Towed Receiver	SEISTR	information		18° 24.258' S	118° 46.058' E	135.4	3.6	133.4	5.6	156.8
SO257_3---6	2017/05/17 18:50:28.000	Seismic Towed Receiver	SEISTR	information		18° 24.410' S	118° 46.117' E	135.8	2.2	134.3	5	163.7
SO257_3---6	2017/05/17 18:52:19.000	Seismic Towed Receiver	SEISTR	information		18° 24.464' S	118° 46.140' E	136.8	1.7	137.6	4.6	155.6
SO257_3---6	2017/05/17 18:56:56.000	Seismic Towed Receiver	SEISTR	information		18° 24.554' S	118° 46.171' E	136.9	0.9	132.1	5.3	167.6
SO257_3---6	2017/05/17 18:58:55.000	Seismic Towed Receiver	SEISTR	on deck		18° 24.582' S	118° 46.174' E	143.3	0.9	134.7	5.7	198.1
SO257_3---6	2017/05/17 18:59:01.000	Seismic Towed Receiver	SEISTR	station end		18° 24.583' S	118° 46.174' E	144.3	0.6	131.7	5.9	151.5
SO257_3---7	2017/05/18 02:18:11.000	Multi Corer	MUC	station start	18552---1	17° 40.560' S	117° 41.642' E	1951.4	0.2	104	6.2	273.8
SO257_3---7	2017/05/18 02:19:23.000	Multi Corer	MUC	in the water	18552---1	17° 40.558' S	117° 41.640' E	1951.3	0.3	107.1	6	301.2
SO257_3---7	2017/05/18 02:57:56.000	Multi Corer	MUC	max depth/on ground	18552---1	17° 40.557' S	117° 41.641' E	1952	0.1	110.2	8	169.4
SO257_3---7	2017/05/18 02:58:01.000	Multi Corer	MUC	hoisting	18552---1	17° 40.557' S	117° 41.642' E	1952	0.2	104.7	8.4	311.3
SO257_3---7	2017/05/18 03:37:38.000	Multi Corer	MUC	on deck	18552---1	17° 40.557' S	117° 41.642' E	1954.4	0.3	109.9	8.8	199.9
SO257_3---7	2017/05/18 03:38:10.000	Multi Corer	MUC	station end	18552---1	17° 40.557' S	117° 41.641' E	1950.7	0.2	107.1	8.8	309.4
SO257_3---8	2017/05/18 03:39:36.000	Piston Corer	PC	station start	18552---2	17° 40.558' S	117° 41.640' E	1954	0.2	101.1	8.8	233.8
SO257_3---8	2017/05/18 04:02:40.000	Piston Corer	PC	in the water	18552---2	17° 40.563' S	117° 41.638' E	1950.1	0.2	101.9	9.8	12.2
SO257_3---8	2017/05/18 04:42:47.000	Piston Corer	PC	max depth/on ground	18552---2	17° 40.558' S	117° 41.646' E	1952.2	0.2	113.3	7.7	168.4
SO257_3---8	2017/05/18 04:42:56.000	Piston Corer	PC	hoisting	18552---2	17° 40.559' S	117° 41.646' E	1952.7	0.1	105.1	7.9	41.3
SO257_3---8	2017/05/18 05:37:53.000	Piston Corer	PC	on deck	18552---2	17° 40.561' S	117° 41.640' E	1951.1	0.2	98.3	8.6	35.5
SO257_3---8	2017/05/18 05:40:44.000	Piston Corer	PC	station end	18552---2	17° 40.562' S	117° 41.642' E	1950.2	0.1	104.8	8.5	340.3
SO257_3---9	2017/05/18 09:33:32.000	CTD	CTD	station start	18553---1	18° 7.024' S	117° 7.001' E	1615.3	0.4	112.3	8.2	356.4
SO257_3---9	2017/05/18 09:34:52.000	CTD	CTD	in the water	18553---1	18° 7.022' S	117° 7.003' E	1619.3	0.2	113.3	9.5	275
SO257_3---9	2017/05/18 10:16:39.000	CTD	CTD	max depth/on ground	18553---1	18° 6.987' S	117° 6.997' E	1620.1	0.2	116.8	7.9	167.2
SO257_3---9	2017/05/18 10:53:32.000	CTD	CTD	on deck	18553---1	18° 6.984' S	117° 6.998' E	1620	0.2	103.9	8.7	148.3
SO257_3---9	2017/05/18 10:54:23.000	CTD	CTD	station end	18553---1	18° 6.983' S	117° 6.998' E	1619.9	0.2	98.4	8.6	98.5
SO257_3---10	2017/05/18 10:55:03.000	Multi Corer	MUC	station start	18553---2	18° 6.982' S	117° 6.999' E	1619.6	0.1	99.7	8.6	95.1
SO257_3---10	2017/05/18 11:02:32.000	Multi Corer	MUC	in the water	18553---2	18° 6.987' S	117° 6.998' E	1619.7	0.2	115.6	9	115
SO257_3---10	2017/05/18 11:35:47.000	Multi Corer	MUC	max depth/on ground	18553---2	18° 6.981' S	117° 6.998' E	1620.4	0.2	110.7	7.2	123
SO257_3---10	2017/05/18 12:10:02.000	Multi Corer	MUC	on deck	18553---2	18° 6.987' S	117° 6.999' E	1618.9	0.1	101.2	8.1	289.2
SO257_3---10	2017/05/18 12:11:05.000	Multi Corer	MUC	station end	18553---2	18° 6.987' S	117° 6.998' E	1618.4	0	95.5	9.3	234.3
SO257_3---11	2017/05/18 13:45:31.000	Seismic Towed Receiver	SEISTR	station start		18° 18.632' S	117° 13.937' E	1227	1.5	117.3	8	173.2
SO257_3---11	2017/05/18 13:53:21.000	Seismic Towed Receiver	SEISTR	Airgun in water		18° 18.857' S	117° 14.049' E	1238.3	2.5	109.9	7.6	146.8
SO257_3---11	2017/05/18 13:56:53.000	Seismic Towed Receiver	SEISTR	in the water		18° 18.999' S	117° 14.148' E	1263.9	3.1	101.7	8.9	138.9
SO257_3---11	2017/05/18 13:57:51.000	Seismic Towed Receiver	SEISTR	information		18° 19.046' S	117° 14.187' E	1259.3	3.7	100.1	7.2	138.6
SO257_3---11	2017/05/18 14:20:35.000	Seismic Towed Receiver	SEISTR	profile start		18° 20.419' S	117° 15.021' E	1173.5	4.4	110.8	8.2	152.2
SO257_3---11	2017/05/19 00:42:51.000	Seismic Towed Receiver	SEISTR	profile end		18° 59.708' S	117° 38.687' E	128.7	3.3	97.2	8.3	151.2
SO257_3---11	2017/05/19 00:50:36.000	Seismic Towed Receiver	SEISTR	information		18° 59.950' S	117° 38.838' E	128.5	1.8	111.6	6.9	137.6
SO257_3---11	2017/05/19 00:54:17.000	Seismic Towed Receiver	SEISTR	on deck		19° 0.044' S	117° 38.929' E	127.7	2.1	98.9	7.8	132.2
SO257_3---11	2017/05/19 00:55:53.000	Seismic Towed Receiver	SEISTR	station end		19° 0.086' S	117° 38.963' E	127.6	1.9	101.7	7.9	144.8
SO257_3---12	2017/05/19 03:43:44.000	Multi Corer	MUC	station start	18554---1	18° 31.980' S	117° 21.958' E	498.5	2	103.7	7.7	142.9
SO257_3---12	2017/05/19 03:47:48.000	Multi Corer	MUC	in the water	18554---1	18° 31.997' S	117° 21.986' E	497.9	0.6	110.7	5.5	31.7
SO257_3---12	2017/05/19 04:00:55.000	Multi Corer	MUC	max depth/on ground	18554---1	18° 31.994' S	117° 21.985' E	498.8	0.2	90.2	5.5	206.7
SO257_3---12	2017/05/19 04:00:58.000	Multi Corer	MUC	hoisting	18554---1	18° 31.994' S	117° 21.985' E	498.7	0.1	99.7	5.2	233.6
SO257_3---12	2017/05/19 04:14:14.000	Multi Corer	MUC	on deck	18554---1	18° 32.000' S	117° 21.986' E	498.5	0.1	105.3	5.7	77.4
SO257_3---12	2017/05/19 04:20:27.000	Multi Corer	MUC	station end	18554---1	18° 31.994' S	117° 21.990' E	547.4	0.1	104.8	6.1	348.6
SO257_3---13	2017/05/19 04:22:36.000	Gravity Corer	GC	station start	18554---2	18° 31.993' S	117° 21.990' E	548.7	0.1	107.5	5.6	133.6
SO257_3---13	2017/05/19 04:28:21.000	Gravity Corer	GC	in the water	18554---2	18° 31.991' S	117° 21.988' E	545.6	0.1	105.9	6.5	349.9
SO257_3---13	2017/05/19 04:38:42.000	Gravity Corer	GC	max depth/on ground	18554---2	18° 31.994' S	117° 21.989' E	498.6	0.2	100.5	7	69.1

SO257_3---13	2017/05/19 04:38:50.000	Gravity Corer	GC	hoisting	18554---2	18° 31.994' S	117° 21.990' E	499	0.1	99.6	6.7	203.2
SO257_3---13	2017/05/19 04:57:06.000	Gravity Corer	GC	on deck	18554---2	18° 31.999' S	117° 21.989' E	499	0.1	94.1	5.5	74.7
SO257_3---13	2017/05/19 04:57:10.000	Gravity Corer	GC	station end	18554---2	18° 31.998' S	117° 21.988' E	498.7	0.2	100.4	6	310.8
SO257_3---14	2017/05/19 06:31:09.000	Multi Corer	MUC	station start	18555---1	18° 21.054' S	117° 15.349' E	1114.9	0.5	143.8	4	37.7
SO257_3---14	2017/05/19 06:33:10.000	Multi Corer	MUC	in the water	18555---1	18° 21.050' S	117° 15.360' E	1113.7	0.2	143.2	4.5	63.8
SO257_3---14	2017/05/19 06:55:40.000	Multi Corer	MUC	max depth/on ground	18555---1	18° 21.051' S	117° 15.404' E	1113.1	0.1	120	4.2	347.8
SO257_3---14	2017/05/19 06:56:12.000	Multi Corer	MUC	hoisting	18555---1	18° 21.052' S	117° 15.404' E	1113.5	0.1	144.7	4.8	56
SO257_3---14	2017/05/19 07:19:37.000	Multi Corer	MUC	on deck	18555---1	18° 21.056' S	117° 15.403' E	1112.8	0.3	158.1	5.5	51.3
SO257_3---14	2017/05/19 07:21:53.000	Multi Corer	MUC	station end	18555---1	18° 21.051' S	117° 15.405' E	1114.8	0.1	143.7	5.6	330.9
SO257_3---15	2017/05/19 07:23:03.000	Gravity Corer	GC	station start	18555---2	18° 21.049' S	117° 15.403' E	1114.1	0.2	135.4	5.1	276.9
SO257_3---15	2017/05/19 07:28:41.000	Gravity Corer	GC	in the water	18555---2	18° 21.049' S	117° 15.402' E	1113	0.1	139.3	5.7	140.4
SO257_3---15	2017/05/19 07:48:50.000	Gravity Corer	GC	max depth/on ground	18555---2	18° 21.054' S	117° 15.401' E	1113.5	0.2	134.4	5.2	66.9
SO257_3---15	2017/05/19 07:49:26.000	Gravity Corer	GC	hoisting	18555---2	18° 21.055' S	117° 15.401' E	1112.2	0	128.6	5	177.3
SO257_3---15	2017/05/19 08:19:33.000	Gravity Corer	GC	on deck	18555---2	18° 21.055' S	117° 15.403' E	1112.2	0.2	134.9	4.3	139.6
SO257_3---15	2017/05/19 08:24:26.000	Gravity Corer	GC	station end	18555---2	18° 21.055' S	117° 15.396' E	1112.8	0.1	148.4	5.6	307.6
SO257_3---16	2017/05/19 09:57:21.000	Seismic Towed Receiver	SEISTR	station start		18° 9.809' S	117° 1.824' E	1265.8	2.5	159.3	9	24.2
SO257_3---16	2017/05/19 10:05:32.000	Seismic Towed Receiver	SEISTR	SCS in water		18° 9.461' S	117° 1.871' E	1276.4	2.7	145.2	7.4	9.1
SO257_3---16	2017/05/19 10:07:46.000	Seismic Towed Receiver	SEISTR	in the water		18° 9.362' S	117° 1.872' E	1277	2.4	153.4	6.5	4.3
SO257_3---16	2017/05/19 10:11:07.000	Seismic Towed Receiver	SEISTR	profile start		18° 9.174' S	117° 1.883' E	1280.3	4.4	157.7	6.6	354.7
SO257_3---16	2017/05/19 20:03:05.000	Seismic Towed Receiver	SEISTR	profile end		17° 23.610' S	117° 10.548' E	2476.8	2.6	132.8	6.9	10.5
SO257_3---16	2017/05/19 20:06:38.000	Seismic Towed Receiver	SEISTR	on deck		17° 23.463' S	117° 10.576' E	2475.1	2.6	131.5	5.2	15.8
SO257_3---16	2017/05/19 20:09:51.000	Seismic Towed Receiver	SEISTR	on deck		17° 23.320' S	117° 10.602' E	2479.6	2.7	125.6	5.9	10
SO257_3---16	2017/05/19 20:11:10.000	Seismic Towed Receiver	SEISTR	station end		17° 23.258' S	117° 10.612' E	2481.5	3.1	131	6.3	2.3
SO257_3---17	2017/05/19 22:31:06.000	Multi Corer	MUC	station start	18556---1	17° 6.186' S	117° 13.811' E	1842.7	0.8	120.8	4.7	71
SO257_3---17	2017/05/19 22:32:57.000	Multi Corer	MUC	in the water	18556---1	17° 6.179' S	117° 13.816' E	1843.6	0.1	119.3	4.1	113.8
SO257_3---17	2017/05/19 23:09:47.000	Multi Corer	MUC	max depth/on ground	18556---1	17° 6.216' S	117° 13.829' E	1842.2	0.1	100.2	6.1	120.8
SO257_3---17	2017/05/19 23:49:32.000	Multi Corer	MUC	on deck	18556---1	17° 6.222' S	117° 13.823' E	1842.6	0.7	137.8	5.1	55
SO257_3---17	2017/05/19 23:52:13.000	Multi Corer	MUC	station end	18556---1	17° 6.221' S	117° 13.824' E	1842.5	0.1	122.3	6.4	50.1
SO257_3---18	2017/05/19 23:55:18.000	Piston Corer	PC	station start	18556---2	17° 6.221' S	117° 13.824' E	1842.2	0.1	115.1	6.7	227
SO257_3---18	2017/05/20 00:15:00.000	Piston Corer	PC	in the water	18556---2	17° 6.219' S	117° 13.827' E	1842.4	0.1	114.2	5.8	359.1
SO257_3---18	2017/05/20 00:49:40.000	Piston Corer	PC	max depth/on ground	18556---2	17° 6.220' S	117° 13.826' E	1842.6	0.1	132.6	5.2	240.6
SO257_3---18	2017/05/20 00:50:07.000	Piston Corer	PC	hoisting	18556---2	17° 6.220' S	117° 13.827' E	1842.9	0.2	125.8	5.9	159.3
SO257_3---18	2017/05/20 01:47:02.000	Piston Corer	PC	on deck	18556---2	17° 6.217' S	117° 13.830' E	1842	0.1	137.6	5.2	237.1
SO257_3---18	2017/05/20 01:52:30.000	Piston Corer	PC	station end	18556---2	17° 6.223' S	117° 13.826' E	1842.5	0.4	123.6	4.2	241.8
SO257_3---19	2017/05/20 04:38:38.000	Multi Corer	MUC	station start	18557---1	17° 32.855' S	117° 8.731' E	2405	0.7	160.5	6.4	117.7
SO257_3---19	2017/05/20 04:40:12.000	Multi Corer	MUC	in the water	18557---1	17° 32.862' S	117° 8.731' E	2405.9	0.6	163.3	6.9	163.4
SO257_3---19	2017/05/20 05:25:14.000	Multi Corer	MUC	max depth/on ground	18557---1	17° 32.917' S	117° 8.756' E	2405.5	0.2	147.4	4.5	242.7
SO257_3---19	2017/05/20 05:25:34.000	Multi Corer	MUC	hoisting	18557---1	17° 32.917' S	117° 8.756' E	2405.4	0.2	139.9	4.4	39.8
SO257_3---19	2017/05/20 06:13:02.000	Multi Corer	MUC	on deck	18557---1	17° 32.910' S	117° 8.762' E	2406.9	0.1	157.1	5.6	148.2
SO257_3---19	2017/05/20 06:15:40.000	Multi Corer	MUC	station end	18557---1	17° 32.911' S	117° 8.763' E	2405.9	0.1	156.5	5.7	184.2
SO257_3---20	2017/05/20 06:16:58.000	Gravity Corer	GC	station start	18557---2	17° 32.911' S	117° 8.763' E	2407.3	0.1	140.8	6.1	213.9
SO257_3---20	2017/05/20 06:21:27.000	Gravity Corer	GC	in the water	18557---2	17° 32.913' S	117° 8.756' E	2406.5	0.4	117.1	4.2	220.7
SO257_3---20	2017/05/20 07:09:03.000	Gravity Corer	GC	max depth/on ground	18557---2	17° 32.916' S	117° 8.759' E	2406.3	0.1	127.9	5.2	34.2
SO257_3---20	2017/05/20 07:09:21.000	Gravity Corer	GC	hoisting	18557---2	17° 32.916' S	117° 8.759' E	2406.6	0.1	124.9	4.9	19.9
SO257_3---20	2017/05/20 08:02:34.000	Gravity Corer	GC	on deck	18557---2	17° 32.912' S	117° 8.760' E	2405.7	0	127.1	4.8	64.4
SO257_3---20	2017/05/20 08:04:56.000	Gravity Corer	GC	station end	18557---2	17° 32.912' S	117° 8.757' E	2405.2	0.2	142.1	4.3	242.4
SO257_4---1	2017/05/20 22:55:07.000	Multi Corer	MUC	station start	18558---1	18° 23.966' S	115° 13.690' E	1756.8	0.3	193.6	5.8	118.8
SO257_4---1	2017/05/20 22:56:44.000	Multi Corer	MUC	in the water	18558---1	18° 23.972' S	115° 13.690' E	1755.4	0.3	181.2	7.3	352.9
SO257_4---1	2017/05/20 23:32:48.000	Multi Corer	MUC	max depth/on ground	18558---1	18° 23.954' S	115° 13.673' E	1757.2	0.4	195.3	6.3	177
SO257_4---1	2017/05/21 00:09:11.000	Multi Corer	MUC	on deck	18558---1	18° 23.959' S	115° 13.667' E	1754.3	0.6	168	5.4	161.9
SO257_4---1	2017/05/21 00:11:32.000	Multi Corer	MUC	station end	18558---1	18° 23.959' S	115° 13.672' E	1755.2	0.7	171.5	6.1	22.4
SO257_4---2	2017/05/21 00:12:02.000	Gravity Corer	GC	station start	18558---2	18° 23.959' S	115° 13.673' E	1754.9	0.7	175.5	6.3	18.9
SO257_4---2	2017/05/21 00:20:14.000	Gravity Corer	GC	in the water	18558---2	18° 23.954' S	115° 13.670' E	1756.9	0.3	172.8	5.5	277
SO257_4---2	2017/05/21 00:52:33.000	Gravity Corer	GC	max depth/on ground	18558---2	18° 23.953' S	115° 13.669' E	1755.2	0.5	177.1	6.6	331.5
SO257_4---2	2017/05/21 00:53:32.000	Gravity Corer	GC	hoisting	18558---2	18° 23.952' S	115° 13.668' E	1755.5	0.4	178.1	5.2	328.6

SO257_4---2	2017/05/21 01:34:40.000	Gravity Corer	GC	on deck	18558---2	18° 23.951' S	115° 13.672' E	1755	0.4	184.5	6.9	219.1
SO257_4---2	2017/05/21 01:37:20.000	Gravity Corer	GC	station end	18558---2	18° 23.951' S	115° 13.670' E	1755.7	0.3	176.7	6.8	298.5
SO257_4---3	2017/05/21 04:13:57.000	CTD	CTD	station start	18559---1	18° 4.998' S	115° 2.896' E	1975.5	1.1	160.5	6.1	239.1
SO257_4---3	2017/05/21 04:17:23.000	CTD	CTD	in the water	18559---1	18° 4.996' S	115° 2.883' E	1974.1	0.5	155.4	7	259.7
SO257_4---3	2017/05/21 05:08:56.000	CTD	CTD	max depth/on ground	18559---1	18° 4.999' S	115° 2.862' E	1976	0.1	148.4	7.9	45.8
SO257_4---3	2017/05/21 05:09:45.000	CTD	CTD	hoisting	18559---1	18° 5.000' S	115° 2.862' E	1977.2	0.2	155.9	8.3	76.3
SO257_4---3	2017/05/21 05:52:50.000	CTD	CTD	on deck	18559---1	18° 5.004' S	115° 2.864' E	1975.8	1.1	145.2	7.5	302.6
SO257_4---3	2017/05/21 05:54:02.000	CTD	CTD	station end	18559---1	18° 5.003' S	115° 2.864' E	1975.3	0.6	133.6	6.7	122.1
SO257_4---4	2017/05/21 06:00:42.000	Multi Corer	MUC	station start	18559---2	18° 5.004' S	115° 2.862' E	1975	0.3	158.7	8.2	28.2
SO257_4---4	2017/05/21 06:02:57.000	Multi Corer	MUC	in the water	18559---2	18° 5.004' S	115° 2.862' E	1976.5	0.3	132.8	7.9	298.8
SO257_4---4	2017/05/21 06:39:19.000	Multi Corer	MUC	max depth/on ground	18559---2	18° 4.999' S	115° 2.864' E	1975.7	0.5	134.5	7.7	291.6
SO257_4---4	2017/05/21 06:39:31.000	Multi Corer	MUC	hoisting	18559---2	18° 4.999' S	115° 2.864' E	1978.1	0.5	129.4	8.2	349.8
SO257_4---4	2017/05/21 07:17:04.000	Multi Corer	MUC	on deck	18559---2	18° 5.001' S	115° 2.861' E	1974.9	0.5	144.9	7.2	337.1
SO257_4---4	2017/05/21 07:17:39.000	Multi Corer	MUC	station end	18559---2	18° 5.001' S	115° 2.861' E	1975.5	0.4	147.9	7.6	126.4
SO257_4---5	2017/05/21 07:20:11.000	Gravity Corer	GC	station start	18559---3	18° 5.002' S	115° 2.859' E	1975.1	0.5	150.2	8.1	268.9
SO257_4---5	2017/05/21 07:24:50.000	Gravity Corer	GC	in the water	18559---3	18° 5.004' S	115° 2.861' E	1977.2	0.7	146.1	6	267.3
SO257_4---5	2017/05/21 08:00:35.000	Gravity Corer	GC	max depth/on ground	18559---3	18° 5.004' S	115° 2.861' E	1976.3	0.3	143.3	7.6	118.7
SO257_4---5	2017/05/21 08:45:29.000	Gravity Corer	GC	on deck	18559---3	18° 5.003' S	115° 2.861' E	1979.9	0.2	140.8	7	46.8
SO257_4---5	2017/05/21 08:47:33.000	Gravity Corer	GC	station end	18559---3	18° 5.002' S	115° 2.862' E	1975.6	0.3	153.5	6.9	64.9
SO257_4---6	2017/05/21 12:51:55.000	Seismic Towed Receiver	SEISTR	station start	18559---3	18° 53.740' S	115° 12.741' E	1594.2	2.5	182.5	6.7	154.1
SO257_4---6	2017/05/21 12:57:17.000	Seismic Towed Receiver	SEISTR	Airgun in water	18559---3	18° 53.871' S	115° 12.857' E	1590.4	1.7	164.4	7.4	135.2
SO257_4---6	2017/05/21 13:00:20.000	Seismic Towed Receiver	SEISTR	information	18559---3	18° 53.949' S	115° 12.927' E	1588.2	2.4	193.6	7.4	156.2
SO257_4---6	2017/05/21 13:02:02.000	Seismic Towed Receiver	SEISTR	information	18559---3	18° 54.017' S	115° 12.975' E	1585	3.4	183.4	6.8	140.2
SO257_4---6	2017/05/21 13:10:55.000	Seismic Towed Receiver	SEISTR	profile start	18559---3	18° 54.590' S	115° 13.264' E	1583.8	4.8	190.5	8.1	146.7
SO257_4---6	2017/05/21 22:32:45.000	Seismic Towed Receiver	SEISTR	profile end	18559---3	19° 31.129' S	115° 32.848' E	430.3	4.1	195.5	11.4	157.9
SO257_4---6	2017/05/21 22:38:03.000	Seismic Towed Receiver	SEISTR	on deck	18559---3	19° 31.348' S	115° 32.954' E	427.4	2.5	179.3	9.7	125
SO257_4---6	2017/05/21 22:41:44.000	Seismic Towed Receiver	SEISTR	on deck	18559---3	19° 31.467' S	115° 33.019' E	420.1	2.1	170.7	10	156.1
SO257_4---6	2017/05/21 22:42:10.000	Seismic Towed Receiver	SEISTR	station end	18559---3	19° 31.482' S	115° 33.026' E	421	2.4	168.5	9.4	129.8
SO257_4---7	2017/05/22 00:39:15.000	Multi Corer	MUC	station start	18560---1	19° 18.222' S	115° 25.922' E	867.5	0.8	173.6	9.2	233.3
SO257_4---7	2017/05/22 00:42:47.000	Multi Corer	MUC	in the water	18560---1	19° 18.238' S	115° 25.933' E	868.8	0.3	187.3	11.2	228.8
SO257_4---7	2017/05/22 01:02:19.000	Multi Corer	MUC	max depth/on ground	18560---1	19° 18.238' S	115° 25.928' E	975.8	0.2	173.6	10.2	21
SO257_4---7	2017/05/22 01:03:03.000	Multi Corer	MUC	hoisting	18560---1	19° 18.237' S	115° 25.927' E	869	0.3	166.3	9	95.4
SO257_4---7	2017/05/22 01:23:03.000	Multi Corer	MUC	on deck	18560---1	19° 18.241' S	115° 25.934' E	867.1	0.1	161.6	9.8	316.8
SO257_4---7	2017/05/22 01:24:46.000	Multi Corer	MUC	station end	18560---1	19° 18.241' S	115° 25.934' E	864.4	1	177	10.1	257
SO257_4---8	2017/05/22 01:25:18.000	Gravity Corer	GC	station start	18560---2	19° 18.241' S	115° 25.934' E	865.8	0.3	182.7	8.7	295
SO257_4---8	2017/05/22 01:32:00.000	Gravity Corer	GC	in the water	18560---2	19° 18.240' S	115° 25.931' E	867	1.4	174	10.1	258.1
SO257_4---8	2017/05/22 01:48:23.000	Gravity Corer	GC	max depth/on ground	18560---2	19° 18.235' S	115° 25.933' E	863.6	0	163.6	10.7	351
SO257_4---8	2017/05/22 01:49:39.000	Gravity Corer	GC	information	18560---2	19° 18.235' S	115° 25.933' E	866.3	0.4	166.3	9.8	256.8
SO257_4---8	2017/05/22 02:15:00.000	Gravity Corer	GC	on deck	18560---2	19° 18.238' S	115° 25.929' E	865.3	0.3	147.3	7.8	262.6
SO257_4---8	2017/05/22 02:16:02.000	Gravity Corer	GC	station end	18560---2	19° 18.239' S	115° 25.928' E	867	0.5	144	7.3	253.4
SO257_4---9	2017/05/22 03:00:05.000	Multi Corer	MUC	station start	18561---1	19° 14.552' S	115° 23.952' E	1185.5	0.1	163	8.1	348.5
SO257_4---9	2017/05/22 03:02:11.000	Multi Corer	MUC	in the water	18561---1	19° 14.553' S	115° 23.948' E	1185	0.2	138.6	7.8	308.6
SO257_4---9	2017/05/22 03:25:28.000	Multi Corer	MUC	max depth/on ground	18561---1	19° 14.552' S	115° 23.950' E	1186.7	1.1	149.7	7.4	87.2
SO257_4---9	2017/05/22 03:26:21.000	Multi Corer	MUC	hoisting	18561---1	19° 14.553' S	115° 23.950' E	1185.2	1.2	153.5	7.4	103.8
SO257_4---9	2017/05/22 03:51:49.000	Multi Corer	MUC	on deck	18561---1	19° 14.551' S	115° 23.950' E	1181.8	0.4	147.5	8	76.3
SO257_4---9	2017/05/22 03:54:35.000	Multi Corer	MUC	station end	18561---1	19° 14.552' S	115° 23.950' E	1182.2	0.2	136.5	8.1	281.5
SO257_4---10	2017/05/22 03:56:03.000	Gravity Corer	GC	station start	18561---2	19° 14.553' S	115° 23.949' E	1184	0.3	150.6	8.2	132
SO257_4---10	2017/05/22 04:00:41.000	Gravity Corer	GC	in the water	18561---2	19° 14.556' S	115° 23.952' E	1184.1	0.8	152.1	8.1	256.1
SO257_4---10	2017/05/22 04:22:31.000	Gravity Corer	GC	max depth/on ground	18561---2	19° 14.555' S	115° 23.947' E	1186.4	0.2	166.6	7.4	205.8
SO257_4---10	2017/05/22 04:23:01.000	Gravity Corer	GC	hoisting	18561---2	19° 14.555' S	115° 23.948' E	1188.5	0.3	151.9	8.5	354.2
SO257_4---10	2017/05/22 04:53:16.000	Gravity Corer	GC	on deck	18561---2	19° 14.553' S	115° 23.947' E	1189.3	0.2	133.7	8.1	241
SO257_4---10	2017/05/22 04:54:10.000	Gravity Corer	GC	station end	18561---2	19° 14.553' S	115° 23.946' E	1187.5	0.1	155.6	8.7	146.6
SO257_4---11	2017/05/22 08:38:40.000	Seismic Towed Receiver	SEISTR	station start	18561---2	19° 47.011' S	115° 48.223' E	106.4	2.7	172.9	7.8	256.2
SO257_4---11	2017/05/22 08:42:57.000	Seismic Towed Receiver	SEISTR	SCS in water	18561---2	19° 47.053' S	115° 48.057' E	107.9	2.7	177.7	5.8	232.3

SO257_4--11	2017/05/22 08:45:06.000	Seismic Towed Receiver	SEISTR	in the water		19° 47.111' S	115° 47.977' E	106.2	3.1	176.9	7.2	240.6
SO257_4--11	2017/05/22 08:50:39.000	Seismic Towed Receiver	SEISTR	profile start		19° 47.296' S	115° 47.633' E	103.7	4.2	183.7	6.3	243
SO257_4--11	2017/05/22 11:17:08.000	Seismic Towed Receiver	SEISTR	alter course		19° 53.223' S	115° 37.914' E	79.6	4.3	189.4	6.1	236.7
SO257_4--11	2017/05/22 12:27:26.000	Seismic Towed Receiver	SEISTR	alter course		19° 56.240' S	115° 33.370' E	67.4	4.7	191.8	6.6	236.1
SO257_4--11	2017/05/22 21:31:33.000	Seismic Towed Receiver	SEISTR	profile end		19° 26.753' S	115° 0.409' E	1394.4	5.1	169	5.8	308.5
SO257_4--11	2017/05/22 21:44:47.000	Seismic Towed Receiver	SEISTR	on deck		19° 26.117' S	114° 59.667' E	1409.1	3.4	176.6	5.5	305.5
SO257_4--11	2017/05/22 21:48:20.000	Seismic Towed Receiver	SEISTR	on deck		19° 25.983' S	114° 59.518' E	1410.5	3.3	171.9	7.3	330.5
SO257_4--11	2017/05/22 21:49:37.000	Seismic Towed Receiver	SEISTR	station end		19° 25.931' S	114° 59.463' E	1411.3	4.4	165.4	6	326.8
SO257_4--12	2017/05/23 02:25:04.000	CTD	CTD	station start	18562--1	19° 24.976' S	114° 19.131' E	1300.2	1.9	145.4	4.1	181
SO257_4--12	2017/05/23 02:29:01.000	CTD	CTD	in the water	18562--1	19° 25.003' S	114° 19.139' E	1300.3	0.7	155.1	4.5	72.7
SO257_4--12	2017/05/23 03:04:02.000	CTD	CTD	max depth/on ground	18562--1	19° 24.999' S	114° 19.138' E	1299.4	0.2	147.8	4.1	112.8
SO257_4--12	2017/05/23 03:05:00.000	CTD	CTD	hoisting	18562--1	19° 24.998' S	114° 19.139' E	1298.3	0.4	139.6	5.5	133.5
SO257_4--12	2017/05/23 03:38:30.000	CTD	CTD	on deck	18562--1	19° 24.999' S	114° 19.140' E	1299.2	0.6	173.6	4.6	67.6
SO257_4--12	2017/05/23 03:40:00.000	CTD	CTD	station end	18562--1	19° 24.998' S	114° 19.142' E	1299.2	0.4	168.4	4.4	239.8
SO257_4--13	2017/05/23 03:41:38.000	Multi Corer	MUC	station start	18562--2	19° 24.998' S	114° 19.143' E	1300.8	0.8	145	3.3	77.1
SO257_4--13	2017/05/23 03:50:19.000	Multi Corer	MUC	in the water	18562--2	19° 25.001' S	114° 19.143' E	1298.8	0.1	140.6	4.1	344.5
SO257_4--13	2017/05/23 04:16:22.000	Multi Corer	MUC	max depth/on ground	18562--2	19° 25.001' S	114° 19.139' E	1302.1	0.3	149.5	3.5	245.8
SO257_4--13	2017/05/23 04:16:41.000	Multi Corer	MUC	hoisting	18562--2	19° 25.001' S	114° 19.139' E	1302.3	0.3	152	3.7	305.1
SO257_4--13	2017/05/23 04:44:19.000	Multi Corer	MUC	on deck	18562--2	19° 25.002' S	114° 19.140' E	1299.7	0.2	140.6	4.1	86.2
SO257_4--13	2017/05/23 04:45:00.000	Multi Corer	MUC	station end	18562--2	19° 25.000' S	114° 19.141' E	1298.9	0.2	139.2	5.7	85.7
SO257_4--14	2017/05/23 04:47:32.000	Gravity Corer	GC	station start	18562--3	19° 24.998' S	114° 19.142' E	1301.1	0.7	137.8	5.4	259.5
SO257_4--14	2017/05/23 04:53:33.000	Gravity Corer	GC	in the water	18562--3	19° 24.999' S	114° 19.141' E	1302	0.2	155.1	4.9	98.2
SO257_4--14	2017/05/23 05:16:41.000	Gravity Corer	GC	max depth/on ground	18562--3	19° 24.998' S	114° 19.138' E	1299.4	0.4	122.6	5.7	250.9
SO257_4--14	2017/05/23 05:17:12.000	Gravity Corer	GC	hoisting	18562--3	19° 24.999' S	114° 19.138' E	1299.4	0.2	NaN	NaN	74.5
SO257_4--14	2017/05/23 05:49:09.000	Gravity Corer	GC	on deck	18562--3	19° 25.002' S	114° 19.140' E	1300.7	0.2	139.3	6.5	187.7
SO257_4--14	2017/05/23 05:50:08.000	Gravity Corer	GC	station end	18562--3	19° 25.001' S	114° 19.137' E	1302.9	0.4	132.5	6.5	275.1
SO257_4--15	2017/05/23 09:53:27.000	Seismic Towed Receiver	SEISTR	station start		19° 52.358' S	114° 55.592' E	1231.5	3.6	81.9	7.2	164.1
SO257_4--15	2017/05/23 09:55:47.000	Seismic Towed Receiver	SEISTR	SCS in water		19° 52.473' S	114° 55.631' E	1228.7	2.9	100.2	6.4	175.8
SO257_4--15	2017/05/23 09:57:41.000	Seismic Towed Receiver	SEISTR	in the water		19° 52.547' S	114° 55.658' E	1226.6	2.2	95.3	6.2	159.1
SO257_4--15	2017/05/23 10:00:02.000	Seismic Towed Receiver	SEISTR	profile start		19° 52.642' S	114° 55.708' E	1225.7	3.1	95.8	5.3	143.3
SO257_4--15	2017/05/23 18:00:31.000	Seismic Towed Receiver	SEISTR	alter course		20° 28.204' S	115° 11.202' E	53.7	4.7	104.9	2.3	158.9
SO257_4--15	2017/05/23 22:00:42.000	Seismic Towed Receiver	SEISTR	profile end		20° 34.491' S	114° 53.408' E	112.8	3.4	110.9	2.1	253
SO257_4--15	2017/05/23 22:05:00.000	Seismic Towed Receiver	SEISTR	on deck		20° 34.558' S	114° 53.206' E	114.1	2.6	108.6	2.3	249.8
SO257_4--15	2017/05/23 22:08:06.000	Seismic Towed Receiver	SEISTR	on deck		20° 34.597' S	114° 53.080' E	114.8	2.2	100.7	2.1	245.9
SO257_4--15	2017/05/23 22:10:47.000	Seismic Towed Receiver	SEISTR	station end		20° 34.628' S	114° 52.984' E	115	1.9	87.5	2.4	250.8
SO257_4--16	2017/05/23 22:19:02.000	Box Corer	BC	station start	18563--1	20° 34.702' S	114° 52.805' E	115.7	0.3	97.7	1.7	293.4
SO257_4--16	2017/05/23 22:30:23.000	Box Corer	BC	in the water	18563--1	20° 34.700' S	114° 52.801' E	116.2	0.3	82.2	2.6	56.8
SO257_4--16	2017/05/23 22:36:38.000	Box Corer	BC	max depth/on ground	18563--1	20° 34.701' S	114° 52.801' E	116.1	0.3	95.6	2.2	278.8
SO257_4--16	2017/05/23 22:46:42.000	Box Corer	BC	on deck	18563--1	20° 34.701' S	114° 52.800' E	116.3	0	82.6	4.3	264.8
SO257_4--16	2017/05/23 23:08:17.000	Box Corer	BC	station end	18563--1	20° 34.701' S	114° 52.807' E	116.3	0.2	85.4	4	85.2
SO257_4--17	2017/05/24 00:48:44.000	Multi Corer	MUC	station start	18564--1	20° 30.081' S	114° 47.082' E	287.7	1.5	114.9	2.8	15
SO257_4--17	2017/05/24 01:00:11.000	Multi Corer	MUC	in the water	18564--1	20° 30.040' S	114° 47.074' E	349.7	0.3	119.6	2.7	269.3
SO257_4--17	2017/05/24 01:18:05.000	Multi Corer	MUC	max depth/on ground	18564--1	20° 30.041' S	114° 47.077' E	291.9	0.1	103.6	3.9	66
SO257_4--17	2017/05/24 01:19:00.000	Multi Corer	MUC	hoisting	18564--1	20° 30.041' S	114° 47.076' E	288.2	0.5	102.9	4.3	270.5
SO257_4--17	2017/05/24 01:28:03.000	Multi Corer	MUC	on deck	18564--1	20° 30.044' S	114° 47.074' E	302.4	0.7	91.9	3.1	76.3
SO257_4--17	2017/05/24 01:29:22.000	Multi Corer	MUC	station end	18564--1	20° 30.044' S	114° 47.075' E	303.9	0.2	106.3	2.6	76.7
SO257_4--18	2017/05/24 06:24:20.000	Multi Corer	MUC	station start	18565--1	20° 0.812' S	114° 14.366' E	1252.7	0.5	82.3	3.5	107.4
SO257_4--18	2017/05/24 06:26:33.000	Multi Corer	MUC	in the water	18565--1	20° 0.818' S	114° 14.357' E	1253.9	0.3	72.6	4.9	222.1
SO257_4--18	2017/05/24 06:51:50.000	Multi Corer	MUC	max depth/on ground	18565--1	20° 0.837' S	114° 14.346' E	1253.4	0.3	93.4	4.4	260.9
SO257_4--18	2017/05/24 06:52:09.000	Multi Corer	MUC	hoisting	18565--1	20° 0.837' S	114° 14.346' E	1253.1	0.3	95.5	4.8	48.4
SO257_4--18	2017/05/24 07:17:21.000	Multi Corer	MUC	on deck	18565--1	20° 0.837' S	114° 14.349' E	1254.4	0.6	86.5	4.3	260.2
SO257_4--18	2017/05/24 07:18:30.000	Multi Corer	MUC	station end	18565--1	20° 0.837' S	114° 14.348' E	1253	0	93.6	4.8	289.6
SO257_4--19	2017/05/24 07:20:47.000	Gravity Corer	GC	station start	18565--2	20° 0.836' S	114° 14.348' E	1254.3	0.5	84.9	4.2	263
SO257_4--19	2017/05/24 07:26:20.000	Gravity Corer	GC	in the water	18565--2	20° 0.837' S	114° 14.348' E	1252.9	0.3	82.5	3	83
SO257_4--19	2017/05/24 07:49:19.000	Gravity Corer	GC	max depth/on ground	18565--2	20° 0.833' S	114° 14.348' E	1252.3	0.3	66.9	4.3	218.1

SO257_4---19	2017/05/24 07:50:01.000	Gravity Corer	GC	hoisting	18565---2	20° 0.834' S	114° 14.347' E	1253.7	0.3	82.8	4.5	204.7
SO257_4---19	2017/05/24 08:23:11.000	Gravity Corer	GC	on deck	18565---2	20° 0.834' S	114° 14.352' E	1253.1	0.5	99.9	4.3	231.7
SO257_4---19	2017/05/24 08:41:12.000	Gravity Corer	GC	station end	18565---2	20° 0.837' S	114° 14.345' E	1253.6	0.1	103.2	3	36.2
SO257_4---20	2017/05/24 12:27:02.000	Multi Corer	MUC	station start	18566---1	19° 38.694' S	113° 48.639' E	1135.9	0.4	152.3	4	255.9
SO257_4---20	2017/05/24 12:31:01.000	Multi Corer	MUC	in the water	18566---1	19° 38.706' S	113° 48.633' E	1133.5	0.2	147.8	3.3	117.3
SO257_4---20	2017/05/24 12:54:09.000	Multi Corer	MUC	max depth/on ground	18566---1	19° 38.707' S	113° 48.633' E	1134.3	0.1	155.7	4.3	83.2
SO257_4---20	2017/05/24 12:55:10.000	Multi Corer	MUC	hoisting	18566---1	19° 38.709' S	113° 48.635' E	1133.7	0.2	140.1	4.3	132.8
SO257_4---20	2017/05/24 13:20:00.000	Multi Corer	MUC	on deck	18566---1	19° 38.705' S	113° 48.629' E	1136.1	0.4	150.1	5.4	142.5
SO257_4---20	2017/05/24 13:21:01.000	Multi Corer	MUC	station end	18566---1	19° 38.704' S	113° 48.629' E	1134.8	0.2	151.9	4.2	326.3
SO257_4---21	2017/05/24 13:22:13.000	Gravity Corer	GC	information	18566---2	19° 38.703' S	113° 48.629' E	1134.6	0.2	152.7	5.1	124
SO257_4---21	2017/05/24 13:32:18.000	Gravity Corer	GC	in the water	18566---2	19° 38.705' S	113° 48.631' E	1134.3	0.2	130	5	87.6
SO257_4---21	2017/05/24 13:51:47.000	Gravity Corer	GC	max depth/on ground	18566---2	19° 38.708' S	113° 48.636' E	1135.1	0.2	137.3	5.5	204.6
SO257_4---21	2017/05/24 13:54:07.000	Gravity Corer	GC	hoisting	18566---2	19° 38.705' S	113° 48.633' E	1134.6	0.1	143.8	4.6	161.9
SO257_4---21	2017/05/24 14:24:52.000	Gravity Corer	GC	on deck	18566---2	19° 38.707' S	113° 48.636' E	1133.9	0.1	124.6	5	240.9
SO257_4---21	2017/05/24 14:30:41.000	Gravity Corer	GC	station end	18566---2	19° 38.703' S	113° 48.631' E	1133.6	0.4	124.9	4	347.6
SO257_4---22	2017/05/24 23:00:00.000	CTD	CTD	station start	18567---1	19° 31.234' S	113° 3.531' E	1130.7	0.5	83.4	4.8	141.9
SO257_4---22	2017/05/24 23:03:16.000	CTD	CTD	in the water	18567---1	19° 31.230' S	113° 3.535' E	1128.7	0.2	76.6	3.8	135.6
SO257_4---22	2017/05/24 23:31:48.000	CTD	CTD	max depth/on ground	18567---1	19° 31.235' S	113° 3.523' E	1129.4	0.3	60.2	2.6	357.1
SO257_4---22	2017/05/25 00:03:41.000	CTD	CTD	on deck	18567---1	19° 31.237' S	113° 3.529' E	1129.7	0.3	61.1	2.4	96.4
SO257_4---22	2017/05/25 00:05:00.000	CTD	CTD	station end	18567---1	19° 31.236' S	113° 3.529' E	1129.9	0.4	67	1.9	253.7
SO257_4---23	2017/05/25 00:06:25.000	Multi Corer	MUC	station start	18567---2	19° 31.235' S	113° 3.530' E	1129.9	0.3	63.2	2.1	75.7
SO257_4---23	2017/05/25 00:12:18.000	Multi Corer	MUC	in the water	18567---2	19° 31.236' S	113° 3.528' E	1131	0.4	67.6	1.5	227.5
SO257_4---23	2017/05/25 00:36:18.000	Multi Corer	MUC	max depth/on ground	18567---2	19° 31.235' S	113° 3.526' E	1129.9	0.3	68.3	2.6	318.5
SO257_4---23	2017/05/25 00:37:45.000	Multi Corer	MUC	hoisting	18567---2	19° 31.234' S	113° 3.525' E	1129.4	0.5	101	0.5	236.8
SO257_4---23	2017/05/25 01:01:37.000	Multi Corer	MUC	on deck	18567---2	19° 31.236' S	113° 3.526' E	1129.2	0	90.8	0.9	281
SO257_4---23	2017/05/25 01:02:02.000	Multi Corer	MUC	station end	18567---2	19° 31.236' S	113° 3.526' E	1129	0.4	71.5	1.1	96.6
SO257_4---24	2017/05/25 01:08:24.000	Piston Corer	PC	station start	18567---3	19° 31.238' S	113° 3.527' E	1130.3	0.4	94.7	1.9	235.2
SO257_4---24	2017/05/25 01:30:15.000	Piston Corer	PC	in the water	18567---3	19° 31.234' S	113° 3.525' E	1129.7	0.2	108.6	0.7	46.2
SO257_4---24	2017/05/25 01:54:19.000	Piston Corer	PC	max depth/on ground	18567---3	19° 31.235' S	113° 3.522' E	1130.6	0.3	83.1	0.8	225.6
SO257_4---24	2017/05/25 01:55:04.000	Piston Corer	PC	hoisting	18567---3	19° 31.236' S	113° 3.522' E	1129.9	0.2	81.4	1.8	57.1
SO257_4---24	2017/05/25 02:35:34.000	Piston Corer	PC	on deck	18567---3	19° 31.232' S	113° 3.526' E	1129.5	0.4	163.1	2	256.9
SO257_4---24	2017/05/25 02:36:24.000	Piston Corer	PC	station end	18567---3	19° 31.233' S	113° 3.527' E	1128.1	0.4	163.3	1.4	137.2
SO257_5---1	2017/05/25 10:43:59.000	Seismic Towed Receiver	SEISTR	station start	18568---1	20° 39.039' S	113° 18.051' E	1066.7	2.5	222.1	3.1	192.1
SO257_5---1	2017/05/25 10:47:06.000	Seismic Towed Receiver	SEISTR	SCS in water	18568---1	20° 39.163' S	113° 18.022' E	1067.1	2.3	190.5	2.6	183.5
SO257_5---1	2017/05/25 10:49:25.000	Seismic Towed Receiver	SEISTR	in the water	18568---1	20° 39.263' S	113° 18.029' E	1068.1	2.7	201.6	2.9	186.3
SO257_5---1	2017/05/25 10:52:54.000	Seismic Towed Receiver	SEISTR	profile start	18568---1	20° 39.479' S	113° 18.029' E	1069.8	4.7	199.5	2.9	193.1
SO257_5---1	2017/05/25 15:43:30.000	Seismic Towed Receiver	SEISTR	alter course	18568---1	20° 20.046' S	113° 13.084' E	928.8	4.4	182.8	4.9	355.4
SO257_5---1	2017/05/25 22:35:09.000	Seismic Towed Receiver	SEISTR	profile end	18568---1	20° 38.265' S	113° 39.780' E	1127	4.6	154.5	5.4	122.6
SO257_5---1	2017/05/25 22:41:49.000	Seismic Towed Receiver	SEISTR	on deck	18568---1	20° 38.497' S	113° 40.098' E	1127.5	2.8	148.6	5.5	128.4
SO257_5---1	2017/05/25 22:45:44.000	Seismic Towed Receiver	SEISTR	on deck	18568---1	20° 38.610' S	113° 40.249' E	1127.8	3.1	165.9	5.9	123.5
SO257_5---1	2017/05/25 22:46:02.000	Seismic Towed Receiver	SEISTR	station end	18568---1	20° 38.619' S	113° 40.260' E	1128.1	2.9	155.4	6.7	145.3
SO257_5---2	2017/05/25 23:19:02.000	Multi Corer	MUC	station start	18568---1	20° 36.566' S	113° 37.471' E	1100.1	1.4	156.7	7.4	200.1
SO257_5---2	2017/05/25 23:21:48.000	Multi Corer	MUC	in the water	18568---1	20° 36.580' S	113° 37.463' E	1100	0.5	154.1	8.9	29.1
SO257_5---2	2017/05/25 23:46:00.000	Multi Corer	MUC	max depth/on ground	18568---1	20° 36.602' S	113° 37.463' E	1100.6	0.6	151.6	7.5	250.8
SO257_5---2	2017/05/26 00:10:06.000	Multi Corer	MUC	on deck	18568---1	20° 36.598' S	113° 37.459' E	1100.2	0.3	151.9	8.3	50.5
SO257_5---2	2017/05/26 00:11:24.000	Multi Corer	MUC	station end	18568---1	20° 36.598' S	113° 37.459' E	1100.8	1	151.8	7.8	240.6
SO257_5---3	2017/05/26 00:12:31.000	Piston Corer	PC	information	18568---2	20° 36.598' S	113° 37.459' E	1099.7	0.4	152.2	7.9	165.6
SO257_5---3	2017/05/26 00:32:35.000	Piston Corer	PC	in the water	18568---2	20° 36.601' S	113° 37.457' E	1098.7	0.8	160.4	8.2	65.9
SO257_5---3	2017/05/26 00:56:24.000	Piston Corer	PC	max depth/on ground	18568---2	20° 36.598' S	113° 37.456' E	1100	0.4	157	10	345.6
SO257_5---3	2017/05/26 00:57:14.000	Piston Corer	PC	hoisting	18568---2	20° 36.596' S	113° 37.457' E	1099.8	0.6	153.4	9.4	331.4
SO257_5---3	2017/05/26 01:37:16.000	Piston Corer	PC	on deck	18568---2	20° 36.602' S	113° 37.463' E	1100.7	0.4	155.8	10	279.6
SO257_5---3	2017/05/26 01:44:05.000	Piston Corer	PC	station end	18568---2	20° 36.601' S	113° 37.457' E	1100.3	0.3	155.1	9.7	112.6
SO257_5---4	2017/05/26 06:00:00.000	CTD	CTD	station start	18569---1	21° 11.507' S	113° 21.443' E	1414.1	0.1	168.1	8.9	61.7
SO257_5---4	2017/05/26 06:01:52.000	CTD	CTD	in the water	18569---1	21° 11.515' S	113° 21.444' E	1414.6	0.5	166	8	10.4

SO257_5---4	2017/05/26 06:41:03.000	CTD	CTD	max depth/on ground	18569---1	21° 11.515' S	113° 21.445' E	1413.9	1.1	185.1	8.9	84.9
SO257_5---4	2017/05/26 06:41:12.000	CTD	CTD	hoisting	18569---1	21° 11.515' S	113° 21.445' E	1414.1	1.2	189.6	9.9	244.6
SO257_5---4	2017/05/26 07:16:46.000	CTD	CTD	on deck	18569---1	21° 11.514' S	113° 21.443' E	1415	0.5	180.4	9.5	247.4
SO257_5---4	2017/05/26 07:17:57.000	CTD	CTD	station end	18569---1	21° 11.513' S	113° 21.443' E	1413.9	0.3	178	8.4	301.8
SO257_5---5	2017/05/26 09:11:14.000	Multi Corer	MUC	station start	18570---1	20° 59.470' S	113° 26.914' E	1184.7	0.5	183.4	7.5	95
SO257_5---5	2017/05/26 09:14:18.000	Multi Corer	MUC	in the water	18570---1	20° 59.468' S	113° 26.908' E	1182.4	0.7	184.6	7.6	71.4
SO257_5---5	2017/05/26 09:42:39.000	Multi Corer	MUC	max depth/on ground	18570---1	20° 59.467' S	113° 26.931' E	1183.7	0.8	174.2	7.7	234.4
SO257_5---5	2017/05/26 10:08:20.000	Multi Corer	MUC	on deck	18570---1	20° 59.468' S	113° 26.933' E	1182	0.6	180.2	8.5	278.9
SO257_5---5	2017/05/26 10:10:13.000	Multi Corer	MUC	station end	18570---1	20° 59.467' S	113° 26.937' E	1182.2	0.3	182.6	7.2	276
SO257_5---6	2017/05/26 10:12:39.000	Piston Corer	PC	station start	18570---2	20° 59.467' S	113° 26.937' E	1184.5	0.5	181	8.6	182.1
SO257_5---6	2017/05/26 10:24:19.000	Piston Corer	PC	in the water	18570---2	20° 59.470' S	113° 26.941' E	1182.5	0.3	190.8	8	67.2
SO257_5---6	2017/05/26 11:01:12.000	Piston Corer	PC	max depth/on ground	18570---2	20° 59.465' S	113° 26.934' E	1183.9	0.6	180.8	8.6	55.5
SO257_5---6	2017/05/26 11:41:28.000	Piston Corer	PC	on deck	18570---2	20° 59.468' S	113° 26.933' E	1182.6	0.4	176.7	8.8	67.7
SO257_5---6	2017/05/26 11:43:27.000	Piston Corer	PC	station end	18570---2	20° 59.467' S	113° 26.931' E	1183.5	0.1	174.9	9.3	247.8
SO257_5---7	2017/05/26 16:05:04.000	Seismic Towed Receiver	SEISTR	station start	18571---1	21° 47.216' S	113° 11.619' E	1713.8	2	166.3	12.2	236
SO257_5---7	2017/05/26 16:08:18.000	Seismic Towed Receiver	SEISTR	information	18571---1	21° 47.258' S	113° 11.537' E	1716.4	2.2	163.3	12.4	259.1
SO257_5---7	2017/05/26 16:09:49.000	Seismic Towed Receiver	SEISTR	information	18571---1	21° 47.282' S	113° 11.494' E	1715.3	1.9	168.3	12.5	218.5
SO257_5---7	2017/05/26 16:12:14.000	Seismic Towed Receiver	SEISTR	in the water	18571---1	21° 47.363' S	113° 11.418' E	1719.1	3.1	159.4	13.8	220.3
SO257_5---7	2017/05/26 16:13:46.000	Seismic Towed Receiver	SEISTR	information	18571---1	21° 47.412' S	113° 11.365' E	1719.4	1.8	158	12.6	213
SO257_5---7	2017/05/26 16:29:39.000	Seismic Towed Receiver	SEISTR	profile start	18571---1	21° 48.518' S	113° 11.158' E	1713	4.4	166.7	11	195.4
SO257_5---7	2017/05/26 16:47:54.000	Seismic Towed Receiver	SEISTR	information	18571---1	21° 49.582' S	113° 11.268' E	1631.1	2	173.2	12	178.5
SO257_5---7	2017/05/26 16:48:28.000	Seismic Towed Receiver	SEISTR	information	18571---1	21° 49.596' S	113° 11.272' E	1631.9	1.7	176.9	11.8	164.4
SO257_5---7	2017/05/26 16:50:40.000	Seismic Towed Receiver	SEISTR	information	18571---1	21° 49.657' S	113° 11.300' E	1632.5	2	168.2	9.8	127.5
SO257_5---7	2017/05/26 16:51:28.000	Seismic Towed Receiver	SEISTR	information	18571---1	21° 49.678' S	113° 11.313' E	1337.1	2.4	169.3	9.8	142.6
SO257_5---7	2017/05/26 16:54:10.000	Seismic Towed Receiver	SEISTR	on deck	18571---1	21° 49.774' S	113° 11.348' E	1621.8	2.5	173.8	11.1	178
SO257_5---7	2017/05/26 16:57:34.000	Seismic Towed Receiver	SEISTR	station end	18571---1	21° 49.904' S	113° 11.386' E	1620.7	2.2	178.1	10.3	179.8
SO257_5---8	2017/05/27 01:20:29.000	Multi Corer	MUC	station start	18571---1	22° 6.666' S	113° 29.688' E	1048.1	0.4	153.3	8.5	206.8
SO257_5---8	2017/05/27 01:22:01.000	Multi Corer	MUC	in the water	18571---1	22° 6.674' S	113° 29.677' E	1049.3	0.5	161.5	7.5	42.0
SO257_5---8	2017/05/27 01:43:20.000	Multi Corer	MUC	max depth/on ground	18571---1	22° 6.685' S	113° 29.665' E	1050.5	0.9	146.3	7.9	258.0
SO257_5---8	2017/05/27 01:45:50.000	Multi Corer	MUC	hoisting	18571---1	22° 6.684' S	113° 29.663' E	1048.5	1.1	161.9	7.3	76.0
SO257_5---8	2017/05/27 02:06:13.000	Multi Corer	MUC	on deck	18571---1	22° 6.684' S	113° 29.666' E	1051.1	0.5	159.8	9.0	230.7
SO257_5---8	2017/05/27 02:07:21.000	Multi Corer	MUC	station end	18571---1	22° 6.684' S	113° 29.665' E	1051.7	0.1	154.3	9.5	135.3
SO257_5---9	2017/05/27 02:08:47.000	Gravity Corer	GC	information	18571---2	22° 6.680' S	113° 29.661' E	1050.8	0.2	159.1	8.8	279.8
SO257_5---9	2017/05/27 02:15:03.000	Gravity Corer	GC	in the water	18571---2	22° 6.685' S	113° 29.663' E	1049.4	0.6	170.3	8.8	309.7
SO257_5---9	2017/05/27 02:34:44.000	Gravity Corer	GC	max depth/on ground	18571---2	22° 6.687' S	113° 29.667' E	1052.1	0.5	NaN	NaN	102.2
SO257_5---9	2017/05/27 02:36:53.000	Gravity Corer	GC	hoisting	18571---2	22° 6.686' S	113° 29.668' E	1051.4	0.5	NaN	NaN	266.7
SO257_5---9	2017/05/27 03:04:01.000	Gravity Corer	GC	on deck	18571---2	22° 6.685' S	113° 29.665' E	1049.2	0.2	180.0	6.1	65.3
SO257_5---9	2017/05/27 03:05:20.000	Gravity Corer	GC	station end	18571---2	22° 6.686' S	113° 29.667' E	1051.2	0.9	167.9	6.8	254.0
SO257_5---10	2017/05/27 05:07:33.000	Multi Corer	MUC	station start	18572---1	22° 4.576' S	113° 13.806' E	1329.2	0.5	172.4	8.4	106.9
SO257_5---10	2017/05/27 05:09:23.000	Multi Corer	MUC	in the water	18572---1	22° 4.585' S	113° 13.798' E	1327.9	0.8	164.7	7.9	167.3
SO257_5---10	2017/05/27 05:35:53.000	Multi Corer	MUC	max depth/on ground	18572---1	22° 4.696' S	113° 13.706' E	1324.2	0.4	176.4	9.1	17.9
SO257_5---10	2017/05/27 05:36:11.000	Multi Corer	MUC	hoisting	18572---1	22° 4.695' S	113° 13.706' E	1326.4	0.2	181.0	9.9	261.1
SO257_5---10	2017/05/27 06:03:13.000	Multi Corer	MUC	on deck	18572---1	22° 4.699' S	113° 13.712' E	1325.6	0.3	182.5	8.5	202.2
SO257_5---10	2017/05/27 06:04:12.000	Multi Corer	MUC	station end	18572---1	22° 4.700' S	113° 13.713' E	1324.4	0.4	184.4	8.6	147.8
SO257_5---11	2017/05/27 06:05:51.000	Gravity Corer	GC	station start	18572---2	22° 4.700' S	113° 13.714' E	1327.1	0.3	180.2	8.9	288.0
SO257_5---11	2017/05/27 06:11:42.000	Gravity Corer	GC	in the water	18572---2	22° 4.697' S	113° 13.715' E	1325.4	0.4	179.3	9.4	291.0
SO257_5---11	2017/05/27 06:36:17.000	Gravity Corer	GC	max depth/on ground	18572---2	22° 4.700' S	113° 13.711' E	1325.5	0.1	169.9	7.6	28.3
SO257_5---11	2017/05/27 06:37:16.000	Gravity Corer	GC	hoisting	18572---2	22° 4.700' S	113° 13.709' E	1324.9	0.1	177.0	8.5	33.9
SO257_5---11	2017/05/27 07:09:09.000	Gravity Corer	GC	on deck	18572---2	22° 4.699' S	113° 13.706' E	1324.8	0.3	185.1	8.2	341.3
SO257_5---11	2017/05/27 07:10:08.000	Gravity Corer	GC	station end	18572---2	22° 4.695' S	113° 13.706' E	1325.9	0.4	182.1	7.7	31.0
SO257_5---12	2017/05/27 10:35:05.000	Multi Corer	MUC	station start	18573---1	22° 37.246' S	112° 50.209' E	1249.9	1.1	175.6	12.0	55.0
SO257_5---12	2017/05/27 10:36:30.000	Multi Corer	MUC	in the water	18573---1	22° 37.245' S	112° 50.209' E	1250.4	0.4	169.8	11.8	18.8
SO257_5---12	2017/05/27 11:03:18.000	Multi Corer	MUC	max depth/on ground	18573---1	22° 37.243' S	112° 50.209' E	1249.1	1.1	177.7	12.8	283.4
SO257_5---12	2017/05/27 11:30:45.000	Multi Corer	MUC	on deck	18573---1	22° 37.245' S	112° 50.210' E	1251.2	0.2	172.9	14.1	182.4
SO257_5---12	2017/05/27 11:32:43.000	Multi Corer	MUC	station end	18573---1	22° 37.251' S	112° 50.206' E	1247.9	1.4	166.7	13.3	86.5

SO257_6---1	2017/05/28 01:48:56.000	Multi Corer	MUC	station start	18574---1	24° 13.893' S	112° 22.117' E	504.5	0.1	141.3	8.7	172.5
SO257_6---1	2017/05/28 01:50:37.000	Multi Corer	MUC	in the water	18574---1	24° 13.892' S	112° 22.114' E	501.9	0.4	149.6	9.8	262.5
SO257_6---1	2017/05/28 02:03:35.000	Multi Corer	MUC	max depth/on ground	18574---1	24° 13.891' S	112° 22.112' E	502.1	0.7	143.5	10.1	51.0
SO257_6---1	2017/05/28 02:04:22.000	Multi Corer	MUC	hoisting	18574---1	24° 13.891' S	112° 22.112' E	503.9	0.4	147.4	10.1	20.3
SO257_6---1	2017/05/28 02:17:26.000	Multi Corer	MUC	on deck	18574---1	24° 13.895' S	112° 22.119' E	501.8	0.8	148.3	12.9	225.5
SO257_6---1	2017/05/28 02:19:00.000	Multi Corer	MUC	station end	18574---1	24° 13.894' S	112° 22.118' E	502.9	0.5	155.2	8.8	52.7
SO257_6---2	2017/05/28 06:30:51.000	Multi Corer	MUC	station start	18575---1	24° 13.798' S	111° 51.184' E	1033.7	0.6	150.6	9.3	188.8
SO257_6---2	2017/05/28 06:32:24.000	Multi Corer	MUC	in the water	18575---1	24° 13.811' S	111° 51.181' E	1032.0	0.5	150.2	9.7	158.0
SO257_6---2	2017/05/28 06:52:58.000	Multi Corer	MUC	max depth/on ground	18575---1	24° 13.892' S	111° 51.181' E	1033.7	0.4	151.7	8.4	180.0
SO257_6---2	2017/05/28 06:53:24.000	Multi Corer	MUC	hoisting	18575---1	24° 13.892' S	111° 51.181' E	1032.4	0.5	149.6	9.6	194.4
SO257_6---2	2017/05/28 07:16:27.000	Multi Corer	MUC	on deck	18575---1	24° 13.888' S	111° 51.180' E	1033.4	0.2	170.1	8.0	166.2
SO257_6---2	2017/05/28 07:17:02.000	Multi Corer	MUC	station end	18575---1	24° 13.888' S	111° 51.181' E	1031.6	0.8	164.0	8.5	48.7
SO257_6---3	2017/05/28 11:13:29.000	Multi Corer	MUC	station start	18576---1	24° 8.404' S	111° 20.502' E	1724.8	0.2	149.9	12.8	20.0
SO257_6---3	2017/05/28 11:15:17.000	Multi Corer	MUC	in the water	18576---1	24° 8.401' S	111° 20.499' E	1725.9	0.2	158.4	13.6	254.3
SO257_6---3	2017/05/28 11:50:22.000	Multi Corer	MUC	max depth/on ground	18576---1	24° 8.391' S	111° 20.450' E	1724.3	0.4	149.1	13.8	269.8
SO257_6---3	2017/05/28 12:25:52.000	Multi Corer	MUC	on deck	18576---1	24° 8.394' S	111° 20.456' E	1726.5	0.1	161.7	14.0	146.6
SO257_6---3	2017/05/28 12:26:34.000	Multi Corer	MUC	station end	18576---1	24° 8.394' S	111° 20.456' E	1725.0	0.1	155.3	12.6	109.8
SO257_6---4	2017/05/28 12:27:22.000	Gravity Corer	GC	information	18576---2	24° 8.395' S	111° 20.457' E	1727.0	0.6	162.7	11.3	161.5
SO257_6---4	2017/05/28 12:36:27.000	Gravity Corer	GC	in the water	18576---2	24° 8.390' S	111° 20.451' E	1726.4	0.3	159.1	12.6	287.3
SO257_6---4	2017/05/28 13:08:11.000	Gravity Corer	GC	max depth/on ground	18576---2	24° 8.395' S	111° 20.460' E	1725.8	0.2	154.3	11.9	25.3
SO257_6---4	2017/05/28 13:10:08.000	Gravity Corer	GC	hoisting	18576---2	24° 8.392' S	111° 20.461' E	1727.1	0.3	146.6	11.7	183.5
SO257_6---4	2017/05/28 14:00:37.000	Gravity Corer	GC	on deck	18576---2	24° 8.394' S	111° 20.459' E	1728.1	0.9	146.7	13.4	252.9
SO257_6---4	2017/05/28 14:04:33.000	Gravity Corer	GC	station end	18576---2	24° 8.393' S	111° 20.463' E	1726.1	0.6	153.6	12.1	36.9
SO257_6---5	2017/05/28 22:44:01.000	CTD	CTD	station start	18577---1	25° 25.796' S	111° 4.991' E	1795.8	0.3	140.2	8.2	74.1
SO257_6---5	2017/05/28 22:45:29.000	CTD	CTD	in the water	18577---1	25° 25.800' S	111° 4.983' E	1793.4	0.5	139.8	9.1	47.9
SO257_6---5	2017/05/28 23:31:40.000	CTD	CTD	max depth/on ground	18577---1	25° 25.797' S	111° 4.988' E	1792.3	0.6	139.0	10.0	188.5
SO257_6---5	2017/05/29 00:16:14.000	CTD	CTD	on deck	18577---1	25° 25.795' S	111° 4.989' E	1795.0	0.3	130.1	9.1	222.3
SO257_6---5	2017/05/29 00:24:13.000	CTD	CTD	station end	18577---1	25° 25.798' S	111° 4.989' E	1795.2	0.9	124.4	9.3	60.3
SO257_6---6	2017/05/29 01:45:43.000	Multi Corer	MUC	station start	18578---1	25° 22.257' S	111° 5.712' E	1677.5	0.2	116.0	6.9	142.9
SO257_6---6	2017/05/29 01:48:28.000	Multi Corer	MUC	in the water	18578---1	25° 22.258' S	111° 5.708' E	1678.9	0.3	109.9	7.5	16.3
SO257_6---6	2017/05/29 02:22:19.000	Multi Corer	MUC	max depth/on ground	18578---1	25° 22.258' S	111° 5.713' E	1678.1	0.3	110.2	6.4	98.8
SO257_6---6	2017/05/29 02:23:27.000	Multi Corer	MUC	hoisting	18578---1	25° 22.256' S	111° 5.712' E	1678.2	0.4	106.4	6.4	2.3
SO257_6---6	2017/05/29 02:56:54.000	Multi Corer	MUC	on deck	18578---1	25° 22.257' S	111° 5.714' E	1678.5	0.4	95.1	6.5	37.0
SO257_6---6	2017/05/29 02:58:04.000	Multi Corer	MUC	station end	18578---1	25° 22.258' S	111° 5.714' E	1678.5	0.2	103.4	5.0	137.2
SO257_6---7	2017/05/29 03:00:24.000	Gravity Corer	GC	station start	18578---2	25° 22.256' S	111° 5.714' E	1675.6	0.3	107.0	6.1	90.6
SO257_6---7	2017/05/29 03:05:34.000	Gravity Corer	GC	in the water	18578---2	25° 22.262' S	111° 5.705' E	1680.5	0.5	109.3	6.6	275.3
SO257_6---7	2017/05/29 03:35:00.000	Gravity Corer	GC	max depth/on ground	18578---2	25° 22.257' S	111° 5.714' E	1680.3	0.4	98.0	6.5	6.0
SO257_6---7	2017/05/29 03:36:02.000	Gravity Corer	GC	hoisting	18578---2	25° 22.257' S	111° 5.713' E	1676.6	0.2	94.5	5.9	37.5
SO257_6---7	2017/05/29 04:13:06.000	Gravity Corer	GC	on deck	18578---2	25° 22.258' S	111° 5.710' E	1676.5	0.5	105.0	6.6	239.5
SO257_6---7	2017/05/29 04:14:47.000	Gravity Corer	GC	station end	18578---2	25° 22.257' S	111° 5.708' E	1679.5	0.8	98.7	5.9	59.9
SO257_6---8	2017/05/29 08:46:41.000	Multi Corer	MUC	station start	18579---1	25° 6.112' S	111° 50.924' E	716.3	0.8	75.5	2.7	125.5
SO257_6---8	2017/05/29 08:47:57.000	Multi Corer	MUC	in the water	18579---1	25° 6.114' S	111° 50.925' E	715.1	0.2	80.5	2.0	0.5
SO257_6---8	2017/05/29 09:06:11.000	Multi Corer	MUC	max depth/on ground	18579---1	25° 6.093' S	111° 50.931' E	715.9	0.1	53.4	0.9	257.6
SO257_6---8	2017/05/29 09:23:29.000	Multi Corer	MUC	on deck	18579---1	25° 6.090' S	111° 50.931' E	717.3	0.3	92.9	2.0	126.0
SO257_6---8	2017/05/29 09:25:43.000	Multi Corer	MUC	station end	18579---1	25° 6.096' S	111° 50.930' E	717.6	0.7	95.7	2.3	190.6
SO257_6---9	2017/05/29 09:35:22.000	Seismic Towed Receiver	SEISTR	station start	18579---1	25° 6.143' S	111° 51.129' E	898.9	2.8	109.5	1.6	269.5
SO257_6---9	2017/05/29 09:39:18.000	Seismic Towed Receiver	SEISTR	SCS in water	18579---1	25° 6.099' S	111° 50.951' E	716.6	3.0	92.0	1.3	290.8
SO257_6---9	2017/05/29 09:42:14.000	Seismic Towed Receiver	SEISTR	in the water	18579---1	25° 6.061' S	111° 50.819' E	721.3	2.4	105.0	2.5	282.4
SO257_6---9	2017/05/29 09:43:38.000	Seismic Towed Receiver	SEISTR	profile start	18579---1	25° 6.030' S	111° 50.743' E	721.8	3.7	112.9	2.0	296.1
SO257_6---9	2017/05/29 20:36:03.000	Seismic Towed Receiver	SEISTR	profile end	18579---1	24° 46.391' S	111° 0.547' E	1896.4	3.1	101.2	3.0	313.4
SO257_6---9	2017/05/29 20:42:39.000	Seismic Towed Receiver	SEISTR	on deck	18579---1	24° 46.295' S	111° 0.254' E	1899.0	2.8	157.4	1.6	258.6
SO257_6---9	2017/05/29 20:46:20.000	Seismic Towed Receiver	SEISTR	on deck	18579---1	24° 46.246' S	111° 0.106' E	1899.7	2.4	112.8	1.5	288.0
SO257_6---9	2017/05/29 20:48:50.000	Seismic Towed Receiver	SEISTR	station end	18579---1	24° 46.181' S	110° 59.967' E	1900.7	5.3	107.8	2.8	306.5
SO257_6---10	2017/05/29 22:28:59.000	Multi Corer	MUC	station start	18580---1	24° 34.159' S	111° 14.786' E	1369.7	0.8	113.6	7.5	183.2

SO257_6---10	2017/05/29 22:31:23.000	Multi Corer	MUC	in the water	18580---1	24° 34.161' S	111° 14.790' E	1369.1	0.1	107.1	7.6	79.7
SO257_6---10	2017/05/29 23:00:24.000	Multi Corer	MUC	max depth/on ground	18580---1	24° 34.136' S	111° 14.755' E	1372.4	0.4	102.4	6.4	214.5
SO257_6---10	2017/05/29 23:30:56.000	Multi Corer	MUC	on deck	18580---1	24° 34.135' S	111° 14.755' E	1371.5	0.3	97.5	6.5	63.5
SO257_6---10	2017/05/29 23:32:59.000	Multi Corer	MUC	station end	18580---1	24° 34.134' S	111° 14.756' E	1371.2	0.5	96.0	5.7	119.0
SO257_6---11	2017/05/29 23:39:42.000	Piston Corer	PC	station start	18580---2	24° 34.136' S	111° 14.760' E	1372.0	0.3	105.5	5.5	352.5
SO257_6---11	2017/05/29 23:46:29.000	Piston Corer	PC	in the water	18580---2	24° 34.138' S	111° 14.759' E	1372.5	0.7	101.7	6.7	102.4
SO257_6---11	2017/05/30 00:25:18.000	Piston Corer	PC	max depth/on ground	18580---2	24° 34.136' S	111° 14.751' E	1371.4	0.5	96.7	5.1	98.8
SO257_6---11	2017/05/30 00:27:29.000	Piston Corer	PC	hoisting	18580---2	24° 34.129' S	111° 14.755' E	1371.9	0.3	100.0	4.4	122.0
SO257_6---11	2017/05/30 01:08:50.000	Piston Corer	PC	on deck	18580---2	24° 34.136' S	111° 14.760' E	1371.9	0.3	92.0	2.6	193.6
SO257_6---11	2017/05/30 01:30:44.000	Piston Corer	PC	station end	18580---2	24° 34.131' S	111° 14.756' E	1373.9	0.2	98.6	2.5	211.7
SO257_6---12	2017/05/30 06:20:06.000	Piston Corer	PC	station start	18581---1	25° 22.246' S	111° 5.729' E	1678.2	0.6	206.8	3.0	215.2
SO257_6---12	2017/05/30 06:36:07.000	Piston Corer	PC	in the water	18581---1	25° 22.257' S	111° 5.710' E	1680.8	0.6	189.9	3.7	105.2
SO257_6---12	2017/05/30 07:11:09.000	Piston Corer	PC	max depth/on ground	18581---1	25° 22.258' S	111° 5.719' E	1675.0	0.9	188.5	4.4	227.7
SO257_6---12	2017/05/30 07:11:19.000	Piston Corer	PC	hoisting	18581---1	25° 22.257' S	111° 5.719' E	1676.9	0.6	189.2	4.1	309.3
SO257_6---12	2017/05/30 08:04:50.000	Piston Corer	PC	on deck	18581---1	25° 22.255' S	111° 5.711' E	1680.4	0.2	166.0	5.7	356.0
SO257_6---12	2017/05/30 08:09:47.000	Piston Corer	PC	station end	18581---1	25° 22.257' S	111° 5.711' E	1679.4	0.6	160.7	5.7	120.4
SO257_6---13	2017/05/30 10:56:52.000	Multi Corer	MUC	station start	18582---1	25° 53.894' S	111° 22.327' E	1548.5	0.4	145.2	7.1	122.4
SO257_6---13	2017/05/30 10:58:29.000	Multi Corer	MUC	in the water	18582---1	25° 53.896' S	111° 22.325' E	1571.5	0.3	151.4	7.1	6.6
SO257_6---13	2017/05/30 11:29:13.000	Multi Corer	MUC	max depth/on ground	18582---1	25° 53.900' S	111° 22.322' E	1588.0	0.8	151.6	7.8	249.6
SO257_6---13	2017/05/30 12:02:49.000	Multi Corer	MUC	on deck	18582---1	25° 53.900' S	111° 22.323' E	1583.0	0.2	134.4	7.1	278.2
SO257_6---13	2017/05/30 12:03:18.000	Multi Corer	MUC	station end	18582---1	25° 53.899' S	111° 22.323' E	1583.6	0.5	138.2	6.8	287.7
SO257_7---1	2017/05/30 21:57:02.000	CTD	CTD	station start	18583---1	27° 48.773' S	112° 19.408' E	1866.6	0.5	116.4	4.0	213.3
SO257_7---1	2017/05/30 21:58:13.000	CTD	CTD	in the water	18583---1	27° 48.779' S	112° 19.396' E	1873.3	0.7	114.0	4.4	32.4
SO257_7---1	2017/05/30 22:48:27.000	CTD	CTD	max depth/on ground	18583---1	27° 48.812' S	112° 19.334' E	1882.6	0.3	127.7	4.2	85.3
SO257_7---1	2017/05/30 23:30:27.000	CTD	CTD	on deck	18583---1	27° 48.813' S	112° 19.329' E	1885.0	0.2	105.9	5.4	24.5
SO257_7---1	2017/05/30 23:33:45.000	CTD	CTD	station end	18583---1	27° 48.808' S	112° 19.331' E	1883.3	0.8	118.9	4.7	27.6
SO257_7---2	2017/05/31 01:17:11.000	Multi Corer	MUC	station start	18584---1	27° 46.188' S	112° 25.222' E	1122.0	0.2	86.1	5.2	167.0
SO257_7---2	2017/05/31 01:20:51.000	Multi Corer	MUC	in the water	18584---1	27° 46.182' S	112° 25.228' E	1121.1	0.7	74.4	4.7	139.9
SO257_7---2	2017/05/31 01:43:52.000	Multi Corer	MUC	max depth/on ground	18584---1	27° 46.186' S	112° 25.231' E	1120.4	0.6	84.3	5.2	344.4
SO257_7---2	2017/05/31 01:44:26.000	Multi Corer	MUC	hoisting	18584---1	27° 46.186' S	112° 25.230' E	1122.1	0.4	89.8	3.9	250.3
SO257_7---2	2017/05/31 02:08:20.000	Multi Corer	MUC	on deck	18584---1	27° 46.183' S	112° 25.230' E	1119.5	0.3	77.4	4.0	185.5
SO257_7---2	2017/05/31 02:09:03.000	Multi Corer	MUC	station end	18584---1	27° 46.184' S	112° 25.230' E	1120.2	0.4	85.1	3.9	348.4
SO257_7---3	2017/05/31 07:20:52.000	Multi Corer	MUC	station start	18585---1	27° 15.375' S	112° 2.214' E	1180.4	0.4	139.9	2.8	20.2
SO257_7---3	2017/05/31 07:22:12.000	Multi Corer	MUC	in the water	18585---1	27° 15.369' S	112° 2.210' E	1182.7	0.4	152.5	1.4	293.6
SO257_7---3	2017/05/31 07:46:00.000	Multi Corer	MUC	max depth/on ground	18585---1	27° 15.325' S	112° 2.177' E	1183.5	0.3	165.2	2.4	174.7
SO257_7---3	2017/05/31 07:46:34.000	Multi Corer	MUC	hoisting	18585---1	27° 15.325' S	112° 2.178' E	1181.2	0.1	155.4	2.5	108.9
SO257_7---3	2017/05/31 08:13:29.000	Multi Corer	MUC	on deck	18585---1	27° 15.317' S	112° 2.174' E	1180.2	0.4	147.0	3.5	350.6
SO257_7---3	2017/05/31 08:15:45.000	Multi Corer	MUC	station end	18585---1	27° 15.319' S	112° 2.174' E	1181.5	0.2	146.7	3.5	214.9
SO257_7---4	2017/05/31 08:25:00.000	Piston Corer	PC	station start	18585---2	27° 15.322' S	112° 2.175' E	1181.7	0.6	156.5	2.6	236.8
SO257_7---4	2017/05/31 08:36:20.000	Piston Corer	PC	in the water	18585---2	27° 15.323' S	112° 2.175' E	1181.8	0.8	136.1	3.2	278.0
SO257_7---4	2017/05/31 09:05:23.000	Piston Corer	PC	max depth/on ground	18585---2	27° 15.325' S	112° 2.177' E	1179.9	0.3	130.3	3.9	237.9
SO257_7---4	2017/05/31 09:44:31.000	Piston Corer	PC	on deck	18585---2	27° 15.322' S	112° 2.176' E	1180.2	0.6	259.3	6.0	275.9
SO257_7---4	2017/05/31 09:46:24.000	Piston Corer	PC	station end	18585---2	27° 15.320' S	112° 2.177' E	1181.4	0.7	255.9	5.8	267.6
SO257_7---5	2017/05/31 11:45:21.000	Seismic Towed Receiver	SEISTR	station start	18586---1	27° 19.249' S	112° 24.968' E	800.3	3.2	264.5	1.7	104.5
SO257_7---5	2017/05/31 11:47:56.000	Seismic Towed Receiver	SEISTR	SCS in water	18586---1	27° 19.269' S	112° 25.107' E	797.8	2.7	259.9	0.8	89.7
SO257_7---5	2017/05/31 11:50:38.000	Seismic Towed Receiver	SEISTR	in the water	18586---1	27° 19.272' S	112° 25.246' E	796.0	3.1	32.7	0.1	91.9
SO257_7---5	2017/05/31 11:52:17.000	Seismic Towed Receiver	SEISTR	profile start	18586---1	27° 19.262' S	112° 25.340' E	793.9	3.7	313.9	0.3	77.5
SO257_7---5	2017/05/31 17:37:40.000	Seismic Towed Receiver	SEISTR	alter course	18586---1	27° 11.275' S	112° 50.946' E	223.6	3.9	97.4	1.2	99.1
SO257_7---5	2017/05/31 22:26:01.000	Seismic Towed Receiver	SEISTR	profile end	18586---1	27° 31.830' S	112° 58.926' E	211.3	4.4	48.0	1.3	169.9
SO257_7---5	2017/05/31 22:31:08.000	Seismic Towed Receiver	SEISTR	on deck	18586---1	27° 32.094' S	112° 59.002' E	210.6	2.8	6.7	1.2	161.6
SO257_7---5	2017/05/31 22:34:57.000	Seismic Towed Receiver	SEISTR	on deck	18586---1	27° 32.262' S	112° 59.042' E	211.7	2.6	318.9	2.2	168.8
SO257_7---5	2017/05/31 22:37:39.000	Seismic Towed Receiver	SEISTR	station end	18586---1	27° 32.426' S	112° 59.070' E	212.7	5.8	309.5	3.3	186.7
SO257_7---6	2017/06/01 02:20:41.000	Multi Corer	MUC	station start	18586---1	28° 8.508' S	112° 38.036' E	1011.9	0.5	313.3	5.1	57.3
SO257_7---6	2017/06/01 02:22:56.000	Multi Corer	MUC	in the water	18586---1	28° 8.509' S	112° 38.035' E	1014.6	0.7	307.8	5.0	123.8
SO257_7---6	2017/06/01 02:43:52.000	Multi Corer	MUC	max depth/on ground	18586---1	28° 8.508' S	112° 38.032' E	1012.5	0.1	293.2	4.2	357.7

SO257_7---6	2017/06/01 02:44:33.000	Multi Corer	MUC	hoisting	18586---1	28° 8.507' S	112° 38.031' E	1012.6	0.4	299.0	4.4	52.2
SO257_7---6	2017/06/01 03:06:10.000	Multi Corer	MUC	on deck	18586---1	28° 10.441' S	112° 36.375' E	1127.0	10.2	301.0	5.0	219.0
SO257_7---6	2017/06/01 03:07:26.000	Multi Corer	MUC	station end	18586---1	28° 8.513' S	112° 38.038' E	1014.5	0.5	296.6	5.2	302.4
SO257_7---7	2017/06/01 07:16:51.000	Multi Corer	MUC	station start	18587---1	28° 7.700' S	112° 56.273' E	799.7	0.9	285.9	2.1	267.3
SO257_7---7	2017/06/01 07:18:26.000	Multi Corer	MUC	in the water	18587---1	28° 7.712' S	112° 56.258' E	797.8	1.0	279.0	2.8	246.4
SO257_7---7	2017/06/01 07:36:13.000	Multi Corer	MUC	max depth/on ground	18587---1	28° 7.736' S	112° 56.218' E	797.7	0.1	261.3	1.9	226.6
SO257_7---7	2017/06/01 07:37:01.000	Multi Corer	MUC	hoisting	18587---1	28° 7.736' S	112° 56.219' E	798.6	0.5	268.0	2.0	173.7
SO257_7---7	2017/06/01 07:56:44.000	Multi Corer	MUC	on deck	18587---1	28° 7.737' S	112° 56.216' E	797.7	1.0	276.9	1.0	310.5
SO257_7---7	2017/06/01 07:57:43.000	Multi Corer	MUC	station end	18587---1	28° 7.737' S	112° 56.216' E	798.1	0.1	238.5	0.8	350.1
SO257_7---8	2017/06/01 13:56:58.000	Seismic Towed Receiver	SEISTR	station start	28° 43.835' S	113° 24.645' E	912.4	4.0	345.0	3.1	109.9	
SO257_7---8	2017/06/01 14:00:22.000	Seismic Towed Receiver	SEISTR	Airgun in water	28° 43.885' S	113° 24.850' E	910.6	3.0	351.8	3.4	101.1	
SO257_7---8	2017/06/01 14:02:35.000	Seismic Towed Receiver	SEISTR	information	28° 43.894' S	113° 24.974' E	909.5	2.5	354.8	4.3	93.5	
SO257_7---8	2017/06/01 14:05:08.000	Seismic Towed Receiver	SEISTR	information	28° 43.855' S	113° 25.134' E	903.9	4.1	347.1	3.0	64.9	
SO257_7---8	2017/06/01 14:06:05.000	Seismic Towed Receiver	SEISTR	profile start	28° 43.827' S	113° 25.201' E	902.7	4.2	345.1	3.4	64.7	
SO257_7---8	2017/06/01 16:00:42.000	Seismic Towed Receiver	SEISTR	alter course	28° 41.012' S	113° 33.519' E	253.5	2.9	320.4	6.2	49.9	
SO257_7---8	2017/06/01 19:28:39.000	Seismic Towed Receiver	SEISTR	alter course	28° 35.113' S	113° 29.188' E	337.7	2.3	255.7	8.5	334.6	
SO257_7---8	2017/06/01 22:00:52.000	Seismic Towed Receiver	SEISTR	profile end	28° 29.527' S	113° 25.984' E	316.3	1.5	233.0	7.7	327.7	
SO257_7---8	2017/06/01 22:05:05.000	Seismic Towed Receiver	SEISTR	on deck	28° 29.469' S	113° 25.957' E	325.7	1.4	236.4	8.5	263.0	
SO257_7---8	2017/06/01 22:08:41.000	Seismic Towed Receiver	SEISTR	on deck	28° 29.435' S	113° 25.945' E	324.7	1.1	231.5	7.3	8.0	
SO257_7---8	2017/06/01 22:10:21.000	Seismic Towed Receiver	SEISTR	station end	28° 29.383' S	113° 25.918' E	326.7	3.5	231.3	7.9	331.9	
SO257_7---9	2017/06/02 00:27:02.000	Multi Corer	MUC	station start	18588---1	28° 23.082' S	113° 0.996' E	811.4	0.1	189.8	5.7	52.8
SO257_7---9	2017/06/02 00:28:14.000	Multi Corer	MUC	in the water	18588---1	28° 23.085' S	113° 0.992' E	810.2	0.6	196.1	7.7	9.3
SO257_7---9	2017/06/02 00:46:53.000	Multi Corer	MUC	max depth/on ground	18588---1	28° 23.084' S	113° 0.992' E	811.5	0.4	196.5	7.0	51.1
SO257_7---9	2017/06/02 00:47:23.000	Multi Corer	MUC	hoisting	18588---1	28° 23.084' S	113° 0.993' E	812.8	0.5	193.1	7.0	228.3
SO257_7---9	2017/06/02 01:06:30.000	Multi Corer	MUC	on deck	18588---1	28° 23.083' S	113° 0.991' E	812.1	0.9	185.3	7.9	179.3
SO257_7---9	2017/06/02 01:08:37.000	Multi Corer	MUC	station end	18588---1	28° 23.082' S	113° 0.990' E	814.0	0.5	188.6	7.2	13.4
SO257_7---10	2017/06/02 01:09:37.000	Piston Corer	PC	information	18588---2	28° 23.082' S	113° 0.989' E	812.2	0.5	189.7	6.7	352.5
SO257_7---10	2017/06/02 01:32:36.000	Piston Corer	PC	in the water	18588---2	28° 23.080' S	113° 0.993' E	810.1	0.3	192.0	7.7	334.1
SO257_7---10	2017/06/02 01:51:42.000	Piston Corer	PC	max depth/on ground	18588---2	28° 23.080' S	113° 0.996' E	812.1	0.3	195.0	8.5	128.9
SO257_7---10	2017/06/02 01:52:36.000	Piston Corer	PC	hoisting	18588---2	28° 23.081' S	113° 0.995' E	811.4	0.8	201.3	8.6	192.2
SO257_7---10	2017/06/02 02:28:18.000	Piston Corer	PC	on deck	18588---2	28° 22.939' S	113° 1.257' E	805.0	0.6	189.1	8.2	117.7
SO257_7---10	2017/06/02 02:29:16.000	Piston Corer	PC	station end	18588---2	28° 22.941' S	113° 1.258' E	803.6	0.8	187.5	8.2	176.7
SO257_7---11	2017/06/02 06:47:42.000	Multi Corer	MUC	station start	18589---1	28° 58.025' S	112° 52.621' E	2484.6	0.7	165.5	5.4	257.7
SO257_7---11	2017/06/02 06:49:55.000	Multi Corer	MUC	in the water	18589---1	28° 58.032' S	112° 52.602' E	2485.8	1.1	149.3	5.2	239.5
SO257_7---11	2017/06/02 07:36:20.000	Multi Corer	MUC	max depth/on ground	18589---1	28° 58.073' S	112° 52.558' E	2390.5	0.3	157.3	4.3	68.2
SO257_7---11	2017/06/02 07:36:37.000	Multi Corer	MUC	hoisting	18589---1	28° 58.073' S	112° 52.558' E	2390.5	0.1	153.6	4.4	11.3
SO257_7---11	2017/06/02 08:26:37.000	Multi Corer	MUC	on deck	18589---1	28° 58.072' S	112° 52.560' E	2728.8	0.1	153.1	4.7	224.4
SO257_7---11	2017/06/02 08:30:24.000	Multi Corer	MUC	station end	18589---1	28° 58.074' S	112° 52.563' E	2486.8	0.3	170.3	5.8	78.5
SO257_7---12	2017/06/02 08:31:02.000	Piston Corer	PC	station start	18589---2	28° 58.074' S	112° 52.564' E	2485.3	1.9	161.2	5.0	267.4
SO257_7---12	2017/06/02 08:39:13.000	Piston Corer	PC	in the water	18589---2	28° 58.073' S	112° 52.564' E	2732.1	0.6	160.0	5.3	232.3
SO257_7---12	2017/06/02 09:35:47.000	Piston Corer	PC	max depth/on ground	18589---2	28° 58.076' S	112° 52.562' E	2496.8	0.1	156.3	4.1	305.3
SO257_7---12	2017/06/02 10:45:31.000	Piston Corer	PC	on deck	18589---2	28° 58.075' S	112° 52.563' E	2496.1	0.3	144.5	4.6	71.9
SO257_7---12	2017/06/02 10:52:47.000	Piston Corer	PC	station end	18589---2	28° 58.075' S	112° 52.565' E	2497.1	0.5	163.8	4.4	251.3
SO257_7---13	2017/06/02 13:14:55.000	CTD	CTD	station start	18590---1	29° 18.686' S	113° 6.282' E	2648.6	0.3	135.7	4.2	3.5
SO257_7---13	2017/06/02 13:18:05.000	CTD	CTD	in the water	18590---1	29° 18.700' S	113° 6.289' E	2642.6	1.6	133.1	4.6	99.2
SO257_7---13	2017/06/02 14:27:46.000	CTD	CTD	max depth/on ground	18590---1	29° 18.723' S	113° 6.300' E	2643.5	0.4	131.1	5.0	150.8
SO257_7---13	2017/06/02 14:28:41.000	CTD	CTD	hoisting	18590---1	29° 18.724' S	113° 6.298' E	2641.8	0.6	134.0	4.7	101.7
SO257_7---13	2017/06/02 15:21:08.000	CTD	CTD	on deck	18590---1	29° 18.723' S	113° 6.299' E	2642.8	0.2	155.4	5.4	350.6
SO257_7---13	2017/06/02 15:22:01.000	CTD	CTD	station end	18590---1	29° 18.723' S	113° 6.299' E	2642.7	1.2	152.7	4.6	62.4
SO257_7---14	2017/06/02 15:27:46.000	Seismic Towed Receiver	SEISTR	station start	29° 18.724' S	113° 6.299' E	2648.0	0.5	134.4	4.7	49.0	
SO257_7---14	2017/06/02 15:33:43.000	Seismic Towed Receiver	SEISTR	Airgun in water	29° 18.769' S	113° 6.127' E	2687.8	2.9	165.2	5.3	251.4	
SO257_7---14	2017/06/02 15:36:39.000	Seismic Towed Receiver	SEISTR	information	29° 18.798' S	113° 6.008' E	2682.8	2.9	141.6	4.2	268.4	
SO257_7---14	2017/06/02 15:37:46.000	Seismic Towed Receiver	SEISTR	information	29° 18.813' S	113° 5.959' E	2683.2	3.3	152.8	5.0	247.4	
SO257_7---14	2017/06/02 15:45:35.000	Seismic Towed Receiver	SEISTR	alter course	29° 19.015' S	113° 5.453' E	2782.4	5.1	147.0	4.5	264.0	
SO257_7---14	2017/06/02 16:00:40.000	Seismic Towed Receiver	SEISTR	profile start	29° 18.491' S	113° 5.712' E	2690.2	4.4	140.2	4.7	95.3	
SO257_7---14	2017/06/02 22:01:10.000	Seismic Towed Receiver	SEISTR	profile end	29° 20.434' S	113° 37.031' E	1694.1	4.0	173.7	5.9	87.2	
SO257_7---14	2017/06/02 22:05:42.000	Seismic Towed Receiver	SEISTR	on deck	29° 20.424' S	113° 37.289' E	1667.0	2.5	165.5	6.0	88.6	
SO257_7---14	2017/06/02 22:09:31.000	Seismic Towed Receiver	SEISTR	on deck	29° 20.403' S	113° 37.492' E	1635.4	3.0	161.4	5.6	89.9	
SO257_7---14	2017/06/02 22:10:07.000	Seismic Towed Receiver	SEISTR	station end	29° 20.400' S	113° 37.524' E	1642.1	3.2	179.6	5.8	86.5	

Appendix C

Profiles / Profile

Profil-Nr. GeoEEL	Date	Time Start	Time End	Latitude Start	Longitude Start	Latitude End	Longitude End	Geo-metrics FFN Start	Geo-metrics FFN End
SO257	2017	UTC	UTC	xx° xx.x'	xx° xx.x'	xx° xx.x'	xx° xx.x'		
001	14.05.	5:18	8:43	15°01.828	120°23.175	15°09.277	120°38.051	842	3889
002	14.05.	8:48	9:30	15°09.654	120°38.165	15°12.573	120°36.526	3960	4573
003	14.05.	9:33	14:38	15°12.645	120°36.386	15°01.516	120°14.877	4618	9143
004	14.05.	14:44	16:11	15°01.247	120°14.766	14°55.325	120°18.405	9222	10515
005	14.05.	16:16	17:28	14°55.150	120°18.747	14°57.353	120°23.779	10594	11656
006	14.05.	17:54	20:11	14°57.037	120°22.584	15°05.819	120°17.266	12043	14071
007	14.05.	20:18	21:37	15°06.286	120°17.514	15°09.064	120°22.510	14177	15340
008	14.05.	21:40	23:11	15°09.086	120°22.765	15°03.240	120°26.160	15397	16737
009	15.05.	5:51	6:56	15°02.866	120°17.767	14°59.200	120°15.246	18000	18959
010	15.05.	7:01	9:26	14°58.887	120°15.884	15°03.978	120°25.408	19034	21187
011	15.05.	9:30	11:18	15°03.983	120°25.700	14°57.213	120°29.656	21240	22846
012	15.05.	11:19	12:01	14°57.158	120°29.679	14°55.479'	120°26.776'	22859	23484
013	15.05.	12:05	14:46	14°55.545	120°26.508'	15°07.599	120°19.837	23533	25915
014	16.05.	11:51	20:37	16°39.609	118°31.634	17°06.755	119°03.039	26010	33785
015	17.05.	8:29	14:35	17°36.093	118°27.007	18°24.227	118°46.049	34016	46191
016	18./19.05	13:59	0:41	18°19.170	117°14.310	18°59.655	117°38.655	47555	59738
017	19.05.	10:15	20:01	18°08.650	117°01.970	17°10.549	117°10.550	60050	68113
018	21.05.	13:01	22:32	18°54.055	115°13.002	18°54.000	115°12.965	70005	79518
019	22.05.	8:47	10:26	19° 47.268	115°47.640	19°56.228	115°33.381	80015	84364
020	22.05.	12:30	21:33	19°56.339	115°33.000	19°26.634	115°00.265	84460	93770
021	23.05.	10:00	18:16	19°52.697	114°55.754	20°28.984	115°10.351	95000	104136
022	23.05.	18:16	22:00	20°28.984	115°10.351	20°34.440	114°53.440	104137	108557
024	25.05.	11:18	15:44	20°40.907	113°17.328	20°19.940	113°13.071	110365	114315
025	25.05.	15:53	22:34	20°19.457	113°13.538	20°38.22	113°39.720	114444	120388
026	29.05.	9:52	20:36	25°05.738	111°50.013	25°0.090	111°49.260	130500	141007
027	31.05.	12:01	17:35	27°18.780	112°26.580	27°11.281	112°50.830	142135	148729
028	31.05.	17:43	22:19	27°11.464	112°51.339	27°31.320	112°58.740	148884	153320
029	01.06.	14:04	16:02	28°43.841	113°25.176	28°40.907	113°33.590	155000	157333
030	01.06.	16:11	22:00	28°40.563	113°33.572	28°30.283	113°26.410	157507	163918
032	02.06.	15:54	22:00	29°18.451	113°05.284	29°20.400	113°36.900	164172	168169

Appendix D

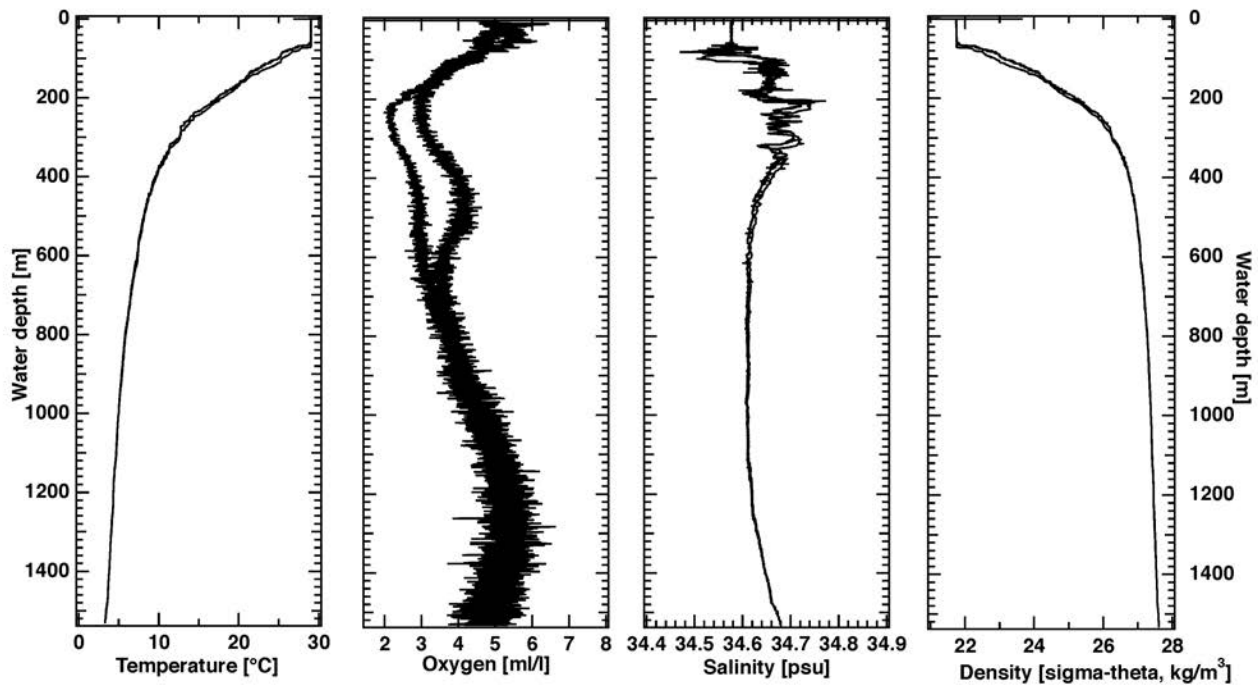
***Stations: CTD, multicores, box core, gravity cores and piston cores
(Samples /Proben)***

	18546	CTD-1			
Date	2017 05 14	*	-	-	-
Start (UTC)	02:00	02:03	-	-	-
Latitude (S)	15°0,012'	15°0,017'	-	-	-
Longitude (E)	120°23,958'	120°23,971'	-	-	-
Waterdepth (m)	1532,6	1531,3	-	-	-

CTD 18546-1

Water samples taken at (m): 1520, 900, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 1520, 900, 200, 5



CTD profiles of station 18546

Station SO257-1-3**SO257-18547**

	18547		MUC-1		
Date	2017 05 14	-	*	-	-
Start (UTC)	23:44	-	23:46	-	-
Latitude (S)	15°3,309'	-	15°3,306'	-	-
Longitude (E)	120°26,169'	-	120°26,174'	-	-
Waterdepth (m)	1460,3	-	1460,5	-	-

MUC 18547-1

12 of 12 tubes recovered

Recovery: 21-23 cm

	18548		MUC-1	KL-2	
Date	2017 05 15	-	*	*	-
Start (UTC)	01:58	-	02:01	03:50	-
Latitude (S)	15°3,591'	-	15°3,595'	15°3,584'	-
Longitude (E)	120°18,846'	-	120°18,840'	120°18,858'	-
Waterdepth (m)	1608,2	-	1610,1	1608,9	-

MUC 18548-1

12 of 12 tubes recovered

Recovery: 22-24 cm

KL 18548-2 (15 m)

Total length: 11,3 m

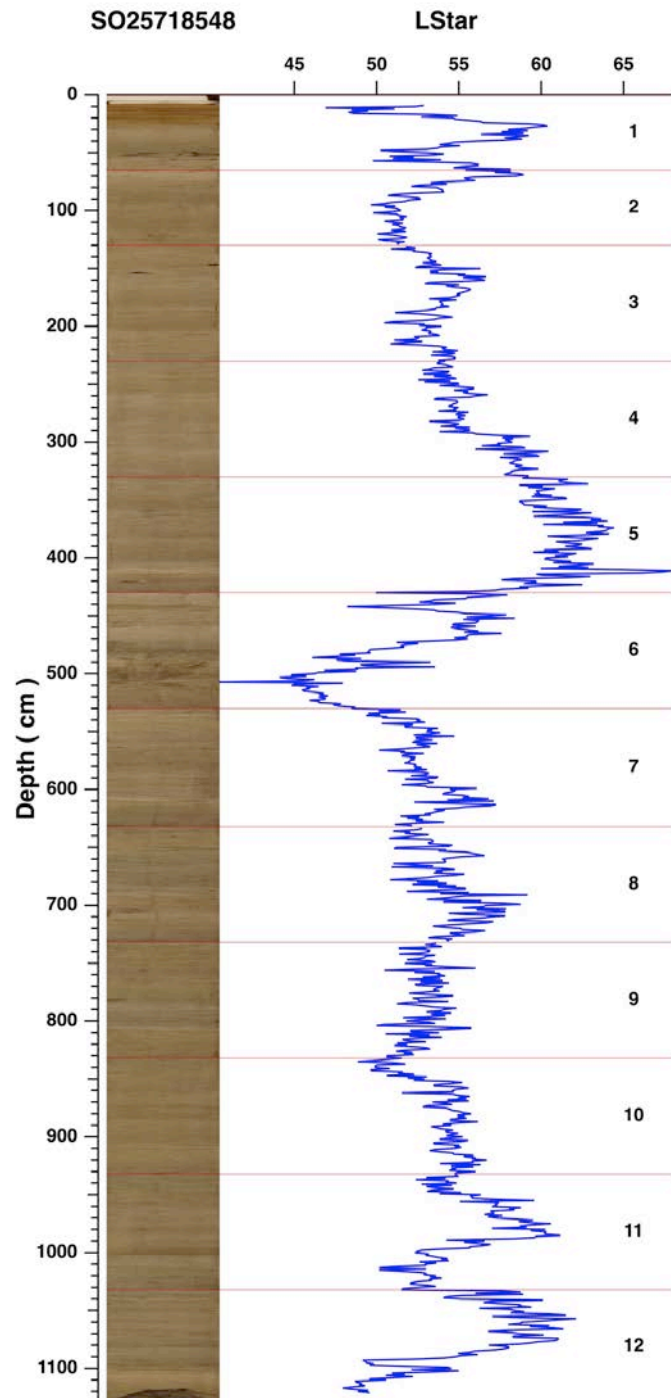
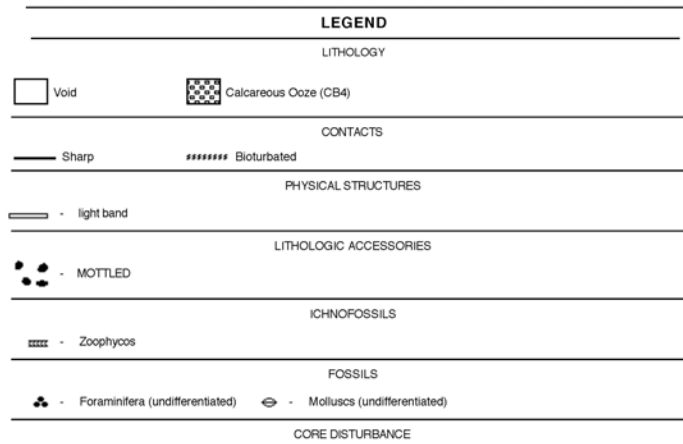
Number of sections: 12

Sections 1	0-65 cm
Sections 2	65-130 cm
Sections 3	130-230 cm
Sections 4	230-330 cm
Sections 5	330-430 cm
Sections 6	430-530 cm
Sections 7	530-632 cm
Sections 8	632-732 cm
Sections 9	732-832 cm
Sections 10	832-932 cm
Sections 11	932-1032 cm
Sections 12	1032-1130 cm

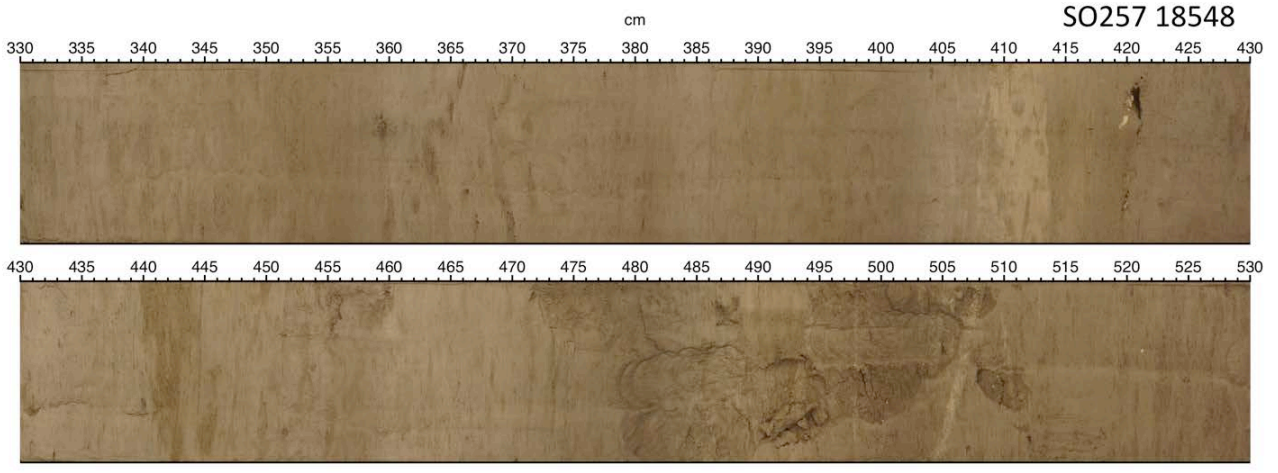
SO257_18548_PC
15°3.5850'S, 120°18.8590'E

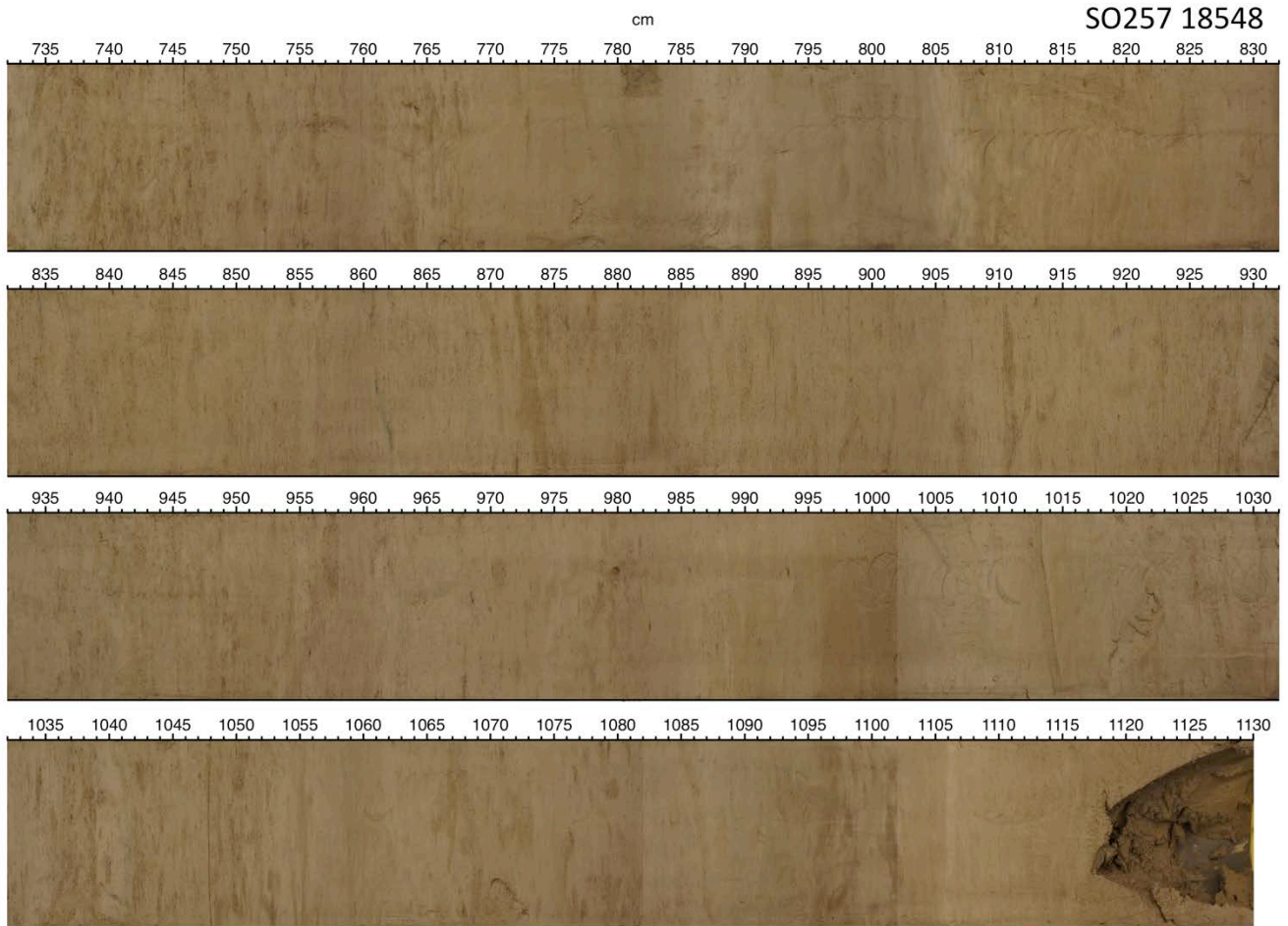
Date logged: May 15, 2017
Logged by: Steven Clemens, Alan Dillon
Ground: 1607.00 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0 to 8 cm is void. 8 to 12 cm is a reddish brown redox zone (0.8Y 5.2/2.7; minotta). 12 to 22 cm is gradational interval to mottled greenish grey (0.3GY 5.2/1.1; minotta) / darker greenish grey calcareous ooze characteristic of the remainder of the section (22 to 65 cm). The gradational interval (12 to 22 cm) has 4 one cm thick dark grey bands. Foraminifera visible throughout.
2									Section 2. 1 to 65 cm is mottled greenish grey (7.6Y 4.95/1.07; minotta) / darker greenish grey calcareous ooze. 22 to 65 cm is slightly darker than 1 to 22 cm interval - gradational contact.
3									Section 3. 1 to 100 cm is mottled greenish grey (9.6Y 5.17/0.99; minotta) / darker greenish grey calcareous ooze. Open burrow at 7 cm. Sub horizontal 2 cm thick foram sand 78 cm to 84 cm (filled Zoophycos burrow?).
4									Section 4. 1 to 58 cm is mottled greenish grey (3.6GY 5.4/0.85; minotta) / darker greenish grey calcareous ooze grading to darker hue (1.6GY 4.43/0.8; minotta) from 58 to 100 cm.
5									Section 5. 1 to 79 cm and 85 to 100 cm is mottled greenish grey (2.2GY 6.16/0.8; minotta) / darker greenish grey calcareous ooze. 79 to 85 cm is light green (0.4gy 6.41/1.36; minotta) with sharp lower contact and bioturbated upper contact. Large bivalve shell spanning section face.
6									Section 6. 0 to 63 cm and 81 to 100 cm is mottled greenish grey (2.2GY 6.16/0.8; minotta) / darker greenish grey calcareous ooze. From 63 to 81 cm several distinct horizontal (Zoophycos?) burrows.
7									Section 7. 0cm - 102cm 0.1GY 5.1/0.8 greenish gray with darker mottling.
8									Section 8. 0-100 cm; greenish gray with reddish mottling until around 50 cm, from 50-100 cm slightly darker mottling (5GY 5/1 minotta).
9									Section 9. 0-77 cm; greenish gray until around 77 cm, from 77-100 cm slightly darker grey, 5GY 5/1, undifferentiated foraminifera throughout, visible to the naked eye
10									Section 10. <mottled throughout, green coloring at 30-31 cm. 1-19cm is light grey (1GY 5/1), 25-93 cm darker grey (2GY 5/1), 93-100cm light grey (1GY 5/1)
11									Section 11. mottled throughout, but more intensively from 0-30 cm and 65-100 cm. Sediments are dark grey between 1 and 22 cm (3GY 5/), light grey between 22 and 58 (2GY 5/1), and light grey between 58 and 100 (2GY 5/1)
12									Section 12. Light grey (2GY 6/1) calcareous ooze from 0-71 cm. Mottled throughout. Dark grey (8Y 5/1) calcareous ooze from 71-85 cm. Core catcher void (85 to 98 cm)



SO257 18548



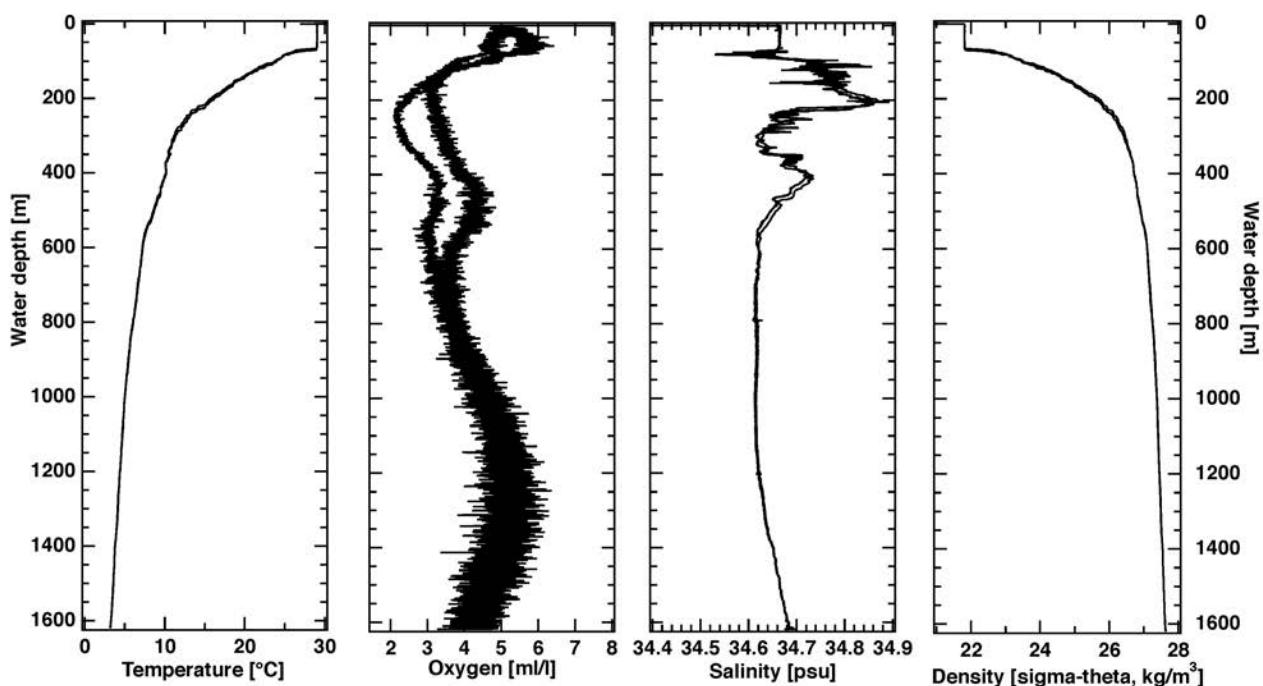


	18549	CTD-1	MUC-2	KL-3	SL-4
Date	2017 05 15	*	2017 05 16	*	*
Start (UTC)	22:59	23:00	01:00	02:32	05:05
Latitude (S)	15°58,040'	15°58,035'	15°57,689'	15°57,693'	15°57,688'
Longitude (E)	119°30,978'	119°30,980'	119°30,580'	119°30,579'	119°30,581'
Waterdepth (m)	1620,8	1621,3	1628,5	1628,1	1626,5

CTD 18549-1

Water samples taken at (m): 1620, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 1620, 900, 300, 200, 10



CTD profiles of station 18549

MUC 18549-2, 12 of 12 tubes recovered, Recovery: 21,5-24 cm

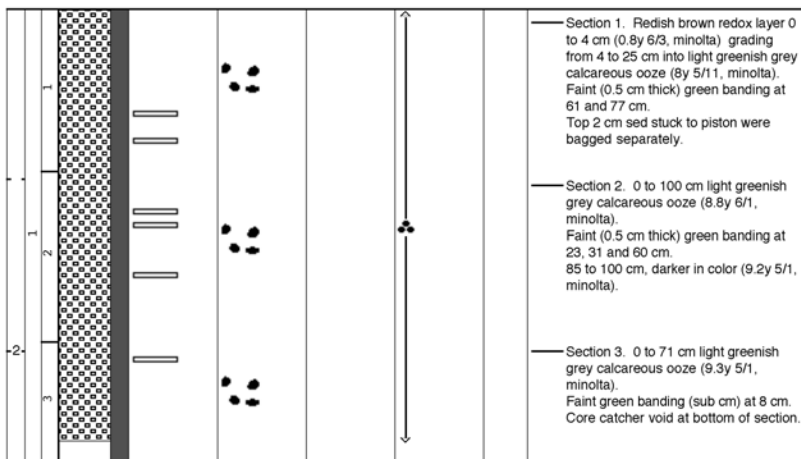
KL 18549-3 (15 m), Total length: 2,66 m Number of sections: 3

KL-Sections 1	0-95 cm
KL-Sections 2	95-195 cm
KL-Sections 3	195-266 cm

SO257-18549 PC
15°57.6980'S, 119°30.5800'E

Date logged: May 16, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 1627.00 m KB: 0.00 m

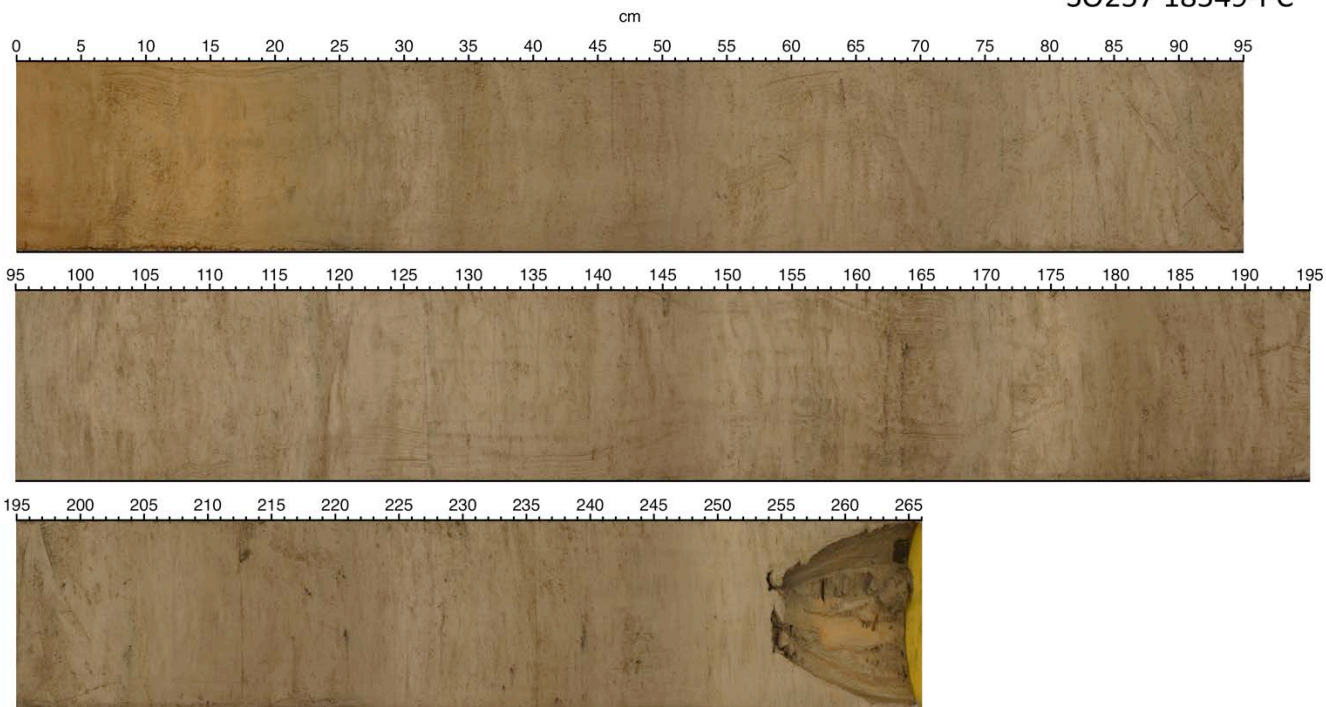
METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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LEGEND

LITHOLOGY	
	Void
	Calcareous Ooze (CB4)
PHYSICAL STRUCTURES	
	light band
LITHOLOGIC ACCESSORIES	
	MOTTLED
FOSSILS	
	Foraminifera (undifferentiated)
CORE DISTURBANCE	

SO257 18549-PC



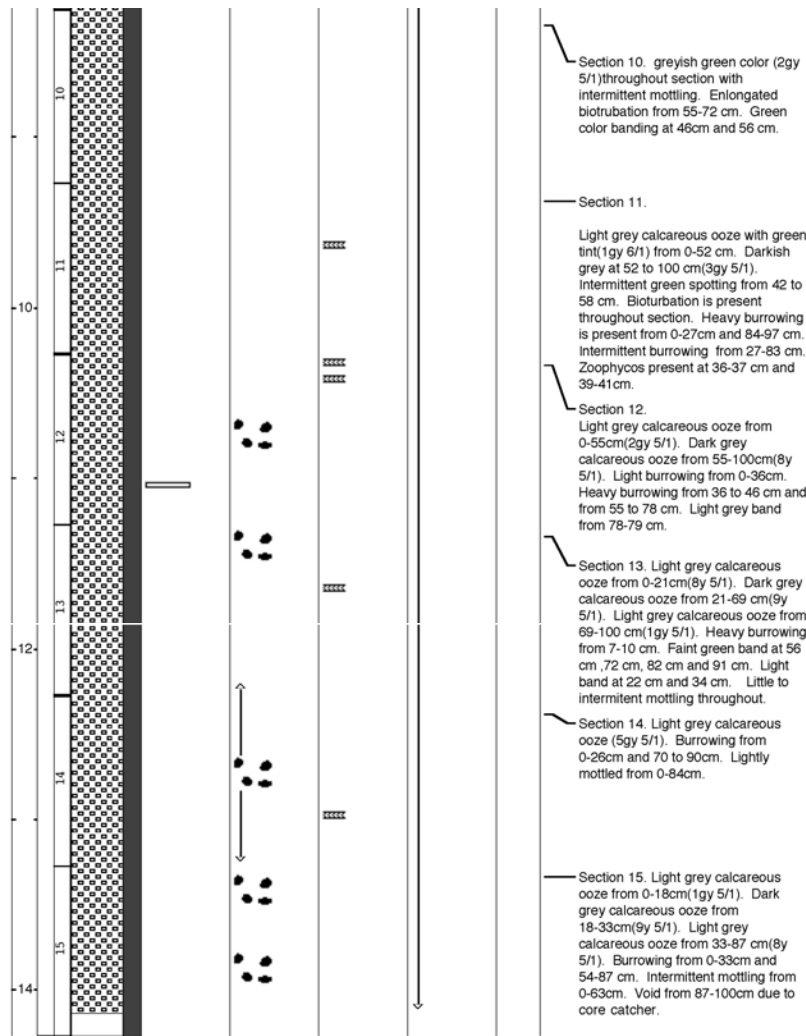
SL 18549-4 (15m), Total length: 14,27 m Number of sections: 15

SL-Sections 1	0-60 cm
SL-Sections 2	60-130 cm
SL-Sections 3	130-230 cm
SL-Sections 4	230-330 cm
SL-Sections 5	330-425 cm
SL-Sections 6	425-525 cm
SL-Sections 7	525-625 cm
SL-Sections 8	625-725 cm
SL-Sections 9	725-825 cm
SL-Sections 10	825-927 cm
SL-Sections 11	927-1027 cm
SL-Sections 12	1027-1127 cm
SL-Sections 13	1127-1227 cm
SL-Sections 14	1227-1327 cm
SL-Sections 15	1327-1427 cm

SO257_18549_GC
 15°57.6980'S, 119°30.5800'E

Date logged: May 16, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1627.00 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. Void 0 to 6 cm. Reddish brown redox interval 6 to 10 cm grading between 10 and 17 cm to mottled light greenish grey carbonate ooze (7.6y 6/1, minolta) for remainder of section to 60 cm. Smear slide at 15 cm indicates volcanic ash.
2									Section 2. 0 to 70 cm Light greenish grey carbonate ooze (8.3y 5/1, Minolta).
3									Section 3. 0 to 100 cm mottled light greenish grey (7.5y 5/1, Minolta).
4									Section 4. 0 to 27 cm and 54 to 100 cm light greenish grey (0.2y 6/1, Minolta) with slightly darker layer (9.6y 5/1) from 27 to 54 cm.
5									Section 5. Light greenish grey (1.1GY 5/1, Minolta) grading slowly to darker hue (9.5y 5/1, Minolta) from 0 to bottom of section at 95 cm. Dark spots (pyrite?) at 29 and 70 cm. Subhorizontal light band (0.5 cm) at 62 cm. Greenish bands (cm scale) at 29 and 40 cm.
6									Section 6. 0 to 18 cm dark greenish grey (0.1GY 5/1, Minolta) grading to lighter hue (1gy 5/1, Minolta) at 18 cm and continuing to the bottom of section at 100 cm. Dark spots at 13, 41, and 55 cm.
7									Section 7. 0 to 100 cm greenish grey calcareous ooze (0.7gy 5/1, Minolta).
8									Section 8. 0 to 100 cm greenish grey calcareous ooze (2.7gy 6/1, Minolta). Fossil at 59 cm. Prominent subhorizontal burrow structures 0 to 20 cm. Green band (1 to 2 cm thick) at 1 to 3 cm.
9									Section 9. 0-37 cm greenish grey calcareous ooze (5gy 5/1). Partial green band at 21 cm, and 42 cm. Mottled from 0-49 cm. Darker greenish grey (9y 5/1) from 38-100 cm. Non linear band from 50-54 cm appx 2 cm thick (?). Apparent bioturbation from 0-53 cm.



LEGEND

LITHOLOGY

- Void
- Calcareous Ooze (CB4)

PHYSICAL STRUCTURES

- Low Angle Tabular Bedding
- Dark spots
- light band

LITHOLOGIC ACCESSORIES

- MOTTLED

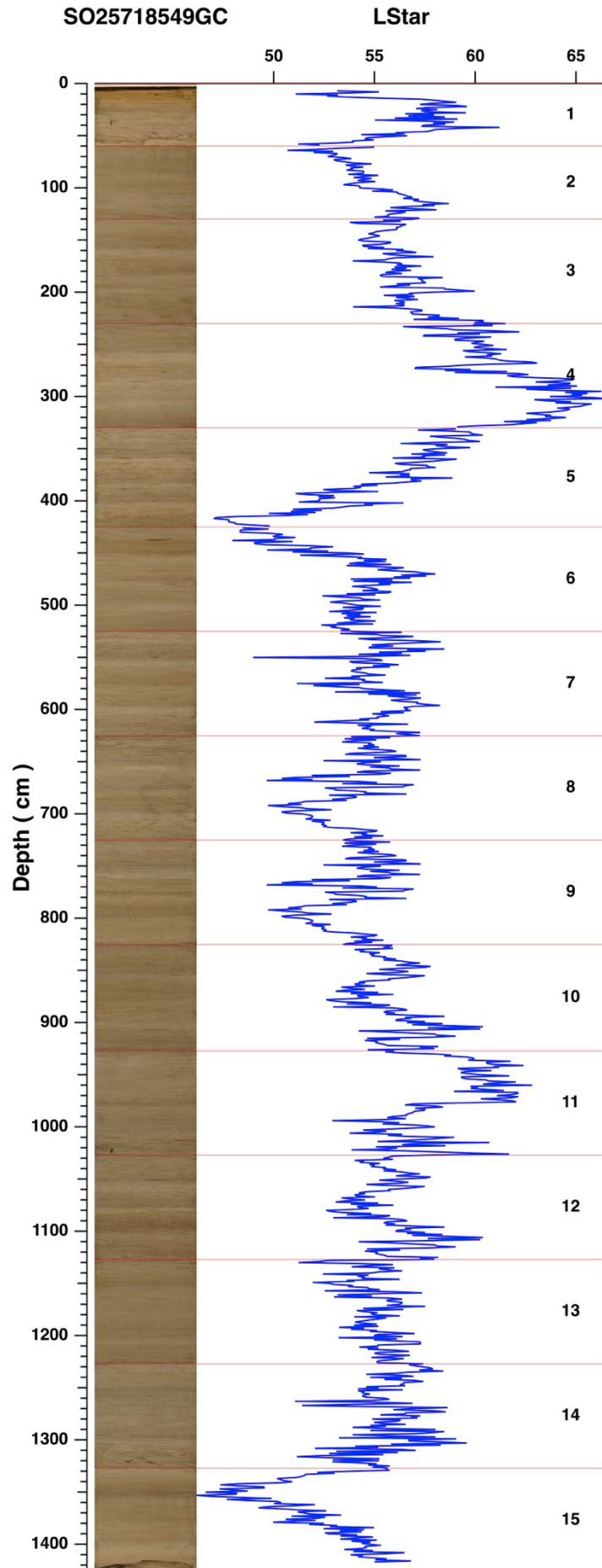
ICHTNOFOSSILS

- Zoophycos

FOSSILS

- Foraminifera (undifferentiated)

CORE DISTURBANCE

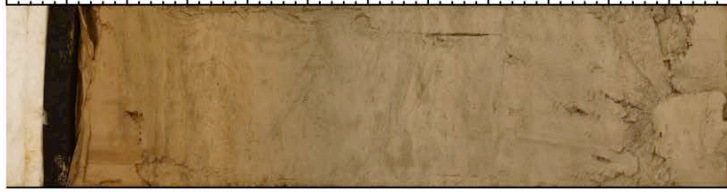


Station SO257-2-1,2,3,4

SO257-18549

SO257 18549-GC

cm
0 5 10 15 20 25 30 35 40 45 50 55 60



60 65 70 75 80 85 90 95 100 105 110 115 120 125 130



130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230

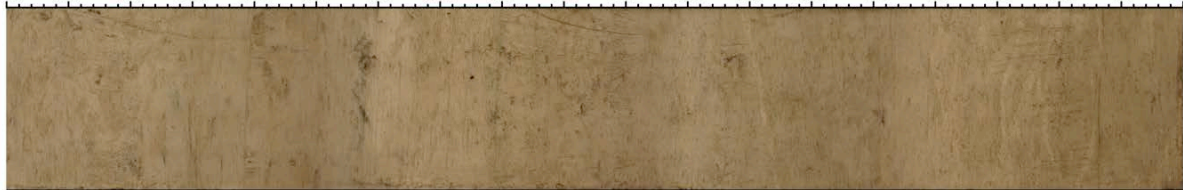


230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330



SO257 18549-GC

cm
330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425



425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525



525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625



625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725



Station SO257-2-1,2,3,4

SO257-18549



	18550		MUC-1	KL-2	
Date	2017 05 16	-	*	2017 05 17	-
Start (UTC)	23:38	-	23:41	01:10	-
Latitude (S)	16°51,552'	-	16°51,556'	16°51,569'	-
Longitude (E)	118°45,420'	-	118°45,423'	118°45,420	-
Waterdepth (m)	1388	-	1388	1387,9	-

MUC 18550-1

12 of 12 tubes recovered

Recovery: 17,5-19,5 cm

KL 18550-2 (20 m)

Total length: 16,21 m

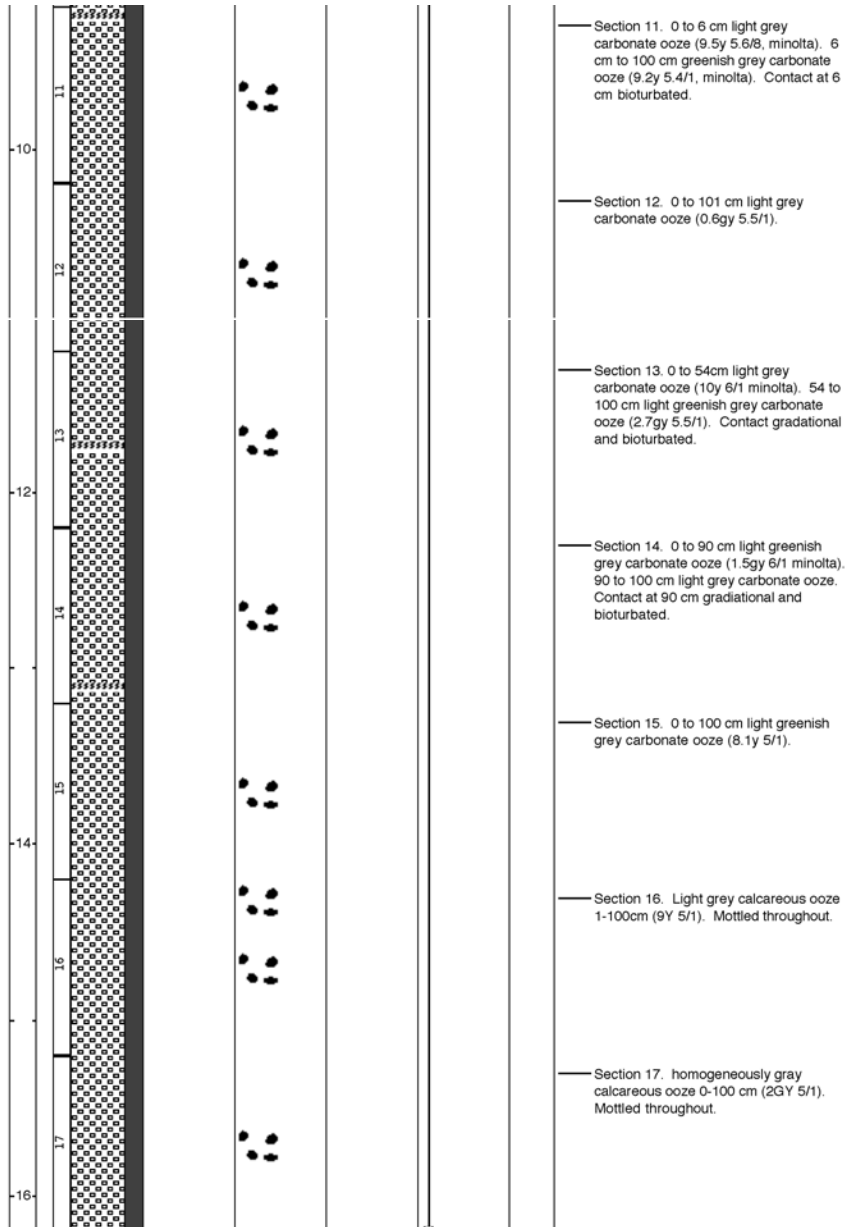
Number of sections: 17

KL-Sections 1	0-60 cm
KL-Sections 2	60-115 cm
KL-Sections 3	115-215 cm
KL-Sections 4	215-316 cm
KL-Sections 5	316-417 cm
KL-Sections 6	417-518 cm
KL-Sections 7	518-619 cm
KL-Sections 8	619-719 cm
KL-Sections 9	719-819 cm
KL-Sections 10	819-919 cm
KL-Sections 11	919-1019 cm
KL-Sections 12	1019-1120 cm
KL-Sections 13	1120-1220 cm
KL-Sections 14	1220-1320 cm
KL-Sections 15	1320-1420 cm
KL-Sections 16	1420-1520 cm
KL-Sections 17	1520-1621 cm

SO257 18550 PC
 16°51.5690'S, 118°45.4200'E



Date logged: May 17, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1387.00 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section #1. 0 to 10 cm void. 10 to 15 cm brown oxidized layer (0.5y 5/2.5 minolta) grading from 15 to 20 cm to light grey carbonate ooze (9.5y 5.5/1 minolta) for remainder of section, to 60 cm.
2									Section #2. Light grey calcareous ooze from 0-31(5.9y 5.6/1.1. minolta) grading to darker grey calcareous ooze from 31-55 cm. Prominent burrows in upper section 0-23 cm.
3									Section 3. 0 to 100 cm light grey ooze (6.2y 5.5/1). Shell material at 45 and 74 cm.
4									Section 4. 0 to 101 cm light greenish grey ooze (9.6y 5.5/1 minolta). Shell material at 18 cm, dark spot (1 cm) at 67 cm.
5									Section 5. 0 to 101 cm light greenish grey ooze (9.6y 5.8/1 minolta). Green band (1 cm) at 20cm.
6									Section 6. 0 to 101 cm light greenish grey ooze (0.4gy 6/1).
7									Section 7. 0 to 75 cm light grey calcareous ooze (9.7y 5/1, minolta). 75 to 101 cm, very light grey calcareous ooze (7.7y 5.6/1, minolta). Contact at 75 cm bioturbated. Light colored subhorizontal band (0.5 cm thick) at 40 cm.
8									Section 8. 0 to 100 cm very light grey carbonate ooze (9.7y 5/1, minolta).
9									Section 9. 0 to 100 cm light grey carbonate ooze (0.7gy 5.5/9 minolta). Lighter color interval 52 to 56 cm.
10									Section 10. 0 to 100 cm light grey carbonate ooze (0.8gy 5.4/8, minolta) with slightly darker interval 98 to 100 cm.



LEGEND

LITHOLOGY

-  Void
-  Calcareous Ooze (CB4)


CONTACTS

-  Bioturbated

PHYSICAL STRUCTURES

-  - Dark spots

LITHOLOGIC ACCESSORIES

-  - MOTTLED

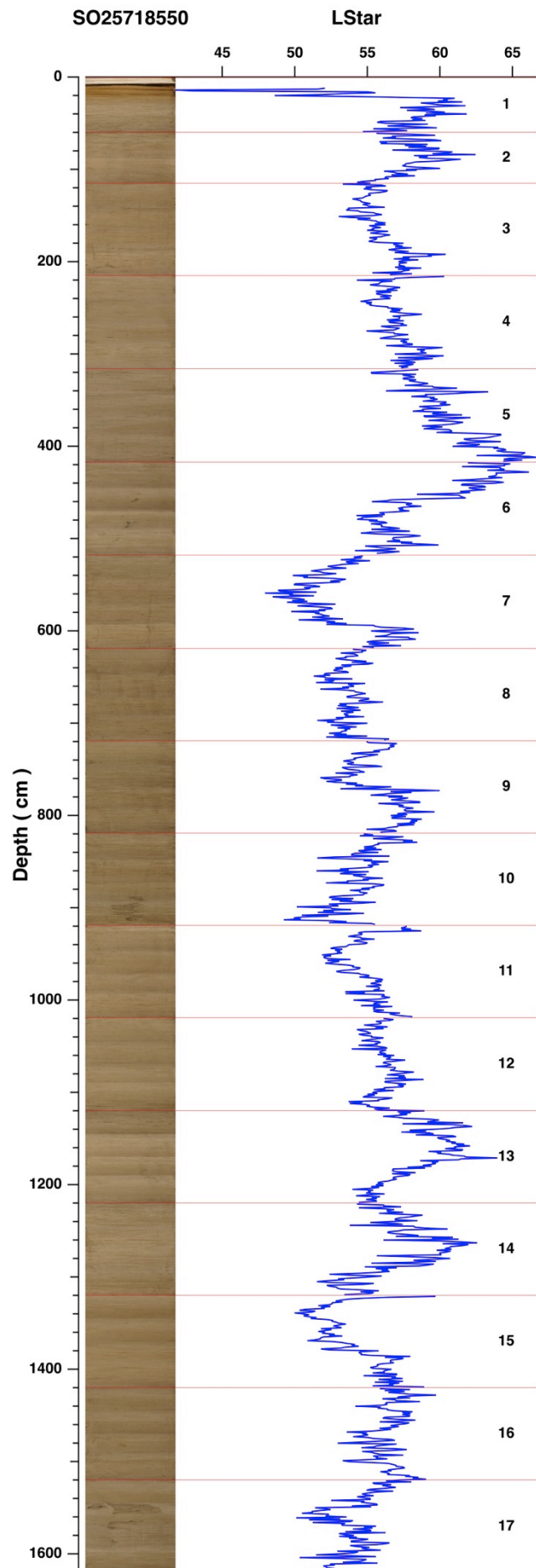
ICHNOFOSSILS

-  - Zoophycos

FOSSILS

-  - Foraminifera (undifferentiated)

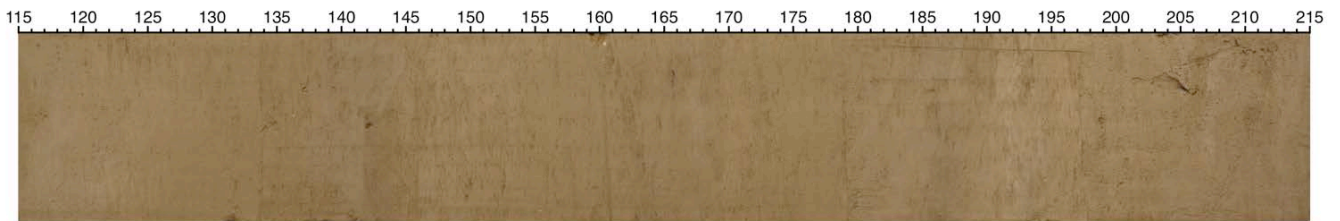
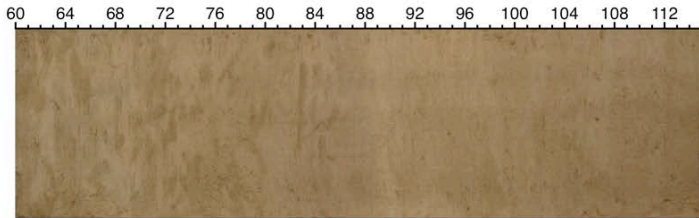
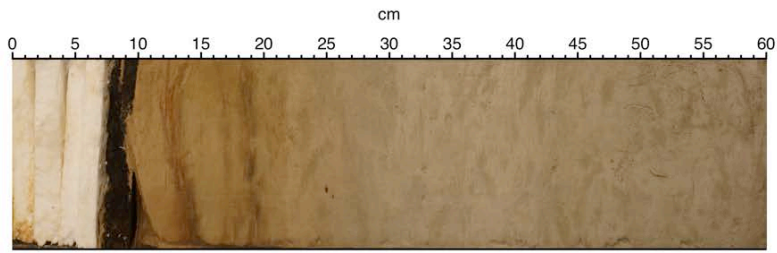
CORE DISTURBANCE



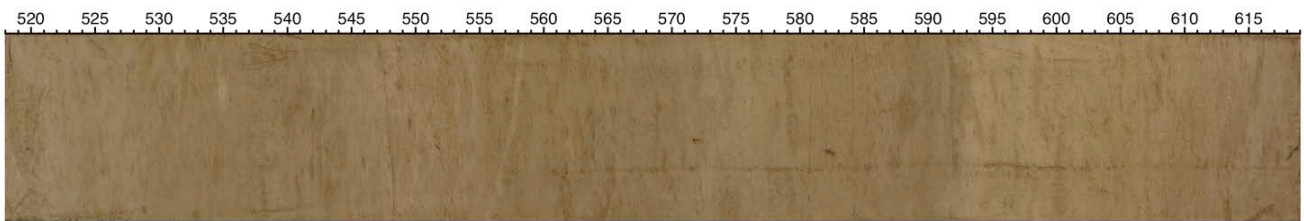
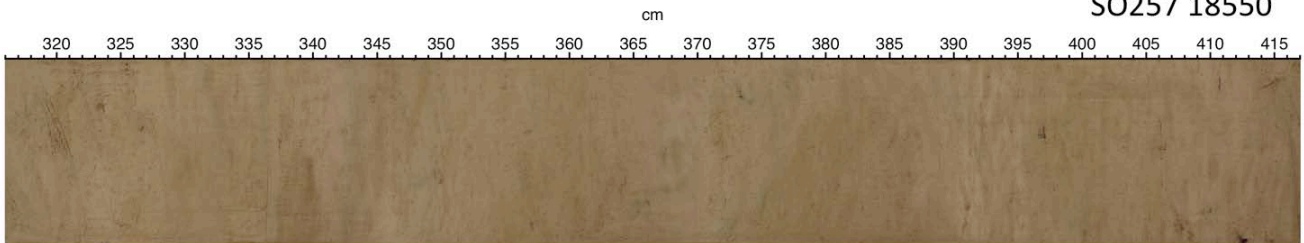
Station SO257-3-3,4

SO257-18550

SO257 18550

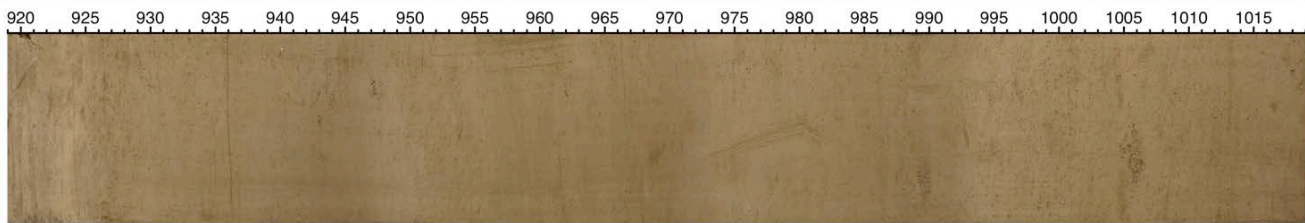
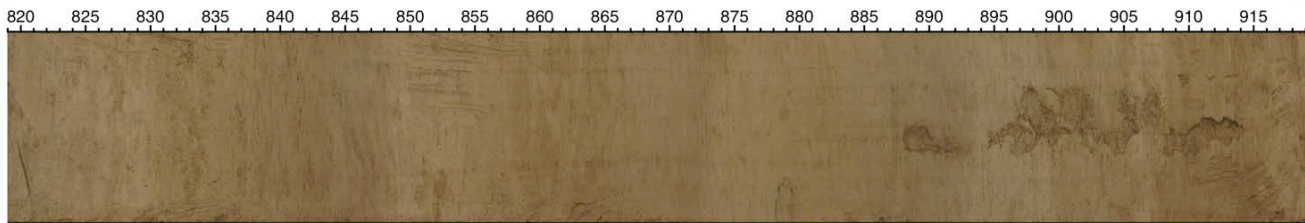


SO257 18550



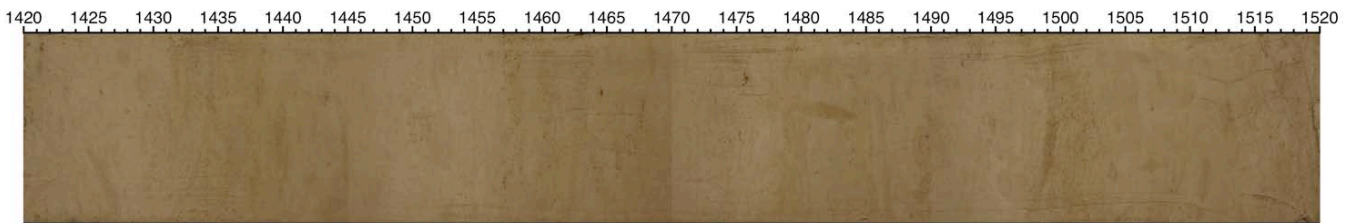
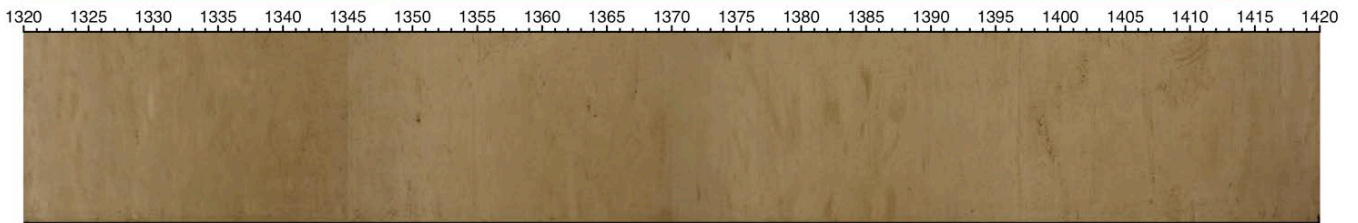
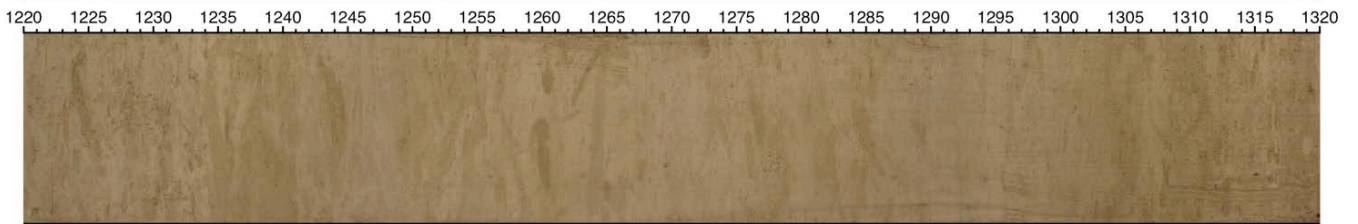
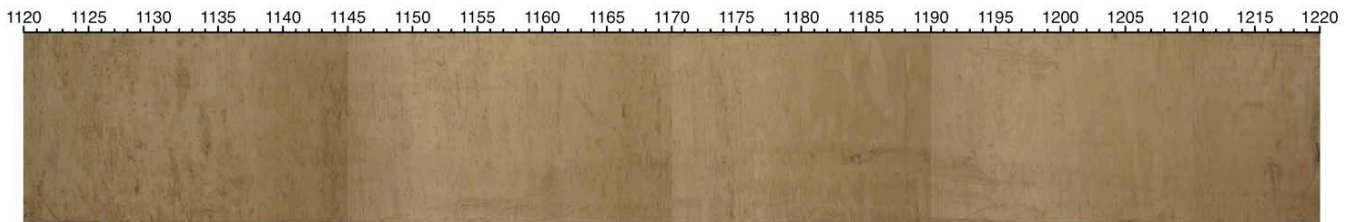
SO257 18550

cm



SO257 18550

cm



Station SO257-3-3,4

SO257-18550

SO257 18550

cm

1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570 1575 1580 1585 1590 1595 1600 1605 1610 1615 1620



Station SO257-3-5**SO257-18551**

	18551		MUC-1		
Date	2017 05 17	-	*	-	-
Start (UTC)	07:38	-	07:40	-	-
Latitude (S)	17°35,493'	-	17°35,493'	-	-
Longitude (E)	118°26,751'	-	118°26,747'	-	-
Waterdepth (m)	669,2	-	668,8	-	-

MUC 18551-1

12 of 12 tubes recovered

Recovery: 14-27 cm

	18552		MUC-1	KL-2	
Date	2017 05 18	-	*	*	-
Start (UTC)	02:18	-	02:19	04:02	-
Latitude (S)	17°40,560'	-	17°40,558'	17°40,563'	-
Longitude (E)	117°41,642'	-	117°41,640'	117°41,638'	-
Waterdepth (m)	1951,4	-	1951,3	1950,1	-

MUC 18552-1

12 of 12 tubes recovered

Recovery: 14,5-17 cm

KL 18552-2 (20 m)

Total length: 16,27 m

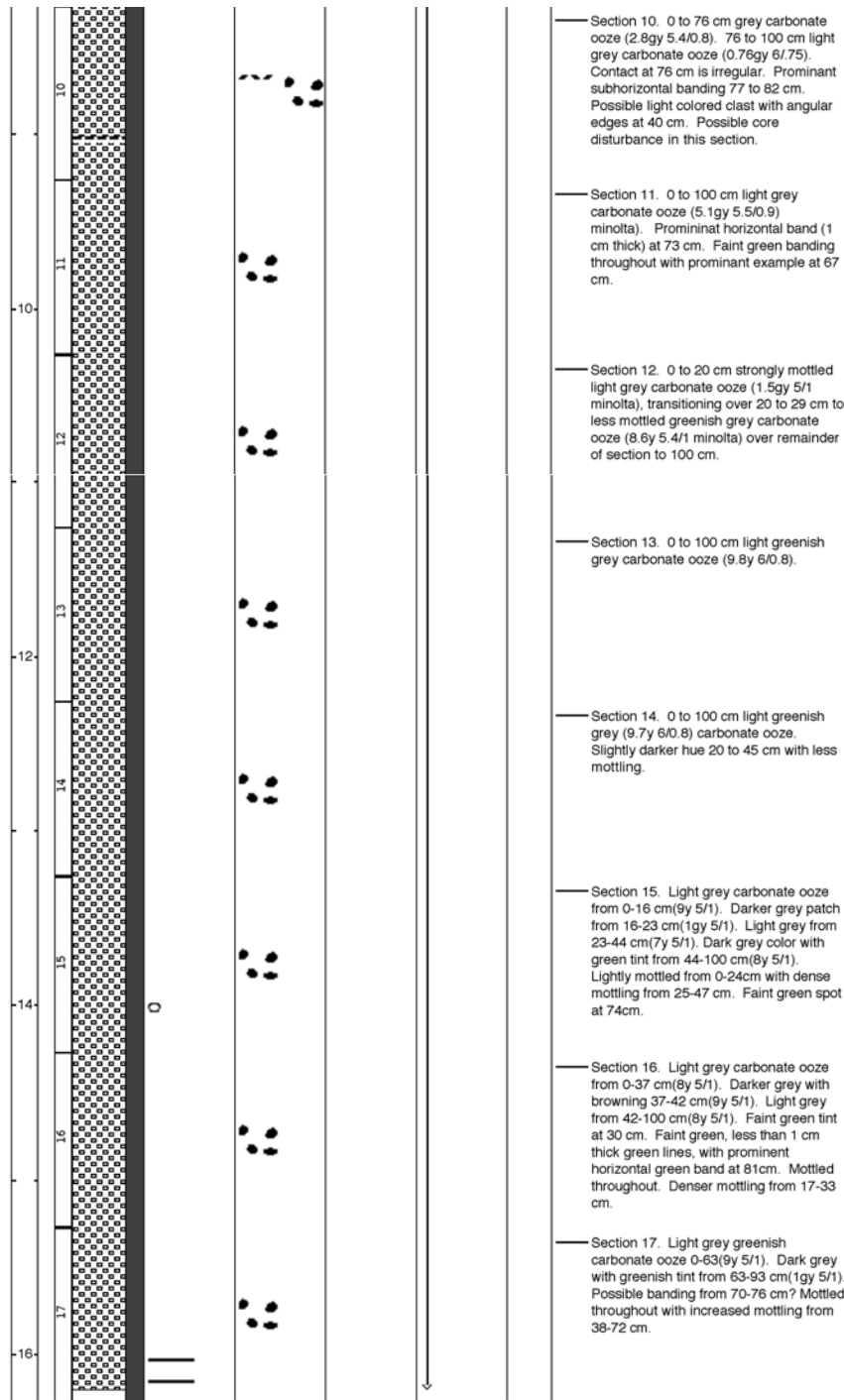
Number of sections: 17

KL-Sections 1	0-62 cm
KL-Sections 2	62-124 cm
KL-Sections 3	124-224 cm
KL-Sections 4	224-324 cm
KL-Sections 5	324-425 cm
KL-Sections 6	425-525 cm
KL-Sections 7	525-626 cm
KL-Sections 8	626-726 cm
KL-Sections 9	726-826 cm
KL-Sections 10	826-926 cm
KL-Sections 11	926-1026 cm
KL-Sections 12	1026-1126 cm
KL-Sections 13	1126-1226 cm
KL-Sections 14	1226-1326 cm
KL-Sections 15	1326-1426 cm
KL-Sections 16	1426-1527 cm
KL-Sections 17	1527-1627 cm

SO257 18552 PC
 17°40.5580'S, 117°41.6460'E

Date logged: May 18, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1952.20 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0 to 10 cm void. 10 to 15 cm brown oxidized layer (0.8y 4.6/1.4 minolta) grading over 15 to 26 cm to gray carbonate ooze (8.6y 6/0.9 minolta). Slight disturbance at 56 cm.
2									Section 2. 0 to 62 cm grey carbonate ooze (6.6y 5.7/1 minolta).
3									Section 3. 0 to 100 cm grey carbonate ooze (8.5y 5.6/1 minolta).
4									Section 4. 0 to 100 cm light grey carbonate ooze (9.5y 5.6/0.9, minolta).
5									Section 5. 0 to 100 cm light grey carbonate ooze (9y 5.7/1 minolta). Very faint green banding (paleo-redox?) throughout with one prominent band at 71 cm.
6									Section 6. 0 to 100 cm light grey carbonate ooze (9.1y 6/1). Prominant subhorizontal burrow at 78cm.
7									Section 7. 0 to 101 cm light grey carbonate ooze (10y 5.5/0.8 minolta). Faint green banding and burrow fill.
8									Section 8. 0 to 100 cm greenish grey carbonate ooze (9.6y 5/1). Faint green banding present, more prominent 78 to 101 cm.
9									Section 9. 0 to 100 cm greenish grey carbonate ooze (10y 5.5/0.9 minolta).



LEGEND




LITHOLOGY

-  Void
-  Calcareous Ooze (CB4)

CONTACTS

-  Uncertain

PHYSICAL STRUCTURES

-  - Light spot
-  - dark band
-  - light band

LITHOLOGIC ASSOCIATIONS

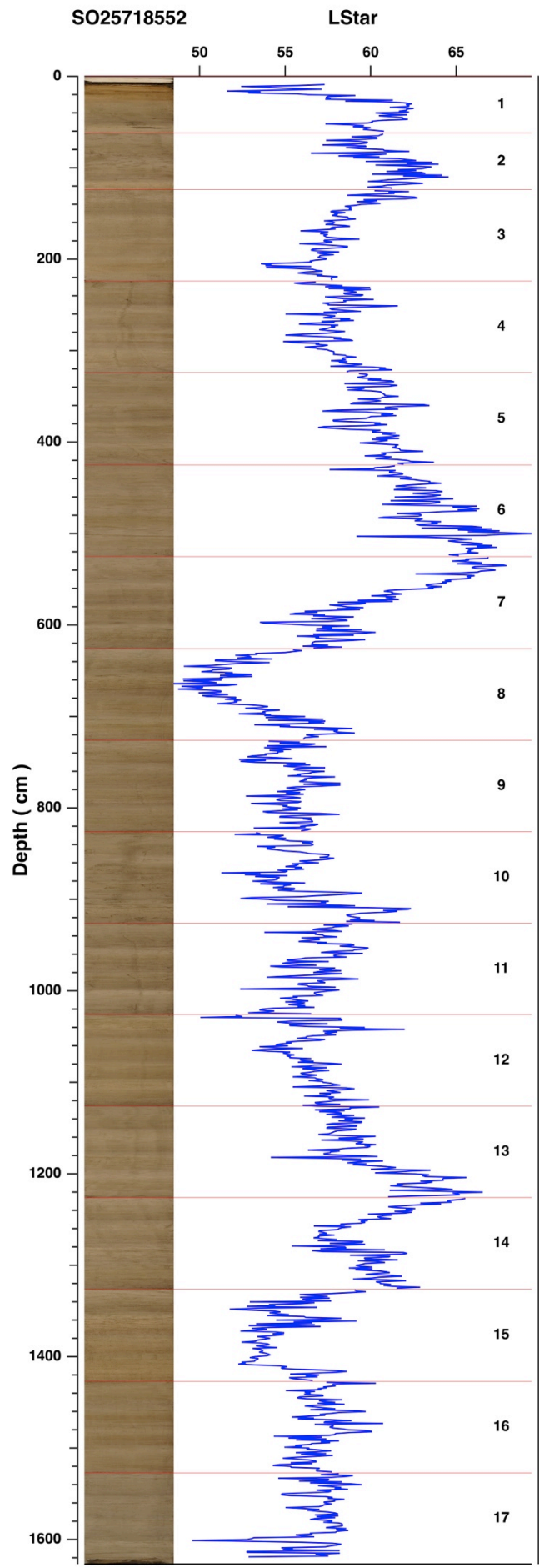
-  - Rip Up Clasts
-  - MOTTLED

FOSSILS

-  - Foraminifera (undifferentiated)

CORE DISTURBANCE

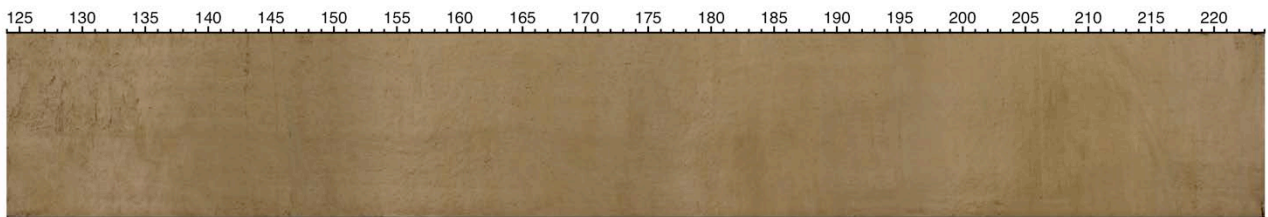
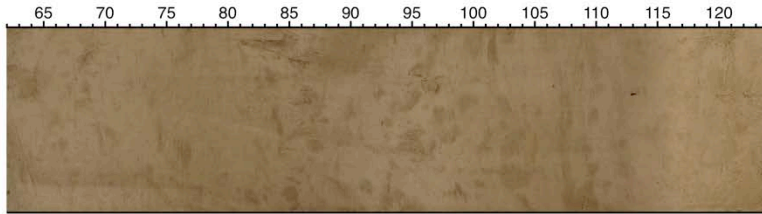
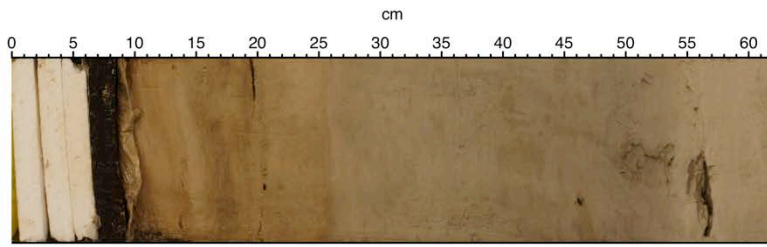
-  - Disturbed



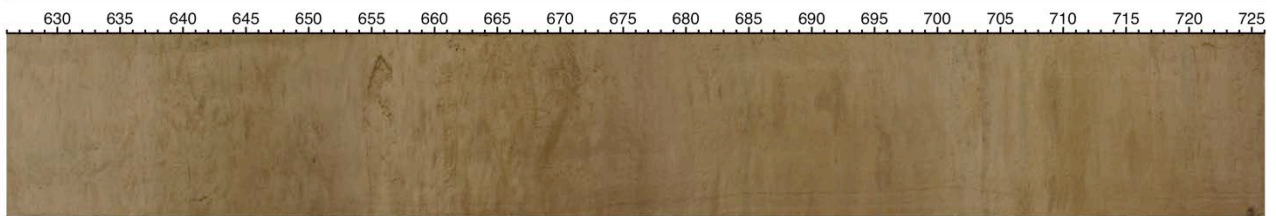
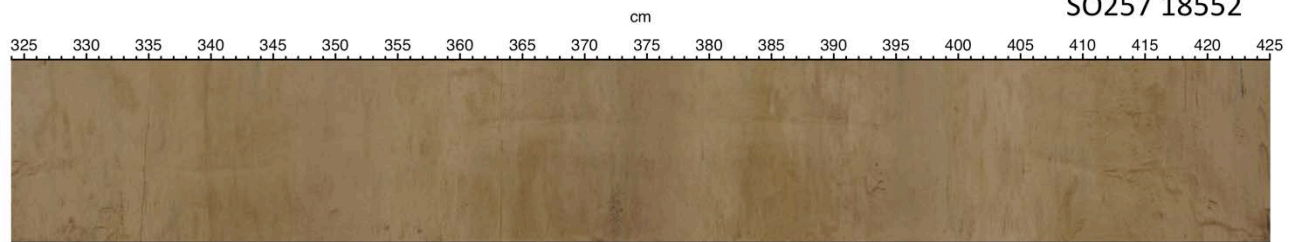
Station SO257-3-7,8

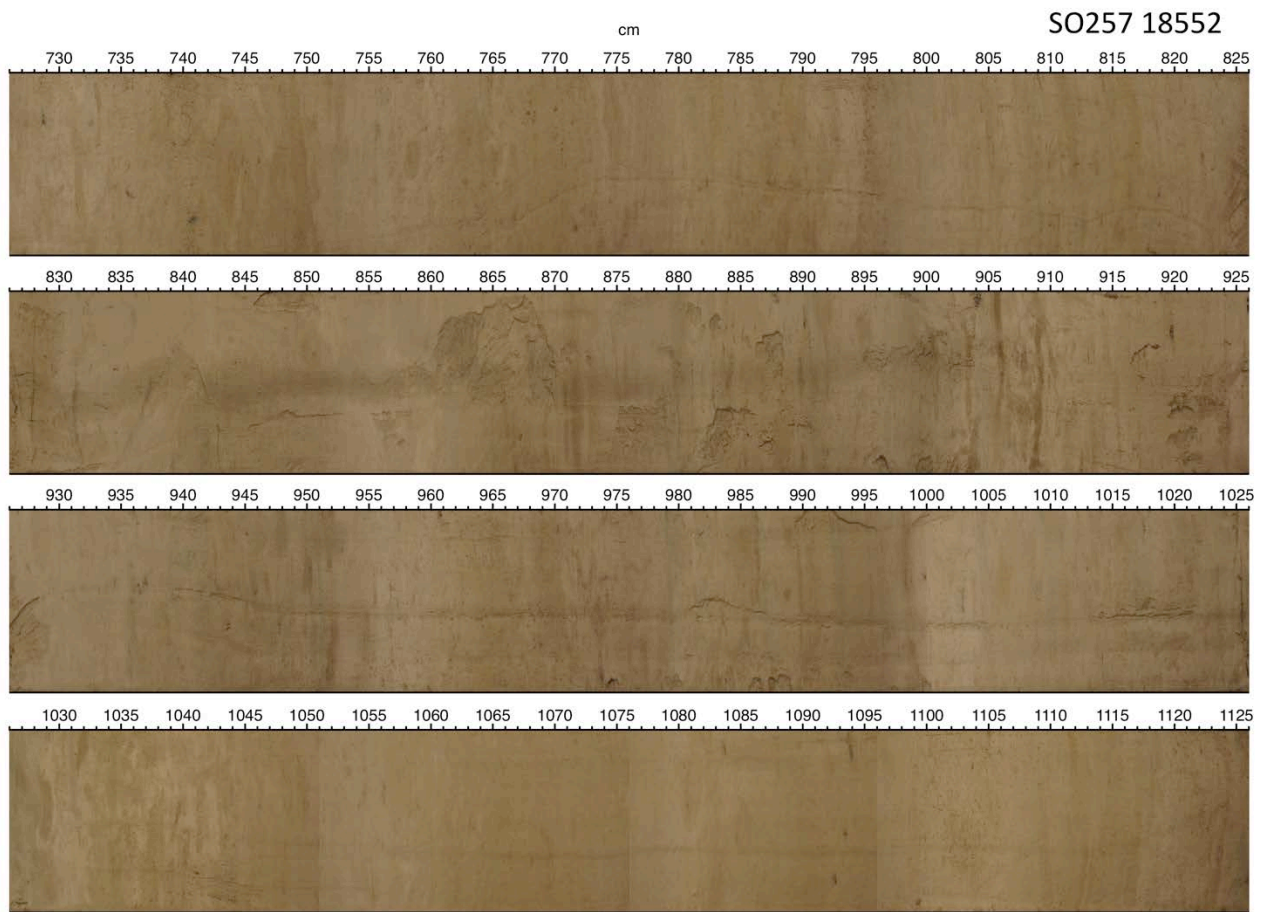
SO257-18552

SO257 18552



SO257 18552





Station SO257-3-7,8

SO257-18552

SO257 18552

cm

1530 1535 1540 1545 1550 1555 1560 1565 1570 1575 1580 1585 1590 1595 1600 1605 1610 1615 1620 1625

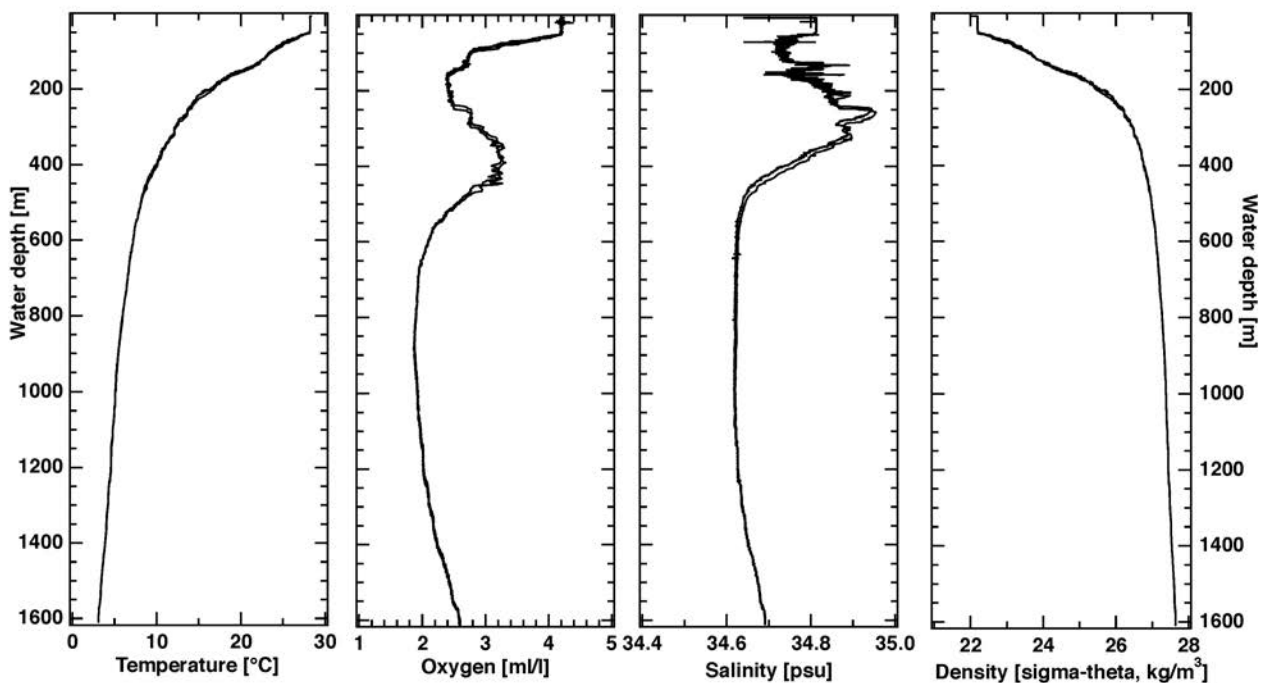


	18553	CTD-1	MUC-2	KL-3	SL-4
Date	2017 05 18	*	*	-	-
Start (UTC)	09:33	09:34	11:02	-	-
Latitude (S)	18°7,024'	18°7,022'	18°6,987'	-	-
Longitude (E)	117°7,001	117°7003'	117°6,998'	-	-
Waterdepth (m)	1615,3	1619,3	1619,7	-	-

CTD 18553-1

Water samples taken at (m): 1615, 1500, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 1615, 900, 265, 100, 10



CTD profiles of station 18553

MUC 18553-2

12 of 12 tubes recovered

Recovery: 13,5-16 cm

	18554		MUC-1		SL-2
Date	2017 05 19	-	*	-	*
Start (UTC)	03:43	-	03:47	-	04:28
Latitude (S)	18°31,980'	-	18°31,997'	-	18°31,991'
Longitude (E)	117°21,958'	-	117°21986'	-	117°21,988'
Waterdepth (m)	498,5	-	497,9	-	545,6

MUC 18554-1

12 of 12 tubes recovered

Recovery: 10-17 cm

SL 18554-2 (15 m)

Total length: 14,84 m

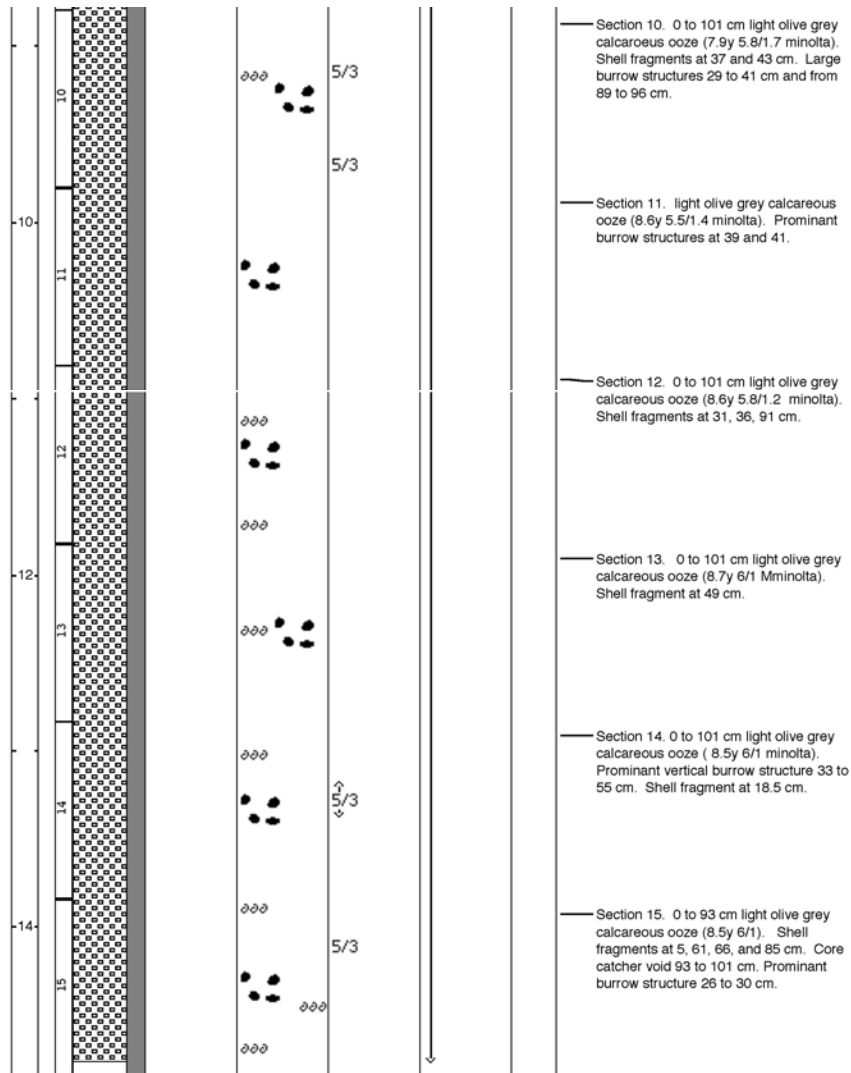
Number of sections: 15

SL-Sections 1	0-100 cm
SL-Sections 2	100-200 cm
SL-Sections 3	200-300 cm
SL-Sections 4	300-400 cm
SL-Sections 5	400-479 cm
SL-Sections 6	479-579 cm
SL-Sections 7	579-679 cm
SL-Sections 8	679-779 cm
SL-Sections 9	779-879 cm
SL-Sections 10	879-980 cm
SL-Sections 11	980-1081cm
SL-Sections 12	1081-1182 cm
SL-Sections 13	1182-1283 cm
SL-Sections 14	1283-1384 cm
SL-Sections 15	1384-1484 cm

SO257 18554 GC
 18°31.9940'S, 117°21.9890'E



Date logged: May 19, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 498.60 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0 to 10 cm void. No readily discernable oxidized interval at top. Multi cores at same site showed only very faint brown oxidized tops (approx 3 cm). 10 to 100 cm is light olive grey calcareous ooze (7.4y 5/2 minolta). Mottling is faint, possibly due to uniform color.
2									Section 2. 0 to 100 cm light olive grey calcareous ooze (7.5y 5.5/2 minolta). Black spot at 23 cm composed largely of foraminifera. Faintly mottled.
3									Section 3. 0 to 100 cm light olive grey calcareous ooze (7.8y 6/1.5 minolta). Faintly mottled, likely due to uniform color throughout. Prominent subhorizontal burrow structure (1 cm) at 80 cm.
4									Section 4. 0 to 100 cm light olive grey calcareous ooze (8y 5/2 minolta). Faintly mottled.
5									Section 5. 0 to 8 cm light olive grey (8y 5/2 minolta) calcareous ooze. 9 to 79 cm slightly darker light olive grey. Sub-vertical burrow structure 25 to 58 cm. Shell fragments at 15 and 24 cm.
6									Section 6. 0 to 100 cm light olive grey (7.8y 5.3/1.5 minolta) calcareous ooze. Solitary coral at 28 cm. Shell fragments at 49, 55, 70, and 82 cm.
7									Section 7. 0 to 100 cm light olive grey (7.7y 5.3/1.7 minolta) calcareous ooze. Shell fragments at 47 and 84 cm.
8									Section 8. 0 to 100 cm light olive grey calcareous ooze (7.8Y 5/1.7 minolta). Shell fragments at 7 and 87 cm.
9									Section 9. 0 to 100 cm light olive grey calcareous ooze (7.9y 5.5/1.7 minolta). Shell fragments at 2.5, 57 and 84 cm.



LEGEND

LITHOLOGY

-  Void
-  Calcareous Ooze (CB4)

PHYSICAL STRUCTURES

-  - Dark spots

LITHOLOGIC ACCESSORIES

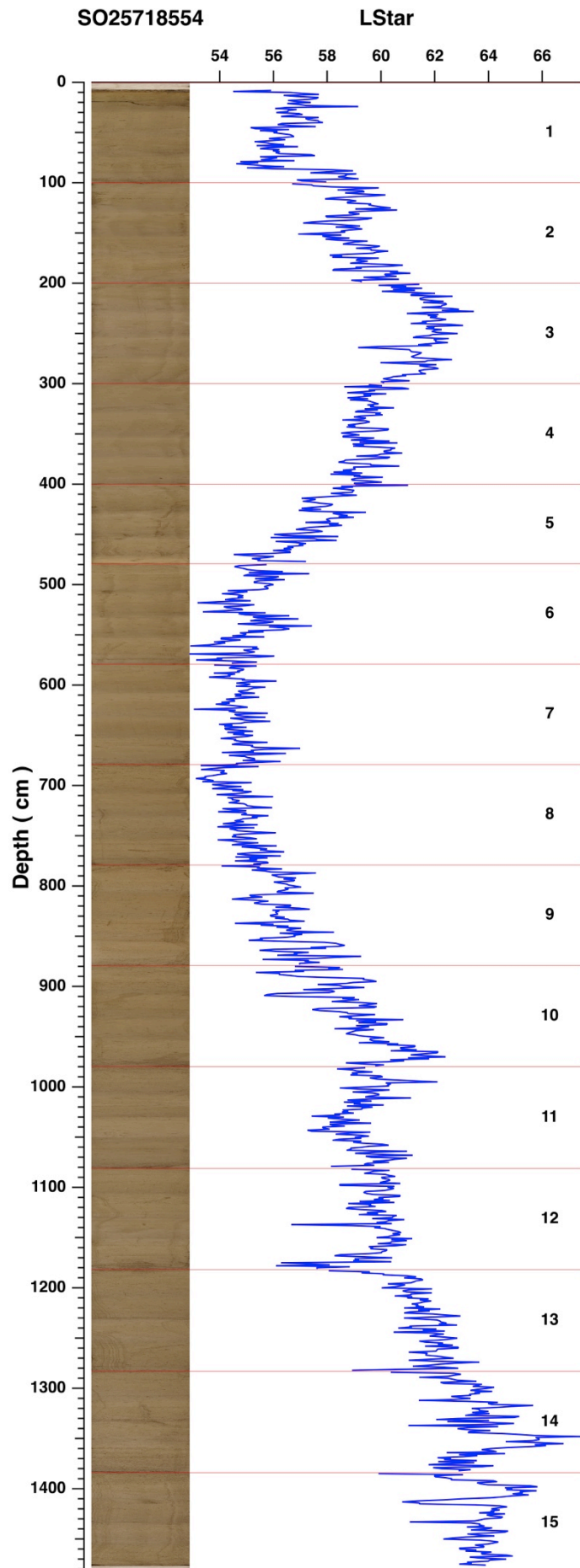
-  - Shell Fragments
-  - MOTTLED

ICHTNOFOSSILS

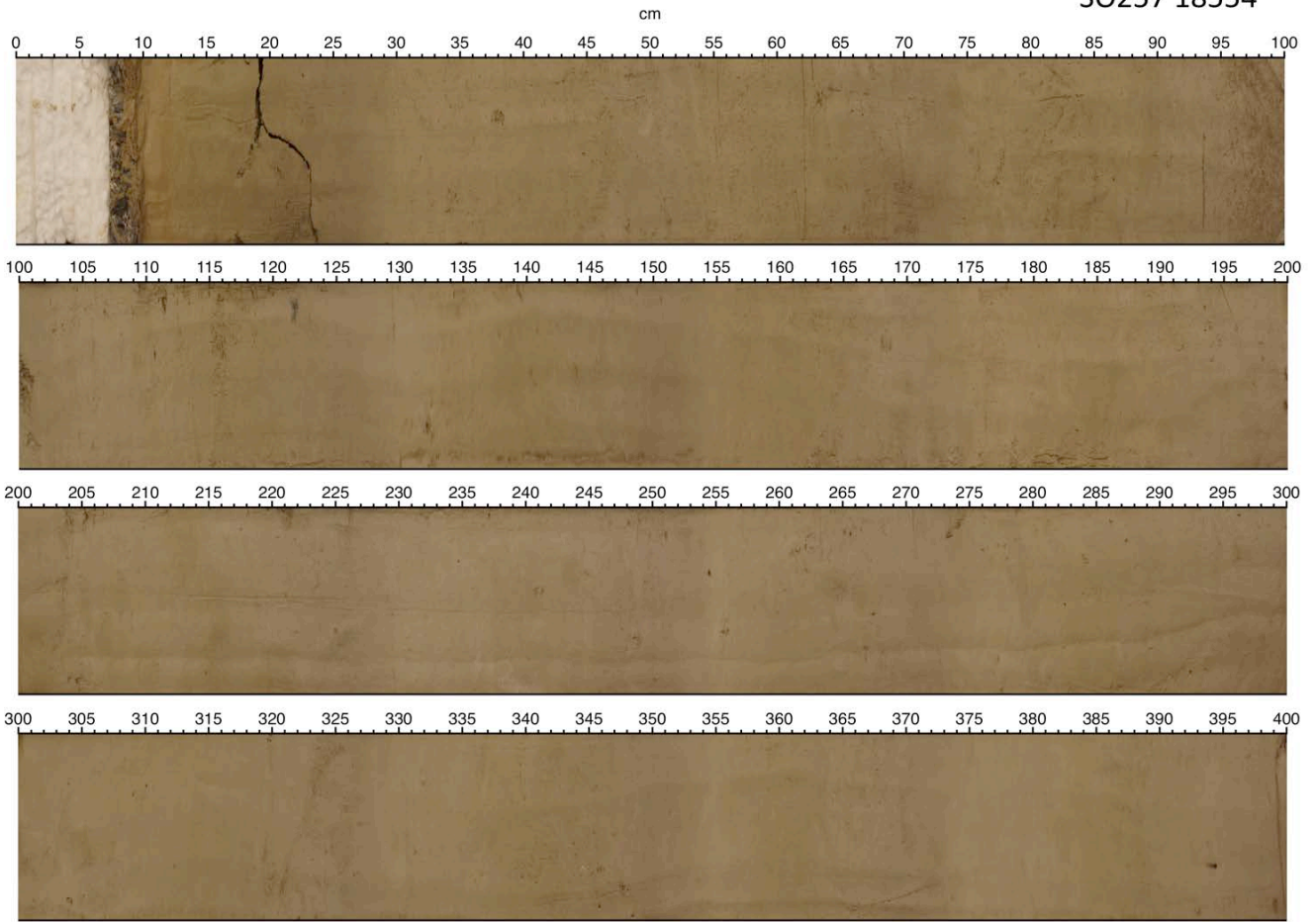
- 5/3 - Homogeneous, common discrete burrows

FOSSILS

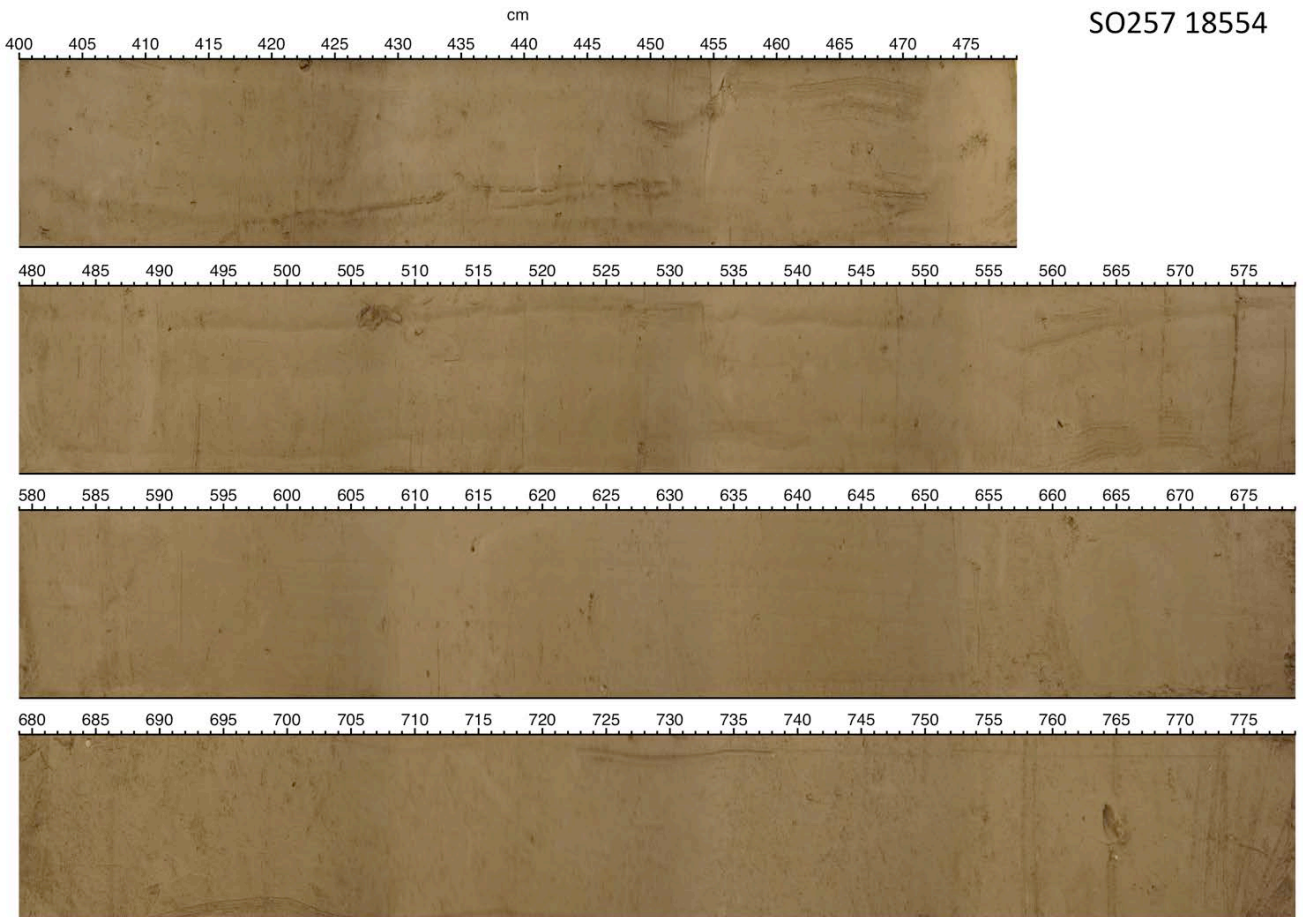
-  - Corals (solitarv)
-  - Foraminifera (undifferentiated)



SO257 18554



SO257 18554



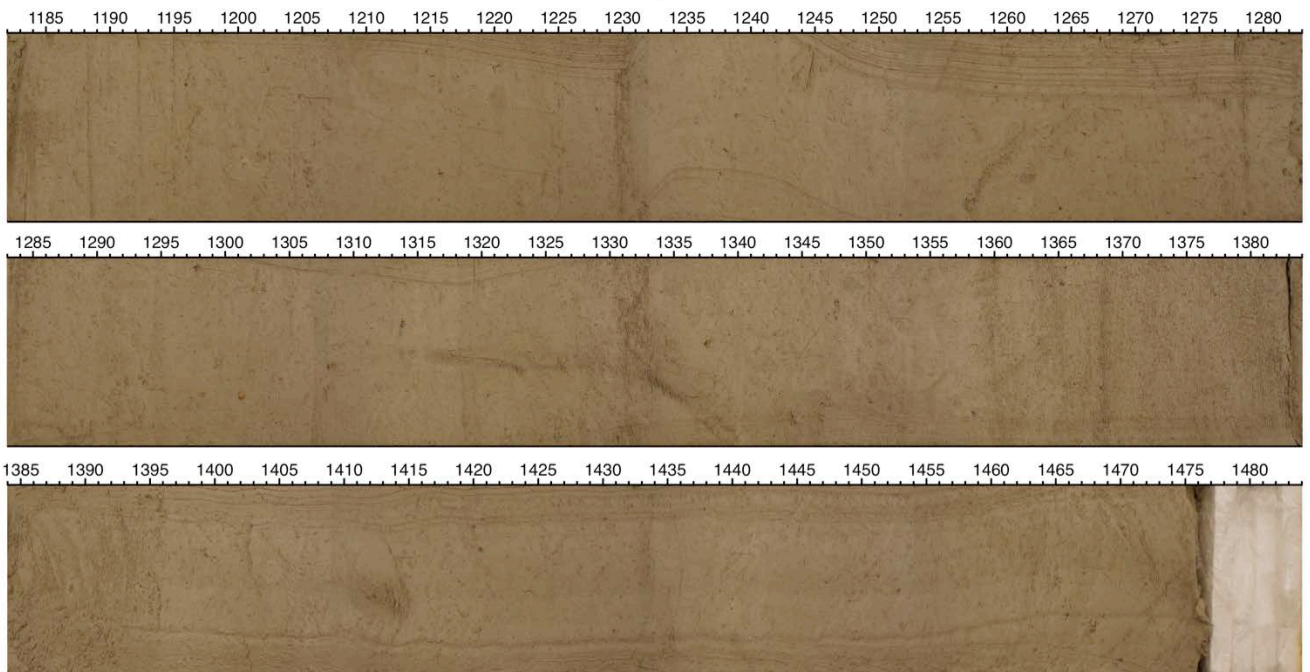
SO257 18554

cm



SO257 18554

cm



Station SO257-3-14,15**SO257-18555**

	18555		MUC-1		SL-2
Date	2017 05 19	-	*	-	*
Start (UTC)	06:31	-	06:33	-	07:28
Latitude (S)	18°21,054'	-	18°21,050'	-	18°21,049'
Longitude (E)	117°15,349'	-	117°15,360'	-	117°15,402'
Waterdepth (m)	1114,9	-	1113,7	-	1113

MUC 18555-1

11 of 12 tubes recovered

Recovery: 35,5-37 cm

SL 18555-2 (20 m)

Total length: 19,68 m

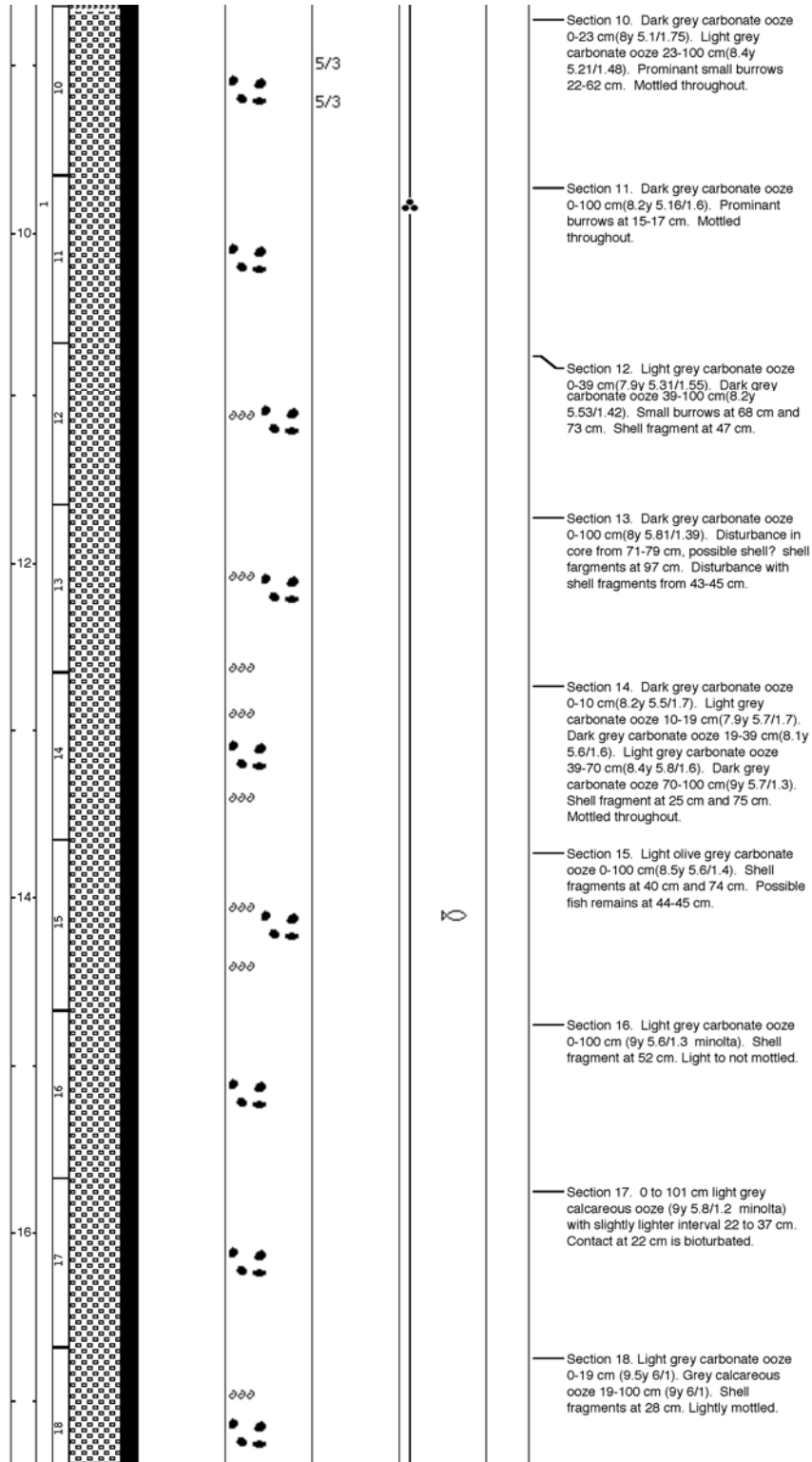
Number of sections: 20

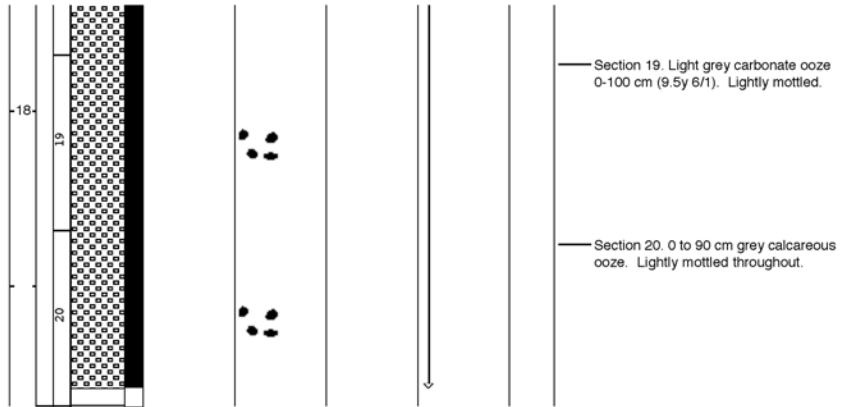
SL-Sections 1	0-100 cm
SL-Sections 2	100-200 cm
SL-Sections 3	200-300 cm
SL-Sections 4	300-400 cm
SL-Sections 5	400-463 cm
SL-Sections 6	463-563 cm
SL-Sections 7	563-663 cm
SL-Sections 8	663-764 cm
SL-Sections 9	764-864 cm
SL-Sections 10	864-965 cm
SL-Sections 11	965-1065 cm
SL-Sections 12	1065-1165 cm
SL-Sections 13	1165-1265 cm
SL-Sections 14	1265-1365 cm
SL-Sections 15	1365-1467 cm
SL-Sections 16	1467-1567 cm
SL-Sections 17	1567-1668 cm
SL-Sections 18	1668-1768 cm
SL-Sections 19	1768-1868 cm
SL-Sections 20	1868-1968 cm

SO257 18555 GC
 18°21.0540'S, 117°15.4010'E

Date logged: May 19, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 1113.50 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. No visible oxidation layer. Archiving half has less volume than working half. Did not capture redox zone in core. Light grey carbonate ooze from 0-31 cm(8Y 5/1). Dark grey carbonate ooze from 31-63 cm(8.5Y 5.5/1). Light grey carbonate ooze from 63-100 cm(9y 5.6/1). Prominent burrows at 64 cm, 72 cm and 98 cm.
2									Section 2. Light grey carbonate ooze 0-100 cm(9.5y 5.5/1.2). Burrows at 15, 20 and 79 cm.
3									Section 3. Light grey carbonate ooze from 0-53 cm(9.8y 5.5/1.3). Dark grey carbonate ooze from 53-100 cm(9y 5.8/1.4). Prominent burrows at 49 cm, 59 cm and 71 cm. Large disturbance at 17-20 cm 80-84 cm.
4									Section 4. Light grey carbonate ooze 0-40 cm(8.1y 5.7/2). Dark grey carbonate ooze 40-100 cm(9.0y 5.7/1.3). Mottled throughout.
5						5/3			Section 5. Light grey carbonate ooze 0-63cm(8.1y 5.52/1.62). Small prominent burrows throughout.
6						5/3			Section 6. Dark grey carbonate ooze 0-98 cm(8.4y 5.38/1.71). Light grey carbonate ooze 98-100 cm(8.3y 5.63/1.52). Prominent shell fragments at 34 cm, 93 cm a 98 cm.
7						5/2			Section 7. Light grey carbonate ooze 0-4 cm(9y 5.59/1.43). Dark grey carbonate ooze 4-63 cm(8.6y 5.49/1.44). Light grey carbonate ooze 63-69 cm(9y 6.06/1.7). Dark grey carbonate ooze 69-100 cm(8.4y 5.27/1.76). Prominate shell fragments at 51 cm. Dark grey band at 14cm. Prominte burrow at 80 cm.
8									Section 8. Light grey carbonate ooze 0-4 cm (8y 5.41/1.75). Dark grez carbonate ooze 4-101 cm(8.3y 5.26/1.78). Prominant shell fragment at 24 cm. Dark spot at 41 cm.
9									Section 9. Dark grey carbonate ooze 0-63 cm(8y 5.16/1.81). Light grey carbonate ooze 63-82 cm(8.1y 5.44/1.52). Dark grey carbonate ooze 82-100 cm(7.9y 5.18/1.79). Shell fragment at 91 cm. Bioturbated at 93-97 cm.





LEGEND


LITHOLOGY

-  Void
-  Calcareous Ooze (CB4)

CONTACTS

- ***** Bioturbated




PHYSICAL STRUCTURES

-  - Dark spots
-  - dark band


LITHOLOGIC ACCESSORIES

-  - Shell Fragments
-  - MOTTLED

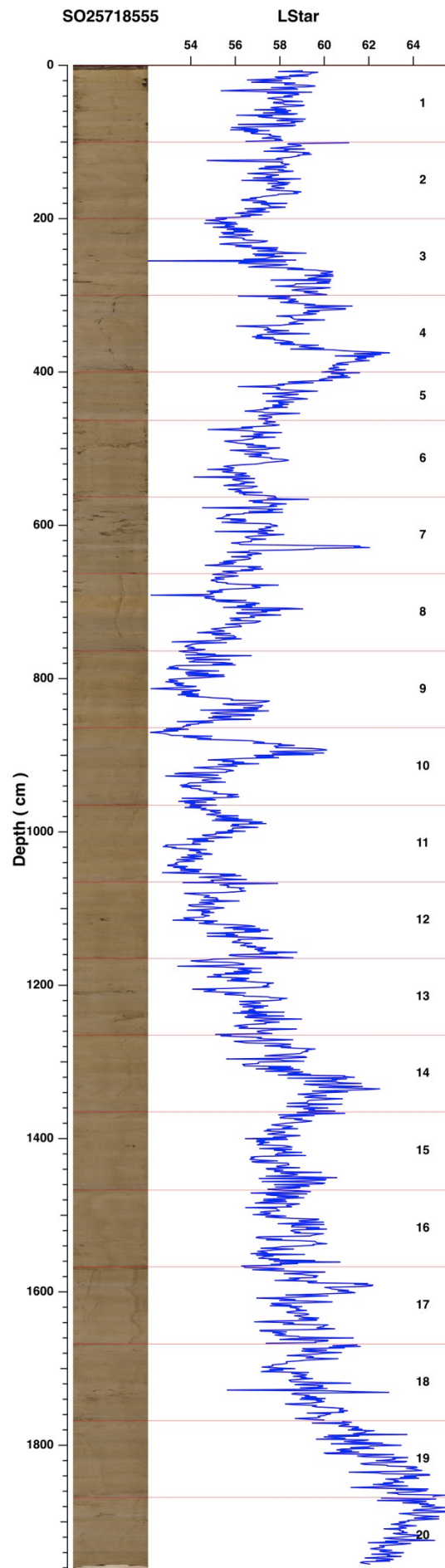
ICHNOFOSSILS

-  - Zoophycos
-  - Homogeneous, rare discrete burrows
-  - Homogeneous, common discrete burrows

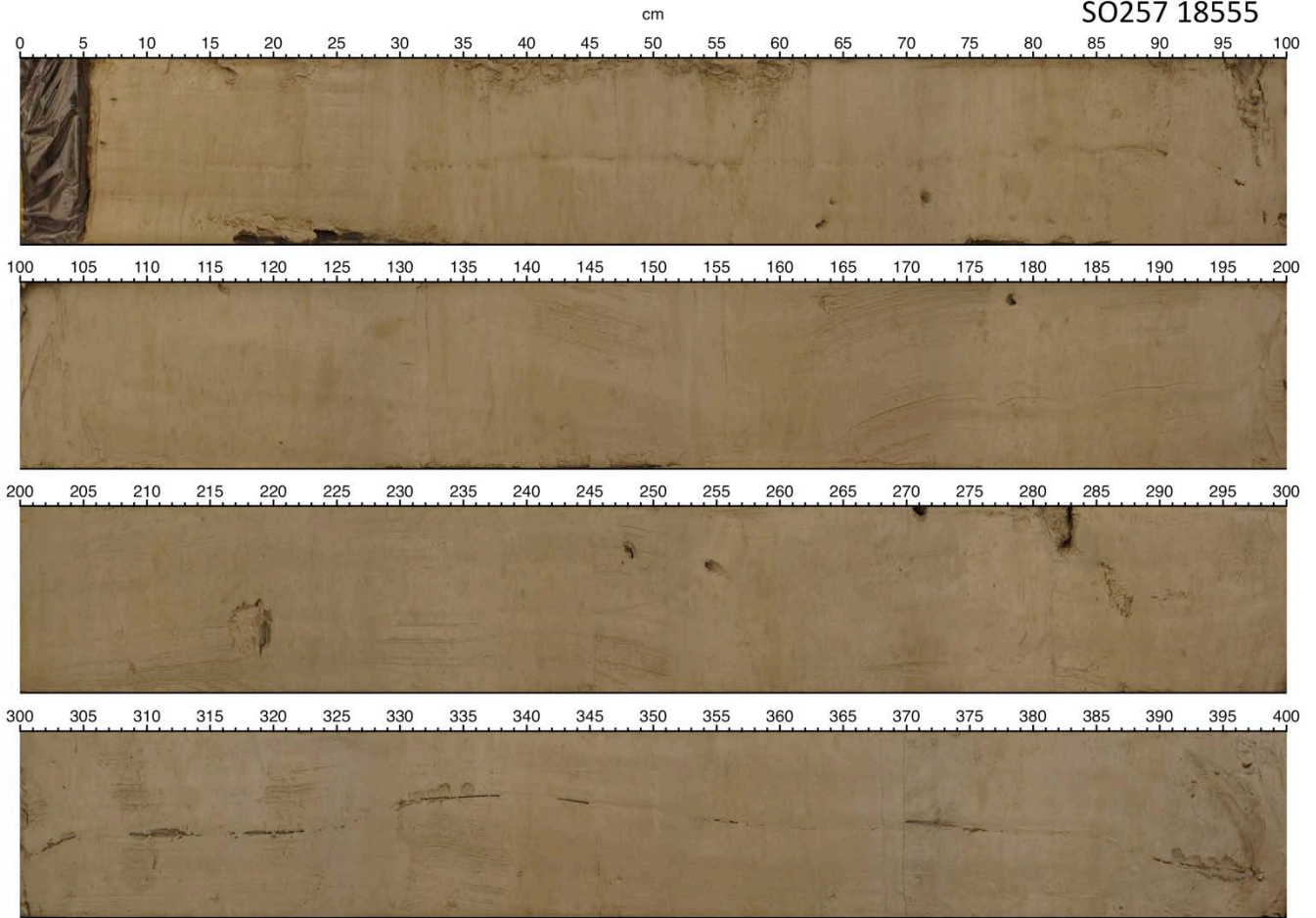
FOSSILS

-  - Fish Remains
-  - Foraminifera (undifferentiated)

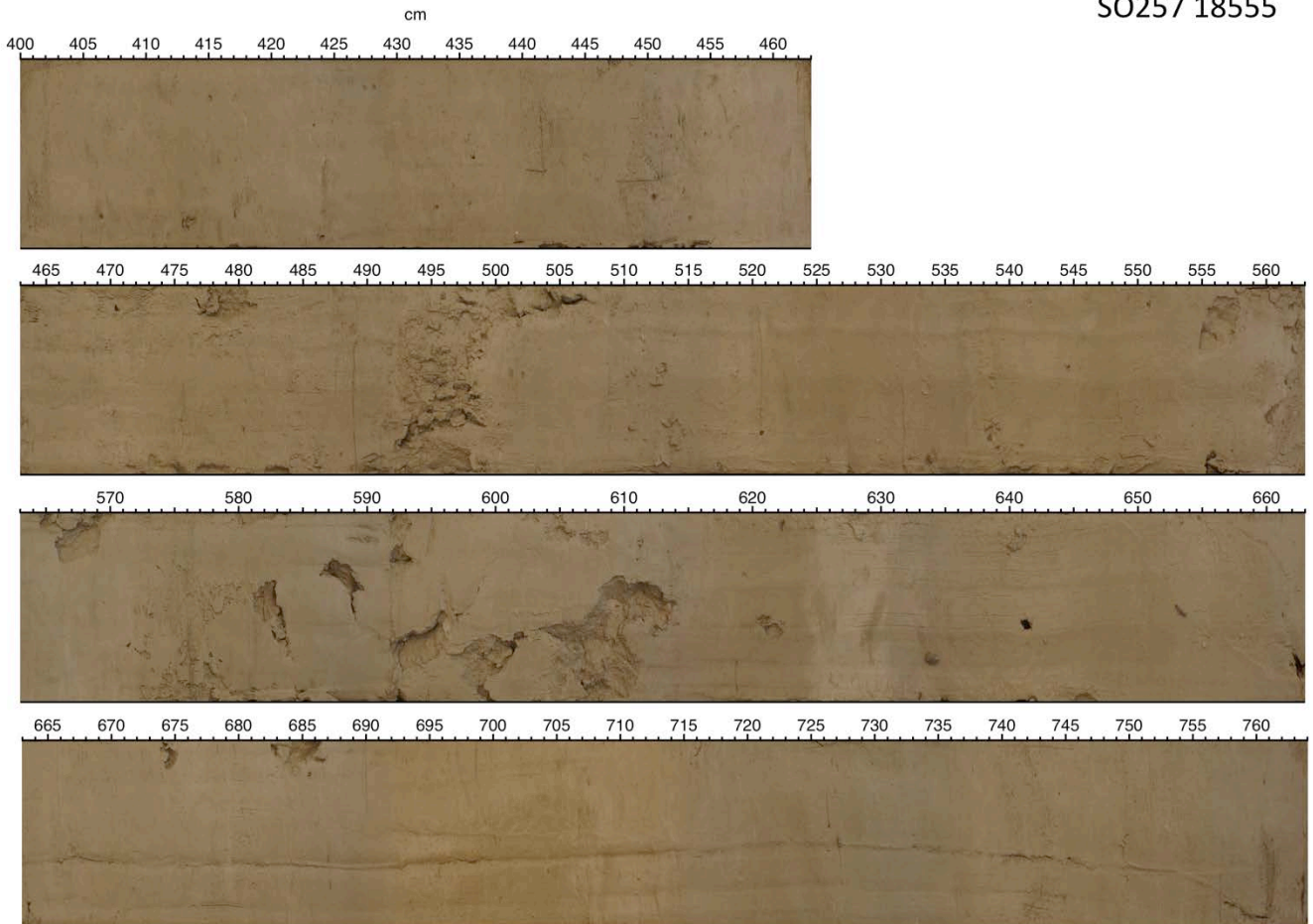
CORE DISTURBANCE



SO257 18555

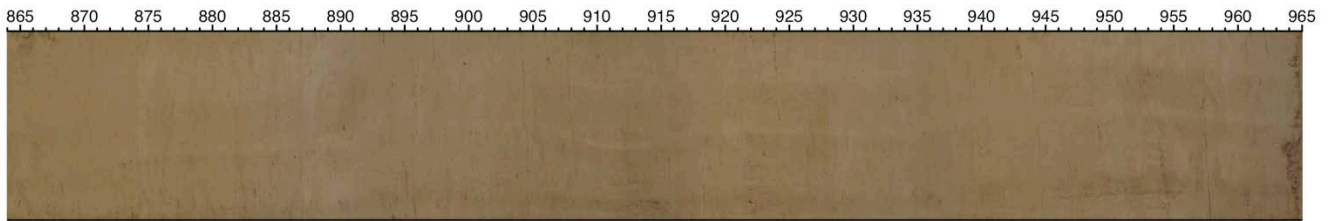
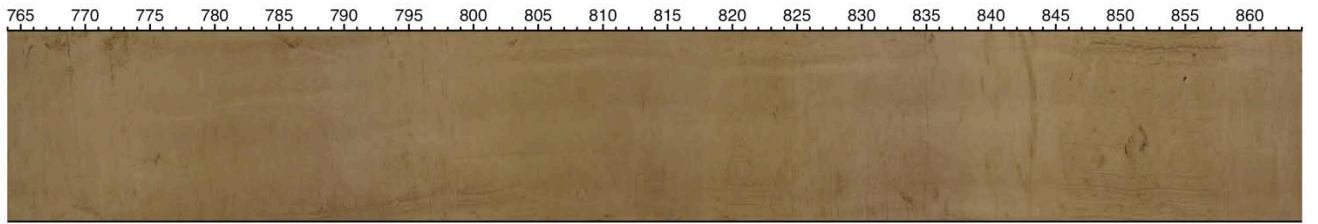


SO257 18555



SO257 18555

cm



SO257 18555

cm



SO257 18555

cm



	18556		MUC-1	KL-2	
Date	2017 05 19	-	*	2017 05 20	-
Start (UTC)	22:31	-	22:32	00:15	-
Latitude (S)	17°6,186'	-	17°6,179'	17°6,219'	-
Longitude (E)	117°13,811'	-	117°13,816'	117°13,827'	-
Waterdepth (m)	1842,7	-	1843,6	1842,4	-

MUC 18556-1

12 of 12 tubes recovered

Recovery: 13-17,5 cm

KL 18556-2 (20 m)

Total length: 15,78 m

Number of sections: 16

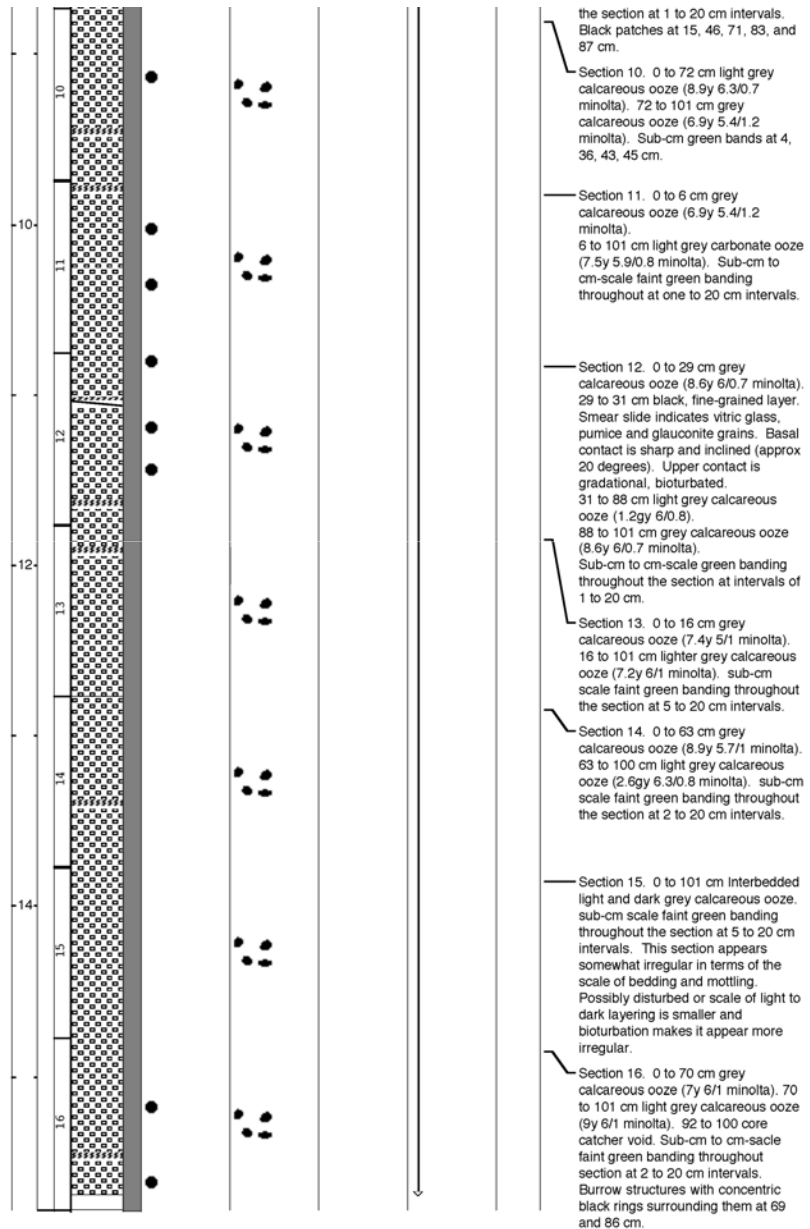
Ash layer at 1175 cm

KL-Sections 1	0-67 cm
KL-Sections 2	67-167 cm
KL-Sections 3	167-267 cm
KL-Sections 4	267-369 cm
KL-Sections 5	369-470 cm
KL-Sections 6	470-571 cm
KL-Sections 7	571-672 cm
KL-Sections 8	672-772 cm
KL-Sections 9	772-873 cm
KL-Sections 10	873-974 cm
KL-Sections 11	974-1075 cm
KL-Sections 12	1075-1176 cm
KL-Sections 13	1176-1277 cm
KL-Sections 14	1277-1377 cm
KL-Sections 15	1377-1477 cm
KL-Sections 16	1477-1578 cm

SO257 18556 GC
17°6.2200'S, 117°13.8260'E

Date logged: May 20, 2017
Logged by: Steve Clemens, Alan Dillon
Ground: 1842.60 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0 to 8 cm void. 8 to 62 cm brown oxidized interval (0.5y 5.6/2.5 minolta) with two darker (manganese?) intervals at 15 to 17 and 25 to 27 cm (0.6y 5.5/2.3). 62 to 67 cm grey calcareous ooze (3.7y 6/1 minolta). Contact at 62 cm bioturbated.
2									Section 2. 0 to 14 cm grey calcareous ooze (3.7y 6/1). 14 to 80 cm light greenish grey calcareous ooze (8.7y 5/1.4 minolta). 80 to 100 cm grey calcareous ooze (3.7y 6/1).
3									Section 3. 0 to 100 cm Light grey calcareous ooze (7.3y 5.8/1 minolta) interbedded with sub-cm scale green banding at 5 to 10 cm intervals (smear slide does not indicate glauconite).
4									Section 4. 0 to 60 cm grey calcareous ooze (4.9y 5.9/1 minolta). 60 to 102 cm light grey calcareous ooze (9.6y 6.3/0.7 minolta). Cm to sub cm thick green banding throughout the entire section at 5 to 20 cm intervals. At 13.5 and 36 cm oval burrow structures surrounded with black (pyrite) rings.
5									Section 5. 0 to 72 cm light grey calcareous ooze (7.1y 5.5/1 minolta) with subcentimeter to cm-scale green banding at 2 to 10 cm intervals. 3 mm thick green band with sharp upper contact at 19.5 cm. 72 to 101 cm grey calcareous ooze (7.7y 4.9/0.8 minolta). Dark (pyrite?) spots present.
6									Smear slide at 81 cm indicates pumice present.
7									Section 6. 0 to 48 cm light grey calcareous ooze (8.2y 5.5/1 minolta). 48 to 101 cm grey calcareous ooze (8.4y 5.2/0.9 minolta) except for one lighter interval 78 to 81 cm. Cm to sub cm thick green banding throughout the entire section at 5 to 20 cm intervals. Prominent black (pyrite) spots at 6, 40, and 75 cm.
8									Smear slide at 1 cm indicates abundant pumice.
9									Section 7. 0 to 55cm grey calcareous ooze (7.1y 5.8/8 minolta). 55 to 70 cm light grey calcareous ooze (9.2y 6.5/0.7 minolta). 70 to 101 cm grey calcareous ooze (7.1y 5.8/8 minolta). sub-cm to cm-scale green banding in top 20 cm of section. Two sharp mm-scale green bands at 77.5 and 78.5 cm. Dark (pyrite) spots (sub-cm scale) throughout section with larger, prominent spots as depicted.
8									Section 8. Interbedded grey calcareous ooze (10y 5.8/0.9 minolta) and light grey calcareous ooze (5.8y 5.7/1 minolta). Sub-cm to cm-scale green banding throughout the section at 2 to 15 cm intervals. Black (pyrite) spots at 4, 45, 62, and 81 cm.
9									Section 9. 0 to 53 cm grey calcareous ooze (7.2y 5.7/1 minolta). 53 to 101 cm light grey calcareous ooze (6.8y 6/0.7 minolta). Sub-cm to cm-scale green banding throughout



the section at 1 to 20 cm intervals. Black patches at 15, 46, 71, 83, and 87 cm.

Section 10. 0 to 72 cm light grey calcareous ooze (8.9y 6.3/0.7 minolta). 72 to 101 cm grey calcareous ooze (6.9y 5.4/1.2 minolta). Sub-cm green bands at 4, 36, 43, 45 cm.

Section 11. 0 to 6 cm grey calcareous ooze (6.9y 5.4/1.2 minolta). 6 to 101 cm light grey carbonate ooze (7.5y 5.9/0.8 minolta). Sub-cm to cm-scale faint green banding throughout at one to 20 cm intervals.

Section 12. 0 to 29 cm grey calcareous ooze (8.6y 6/0.7 minolta). 29 to 31 cm black, fine-grained layer. Smear slide indicates vitric glass, pumice and glauconite grains. Basal contact is sharp and inclined (approx 20 degrees). Upper contact is gradational, bioturbated. 31 to 88 cm light grey calcareous ooze (1.2gy 6/0.8). 88 to 101 cm grey calcareous ooze (8.6y 6/0.7 minolta). Sub-cm to cm-scale green banding throughout the section at intervals of 1 to 20 cm.

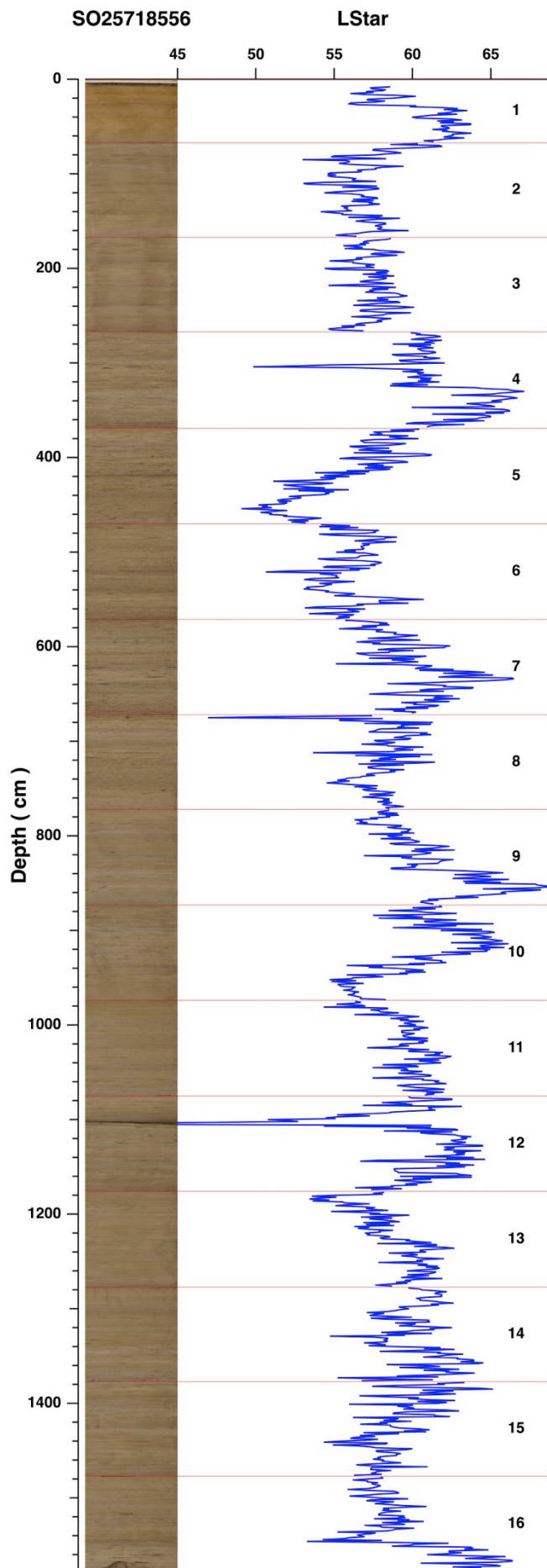
Section 13. 0 to 16 cm grey calcareous ooze (7.4y 5/1 minolta). 16 to 101 cm lighter grey calcareous ooze (7.2y 6/1 minolta). sub-cm scale faint green banding throughout the section at 5 to 20 cm intervals.

Section 14. 0 to 63 cm grey calcareous ooze (8.9y 5.7/1 minolta). 63 to 100 cm light grey calcareous ooze (2.6gy 6.3/0.8 minolta). sub-cm scale faint green banding throughout the section at 2 to 20 cm intervals.

Section 15. 0 to 101 cm interbedded light and dark grey calcareous ooze. sub-cm scale faint green banding throughout the section at 5 to 20 cm intervals. This section appears somewhat irregular in terms of the scale of bedding and mottling. Possibly disturbed or scale of light to dark layering is smaller and bioturbation makes it appear more irregular.

Section 16. 0 to 70 cm grey calcareous ooze (7y 6/1 minolta). 70 to 101 cm light grey calcareous ooze (9y 6/1 minolta). 92 to 100 core catcher void. Sub-cm to cm-scale faint green banding throughout section at 2 to 20 cm intervals. Burrow structures with concentric black rings surrounding them at 69 and 86 cm.

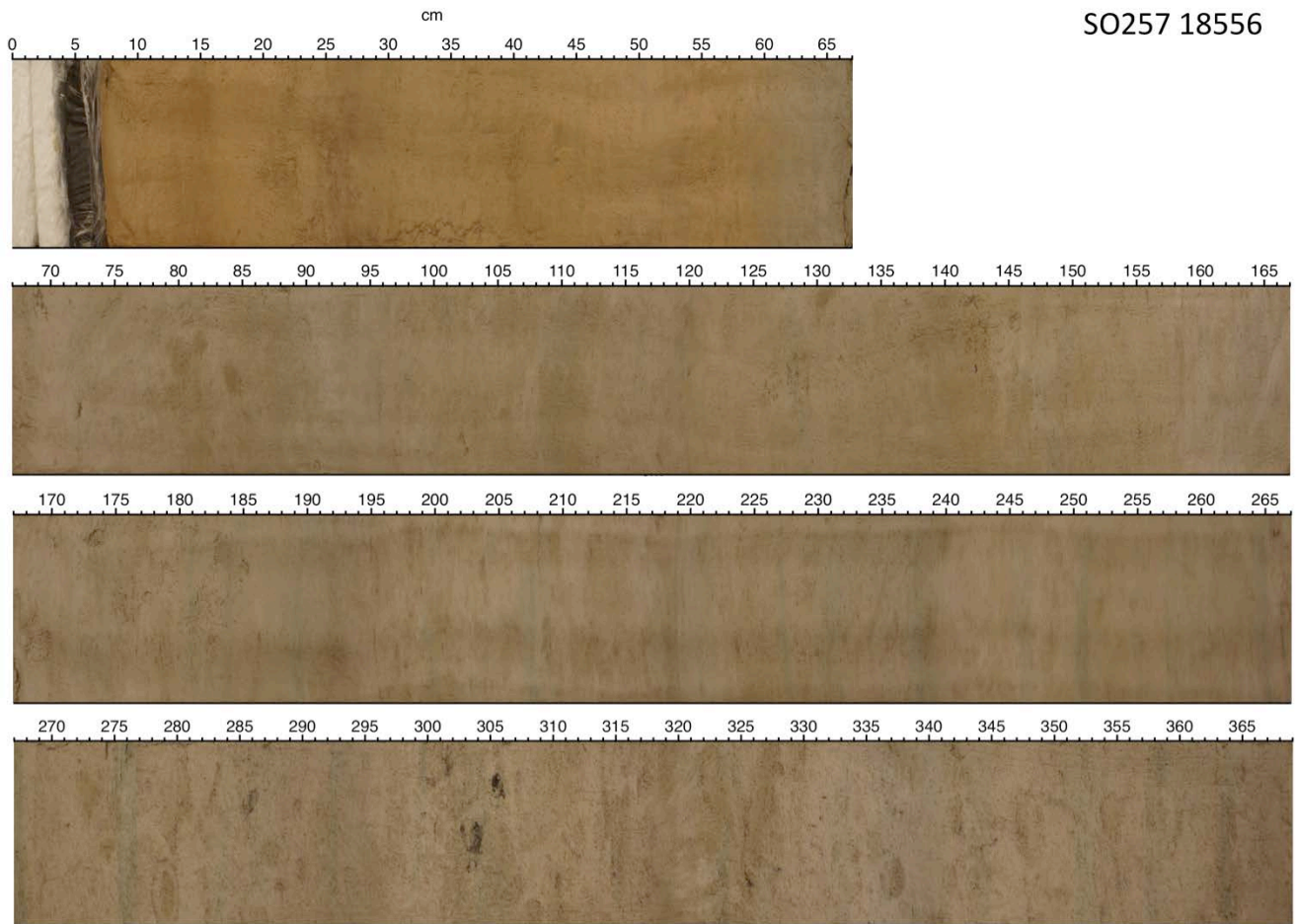
LEGEND	
LITHOLOGY	
Void	Volcanic Ash or Tuff (V1) Calcareous Ooze (CB4)
CONTACTS	
Bioturbated	Inclined
PHYSICAL STRUCTURES	
- Dark spots	
LITHOLOGIC ACCESSORIES	
- MOTTLED	
FOSSILS	
- Foraminifera (undifferentiated)	
CORE DISTURBANCE	



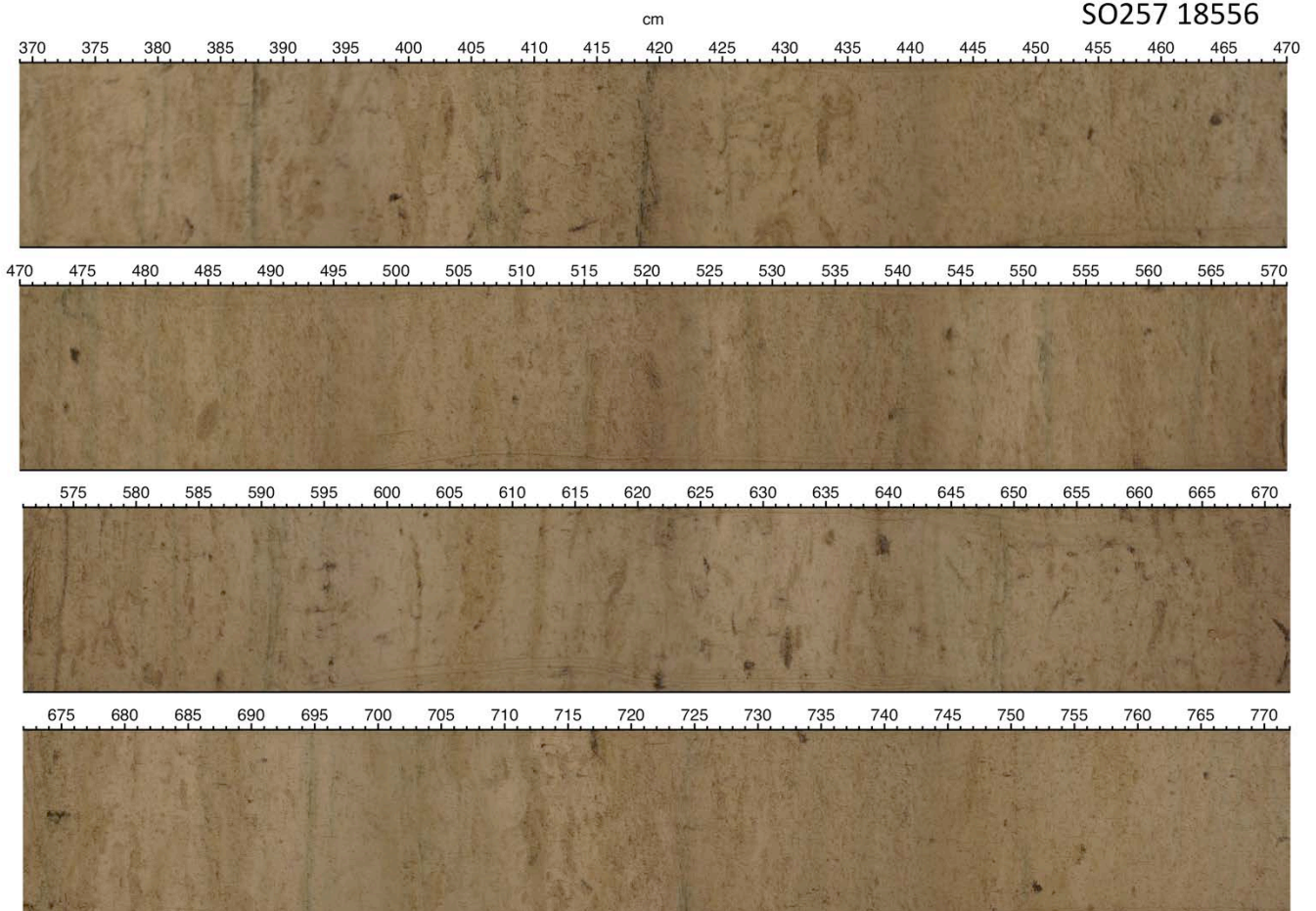
Station SO257-3-17,18

SO257-18556

SO257 18556



SO257 18556



SO257 18556

cm

775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870



875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970



975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075



1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175



SO257 18556

cm

1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265 1270 1275



1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365 1370 1375



1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470 1475



1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570 1575



Station SO257-3-19,20**SO257-18557**

	18557		MUC-1		SL-2
Date	2017 05 20	-	*	-	*
Start (UTC)	04:38	-	04:40	-	06:21
Latitude (S)	17°32,855'	-	17°32,862'	-	17°32,913'
Longitude (E)	117°8,731'	-	117°8,731'	-	117°8,756'
Waterdepth (m)	2405	-	2405,9	-	2406,5

MUC 18557-1

12 of 12 tubes recovered

Recovery: 16,5-19 cm

SL 18557-2 (20 m)

Total length: 19,43 m

Number of sections: 20

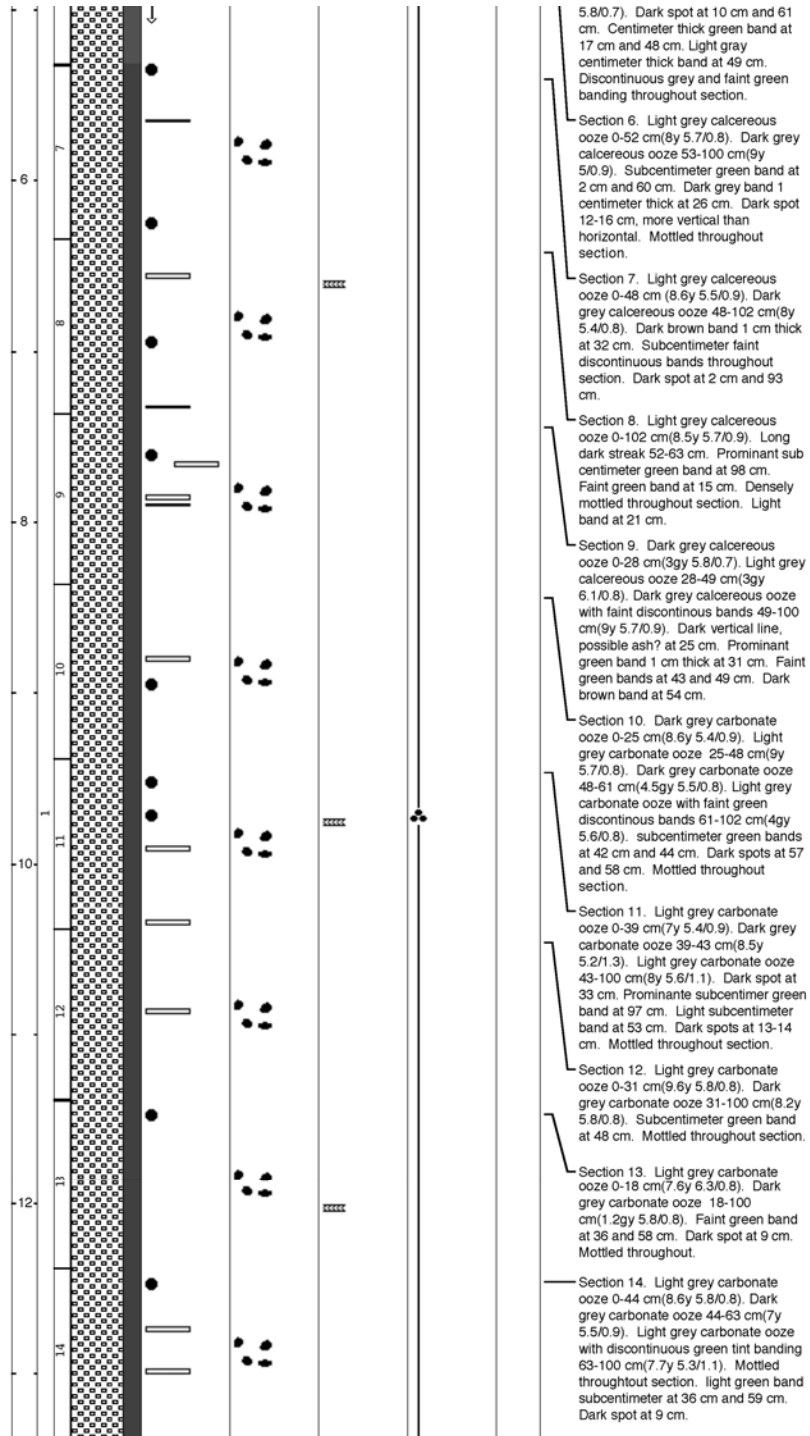
Ash layer at 1528 cm

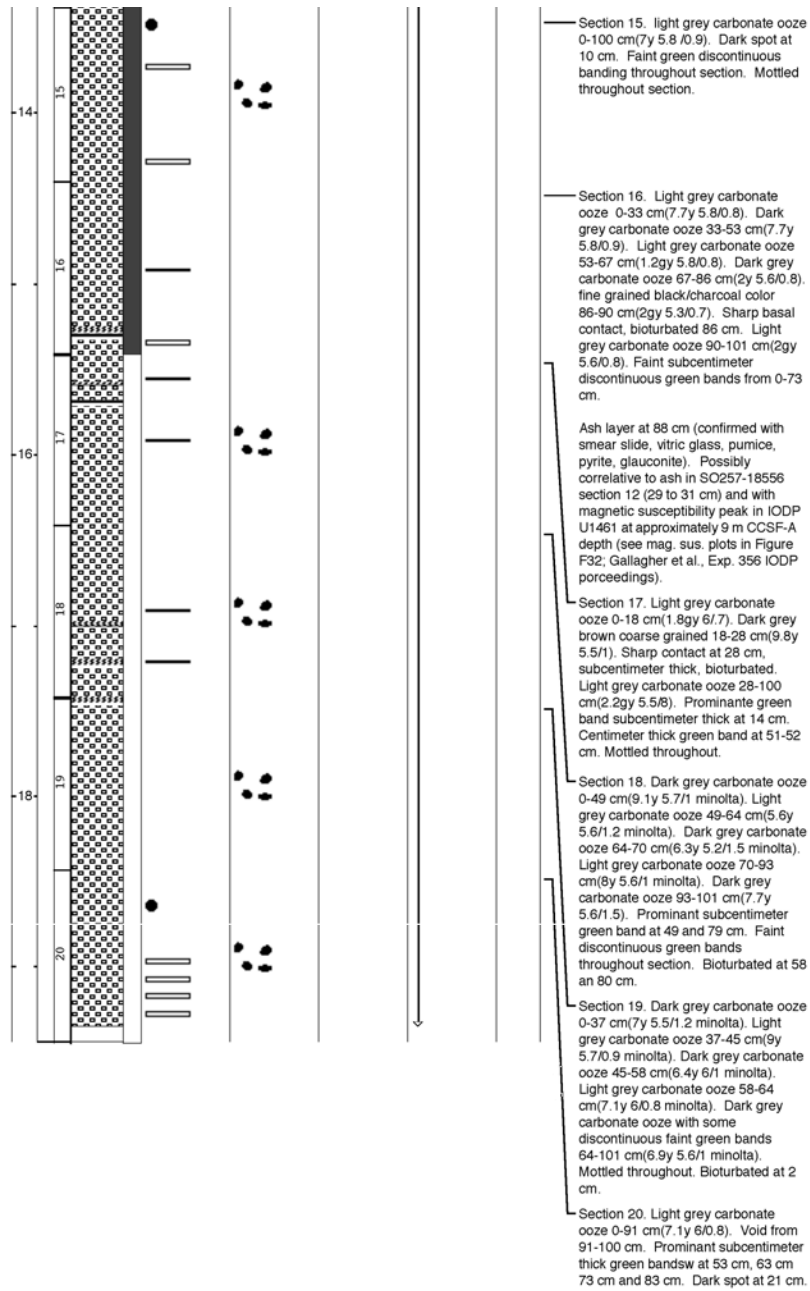
SL-Sections 1	0-100 cm
SL-Sections 2	100-201 cm
SL-Sections 3	201-301 cm
SL-Sections 4	301-366 cm
SL-Sections 5	366-432 cm
SL-Sections 6	432-532 cm
SL-Sections 7	532-634 cm
SL-Sections 8	634-736 cm
SL-Sections 9	736-836 cm
SL-Sections 10	836-938 cm
SL-Sections 11	938-1038 cm
SL-Sections 12	1038-1138 cm
SL-Sections 13	1138-1238 cm
SL-Sections 14	1238-1338 cm
SL-Sections 15	1338-1440 cm
SL-Sections 16	1440-1541 cm
SL-Sections 17	1541-1641 cm
SL-Sections 18	1641-1742 cm
SL-Sections 19	1742-1842 cm
SL-Sections 20	1842-1943 cm

SO257 18557 GC
 17°32.9160'S, 117°8.7590'E

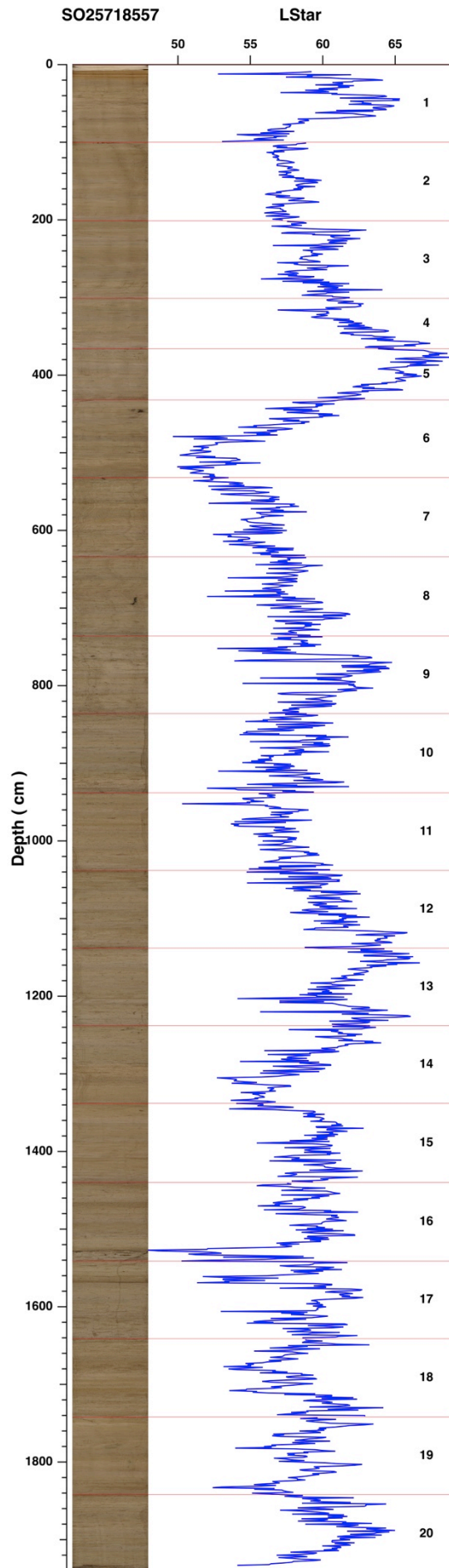
Date logged: May 20, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 2406.30 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB. STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
0-1								Section 1. 0-7 cm void. Brown oxidized interval from 7-13 cm(2y 5.6/2) and 15-17 cm, both intervals have darker bottom two centimeters. Light grey calcereous ooze from 13-15 cm(1.8y 5.6/1.7), mottled. Light grey calcereous ooze with brown tint from 15-35 cm(3.2y 5.9/1.1). Light grey calcereous ooze from 35-70 cm(4.6y 6/9.9), densely mottled. Dark grey calcereous ooze with faint green subcentimeter bands from 70-100 cm(8.5y 5.5/1).
1-2								Section 2. Light grey calcereous ooze from 0-10 cm(5.8y 5.6/0.9). Dark grey calcereous ooze from 10-58 cm(7.3y 5.5/1.2). Light grey calcereous ooze from 58-66 cm(6y 5.6/0.8). Dark grey calcereous ooze from 66-101 cm(7.5y 5.6/0.9). Prominent green band 21-23 cm with subcentimeter green bands throughout core.
2-3								Section 3. Dark grey calcereous ooze 0-10 cm(8y 5.6/y). Light grey calcereous ooze 10-34 cm(7y 5.9/0.9). Dark grey calcereous ooze 34-55 cm(9y 5.7/1). Light grey calcereous ooze 56-100 cm(9y 5.7/0.8). Heavily mottled throughout. Prominent 2 cm thick green band at 30-32 cm. Subcentimeter green bands throughout section. Prominent burrow at 84 cm. Dark spot at 66 cm.
3-4								Section 4. Light grey calcereous ooze 0-17 cm(8y 6/0.8). Dark grey calcereous ooze 17-56 cm(7.8y 5.7/0.8). Light grey calcereous ooze 56-65 cm(6.5y 6.4/0.5). 1 cm thick green band at 45 cm. Faint green discontinuous banding from 13-45 cm. Densely mottled throughout section. Subcentimeter dark band(under green band) at 16 cm and 46 cm.
4-5								
5-6								Section 5. Light grey calcereous ooze 0-22 cm(9y 6.4/0.6). Dark grey calcereous ooze 22-66 cm(7y

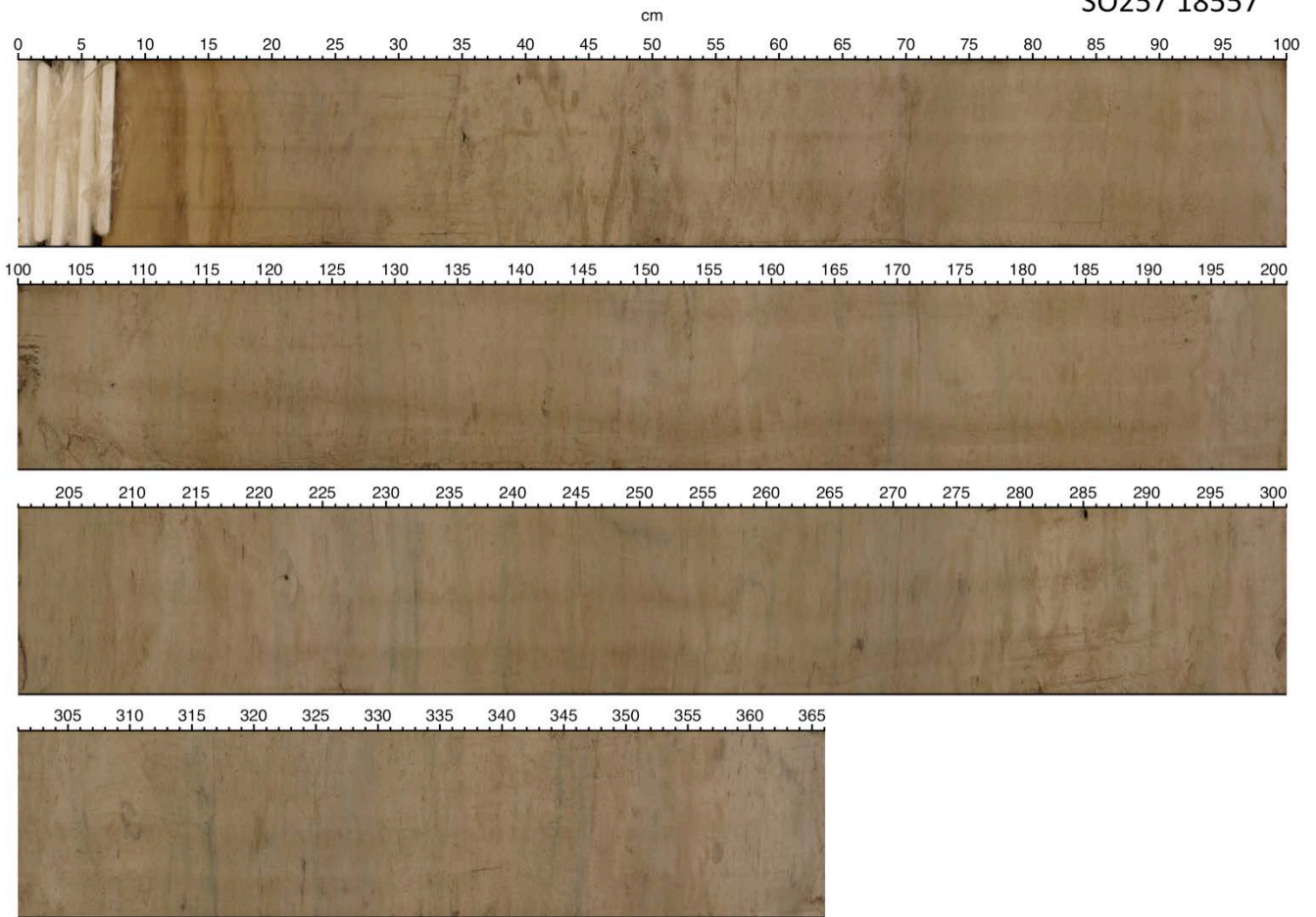




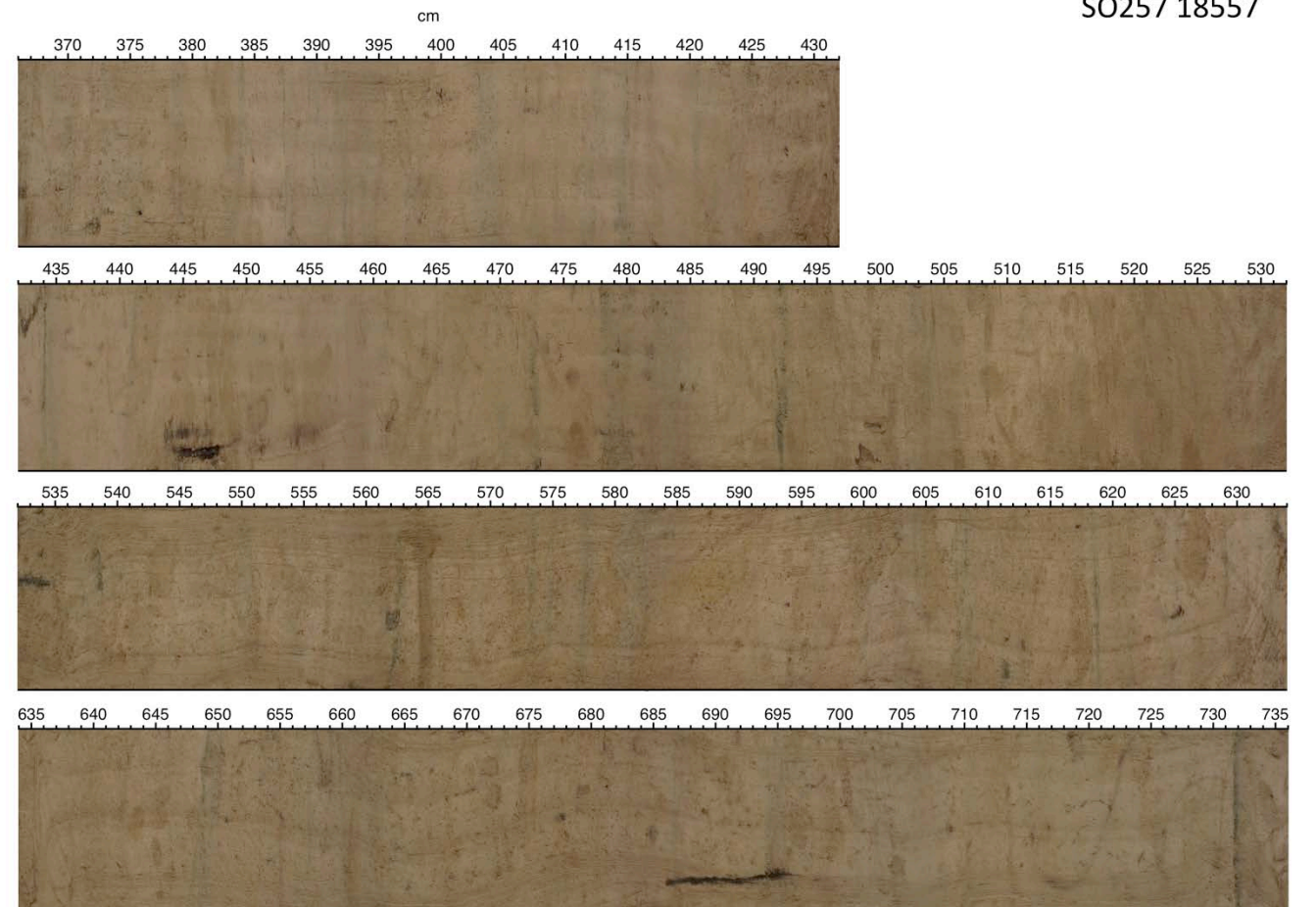
LEGEND	
LITHOLOGY	
Void	Volcanic Ash or Tuff (V1)
	Calcareous Ooze (CB4)
CONTACTS	
Sharp	Bioturbated
PHYSICAL STRUCTURES	
- Dark spots	- dark band
	- light band
LITHOLOGIC ACCESSORIES	
- MOTTLED	
ICHTHOFOSSILS	
- Zoophycos	
FOSSILS	
- Foraminifera (undifferentiated)	
CORE DISTURBANCE	



SO257 18557



SO257 18557



SO257 18557

cm

740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835



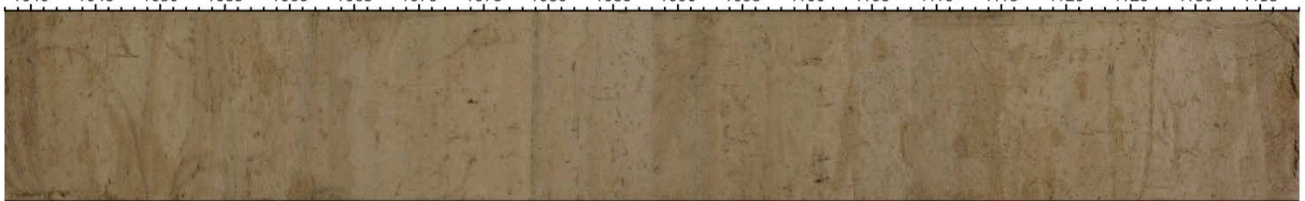
840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935



940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035



1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135



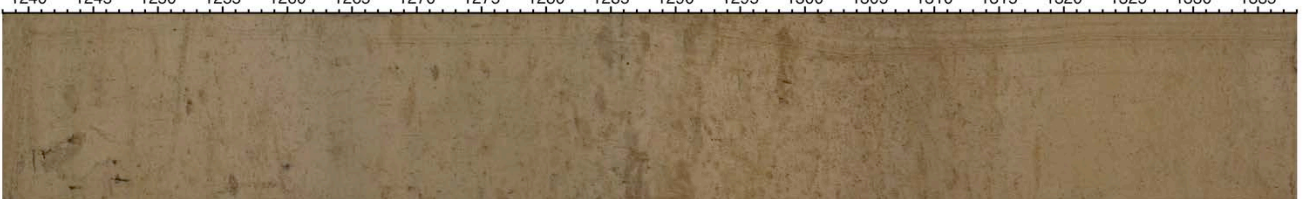
SO257 18557

cm

1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235



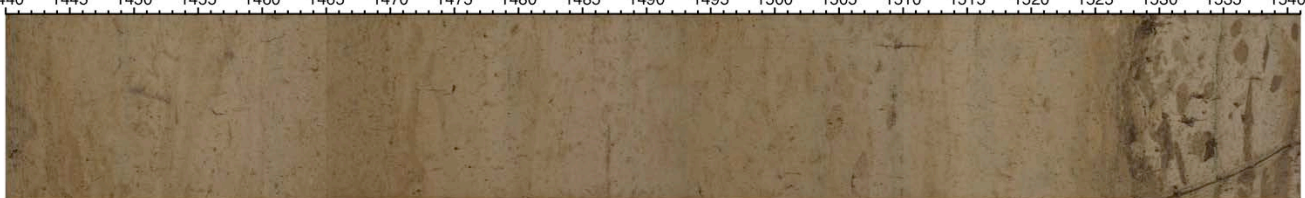
1240 1245 1250 1255 1260 1265 1270 1275 1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335



1340 1345 1350 1355 1360 1365 1370 1375 1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435 1440



1440 1445 1450 1455 1460 1465 1470 1475 1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535 1540



SO257 18557



Station SO257-4-1,2**SO257-18558**

	18558		MUC-1		SL-2
Date	2017 05 20	-	*	-	2017 05 21
Start (UTC)	22:55	-	22:56	-	00:20
Latitude (S)	18°23,966'	-	18°23,972'	-	18°23,954'
Longitude (E)	115°13,690'	-	115°13,690'	-	115°13,670'
Waterdepth (m)	1756,8	-	1755,4	-	1756,9

MUC 18558-1

12 of 12 tubes recovered

Recovery: 16,5-19 cm

SL 18558-2 (20 m)

Total length: 16,38 m

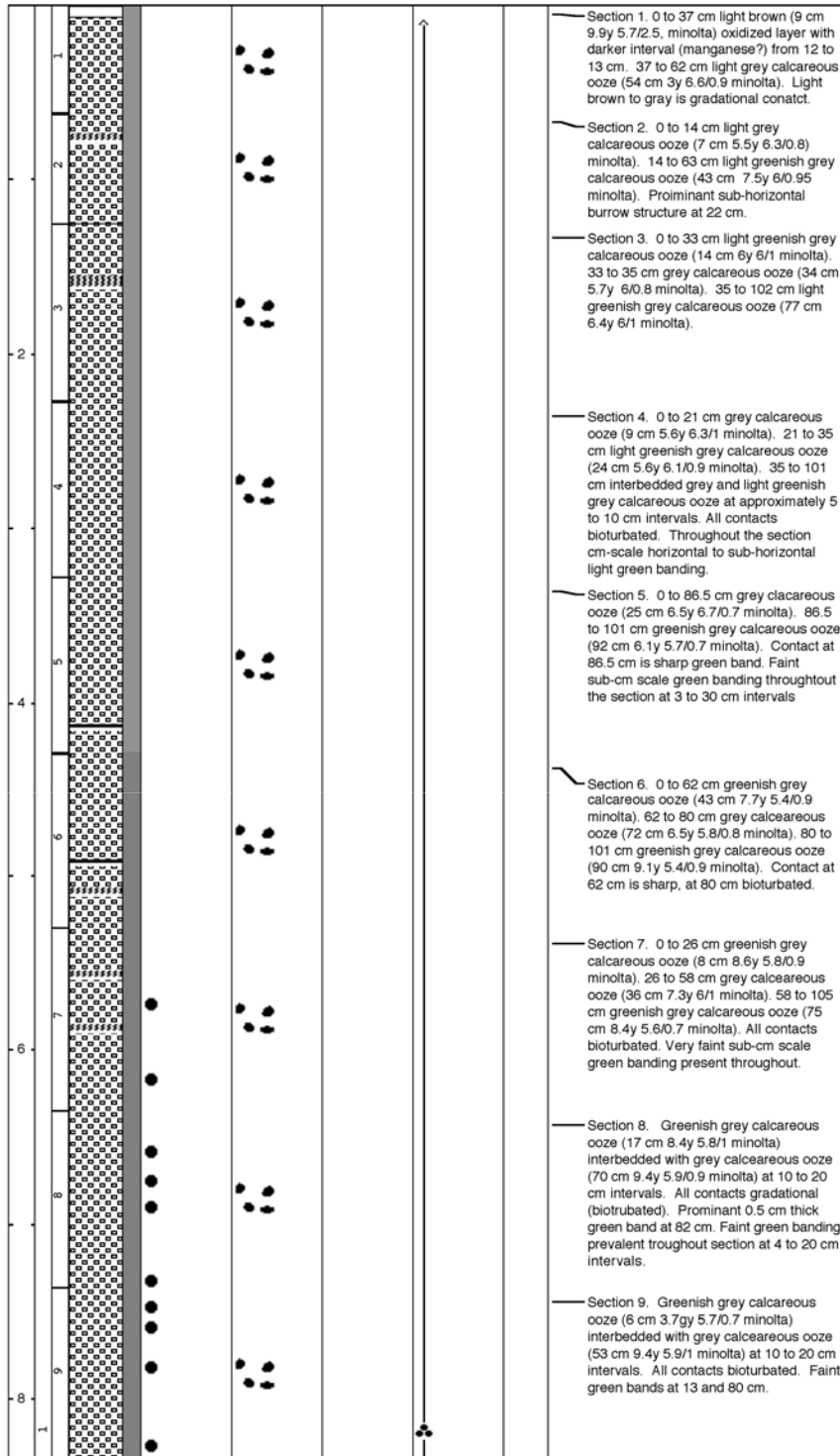
Number of sections: 17

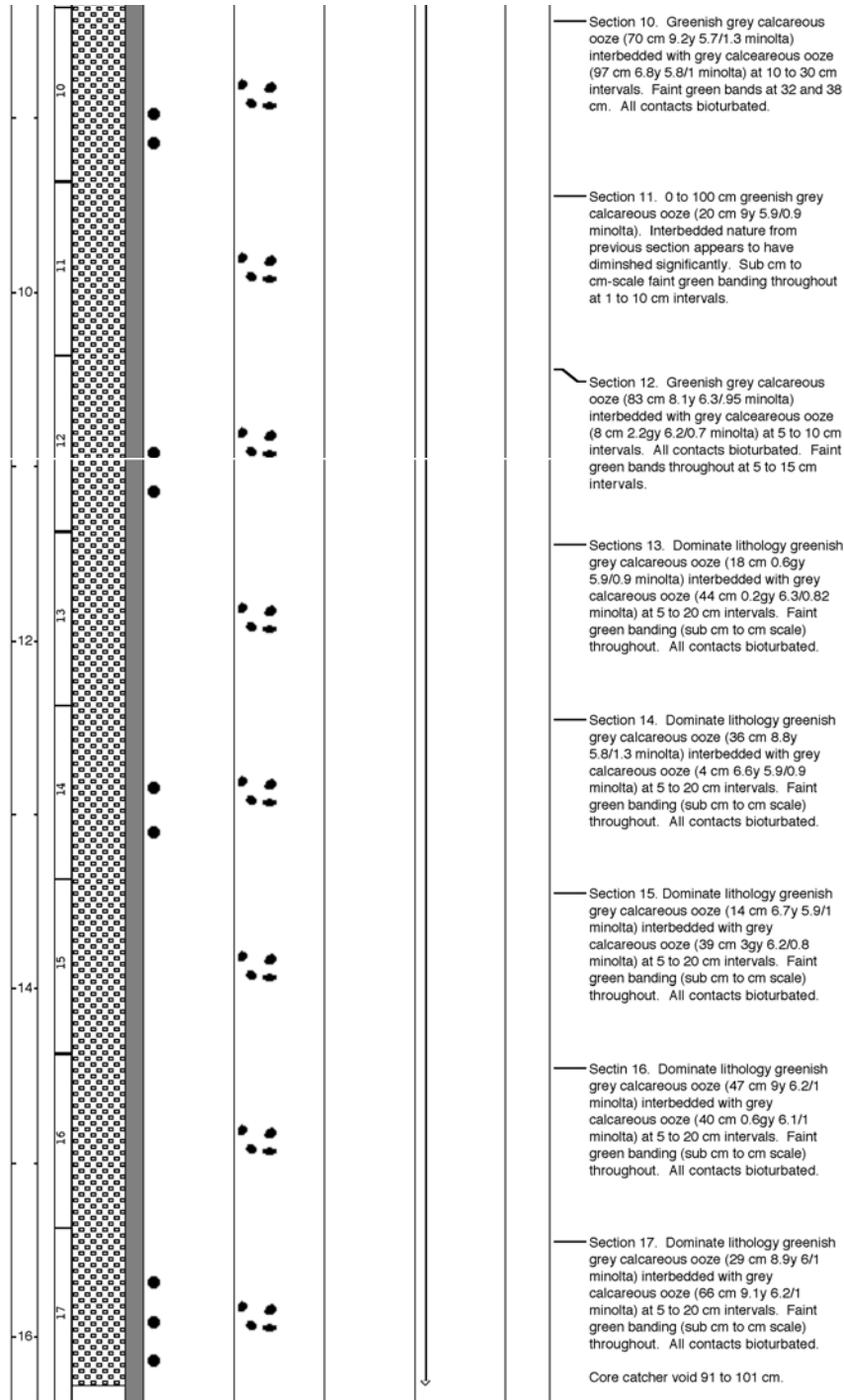
SL-Sections 1	0-62 cm
SL-Sections 2	62-125 cm
SL-Sections 3	125-227 cm
SL-Sections 4	227-328 cm
SL-Sections 5	328-429 cm
SL-Sections 6	429-530 cm
SL-Sections 7	530-635 cm
SL-Sections 8	635-736 cm
SL-Sections 9	736-836 cm
SL-Sections 10	836-936 cm
SL-Sections 11	936-1036 cm
SL-Sections 12	1036-1137 cm
SL-Sections 13	1137-1237 cm
SL-Sections 14	1237-1337 cm
SL-Sections 15	1337-1437 cm
SL-Sections 16	1437-1537 cm
SL-Sections 17	1537-1638 cm

SO257 18558 GC
 18°23.9530'S, 115°13.6690'E

Date logged: May 21, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1755.20 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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LEGEND

LITHOLOGY

-  Void
-  Calcareous Ooze (CB4)


CONTACTS

-  Sharp
-  Bioturbated

PHYSICAL STRUCTURES

-  - Dark spots

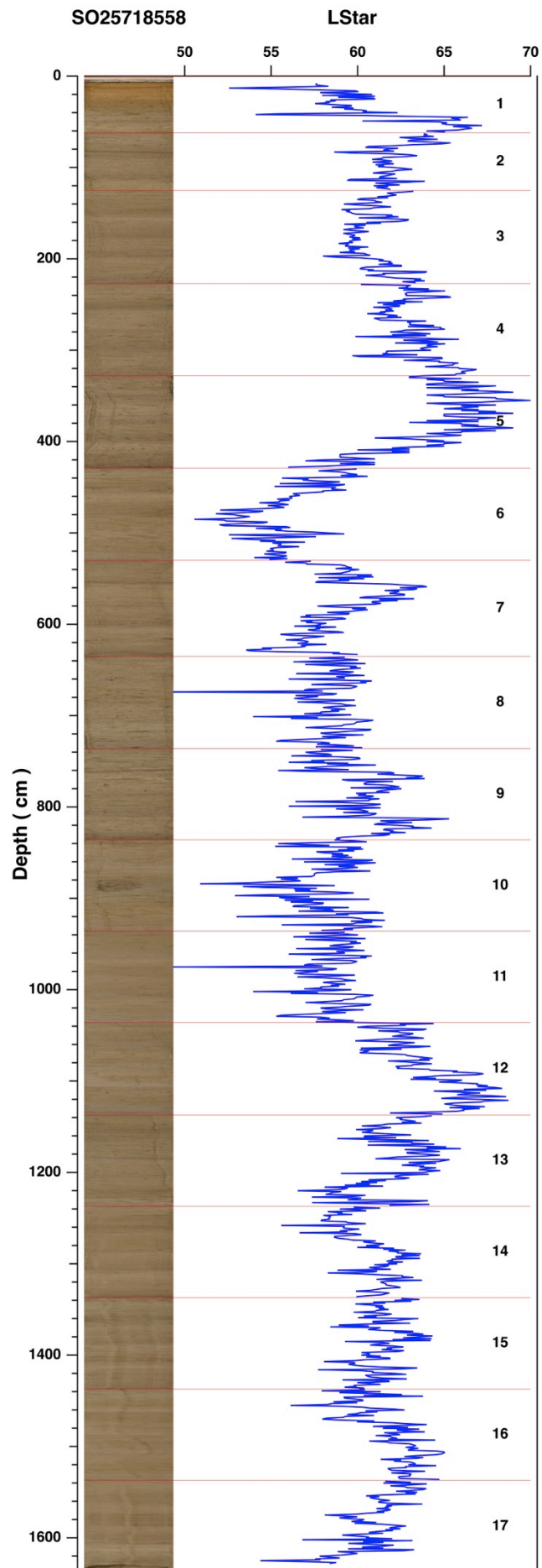
LITHOLOGIC ACCESSORIES

-  - MOTTLED

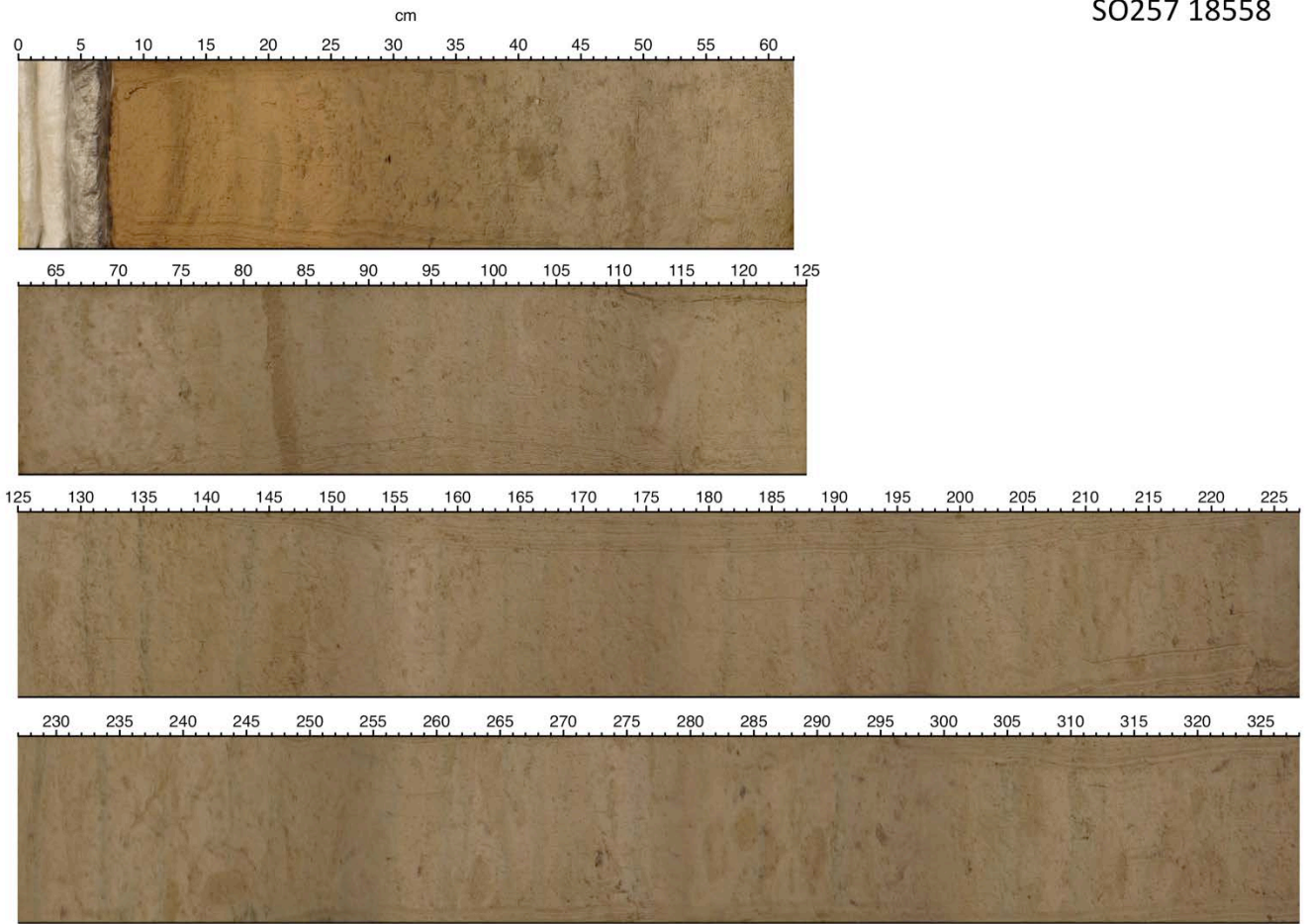
FOSSILS

-  - Foraminifera (undifferentiated)

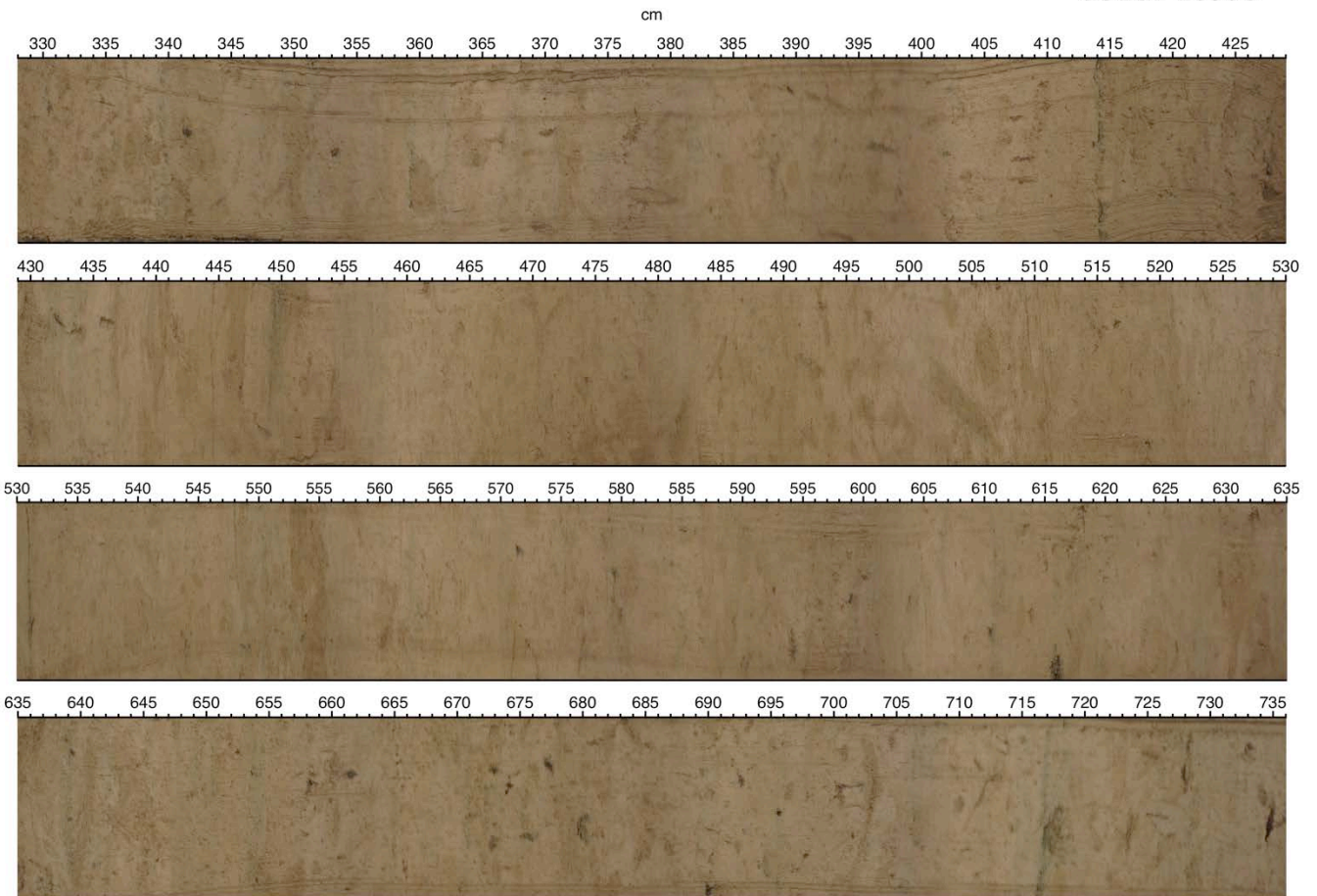
CORE DISTURBANCE



SO257 18558



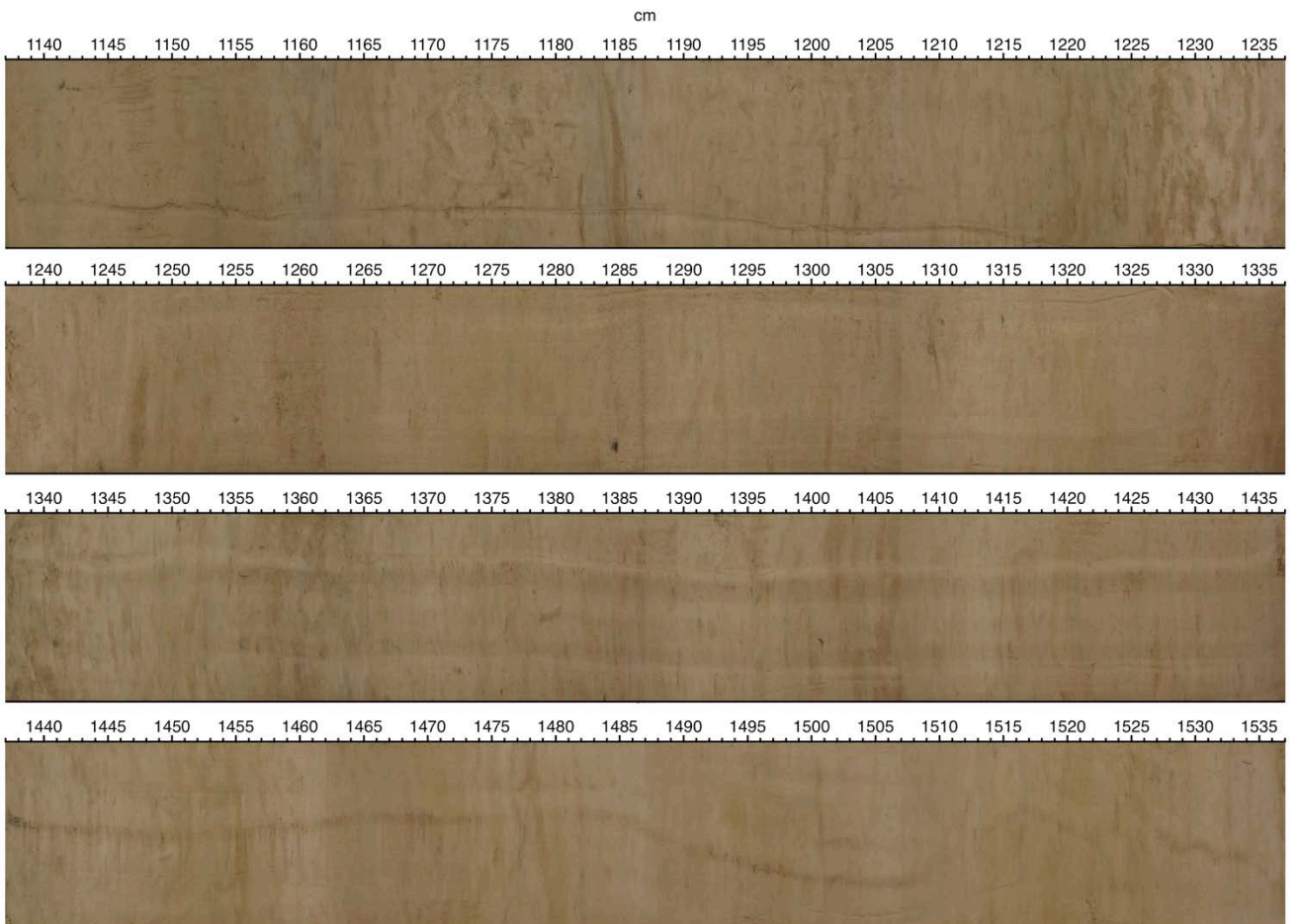
SO257 18558



SO257 18558



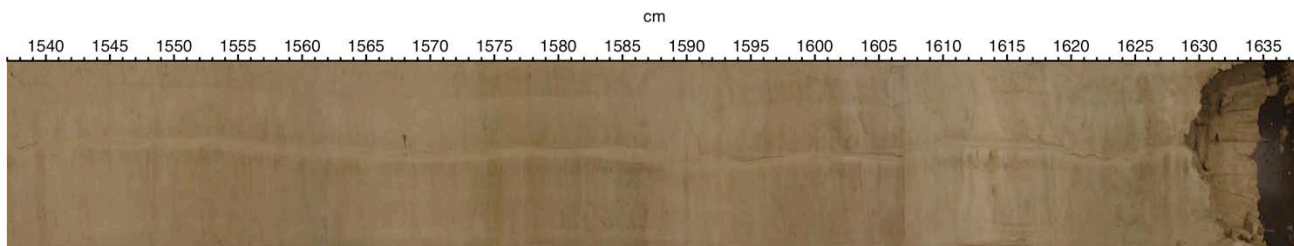
SO257 18558



Station SO257-4-1,2

SO257-18558

SO257 18558

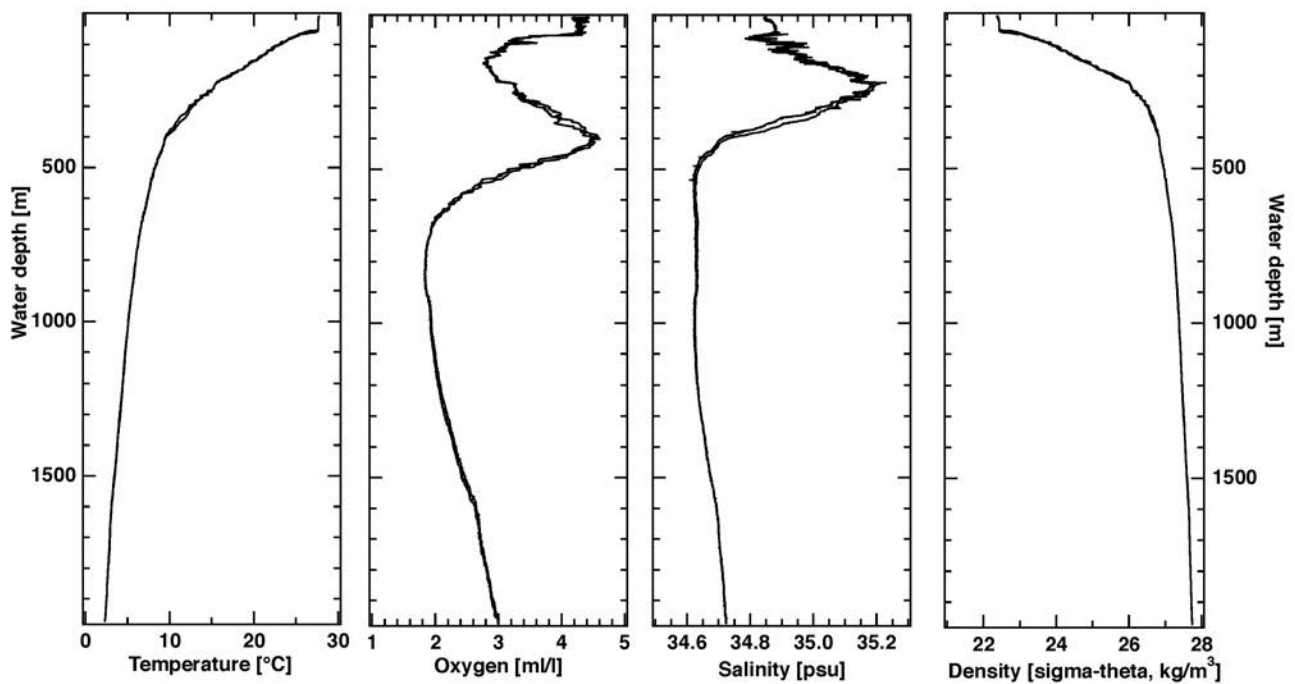


	18559	CTD-1	MUC-2		SL-3
Date	2017 05 21	*	*	-	*
Start (UTC)	04:13	04:17	06:02	-	07:24
Latitude (S)	18°4,998'	18°4,996'	18°5,004'	-	18°5,004'
Longitude (E)	115°2,896'	115°2,883'	115°2,862'	-	115°2,861'
Waterdepth (m)	1975,5	1974,1	1976,5	-	1977,2

CTD 18559-1

Water samples taken at (m): 1970, 1500, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 1970, 900, 225, 75, 10



CTD profiles of station 18559

MUC 18559-2

12 of 12 tubes recovered

Recovery: 17-19 cm

SL 18559-3 (20 m)

Total length: 19,01 m

Number of sections: 19

SL-Sections 1	0-100 cm
SL-Sections 2	100-201 cm
SL-Sections 3	201-301 cm
SL-Sections 4	301-394 cm

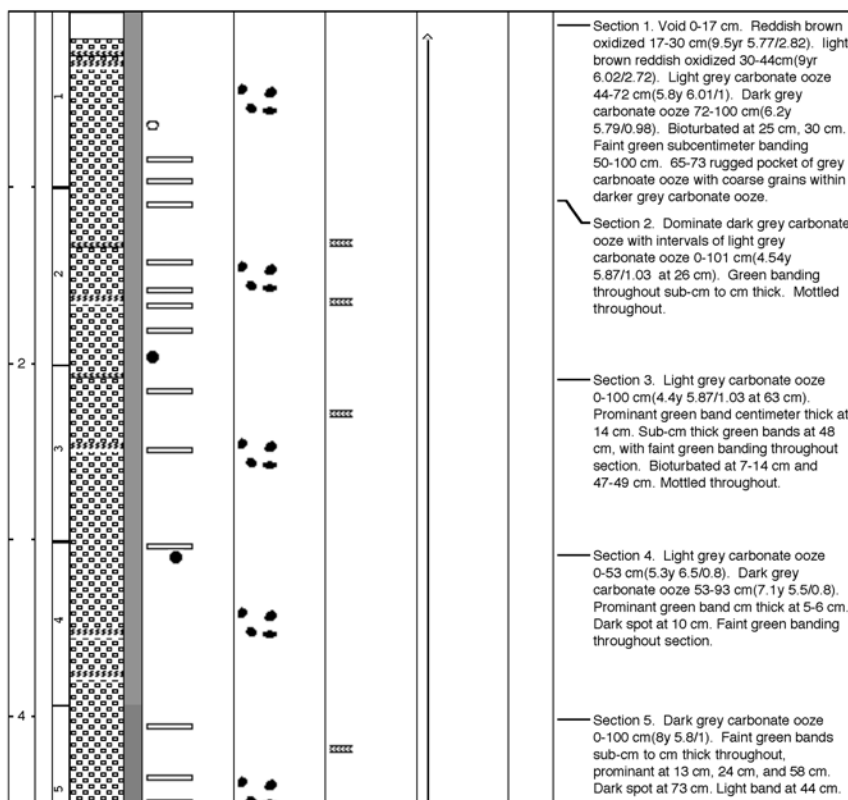
SL-Sections 5	394-494 cm
SL-Sections 6	494-595 cm
SL-Sections 7	595-695 cm
SL-Sections 8	695-795 cm
SL-Sections 9	795-896 cm
SL-Sections 10	896-997 cm
SL-Sections 11	997-1097 cm
SL-Sections 12	1097-1197 cm
SL-Sections 13	1197-1297 cm
SL-Sections 14	1297-1399 cm
SL-Sections 15	1399-1499 cm
SL-Sections 16	1499-1599 cm
SL-Sections 17	1599-1699 cm
SL-Sections 18	1699-1800 cm
SL-Sections 19	1800-1901 cm

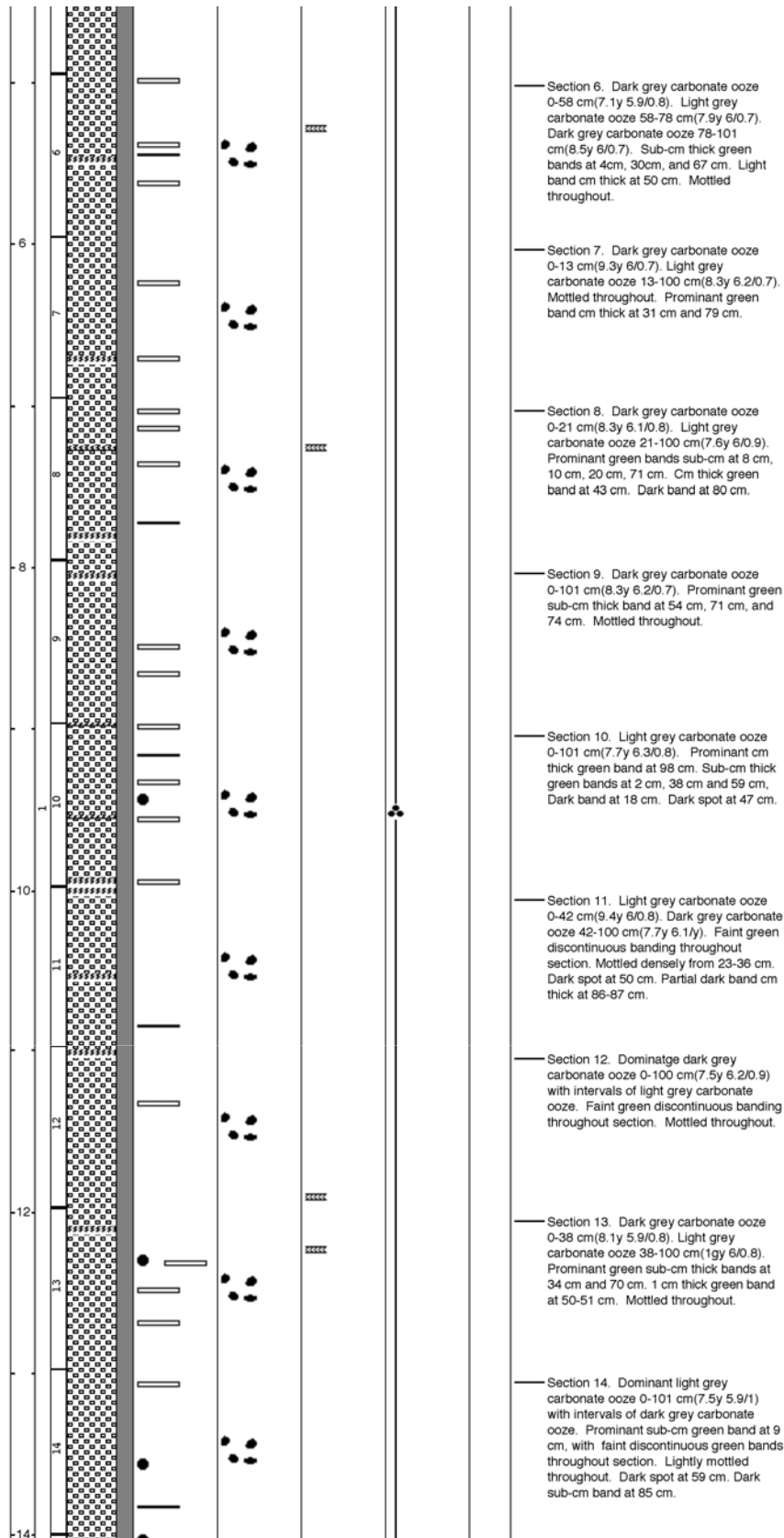
SO257 18559 GC

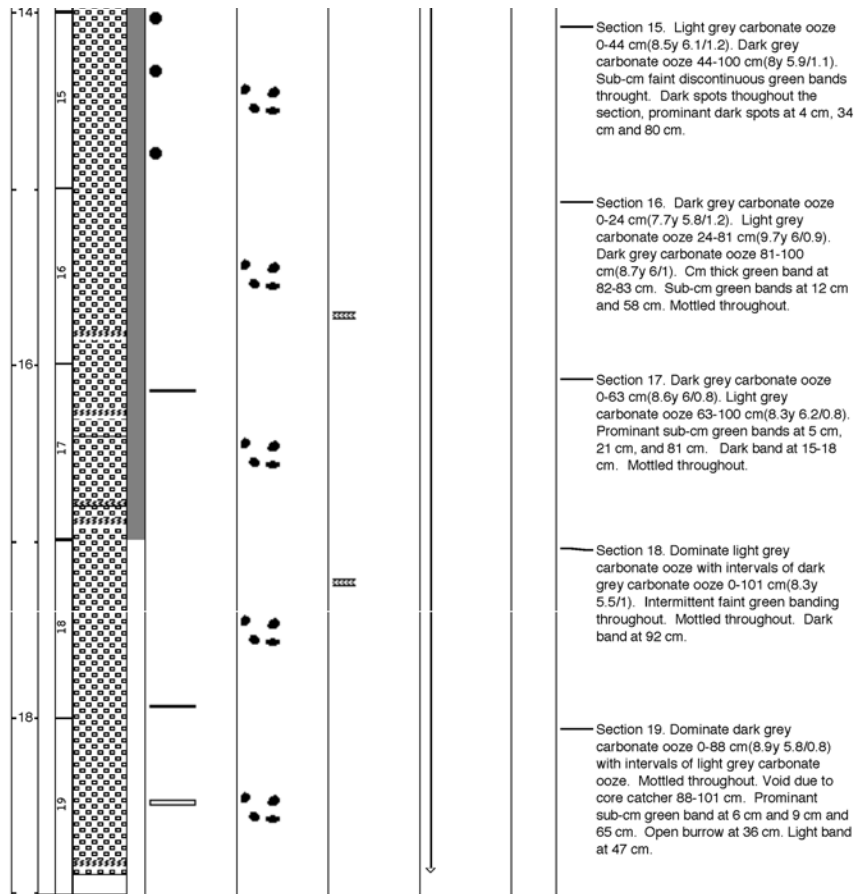
18°5.0040'S, 115°2.8610'E

Date logged: May 21, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 1976.30 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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LEGEND





LITHOLOGY

-  Void
-  Calcareous Ooze (CB4)

CONTACTS

- ***** Bioturbated

PHYSICAL STRUCTURES

-  - Dark spots
-  - Light spot
-  - dark band
-  - light band

LITHOLOGIC ACCESSORIES

-  - MOTTLED

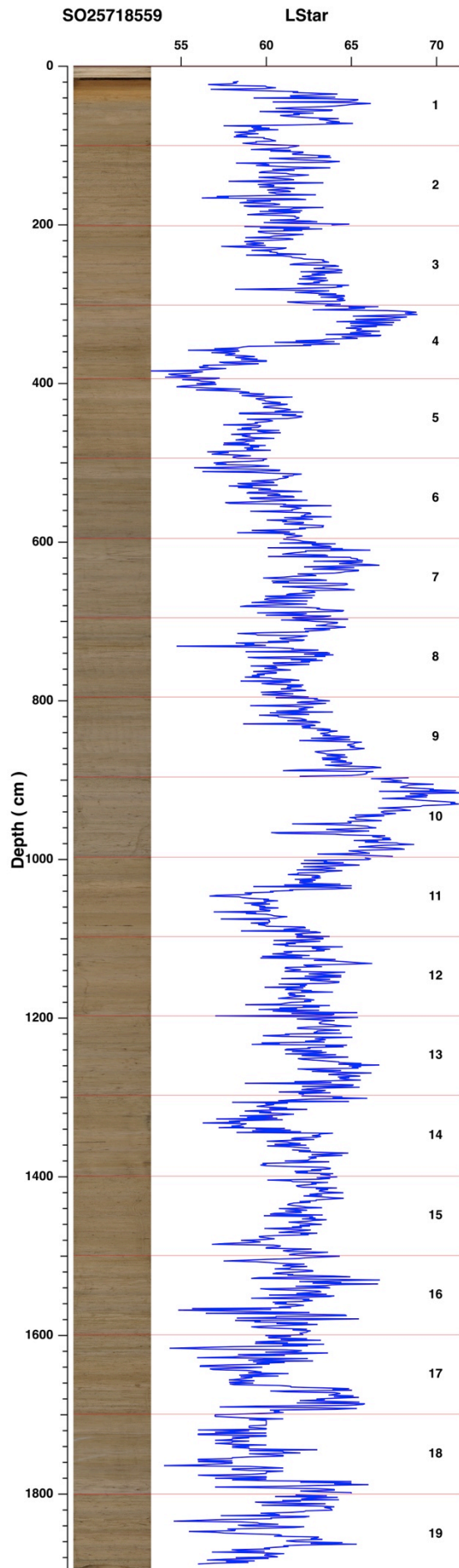
ICHTHOFOSSILS

- xxxxx - Zoophycos

FOSSILS

-  - Foraminifera (undifferentiated)

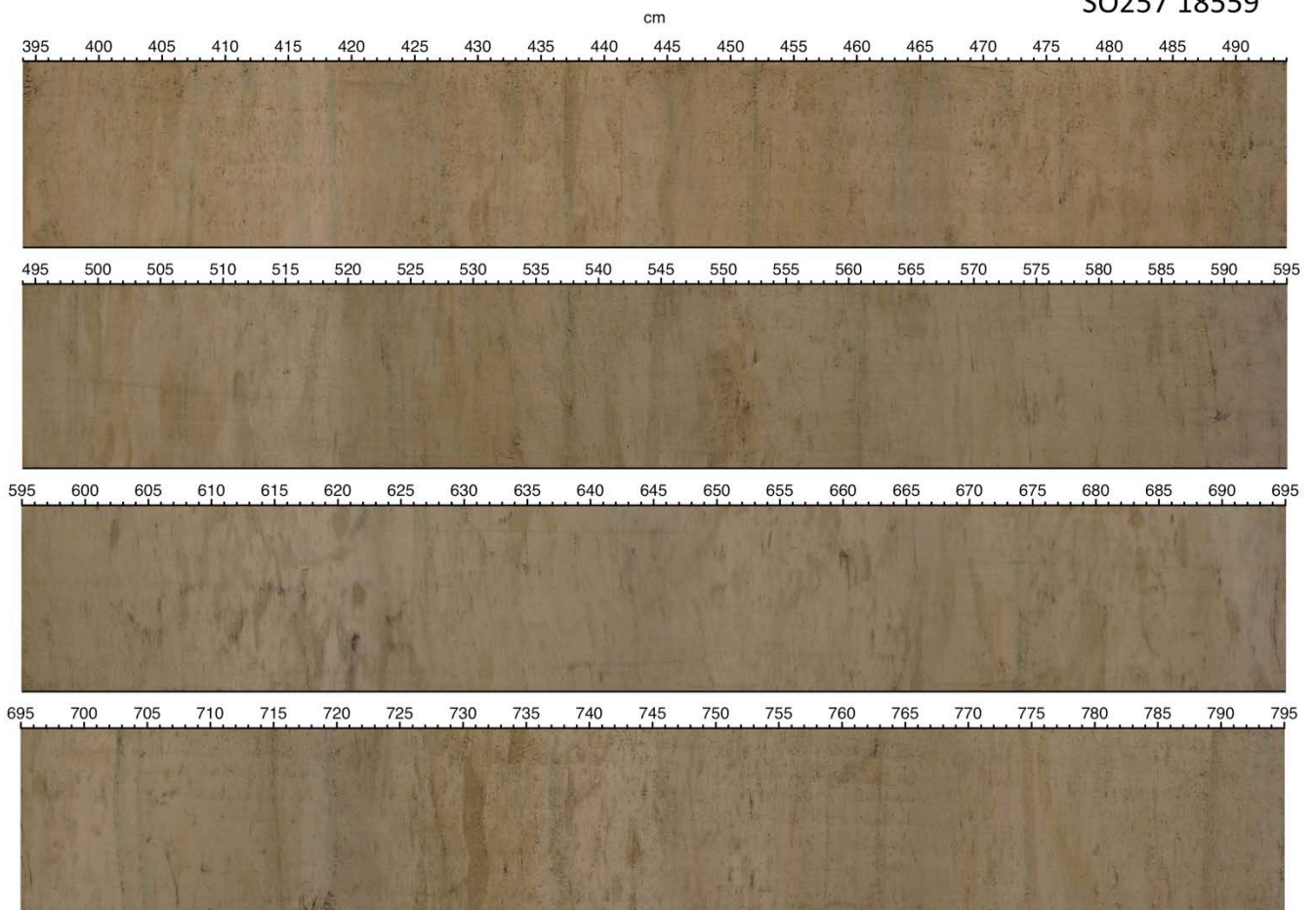
CORE DISTURBANCE



SO257 18559



SO257 18559



SO257 18559

cm

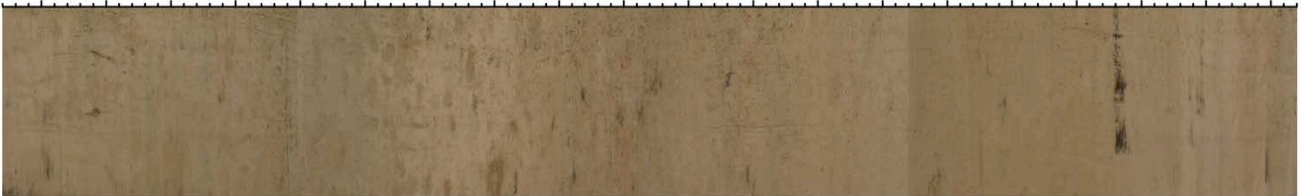
795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895



900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995



1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095



1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195



cm

SO257 18559

1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265 1270 1275 1280 1285 1290 1295



1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365 1370 1375 1380 1385 1390 1395



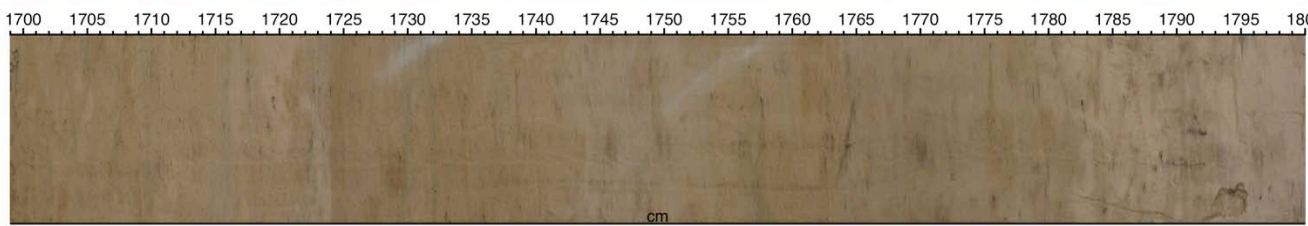
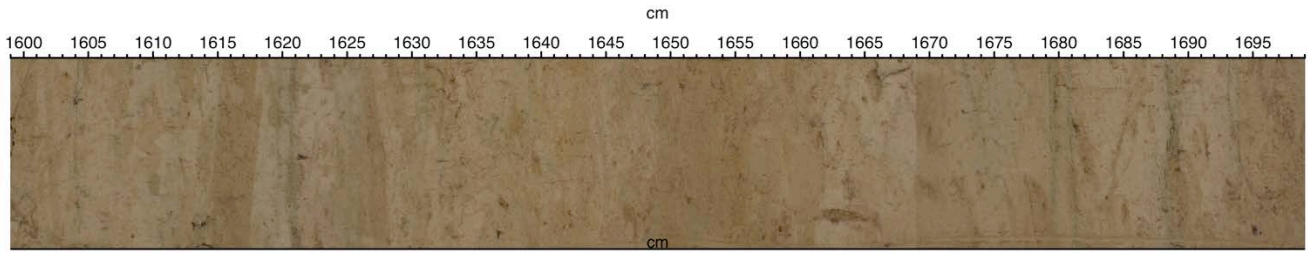
1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470 1475 1480 1485 1490 1495



1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570 1575 1580 1585 1590 1595



SO257 18559



Station SO257-7,8**SO257-18560**

	18560		MUC-1		SL-2
Date	2017 05 22	-	*	-	*
Start (UTC)	00:39	-	00:42	-	01:32
Latitude (S)	19°18,222'	-	19°18,238'	-	19°18,240'
Longitude (E)	115°25,922'	-	115°25,933'	-	115°25,931'
Waterdepth (m)	867,5	-	868,8	-	867

MUC 18560-1

12 of 12 tubes recovered

Recovery: 38-42 cm

SL 18560-2 (20 m)

Total length: 17,70 m

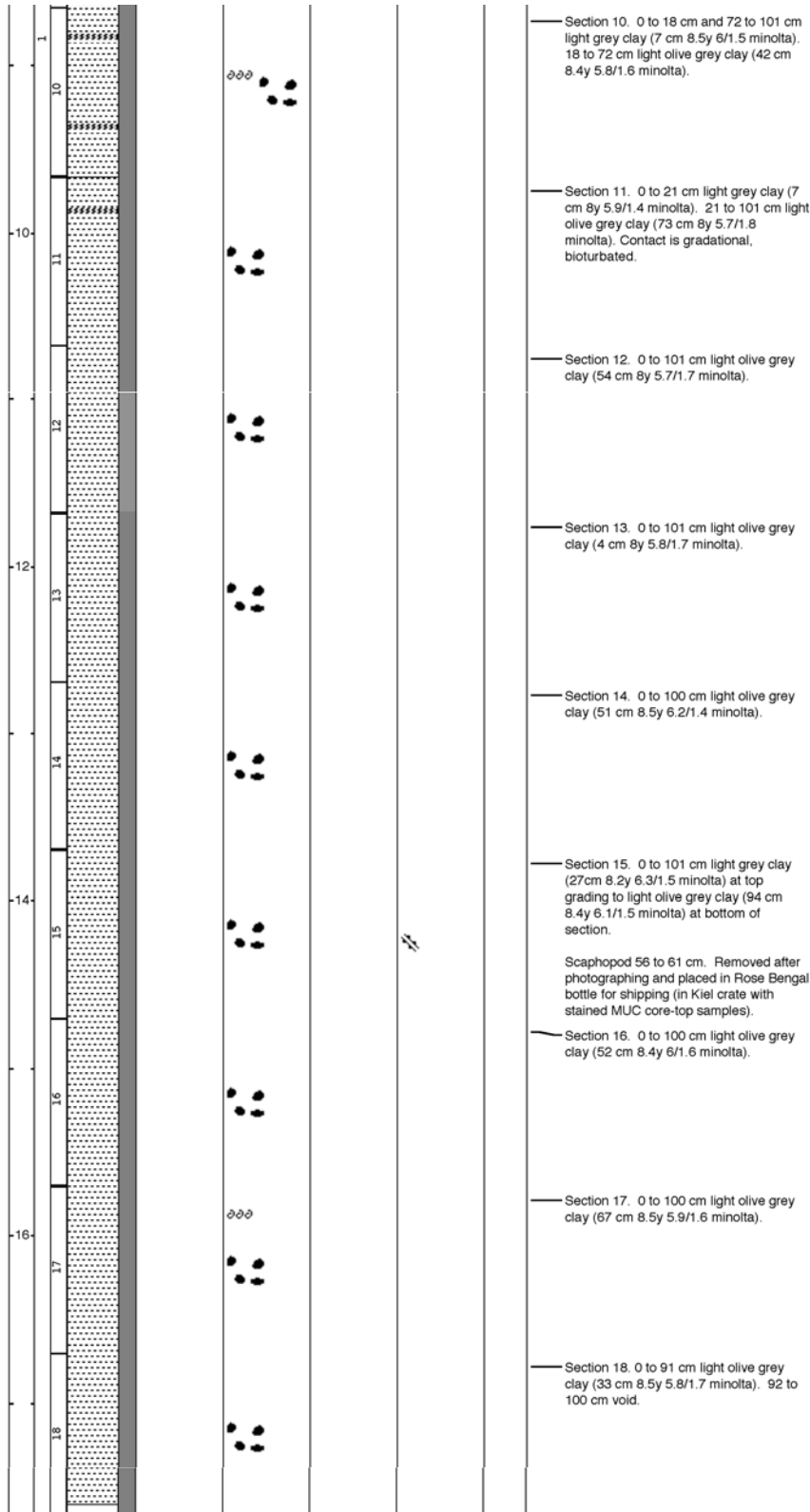
Number of sections: 18

SL-Sections 1	0-100 cm
SL-Sections 2	100-200 cm
SL-Sections 3	200-258 cm
SL-Sections 4	258-359 cm
SL-Sections 5	359-460 cm
SL-Sections 6	460-561 cm
SL-Sections 7	561-662 cm
SL-Sections 8	662-764 cm
SL-Sections 9	764-865 cm
SL-Sections 10	865-966 cm
SL-Sections 11	966-1067 cm
SL-Sections 12	1067-1168 cm
SL-Sections 13	1168-1269 cm
SL-Sections 14	1269-1369 cm
SL-Sections 15	1369-1470 cm
SL-Sections 16	1470-1570 cm
SL-Sections 17	1570-1670 cm
SL-Sections 18	1670-1770 cm

SO257 18560 GC
 19°18.2350'S, 115°25.9330'E



Date logged: May 22, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 863.60 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0 to 5 cm void. 5 cm to 100 cm light olive grey clay (50cm 8.2y 5.4/1.8 minolta). Very faintly mottled with darker hue. Open burrow structure at 48 cm. Foraminifera not readily visible on the core face but are present in the sieved core catcher. Sections very difficult to split (due to high clay content).
2									Section 2. 0 to 100 cm light olive grey clay (56 cm 8.7y 5.5/1.6 minolta). Open burrow structures at 7 and 69 cm.
3									Section 3. 0 to 58 cm light olive grey clay (34 cm 8.5Y 5.5/1.7 minolta). Open burrow structures at 19, 39, and 52 cm.
4									Section 4. 0 to 101 cm light olive grey clay (44 cm 8.8Y 5.5/1.6 minolta).
5									Section 5. 0 to 101 cm light olive grey clay (30 cm 8.5Y 5.5/1.6 minolta).
6									Section 6. 0 to 101 cm light olive grey clay (71 cm 9.2y 5.4/1.5 minolta).
7									Section 7. 0 to 101 cm light olive grey clay (32 cm 9.6y 5/1.6 minolta).
8									Section 8. 0 to 17 cm, 23 to 29 cm, and 32 to 102 cm light olive grey clay (13 cm 9.8y 5.2/1.5 minolta). 17 to 23 cm and 29 to 32 cm olive grey clay (21 cm 1.8gy 5/1.1 minolta). Burrow structure 2 to 13 cm.
9									Section 9. 0 to 101 cm light olive grey clay (88 cm 8.6y 6.2/1.5 minolta). Burrow structures 35 and 68 cm.





LEGEND


LITHOLOGY

 Clay or Claystone (T1)	 Void
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CONTACTS

 Sharp	 Bioturbated
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PHYSICAL STRUCTURES

 - Dark spots
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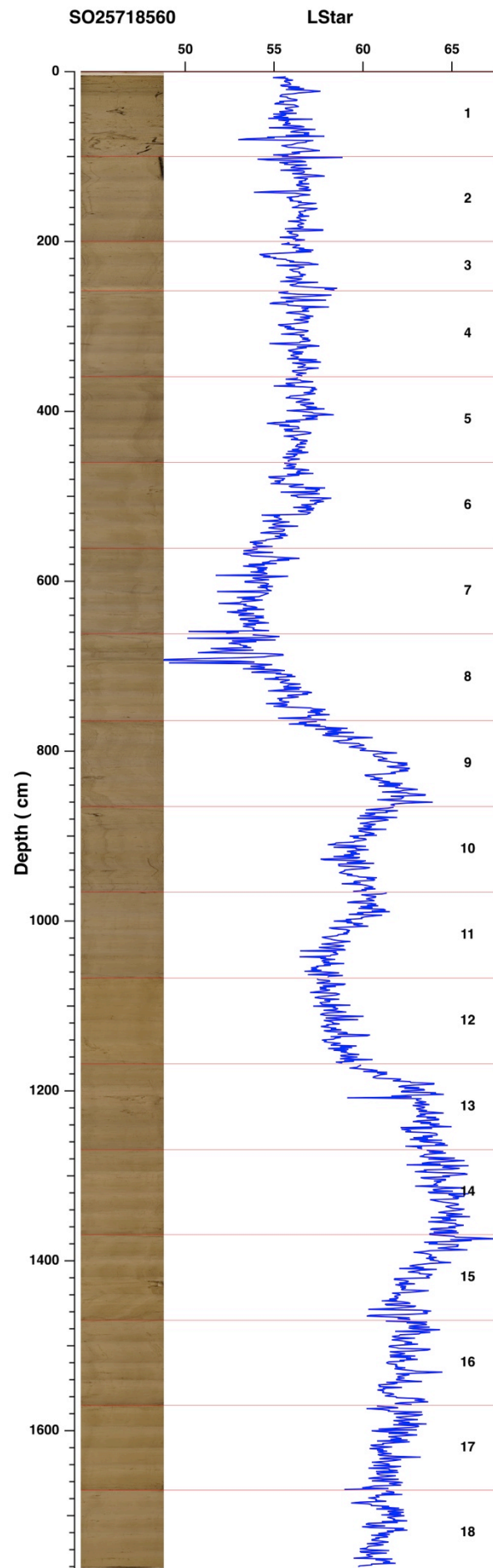
LITHOLOGIC ACCESSORIES

 - Shell Fragments	 - MOTTLED
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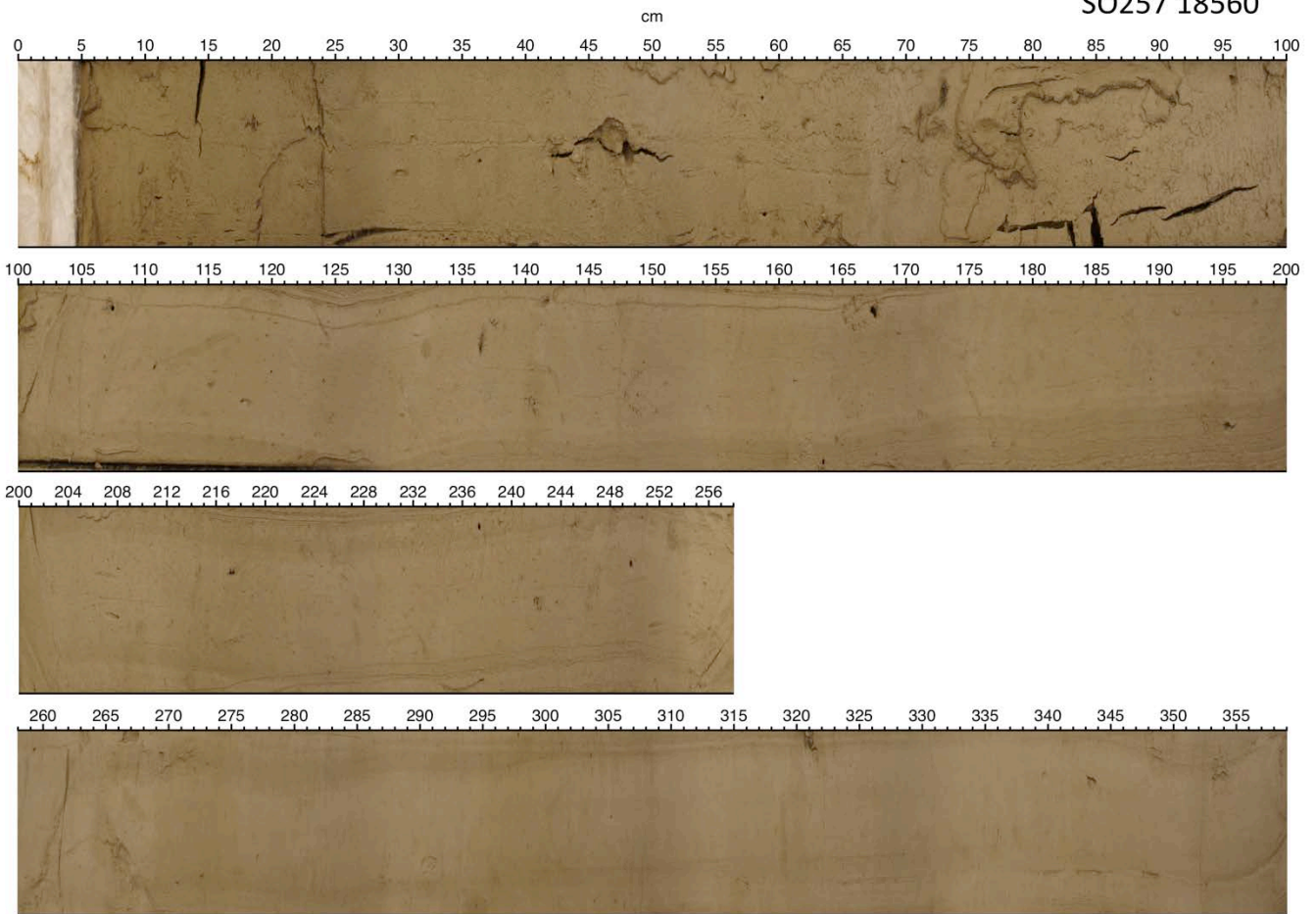
FOSSILS

 - Scaphopod

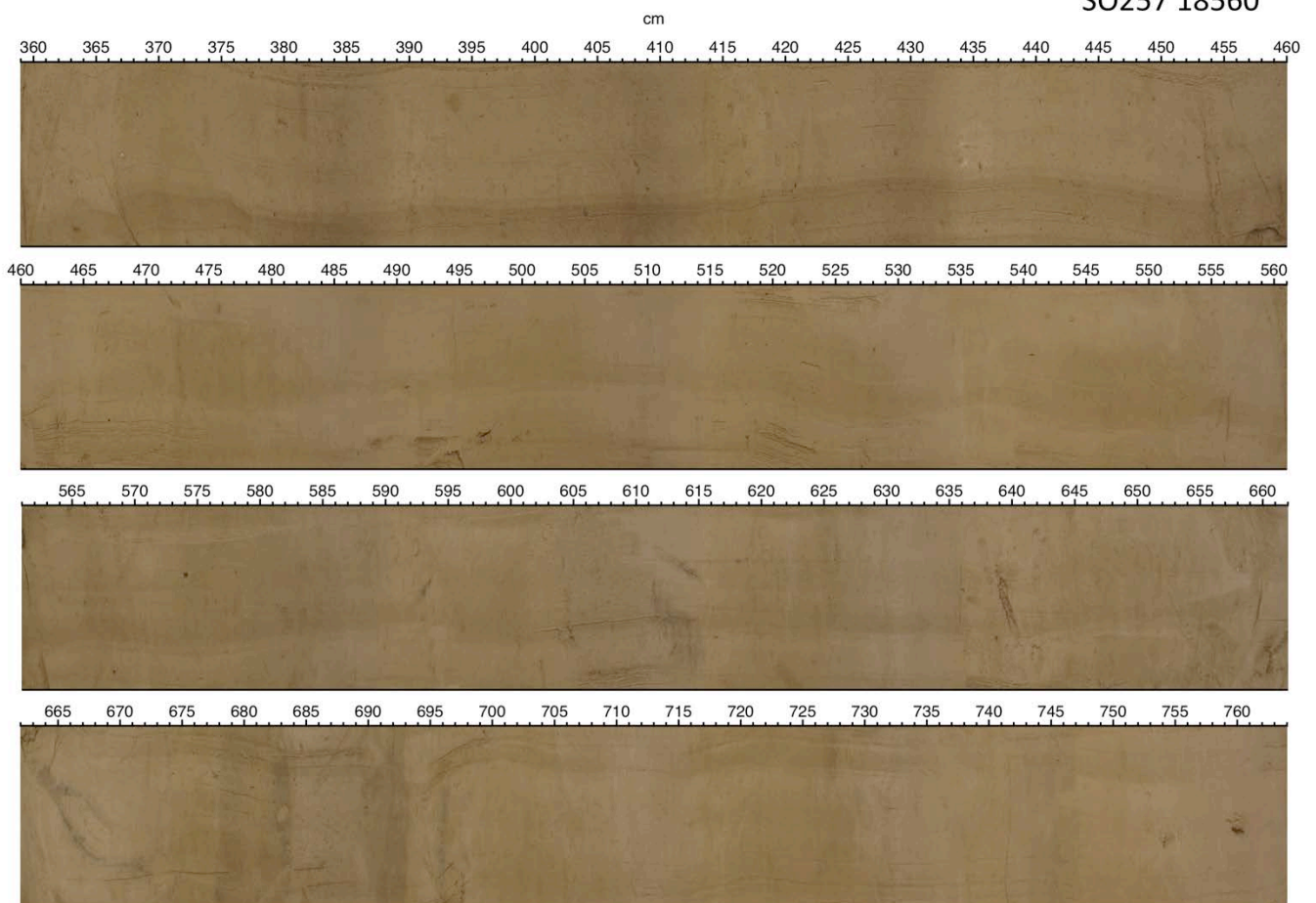
CORE DISTURBANCE



SO257 18560



SO257 18560



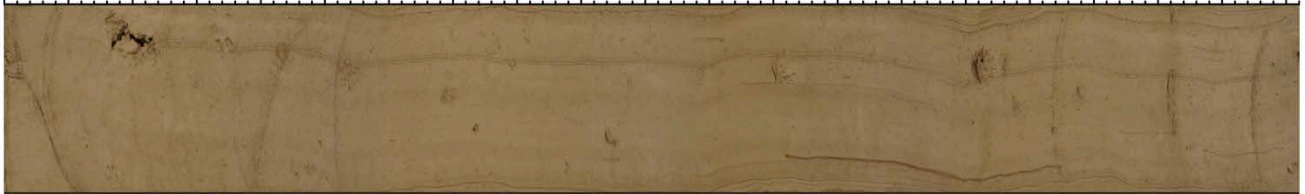
SO257 18560

cm

765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865



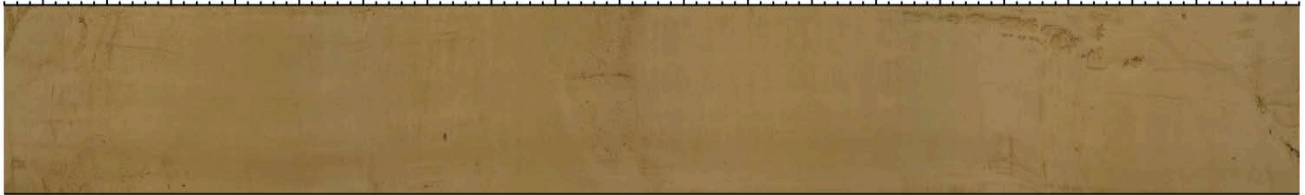
865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965



970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065



1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165



SO257 18560

cm

1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265



1270 1275 1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365



1370 1375 1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470



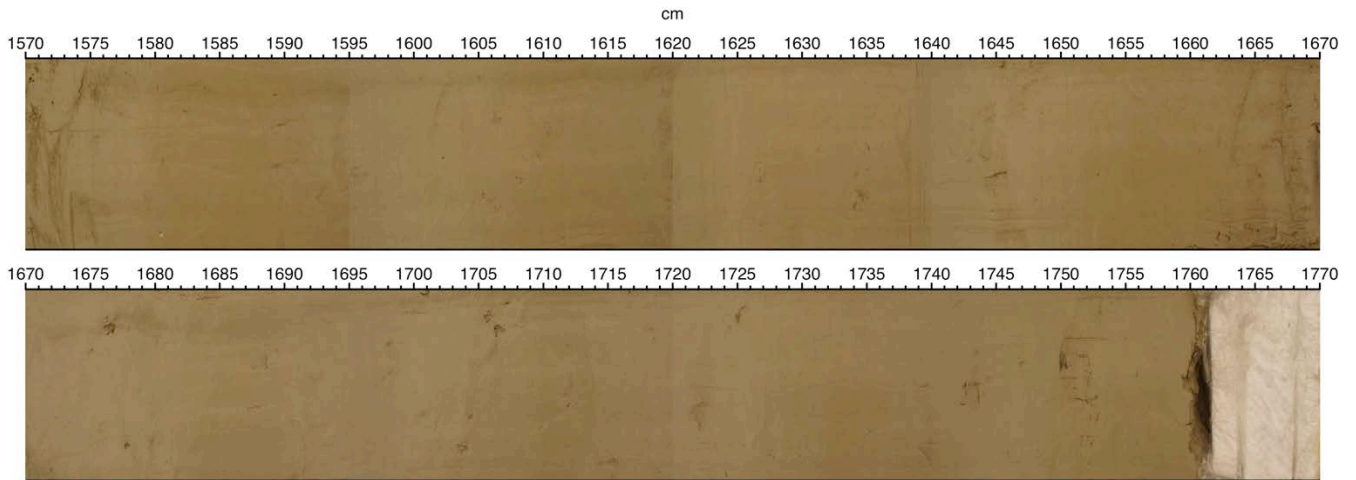
1470 1475 1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570



Station SO257-7,8

SO257-18560

SO257 18560



	18561		MUC-1		SL-2
Date	2017 05 22	-	*	-	*
Start (UTC)	03:00	-	03:02	-	04:00
Latitude (S)	19°14,552'	-	19°14,553'	-	19°14,556'
Longitude (E)	115°23,952'	-	115°23,948'	-	115°23,952'
Waterdepth (m)	1185,5	-	1185	-	1184,1

MUC 18561-1

12 of 12 tubes recovered

Recovery: 31-37 cm

SL 18561-2 (20 m)

Total length: 19,75 m

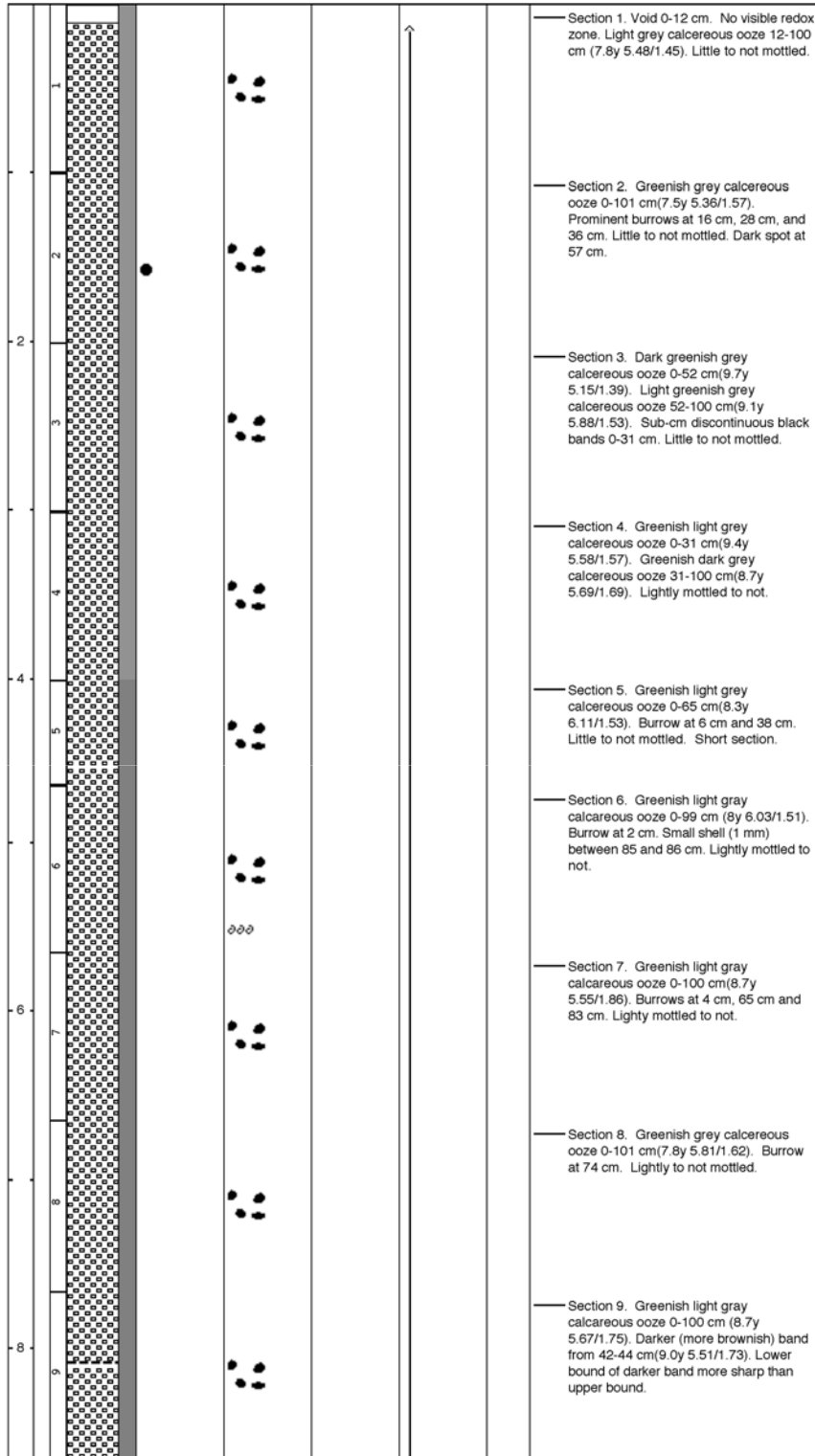
Number of sections: 20

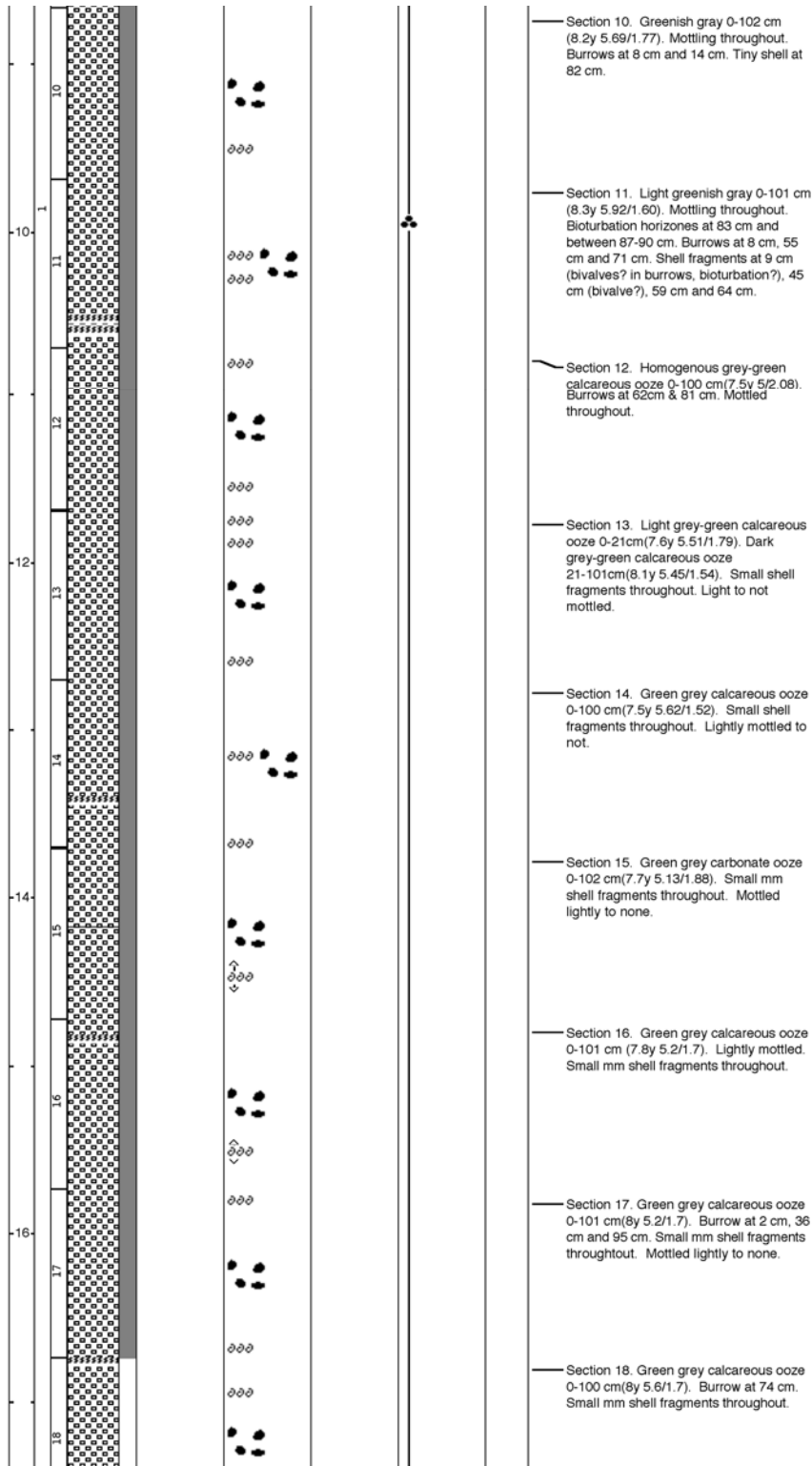
SL-Sections 1	0-100 cm
SL-Sections 2	100-201cm
SL-Sections 3	201-301 cm
SL-Sections 4	301-401 cm
SL-Sections 5	401-466 cm
SL-Sections 6	466-565 cm
SL-Sections 7	565-665 cm
SL-Sections 8	665-766 cm
SL-Sections 9	766-866 cm
SL-Sections 10	866-968 cm
SL-Sections 11	968-1069 cm
SL-Sections 12	1069-1169 cm
SL-Sections 13	1169-1270 cm
SL-Sections 14	1270-1370 cm
SL-Sections 15	1370-1472 cm
SL-Sections 16	1472-1573 cm
SL-Sections 17	1573-1674 cm
SL-Sections 18	1674-1774 cm
SL-Sections 19	1774-1874 cm
SL-Sections 20	1874-1975 cm

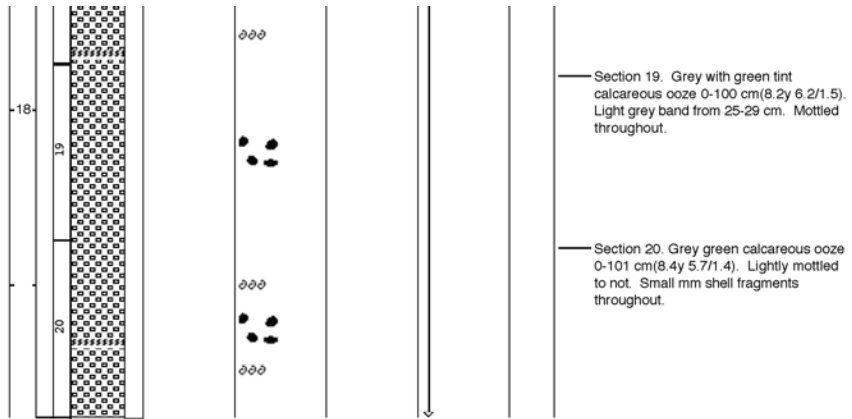
SO257 18561 GC
19°14.5550'S, 115°23.9470'E

Date logged: May 22, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 1186.40 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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Section 19. Grey with green tint calcareous ooze 0-100 cm(8.2y 6.2/1.5). Light grey band from 25-29 cm. Mottled throughout.

Section 20. Grey green calcareous ooze 0-101 cm(8.4y 5.7/1.4). Lightly mottled to not. Small mm shell fragments throughout.

LEGEND

LITHOLOGY

□ Void

▣ Calcareous Ooze (CB4)

CONTACTS

***** Bioturbated

--- Uncertain

PHYSICAL STRUCTURES

● - Dark spots

LITHOLOGIC ACCESSORIES

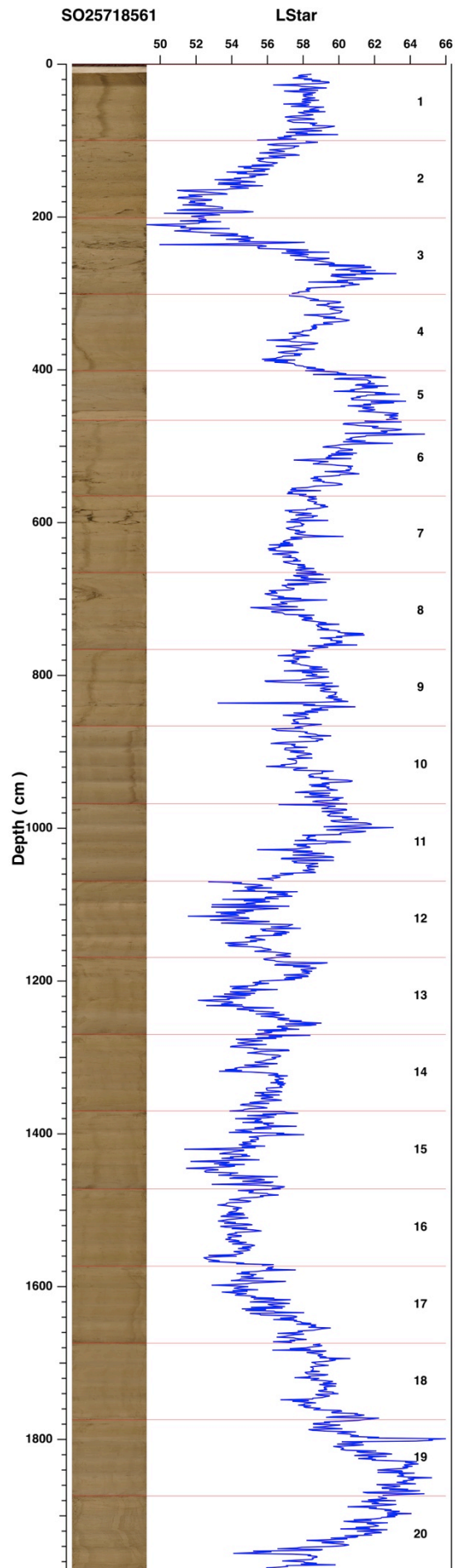
⊖ - Shell Fragments

● - MOTTLED

FOSSILS

⊕ - Foraminifera (undifferentiated)

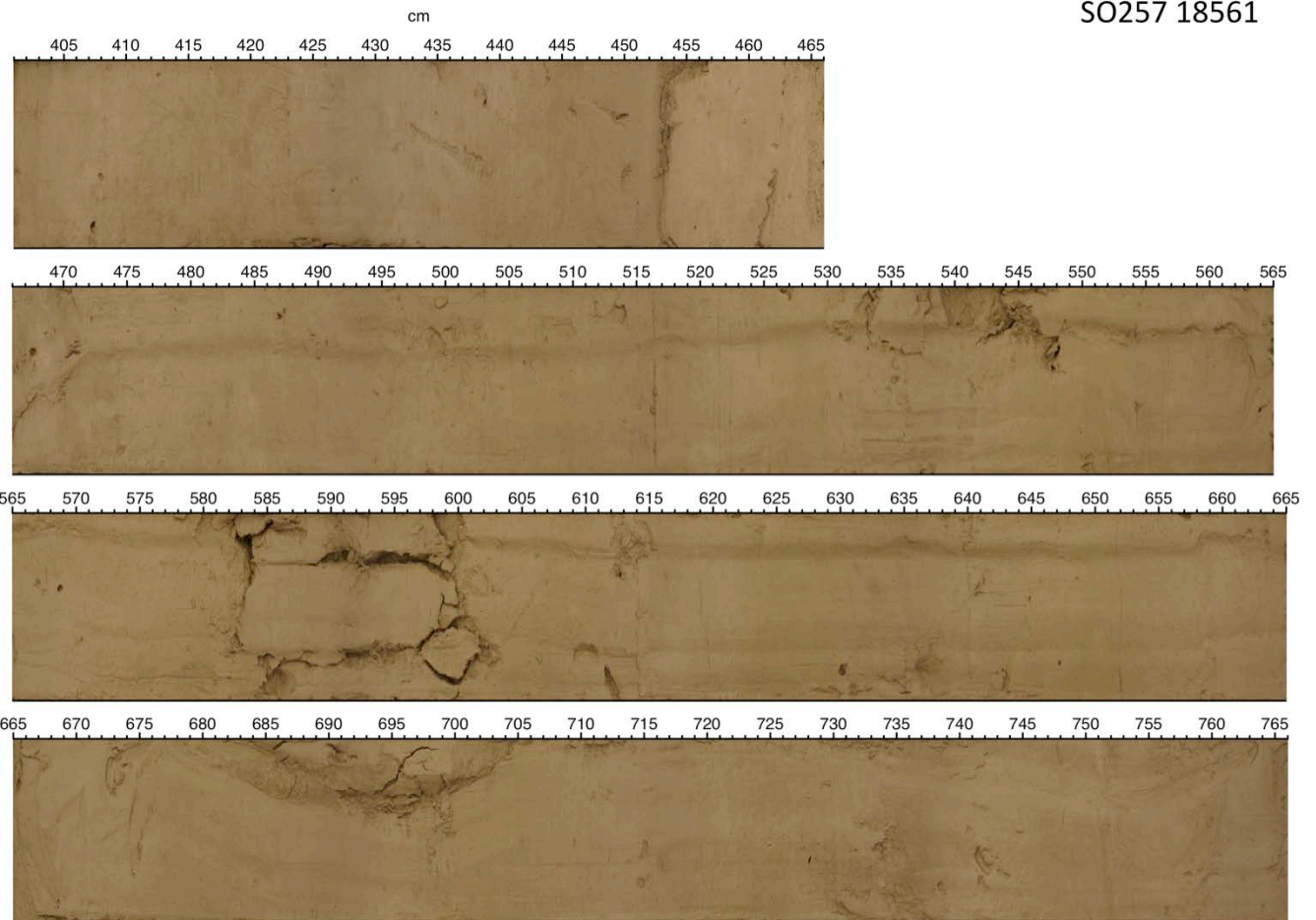
CORE DISTURBANCE



SO257 18561



SO257 18561



Station SO257-4-9,10

SO257-18561

SO257 18561

cm

770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865



870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965



970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065



1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165



Station SO257-4-9,10

SO257-18561

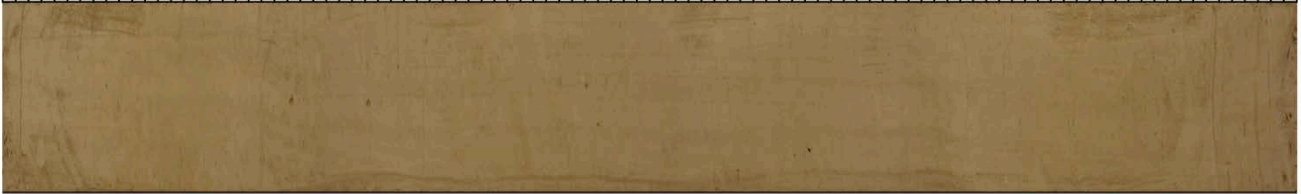
SO257 18561

cm

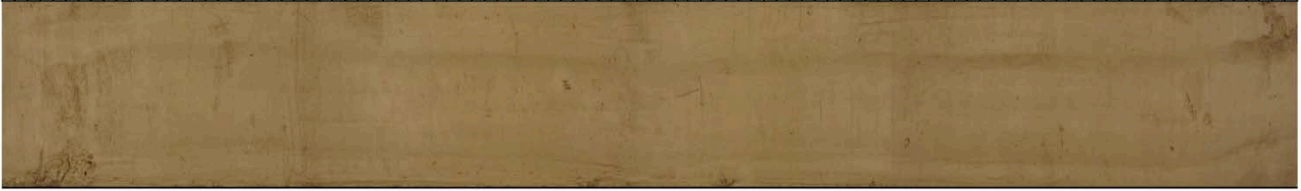
1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265 1270



1270 1275 1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365 1370



1370 1375 1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470



1475 1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570



SO257 18561

cm

1575 1580 1585 1590 1595 1600 1605 1610 1615 1620 1625 1630 1635 1640 1645 1650 1655 1660 1665 1670



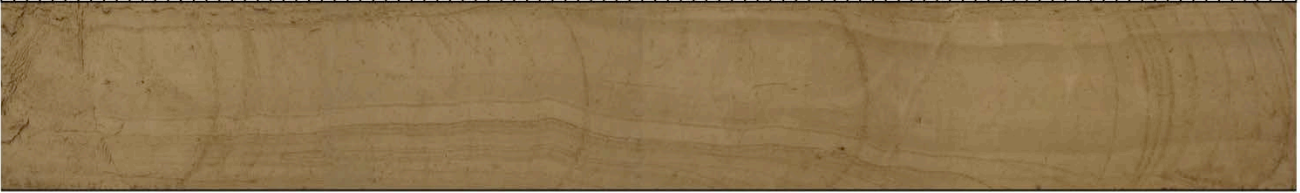
1675 1680 1685 1690 1695 1700 1705 1710 1715 1720 1725 1730 1735 1740 1745 1750 1755 1760 1765 1770



1775 1780 1785 1790 1795 1800 1805 1810 1815 1820 1825 1830 1835 1840 1845 1850 1855 1860 1865 1870



1875 1880 1885 1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975

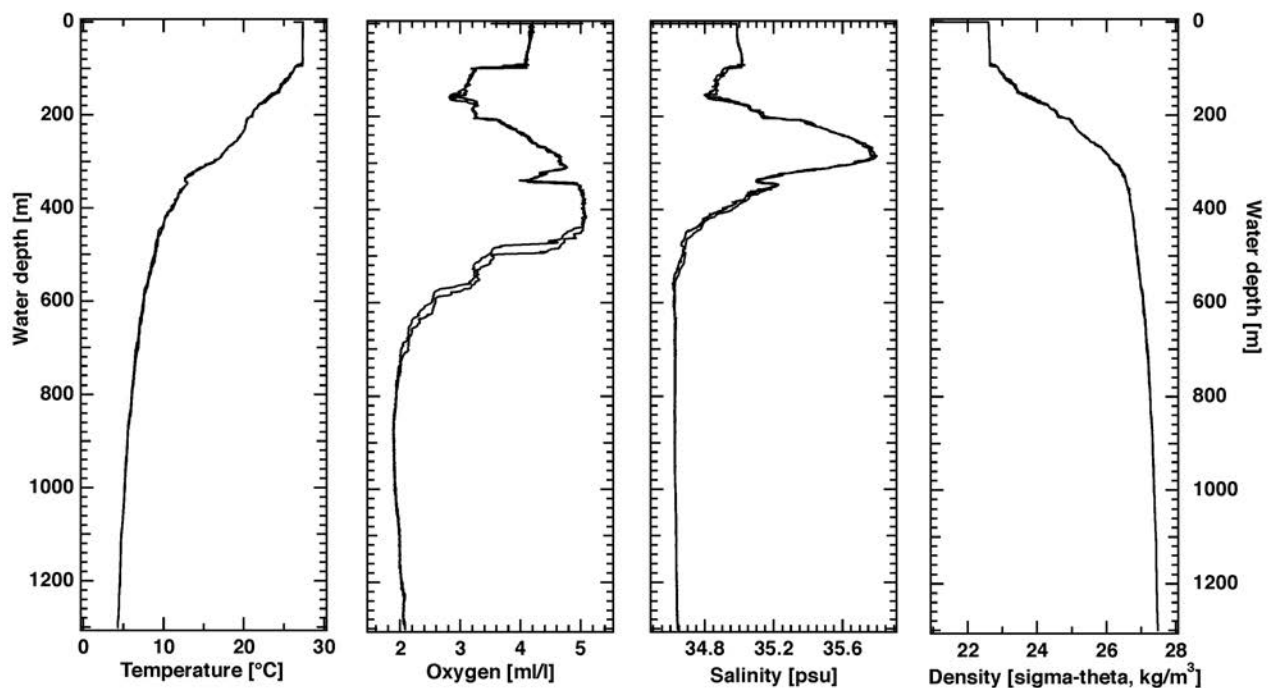


	18562	CTD-1	MUC-2		SL-3
Date	2017 05 23	*	*	-	*
Start (UTC)	02:25	02:29	03:50	-	04:53
Latitude (S)	19°24,976'	19°25,003'	19°25,001'	-	19°24.999'
Longitude (E)	114°19,131'	114°19,139'	114°19,143'	-	114°19,141'
Waterdepth (m)	1300,2	1300,3	1298,8	-	1302

CTD 18562-1

Water samples for Oxygen taken at (m): 1295, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 1295, 900, 280, 160, 75, 10



CTD profiles of station 18562

MUC 18562-2

12 of 12 tubes recovered

Recovery: 24-27 cm

SL 18562-3 (15 m)

Total length: 12,06 m

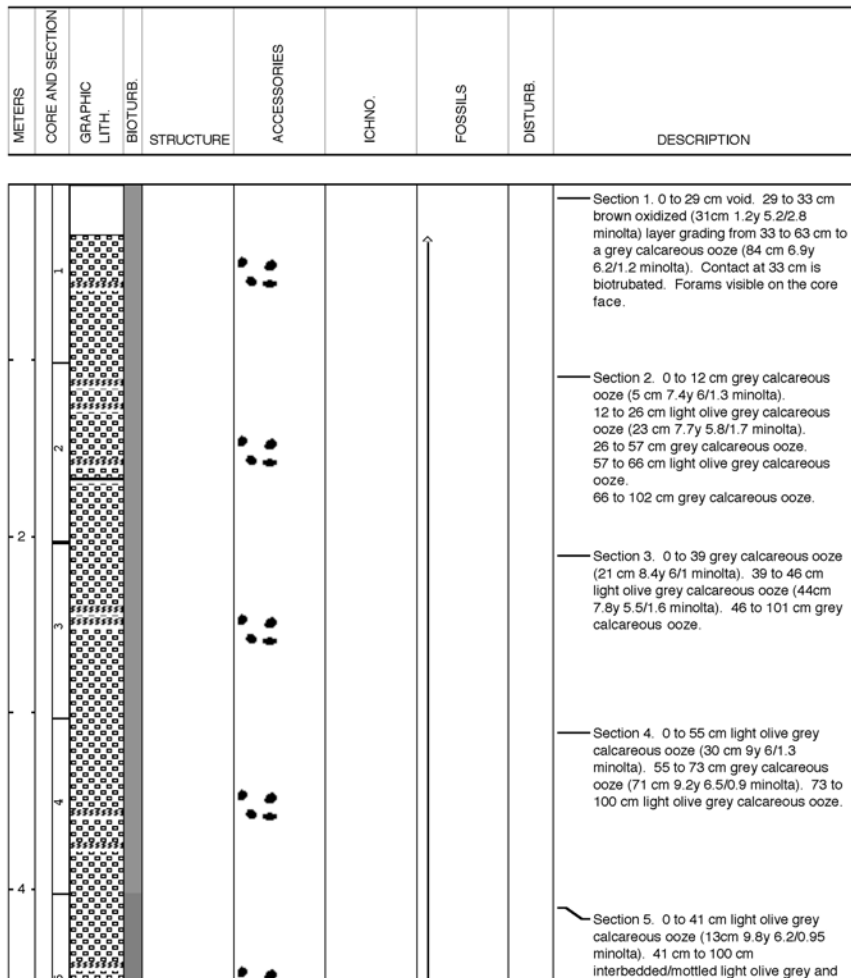
Number of sections: 12

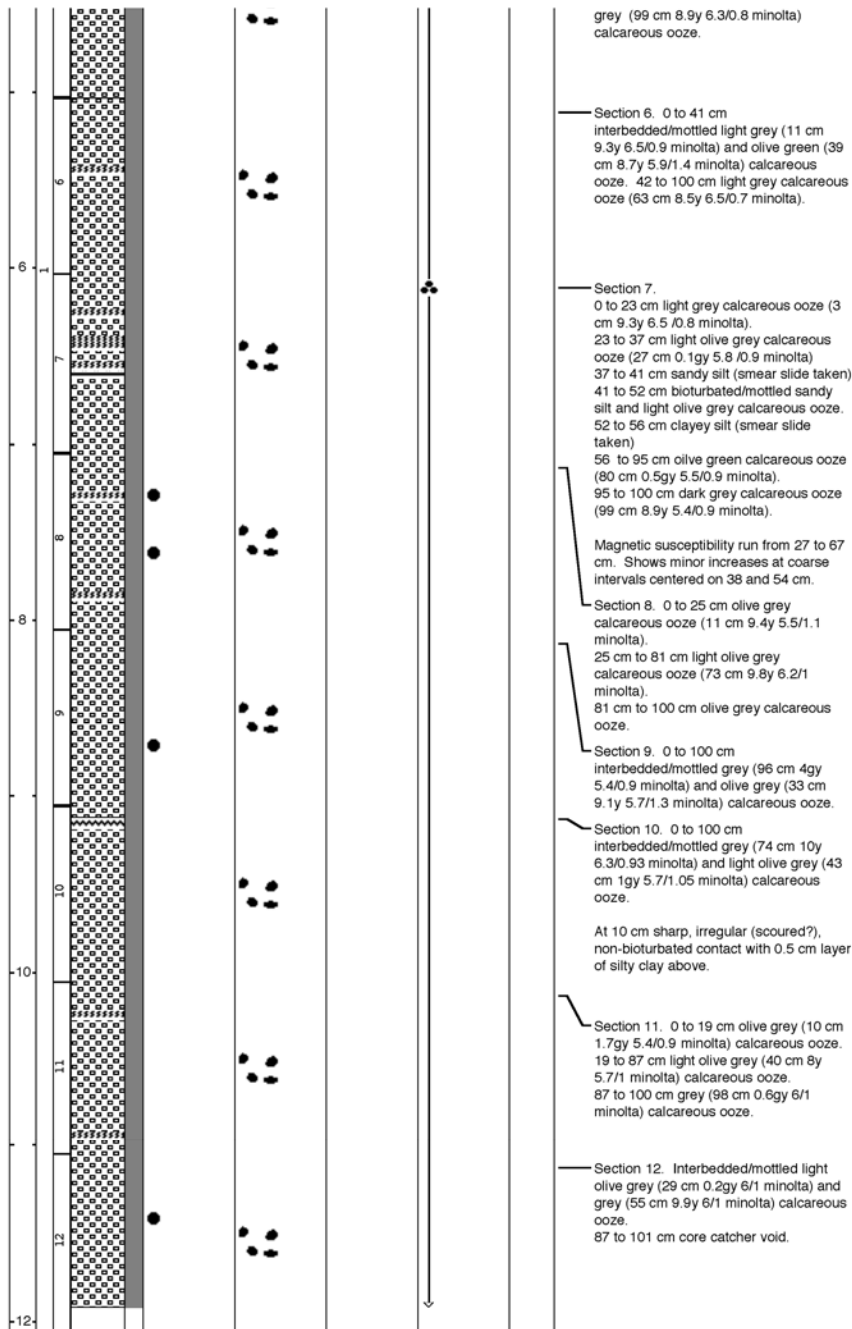
SL-Sections 1	0-101 cm
SL-Sections 2	101-203 cm
SL-Sections 3	203-303 cm
SL-Sections 4	303-403 cm
SL-Sections 5	403-503 cm

SL-Sections 6	503-603 cm
SL-Sections 7	603-705 cm
SL-Sections 8	705-805 cm
SL-Sections 9	805-905 cm
SL-Sections 10	905-1005 cm
SL-Sections 11	1005-1105 cm
SL-Sections 12	1105-1206 cm

SO257 18562 GC
 19°24.9980'S, 114°19.1380'E

Date logged: May 23, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1299.40 m KB: 0.00 m





LEGEND

LITHOLOGY

- Sandy Silt
- Silty Clay (T8)
- Void
- Calcareous Ooze (CB4)
- Clayey Silt

CONTACTS

- Sharp
- Scoured
- Bioturbated

PHYSICAL STRUCTURES

- Dark spots

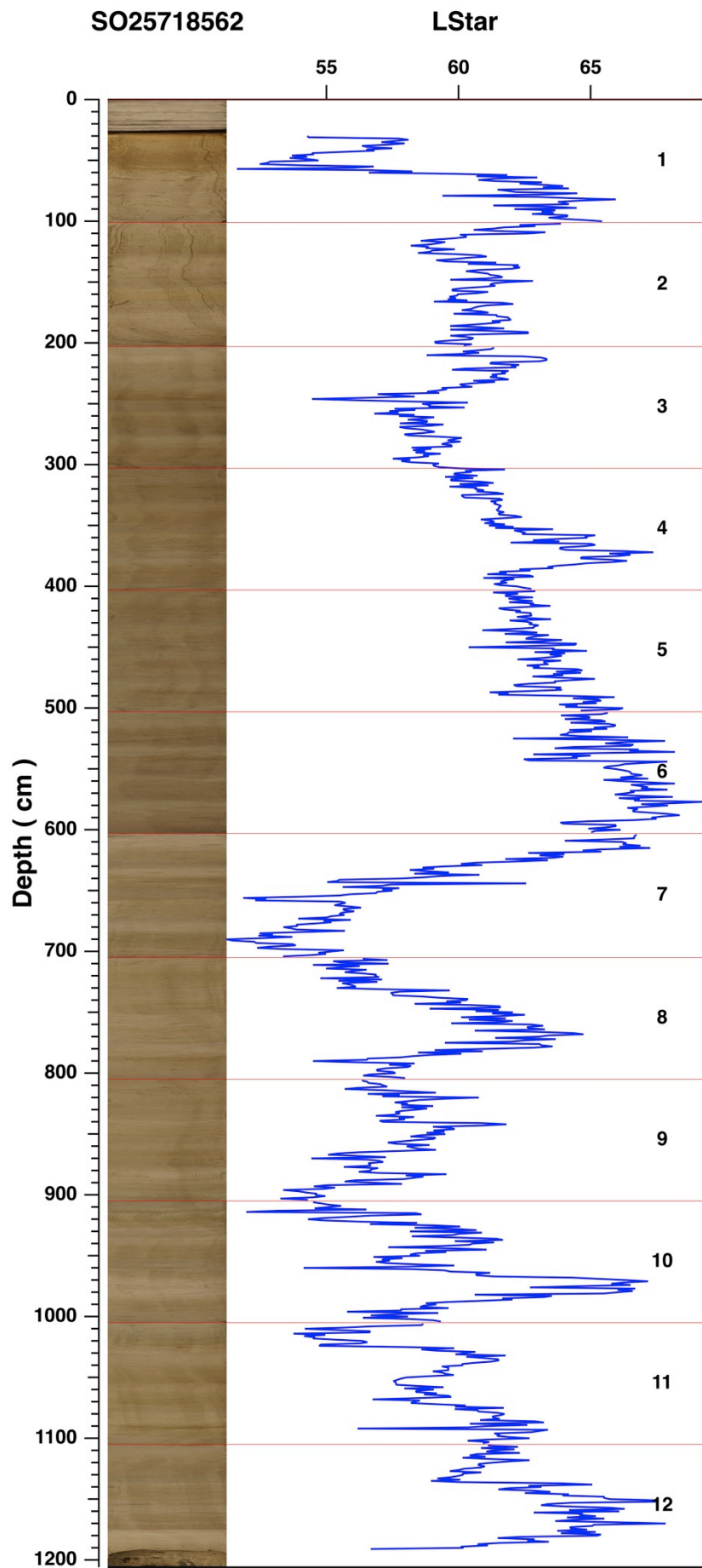
LITHOLOGIC ACCESSORIES

- MOTTLED

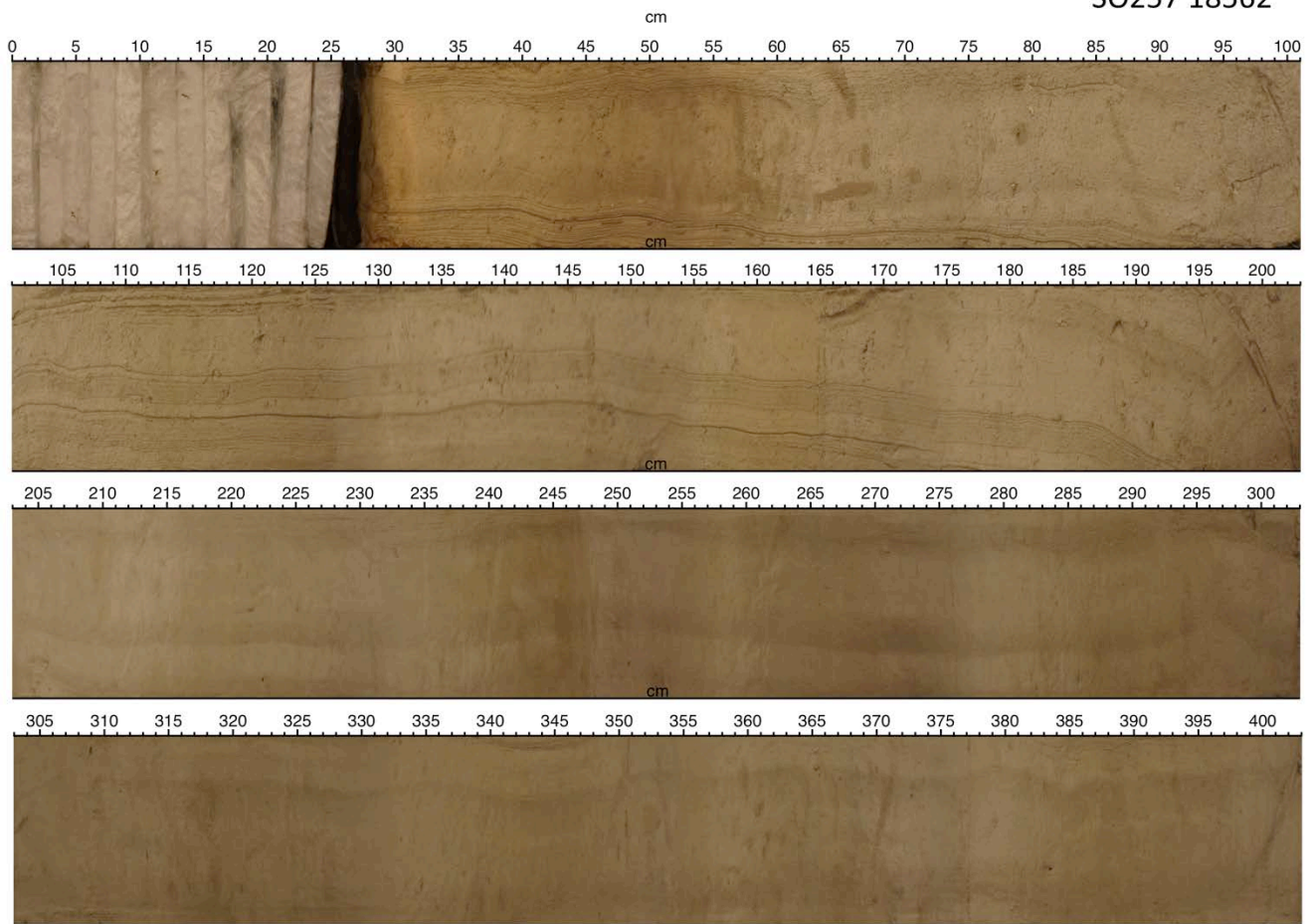
FOSSILS

- Foraminifera (undifferentiated)

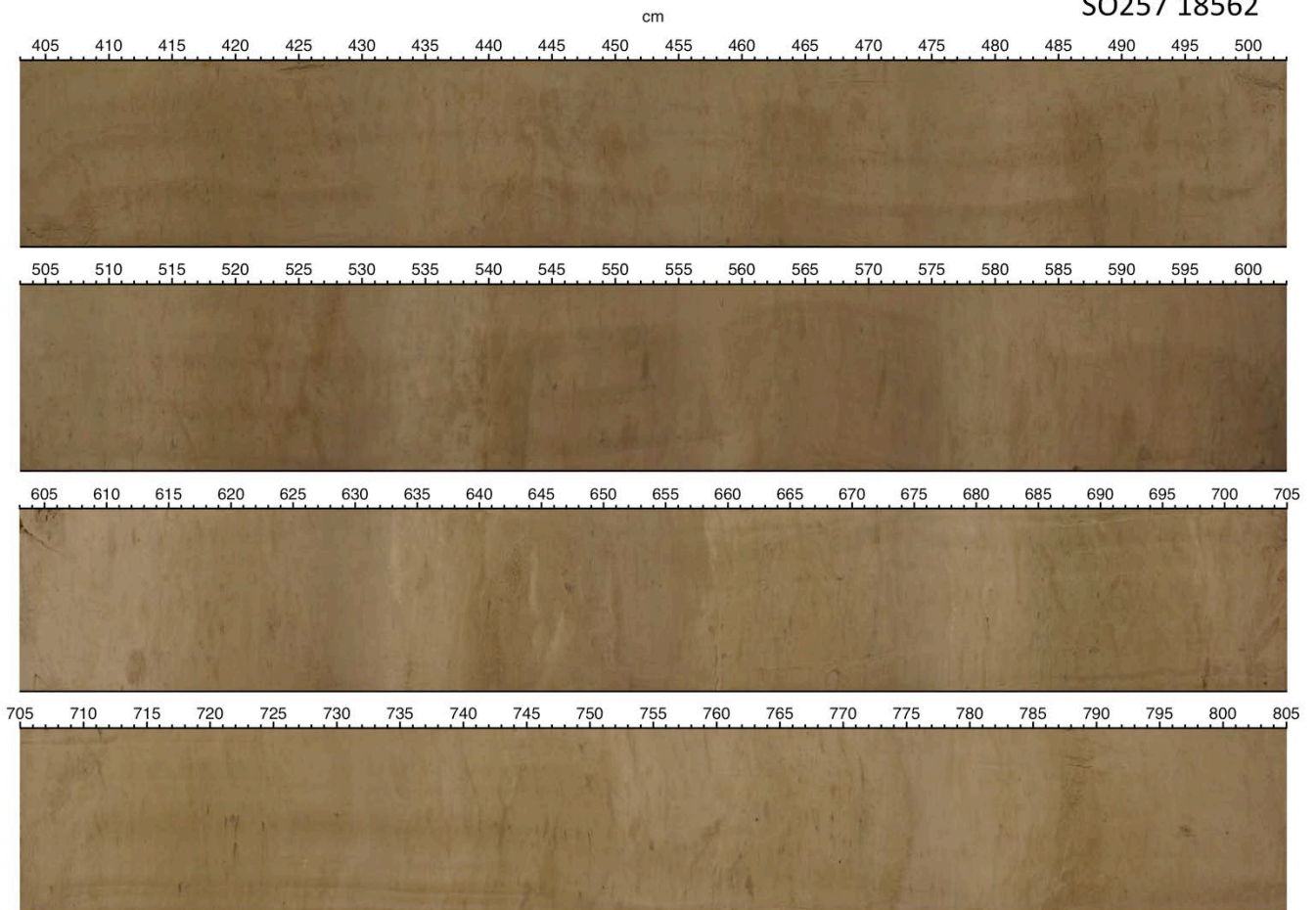
CORE DISTURBANCE



SO257 18562



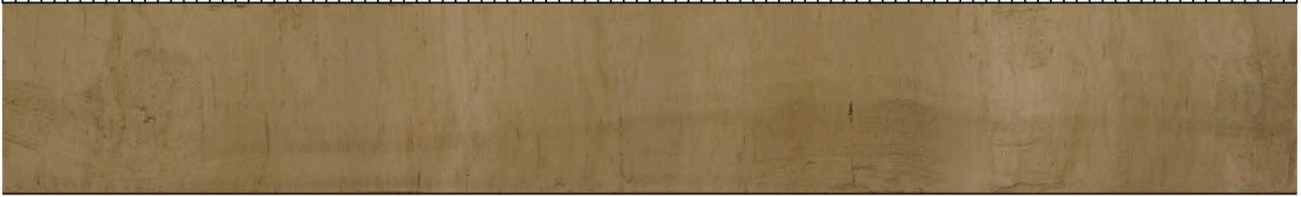
SO257 18562



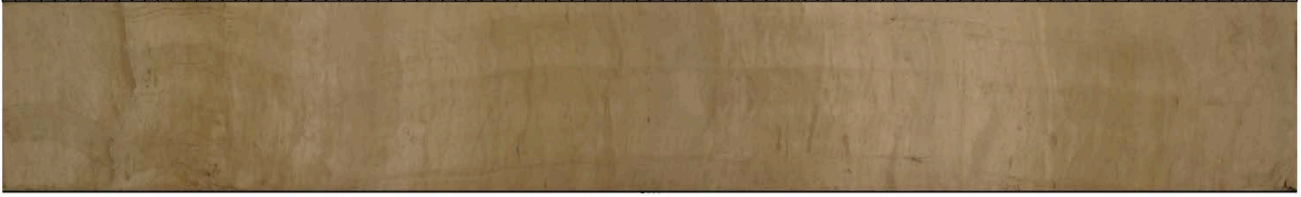
SO257 18562

cm

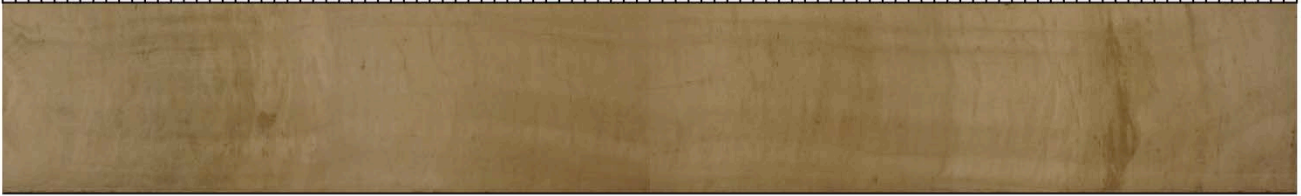
805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905



905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005



1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105



1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205



	18563	Box Corer
Date	2017 05 23	*
Start (UTC)	22:19	22:30
Latitude (S)	20°34,702'	20°34,700'
Longitude (E)	114°52,805'	114°52,801'
Waterdepth (m)	115,7	116,2

Box Corer 18563-1

peloidel sandy-silt Volume 0,625 m³

Station SO257-4-17**SO257-18564**

	18564		MUC-1		
Date	2017 05 24	-	*	-	-
Start (UTC)	00:48	-	01:00	-	-
Latitude (S)	20°30,081'	-	20°30,040'	-	-
Longitude (E)	114°47,082'	-	114°47,074'	-	-
Waterdepth (m)	287,7	-	349,7	-	-

MUC 18564-1

12 of 12 tubes recovered

Recovery: 27-38 cm

Pockmark location, soupy sediment

	18565		MUC-1	KL-2	
Date	2017 05 24	-	*	*	-
Start (UTC)	06:24	-	06:26	07:26	-
Latitude (S)	20°0,812'	-	20°0,818'	20°0,837'	-
Longitude (E)	114°14,366'	-	114°14,357'	114°14,348'	-
Waterdepth (m)	1252,7	-	1253,9	1252,9	-

MUC 18565-1

12 of 12 tubes recovered

Recovery: 24,5-27 cm

KL 18565-2 (15 m)

Total length: 12,23 m

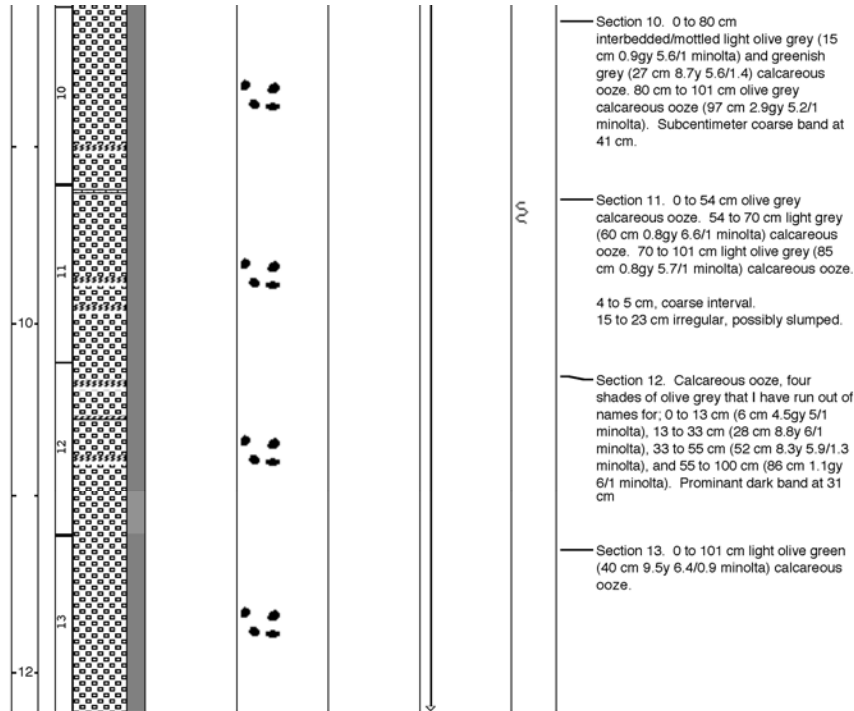
Number of sections: 13

KL-Sections 1	0-100 cm
KL-Sections 2	100-158 cm
KL-Sections 3	158-215 cm
KL-Sections 4	215-316 cm
KL-Sections 5	316-417 cm
KL-Sections 6	417-518 cm
KL-Sections 7	518-618 cm
KL-Sections 8	618-720 cm
KL-Sections 9	720-820 cm
KL-Sections 10	820-921 cm
KL-Sections 11	921-1022 cm
KL-Sections 12	1022-1122 cm
KL-Sections 13	1122-1223 cm

SO257 18565 GC
 20°0.8330'S, 114°14.3480'E

Date logged: May 24, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1252.30 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0 to 12 cm void. 12 to 72 cm brown oxidized layer (54 cm 2.3y 5.1/1.8 minolta). 72 cm to 101 cm light grey calcareous ooze (90cm 7.6y 5.9/1.2 minolta).
2									Section 2. 0 to 15 cm light grey calcareous ooze (6 cm 7y 6.3/1 minolta). 15 to 58 cm light olive grey calcareous ooze (31 cm 7.9y 5.9/1.4 minolta).
3									Section 3. 0 to 57 cm light olive grey calcareous ooze (35 cm 8.8y 6.1/1.3 minolta).
4									Section 4. 0 to 101 cm light olive grey calcareous ooze (65 cm 8.5y 5.8/1.4 minolta).
5									Section 5. 0 to 16 cm light olive grey calcareous ooze (9 cm 8.8y 6/1.4 minolta). 16 to 101 cm light grey calcareous ooze (64 cm 9.5y 6.2/1.1 minolta).
6									Section 6. 0 to 101 cm light grey calcareous ooze (63 cm 10y 6.3/1.2 minolta).
7									Section 7. 0 to 3 cm light grey calcareous ooze. 3 to 70 cm light olive grey calcareous ooze (55 cm 0.8gy 6.6/1 minolta). 70 to 100 cm light grey calcareous ooze (93 cm 9y 6.4/1 minolta). Prominent burrow structure at 50 cm.
8									Section 8. 0 to 18 cm light grey carbonate ooze (3 cm 0.8gy 6.5/1 minolta). 18 to 102 cm olive green calcareous ooze (65 cm 2.7gy 5.5/0.9 minolta). At 21 cm a 1 cm thick light band (smear slide indicates pumice). At 25 cm a 1 cm thick dark, coarse band (foram sand?).
9									Section 9. 0 to 59 cm olive grey (24 cm 9.7y 5.5/1.1 minolta) calcareous ooze. 58 to 73 light olive grey (66 cm 9.9y 6.1/1.2 minolta) calcareous ooze. 73 to 101 cm olive grey calcareous ooze. 87 to 89 cm coarse sand layer composed of large grains and broken shells. 91 to 93 cm irregular contact.



LEGEND

LITHOLOGY

- Sand or Sandstone (T6) Void Calcareous Ooze (CB4)

CONTACTS

- Bioturbated Undulating

PHYSICAL STRUCTURES

- Dark spots - dark band - light band

LITHOLOGIC ACCESSORIES

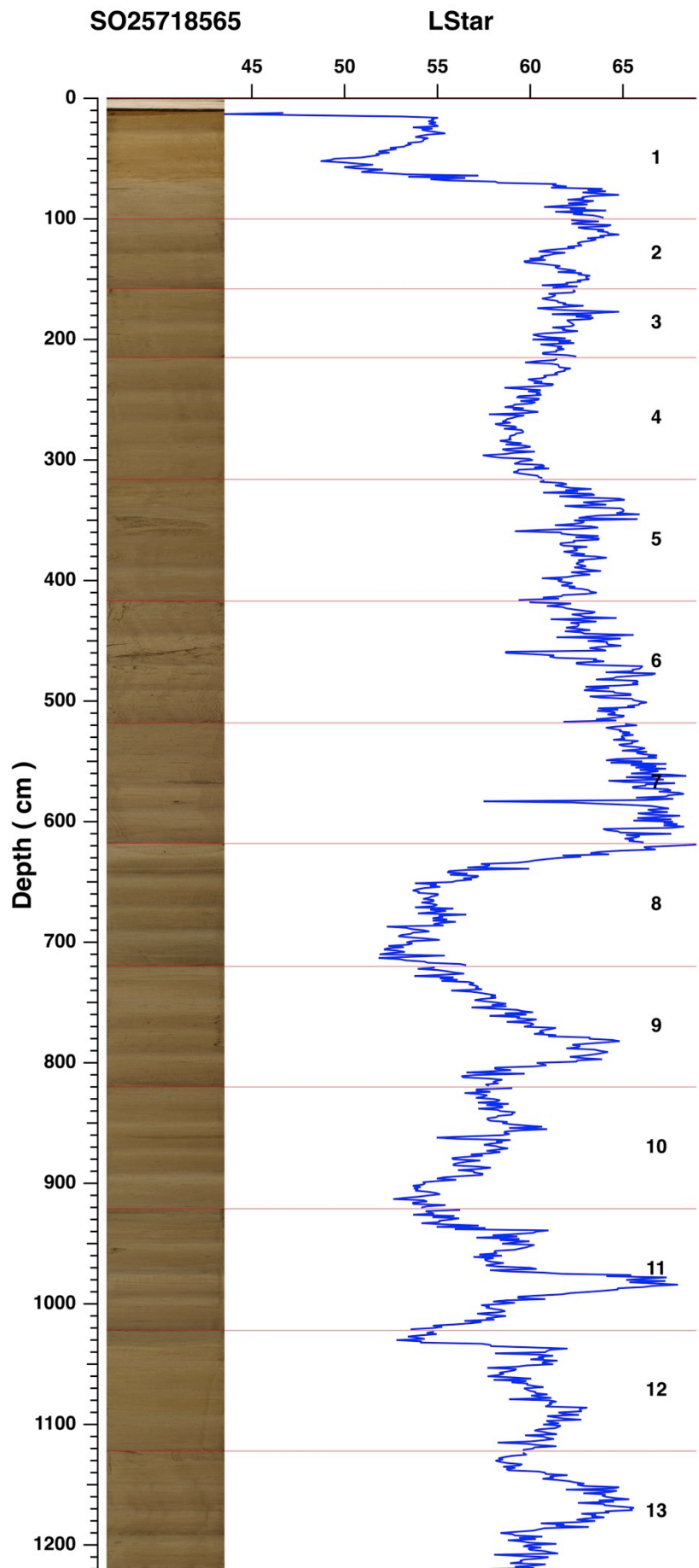
- Shell Fragments - MOTTLED

FOSSILS

- Foraminifera (undifferentiated)

CORE DISTURBANCE

- Deformed



SO257 18565

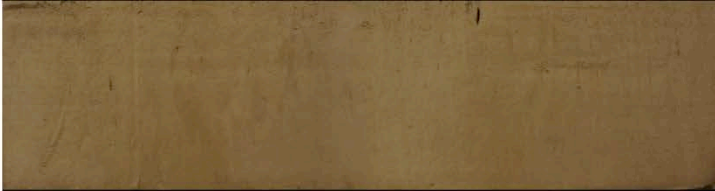
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
cm



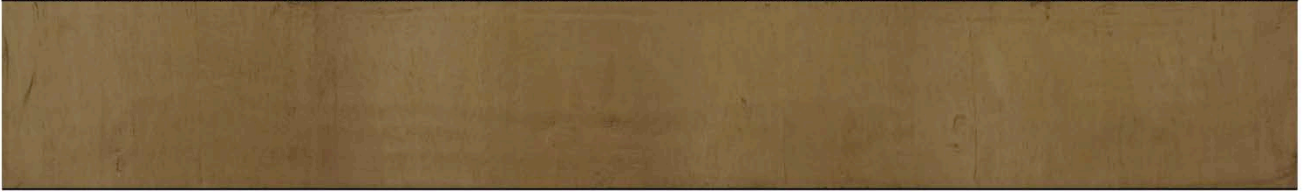
100 104 108 112 116 120 124 128 132 136 140 144 148 152 156



160 164 168 172 176 180 184 188 192 196 200 204 208 212

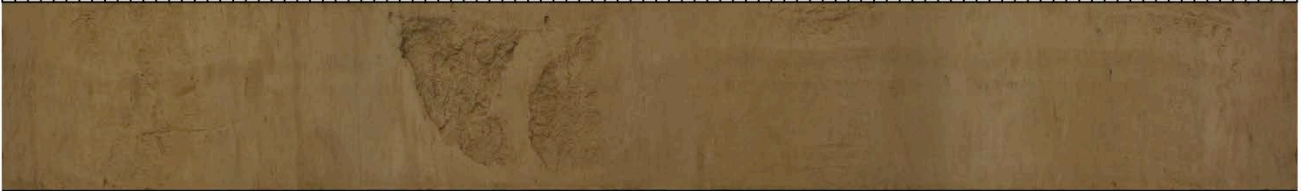


215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315



SO257 18565

320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415
cm



100 104 108 112 116 120 124 128 132 136 140 144 148 152 156



520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615



620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720



SO257 18565

cm

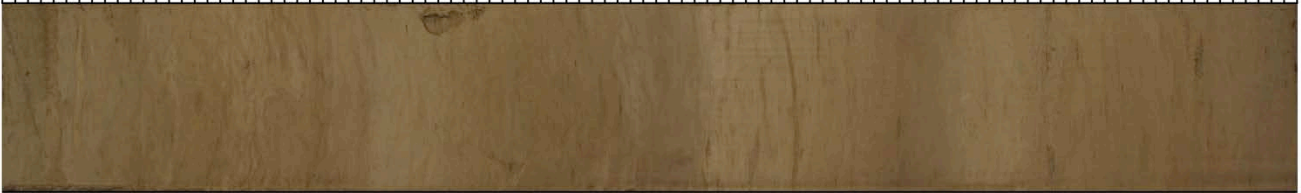
720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820



820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920



925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020



1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120



cm

SO257 18565

1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220



	18566		MUC-1		SL-2
Date	2017 05 24	-	*	-	*
Start (UTC)	12:27	-	12:31	-	13:32
Latitude (S)	19°38,694'	-	19°38,706'	-	19°38,705'
Longitude (E)	113°48,639'	-	113°48,633'	-	113°48,631'
Waterdepth (m)	1135,9	-	1133,5	-	1134,3

MUC 18566-1

12 of 12 tubes recovered

Recovery: 22-25,5 cm

SL 18566-2 (15 m)

Total length: 11,82 m

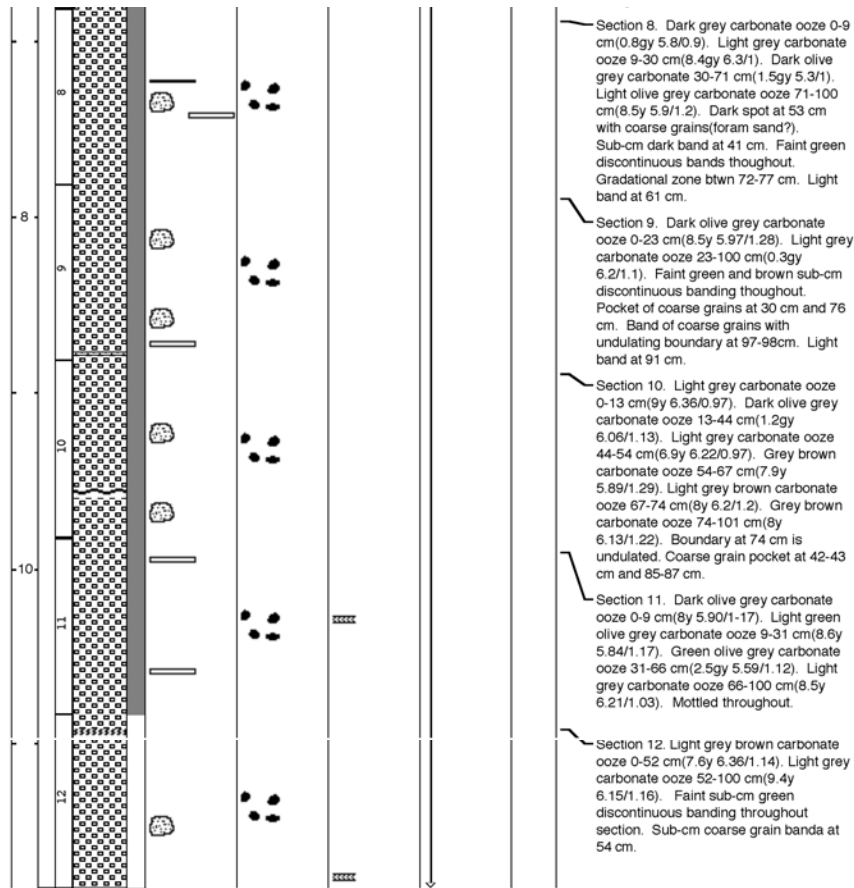
Number of sections: 12

SL-Sections 1	0-100 cm
SL-Sections 2	100-179 cm
SL-Sections 3	179-279 cm
SL-Sections 4	279-379 cm
SL-Sections 5	379-479 cm
SL-Sections 6	479-580 cm
SL-Sections 7	580-681 cm
SL-Sections 8	681-781 cm
SL-Sections 9	781-881 cm
SL-Sections 10	881-982 cm
SL-Sections 11	982-1082 cm
SL-Sections 12	1082-1182 cm

SO257 18566 GC
 19°38.7080'S, 113°48.6360'E

Date logged: May 24, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 1135.10 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0 to 9 cm void. 9-33 cm red brown with faint green patches and a gradation to gray(0.6y 5.4/2.6 at 16 cm, 1.8y 5.2y/2 30 cm). Light grey carbonate ooze 33-100 cm(4.5y 6.2/1.2). Burrow at 51 cm. Light spot at 72 cm.
2									Section 2. Light grey carbonate ooze 0-79 cm(5.8y 5.9/1.4). Faint green discontinuous bands throughout. Lightly to not mottled. Burrow at 16 cm.
3									Section 3. Dark grey carbonate ooze 0-25 cm(6.4y 5.8/1.3). Light grey carbonate ooze 25-66 cm(8.2y 6/1.1). Light grey carbonate ooze 66-100 cm(6.8y 6/1.2). Faint green discontinuous bands throughout section. Light spot at 81 cm.
4									Section 4. Light grey carbonate ooze 0-100 cm(8y 6.2/1). Faint green discontinuous bands throughout. Coarse patches at 93-95 cm and 10 cm.
5									Section 5. Light grey carbonate ooze 0-35 cm(7.6y 6.2/0.9). Dark grey carbonate ooze 35-96cm(4.5y 5/1.5). Light grey carbonate ooze 96-100 cm(5.5y 5.2/1.2). Sharp transition between grey's. Faint green coloring throughout section. Mottled throughout light grey section. Large burrow filled in with light grey sediment within dark grey section 75-85 cm.
6									Section 6. Dark grey carbonate ooze 0-45 cm(7.6y 5.7/1). Light grey carbonate ooze 45-101 cm(6.7y 5.9/1.2). Faint green sub-cm discontinuous bands throughout section. Mottled throughout. Light band at 88 cm.
7									Section 7. Grey green carbonate ooze 0-15 cm(8.8y 5.7/1.1). Olive grey carbonate ooze 15-47 cm(9.2y 5.6/1.3). Grey carbonate ooze 47-78 cm(1gy 5.4/1.2). Light grey carbonate ooze 78-101 cm(0.5gy 5.7/1). Boundary from light grey to light grey sharp with an undulated boundar of apprx 1.5 cm. Faint green sub-cm discontinuous banding throughout.



LEGEND

LITHOLOGY

- Silty Sand (T7)
- Void
- Calcareous Ooze (CB4)

CONTACTS

- Bioturbated
- Undulating

PHYSICAL STRUCTURES

- Light spot
- coarser patch
- dark band
- light band

LITHOLOGIC ACCESSORIES

- Shell Fragments
- MOTTLED

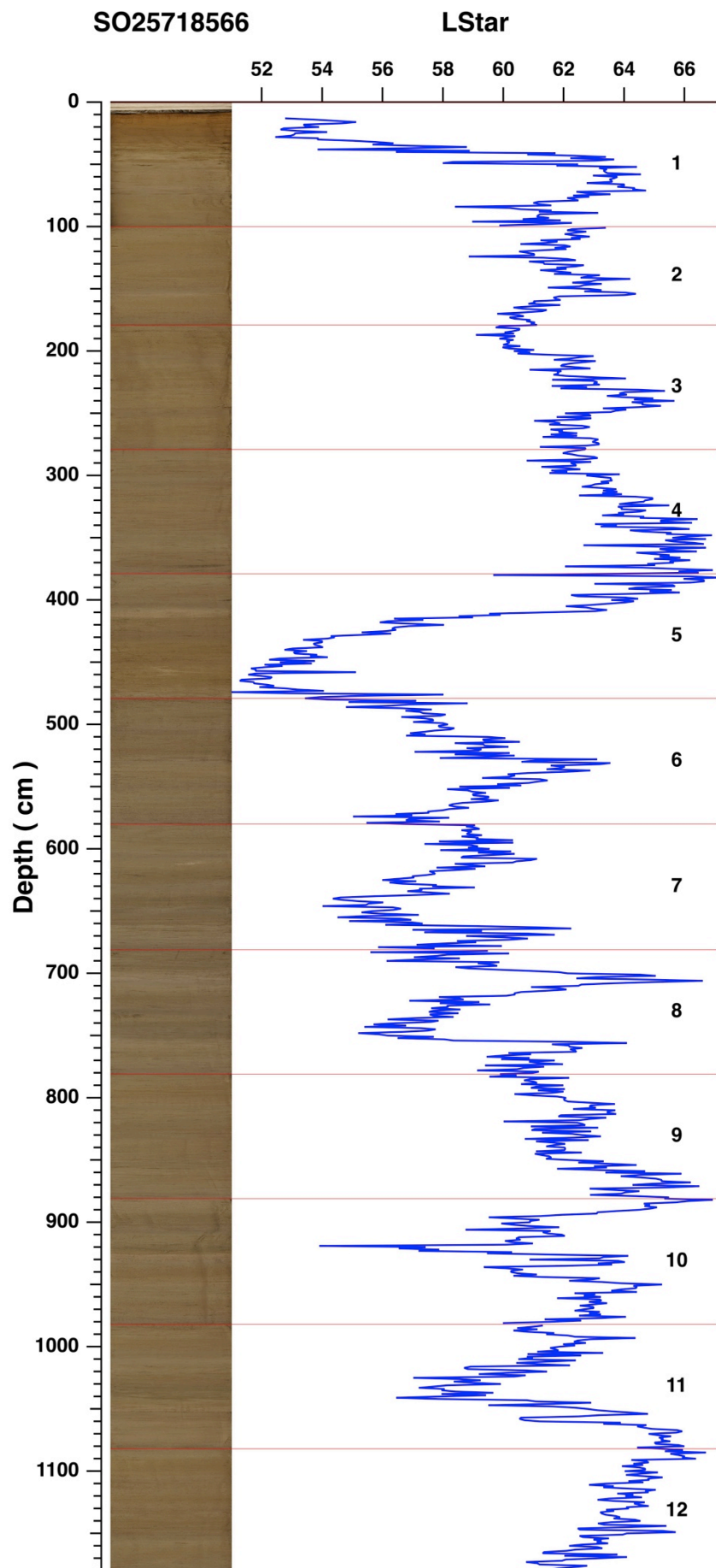
ICHTNOFOSSILS

- Zoophycos

FOSSILS

- Foraminifera (undifferentiated)

CORE DISTURBANCE



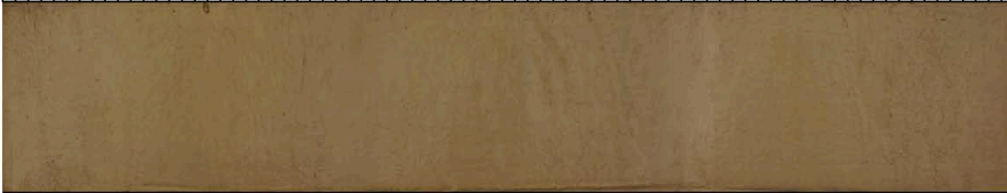
SO257 18566

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

cm



100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175



180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275



280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375



SO257 18566

380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475

cm



480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580



580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680



685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780



Station SO257-4-20,21

SO257-18566

SO257 18566

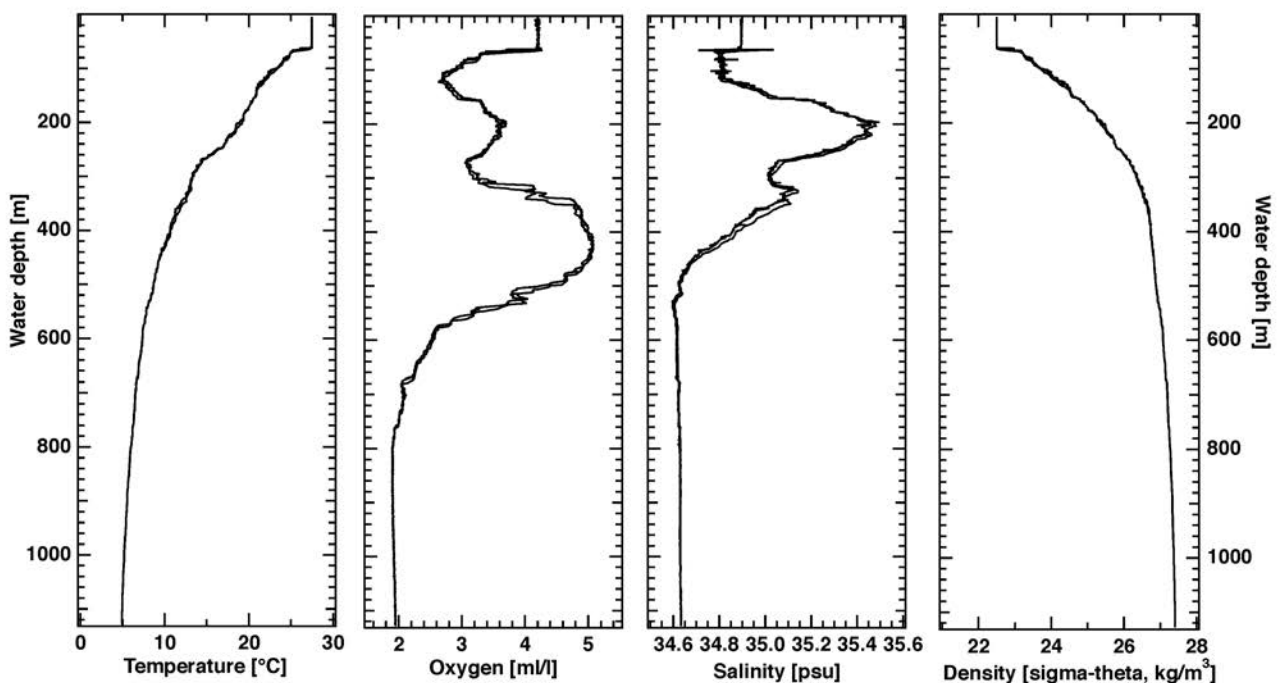


	18567	CTD-1	MUC-2	KL-3	
Date	2017 05 24	*	2017 05 25	2017 05 24	-
Start (UTC)	23:00	23:00	00:12	01:30	-
Latitude (S)	19°31,234'	19°31,230'	19°31,236'	19°31,234'	-
Longitude (E)	113°3,531'	113°3,535'	113°3,528'	113°3,525'	-
Waterdepth (m)	1130,7	1128,7	1131	1129,7	-

CTD 18567-1

Water samples for Oxygen taken at (m): 1125, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): -



CTD profiles of station 18567

MUC 18567-2

12 of 12 tubes recovered

Recovery: 28-33 cm

KL 18567-3 (20 m)

Total length: 17,06 m

Number of sections: 17

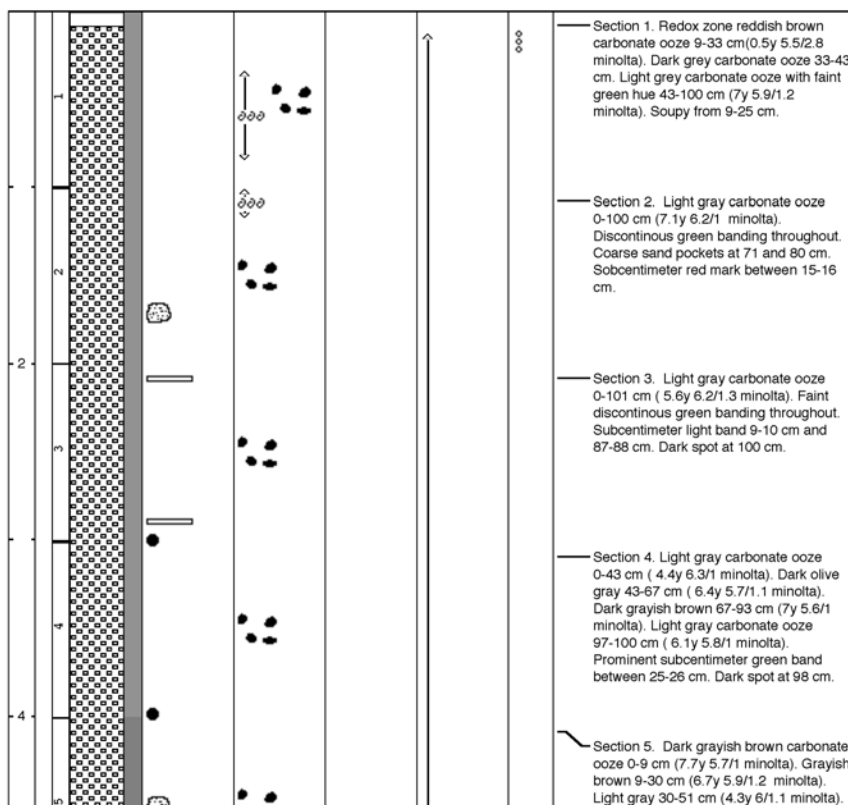
KL-Sections 1	0-100 cm
KL-Sections 2	100-200 cm
KL-Sections 3	200-301 cm
KL-Sections 4	301-401 cm
KL-Sections 5	401-501 cm
KL-Sections 6	501-601 cm

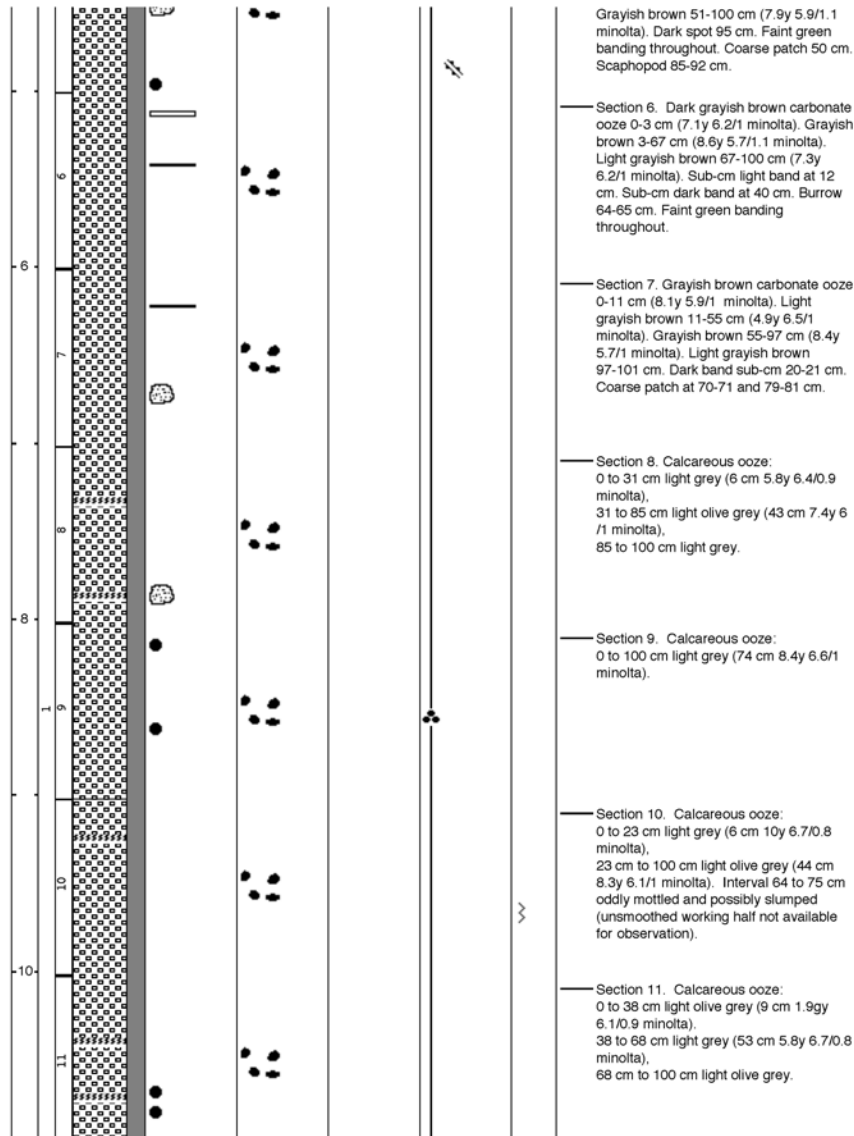
KL-Sections 7	601-702 cm
KL-Sections 8	702-802 cm
KL-Sections 9	802-902 cm
KL-Sections 10	902-1002 cm
KL-Sections 11	1002-1102 cm
KL-Sections 12	1102-1203 cm
KL-Sections 13	1203-1303 cm
KL-Sections 14	1303-1404 cm
KL-Sections 15	1404-1505 cm
KL-Sections 16	1505-1606 cm
KL-Sections 17	1606-1706 cm

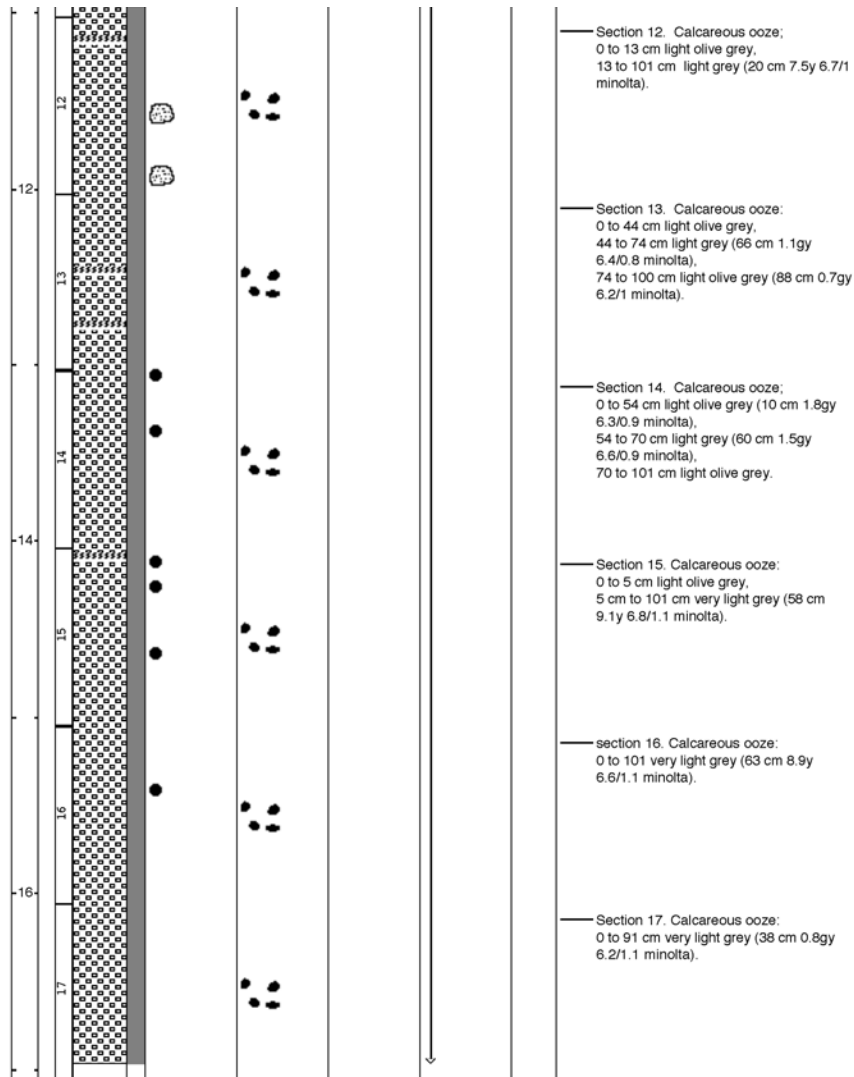
SO257 18567 PC
 19°31.2350'S, 113°3.5220'E

Date logged: May 25, 2017
 Logged by: Jennifer Gonzales, Steve Clemens
 Ground: 1130.60 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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LEGEND

LITHOLOGY

□ Void Calcareous Ooze (CB4)

CONTACTS

***** Bioturbated

PHYSICAL STRUCTURES

● - Dark spots — - dark band — - light band
 - coarser patch

LITHOLOGIC ACCESSORIES

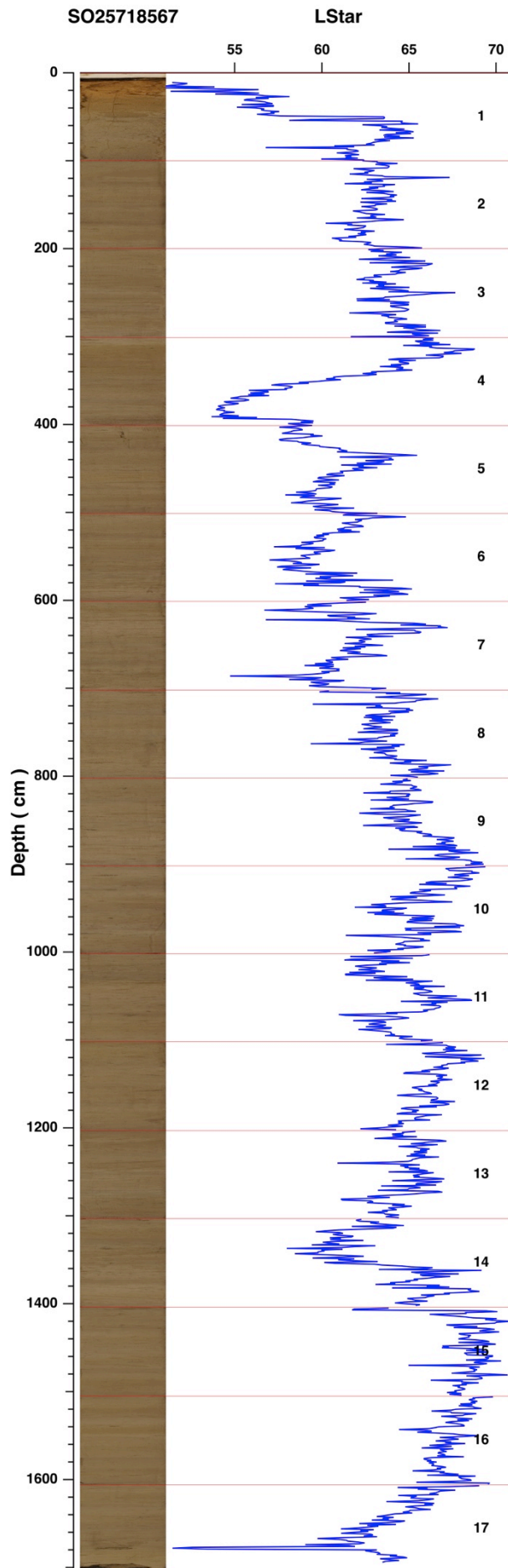
φφφ - Shell Fragments - MOTTLED

FOSSILS

••• - Foraminifera (undifferentiated) - Scaphopod

CORE DISTURBANCE

> - Disturbed - Soupy



SO257 18567

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

cm



100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200



200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300



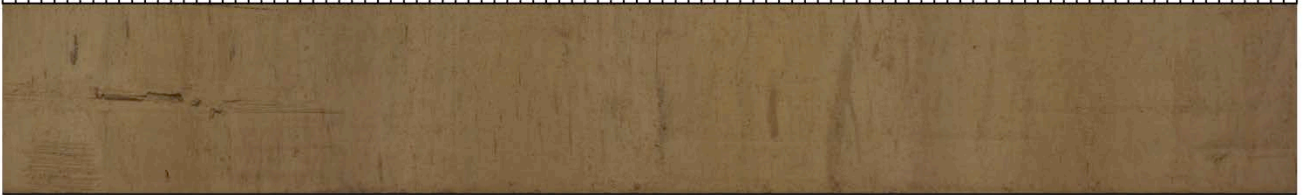
305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400



SO257 18567

405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500

cm



505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600



605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700



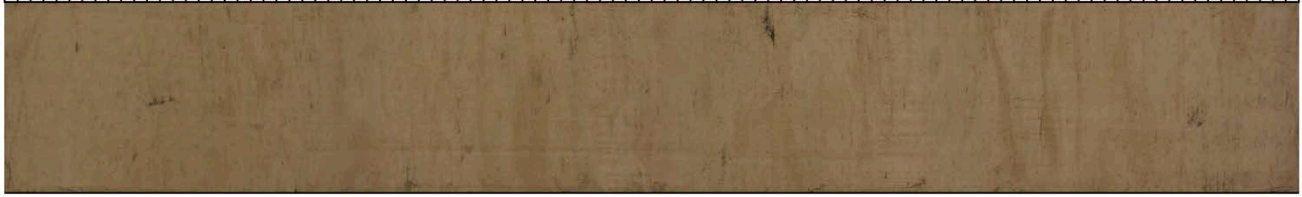
705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800



SO257 18567

cm

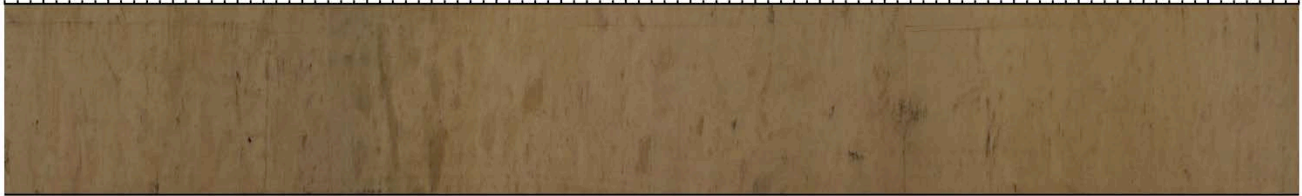
805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900



905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000



1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100



1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200



SO257 18567

cm

1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265 1270 1275 1280 1285 1290 1295 1300



1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365 1370 1375 1380 1385 1390 1395 1400



1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470 1475 1480 1485 1490 1495 1500 1505



1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570 1575 1580 1585 1590 1595 1600 1605



SO257 18567

cm

1610 1615 1620 1625 1630 1635 1640 1645 1650 1655 1660 1665 1670 1675 1680 1685 1690 1695 1700 1705



	18568	CTD-1	MUC-1	KL-2	
Date	2017 05 25	-	*	2017 05 26	
Start (UTC)	23:19	-	23:21	00:32	
Latitude (S)	20°36,566'	-	20°36,580'	20°36,601'	
Longitude (E)	113°37,471'	-	113°37,463'	113°37,457'	
Waterdepth (m)	1100,1	-	1100	1098,7	

MUC 18568-1

11 of 12 tubes recovered

Recovery: 25,5-28 cm

KL 18568-2 (20 m)

Total length: 18,41 m

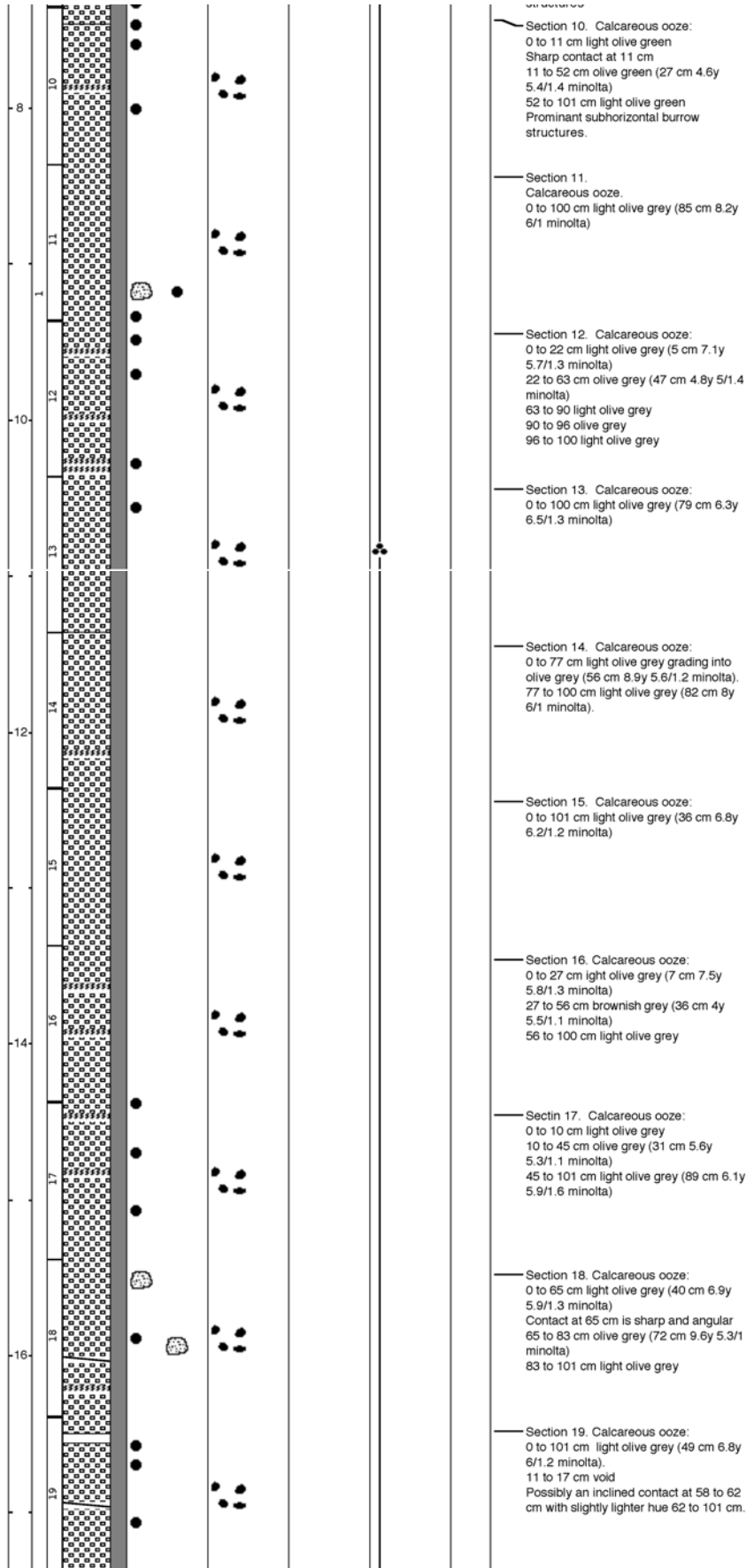
Number of sections: 20

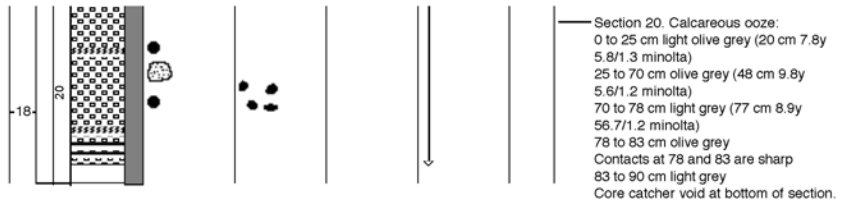
KL-Sections 1	0-23 cm
KL-Sections 2	23-105 cm
KL-Sections 3	105-205 cm
KL-Sections 4	205-269 cm
KL-Sections 5	269-333 cm
KL-Sections 6	333-434 cm
KL-Sections 7	434-534 cm
KL-Sections 8	534-635 cm
KL-Sections 9	635-735 cm
KL-Sections 10	735-836 cm
KL-Sections 11	836-936 cm
KL-Sections 12	936-1036 cm
KL-Sections 13	1036-1136 cm
KL-Sections 14	1136-1236 cm
KL-Sections 15	1236-1337 cm
KL-Sections 16	1337-1437 cm
KL-Sections 17	1437-1538 cm
KL-Sections 18	1538-1639 cm
KL-Sections 19	1639-1740 cm
KL-Sections 20	1740-1841 cm

S0257 18568 PC
20°36.5980'S, 113°37.4560'E

Date logged: May 26, 2017
Logged by: Steve Clemens, Alan Dillon
Ground: 1100.00 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0 to 18 cm void. 18 to 23 cm brown oxidized ooze.
2									Section 2. Calcareous ooze: 0 to 22 cm brown oxidized zone, 22 to 24 cm light grey, 24 to 82 cm disturbed due to crushed liner - wrapped in plastic, not visible.
3									Section 3. Calcareous ooze: 0 to 100 cm light grey (52 cm 5.4y 6.1/1.3 minolta). 0 to 23 cm soupy.
4									Section 4. Calcareous ooze: 0 to 63 cm light grey (30 cm 6y 6.2/1.1 minolta).
5									Section 5. Calcareous ooze: 0 to 17 cm light grey. 17 to 64 cm lost due to coring disturbance - was necessary to take apart the core barrel to recover liner.
6									Section 6. Calcareous ooze: 0 to 18 cm brown (12 cm 3y 5/1.7 minolta), 18 to 101 cm light olive green (71 cm 4.7y 5.8/1.2 minolta). Prominant subhorizontal burrow structures.
7									Section 7. Calcareous ooze. 0 to 45 cm olive grey (12 cm 8.9y 5.6/1 minolta) 45 to 55 cm light olive grey 55 to 75 cm olive grey 75 to 100 cm light olive grey (81 cm 6.2y 6/1 minolta) Prominant subhorizontal burrow structures.
8									Section 8. Calcareous ooze: 0 to 14 cm grey (6 cm 6.7y 5.8/1 minolta) Contact at 14 cm is sharp and irregular. 14 to 35 cm olive green (25 cm 4.7y 5.2/1.3 minolta) 35 to 100 cm light olive green (77 cm 6.2y 6.2/1.2 minolta). Prominant sub horizontal burrow structures.
9									Section 9. Calcareous ooze: 0 to 24 cm light olive green (13 cm 7.1y 6.2/1 minolta) 24 to 64 cm light grey (92 cm 7.3y 6/1 minolta) 64 to 88 cm light olive green 88 to 95 cm light grey 95 to 101 cm light olive green Prominant subhorizontal burrow structures





LEGEND

LITHOLOGY

Void Calcareous Ooze (CB4)

CONTACTS

Sharp Bioturbated Undulating Inclined

PHYSICAL STRUCTURES

- Dark spots - coarser patch

LITHOLOGIC ACCESSORIES

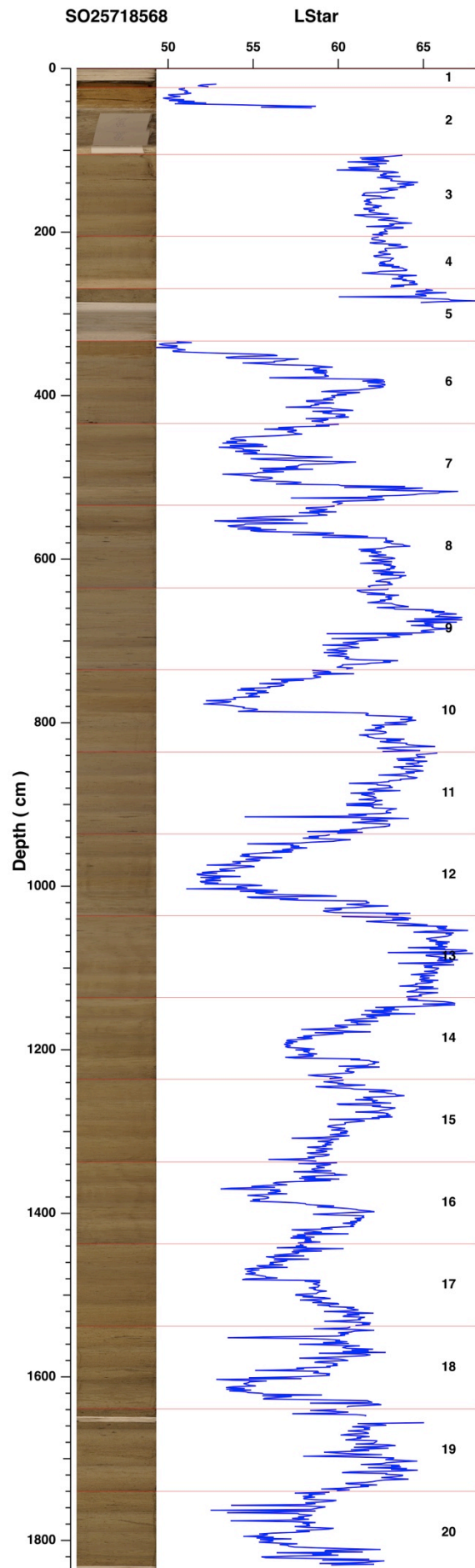
- MOTTLED

FOSSILS

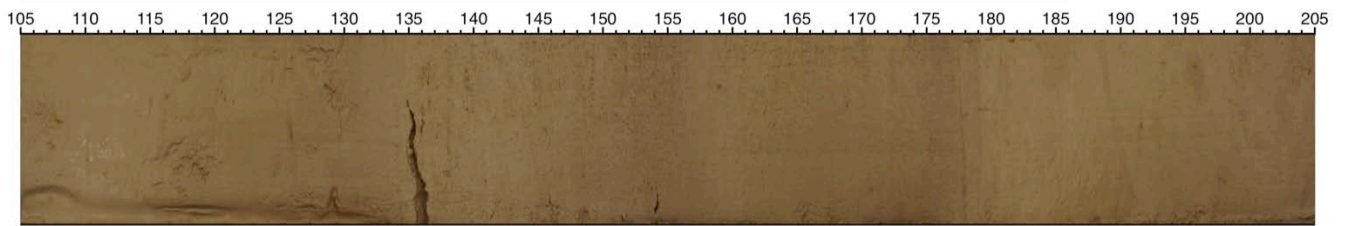
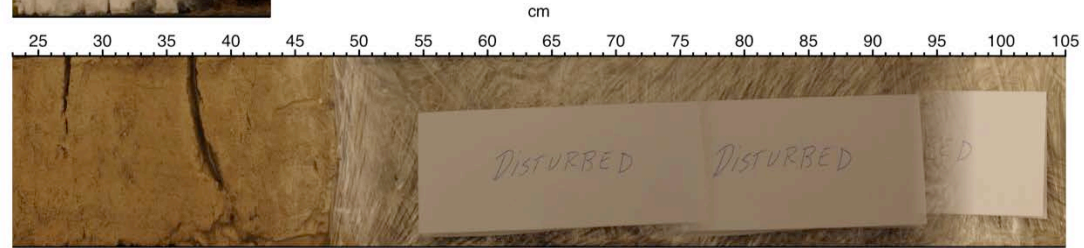
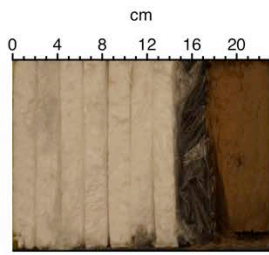
- Foraminifera (undifferentiated)

CORE DISTURBANCE

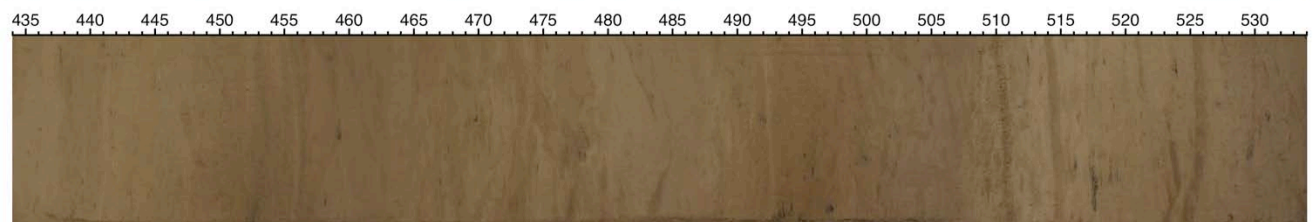
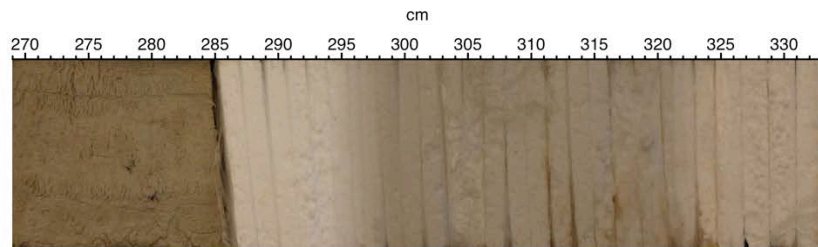
- Soupy



SO257 18568



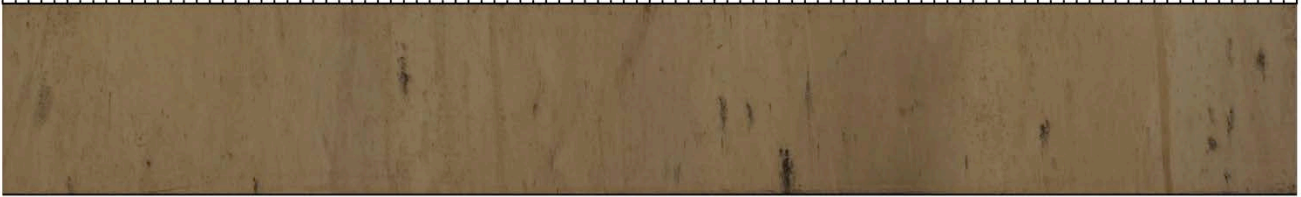
SO257 18568



SO257 18568

cm

635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735



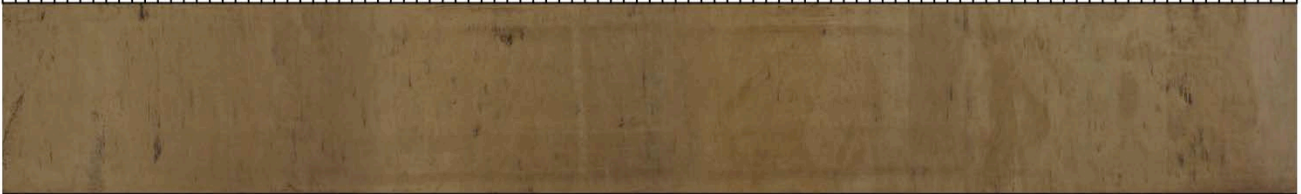
735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835



840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935



940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035



SO257 18568

cm

1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135



1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235



1240 1245 1250 1255 1260 1265 1270 1275 1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335



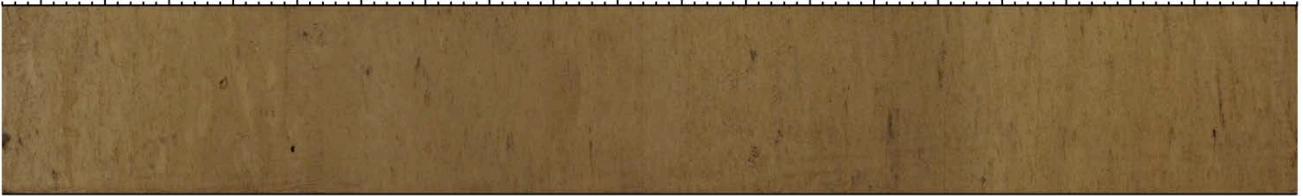
1340 1345 1350 1355 1360 1365 1370 1375 1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435



SO257 18568

cm

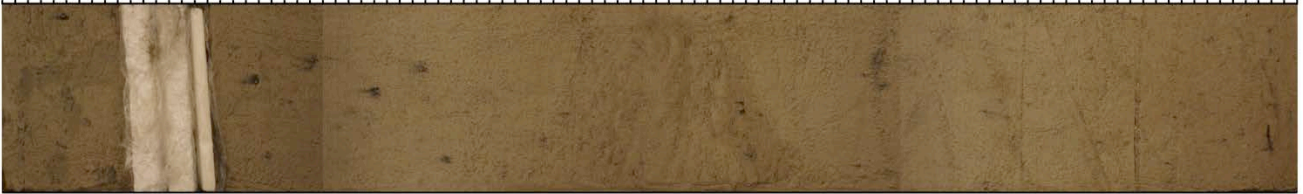
1440 1445 1450 1455 1460 1465 1470 1475 1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535



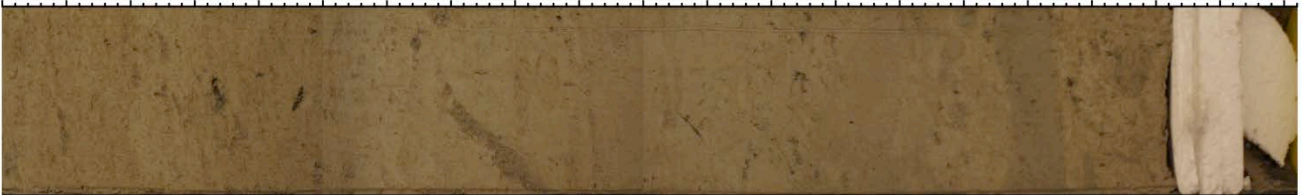
1540 1545 1550 1555 1560 1565 1570 1575 1580 1585 1590 1595 1600 1605 1610 1615 1620 1625 1630 1635



1640 1645 1650 1655 1660 1665 1670 1675 1680 1685 1690 1695 1700 1705 1710 1715 1720 1725 1730 1735 1740



1740 1745 1750 1755 1760 1765 1770 1775 1780 1785 1790 1795 1800 1805 1810 1815 1820 1825 1830 1835 1840

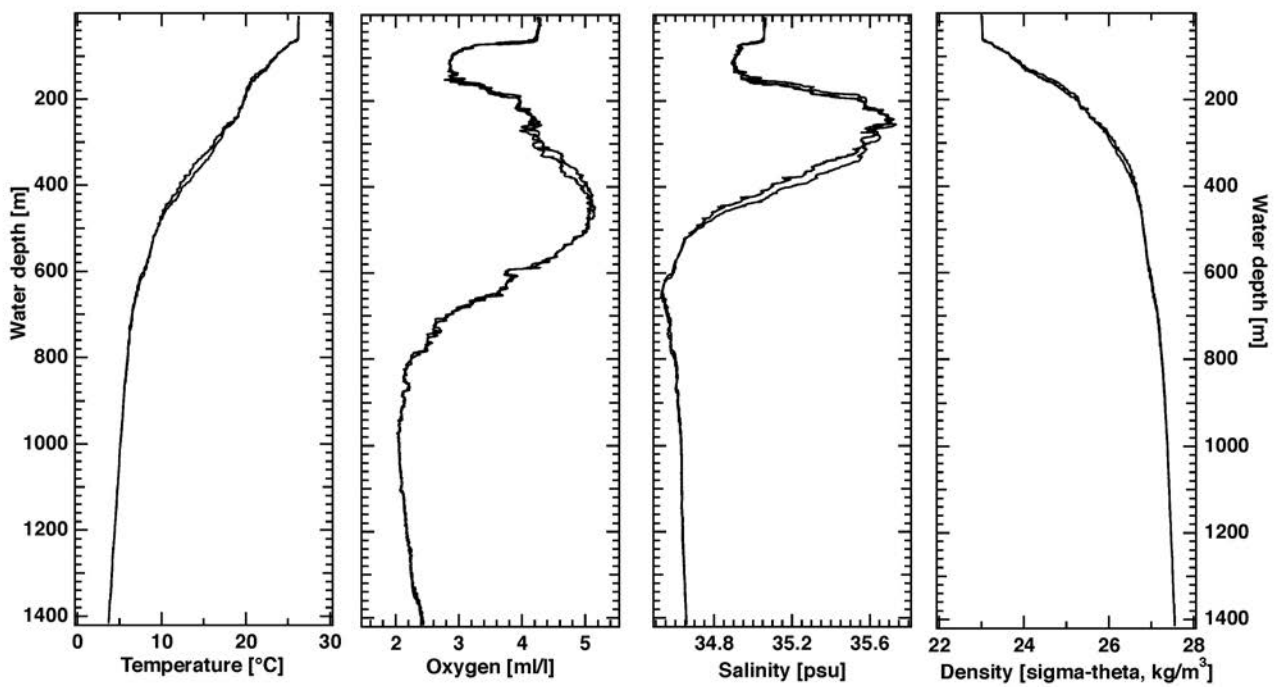


	18569	CTD-1			
Date	2017 05 26	2017 05 26	-	-	-
Start (UTC)	06:00	06:01	-	-	-
Latitude (S)	21° 11,507'	21° 11,515' S	-	-	-
Longitude (E)	113° 21,443'	113° 21,444' E	-	-	-
Waterdepth (m)	1414,1	1414,6	-	-	-

CTD 18569-1

Water samples for Oxygen taken at (m): 1410, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 1410, 900, 650, 250, 100, 10



CTD profiles of station 18569

	18570		MUC-1	KL-2	
Date	2017 05 26	-	2017 05 26	2017 05 26	-
Start (UTC)	09:11	-	09:14	10:24	-
Latitude (S)	20° 59,470'	-	20° 59,468'	20° 59,470'	-
Longitude (E)	113° 26,914'	-	113° 26,908'	113° 26,941'	-
Waterdepth (m)	1184,7	-	1182,4	1182,5	-

MUC 18570-1

12 of 12 tubes recovered

Recovery: 24,5-28,5 cm

KL 18570-2 (20 m)

Total length: 17,79 m

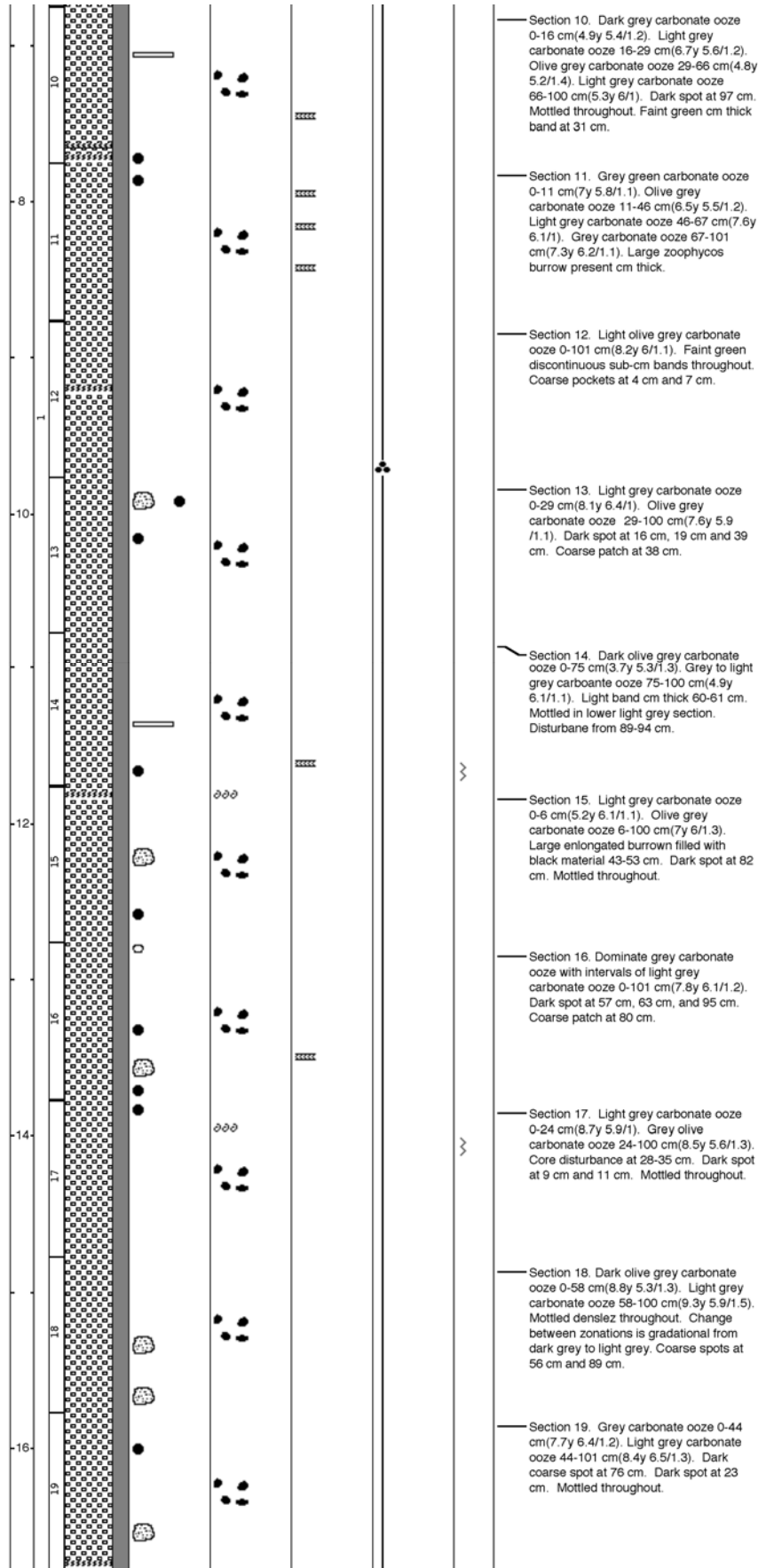
Number of sections: 21

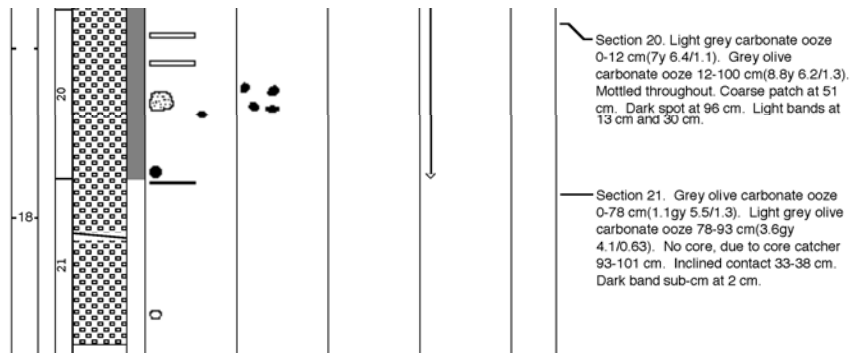
KL-Sections 1	0-61 cm
KL-Sections 2	61-161 cm
KL-Sections 3	161-222 cm
KL-Sections 4	222-281 cm
KL-Sections 5	281-356 cm
KL-Sections 6	356-374 cm
KL-Sections 7	374-474 cm
KL-Sections 8	474-575 cm
KL-Sections 9	575-675 cm
KL-Sections 10	675-775 cm
KL-Sections 11	775-876 cm
KL-Sections 12	876-976 cm
KL-Sections 13	976-1076 cm
KL-Sections 14	1076-1176 cm
KL-Sections 15	1176-1276 cm
KL-Sections 16	1276-1377 cm
KL-Sections 17	1377-1477 cm
KL-Sections 18	1477-1577 cm
KL-Sections 19	1577-1678 cm
KL-Sections 20	1678-1778 cm
KL-Sections 21	1778-1879 cm

SO257 18570 PC
 20°59.4650'S, 113°26.9340'E

Date logged: Maz 26, 2017 a 26, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 1183.90 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0-9 cm void. 9-39 cm(1y 4.9/2.4) brown with gradation to red brown and grey. Grey carbone ooze 39-61 cm(2.4y 5.6/1.5). Section was soupy at bottom, disturbed from coring.
2									Section 2. Did not receive section for description.
3									Section 3. 0-15 cm(3.6y 5.9/1.4) soupy indescribable. 16-29 cm(3.8y 5.9/1.5) deformed, light grey. 29-61 cm(5.91 6.1/1) light grey carbonate ooze.
4									Section 4. Light grey carbonate ooze 0-59 cm(7.3y 6.1/1.1). Prominante burrows at 23 cm and 27 cm. Faint green sub-cm banding 1-4 cm.
5									Section 5. Olive grey carbonate ooze 0-75 cm(7y 4.6/1.1). Faint green sub-cm discontinuous banding. sub cm dark band at 19 cm. Core is distrubed 67-75 cm.
6									Section 6. 0-3 cm foam. Light grey carbonate ooze 3-18 cm(6.8y 6.3/1.1).
7									Section 7. Dark grey carbonate ooze 0-16 cm(7.3y 6.3/1). Light grey carbonate ooze 16-69 cm(7y 6.2/1). Dark grey carbonate ooze 69-100 cm(5.5y 5.5/1.4). Faint discontinous sub-cm green banding throughout. Dark spot with coarse grains (forams?) at 69-70 cm.
8									Section 8. Dark grey carbonate ooze 0-9 cm(5y 5.1/1.4), mottled light grey 6-9 cm. Dark brown with sub-cm grey intervals 9-55 cm(2.5y 4.8/1.7). Olive grey carbonate ooze 55-82 cm(5.8y 5.7/1.2). Light grey carbonate ooze 82-101 cm(3y 4.8/1.8). Large burrow at 69 cm. Dark brown band at 70 cm. Light band at 9-10 cm with some coarse grains (forams?).
9									Section 9. Grey brown carbonate ooze 0-17 cm(4.4y 5.8/1.2). Light grey carbonate ooze 17-81 cm(6.6y 5.7/1.2). Grey carbonate ooze 81-100 cm(5.7y 5.3/1.3). Patches of coarse grains (forams?) throughout. Light band at 84 cm. Faint green cm band at 33-34 cm.





LEGEND

LITHOLOGY

- Void
- Calcareous Ooze (CB4)

CONTACTS

- Bioturbated
- Inclined

PHYSICAL STRUCTURES

- Dark spots
- Light spot
- light band
- coarser patch
- dark band

LITHOLOGIC ACCESSORIES

- Shell Fragments
- MOTTLED

ICHTNOFOSSILS

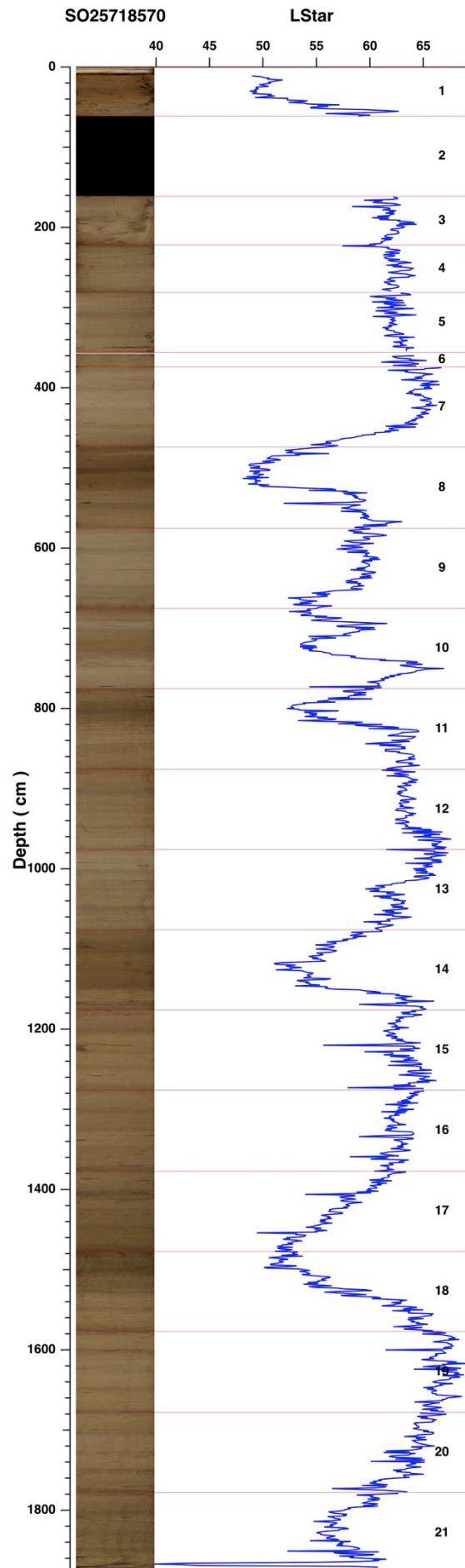
- Zoophycos

FOSSILS

- Foraminifera (undifferentiated)

CORE DISTURBANCE

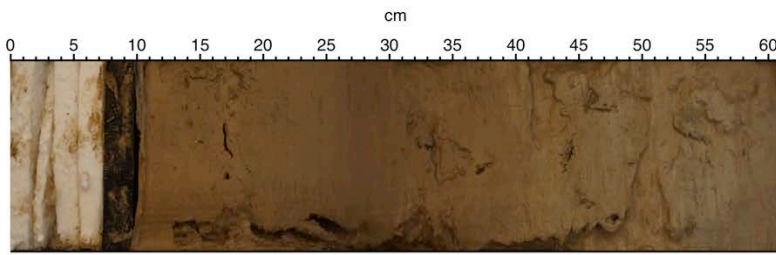
- Disturbed
- Deformed
- Soupy



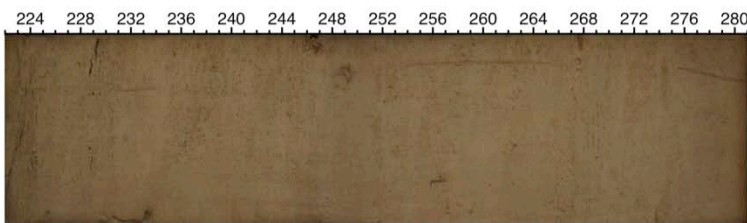
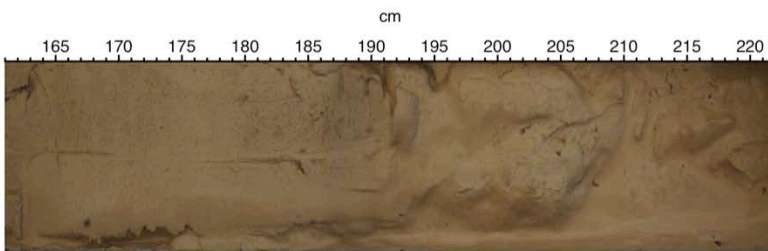
Station SO257-5-5,6

SO257-18570

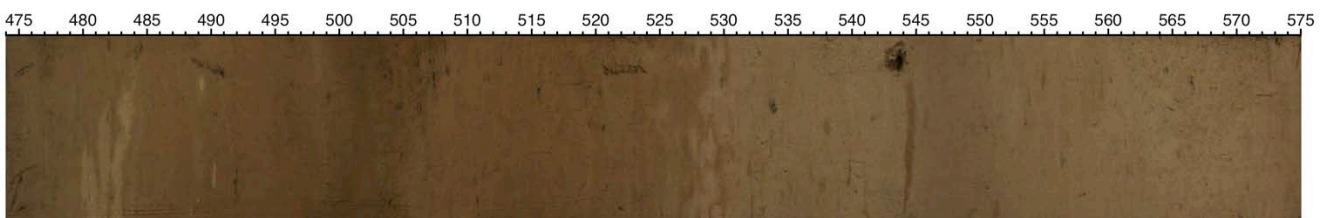
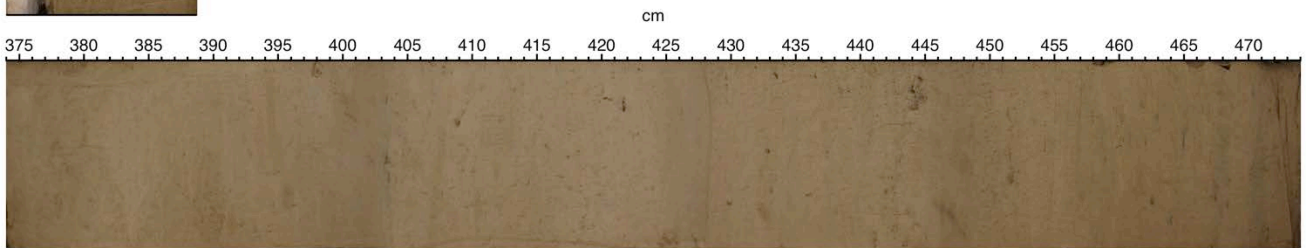
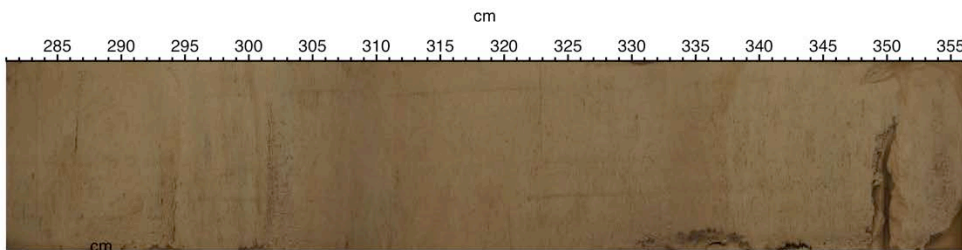
SO257 18570



61 cm – 161 cm imploded core liner



SO257 18570



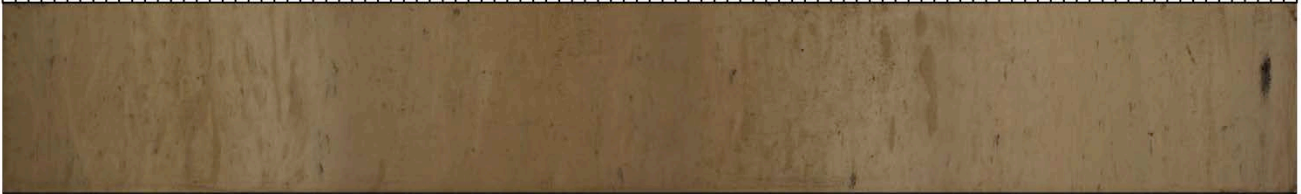
SO257 18570

cm

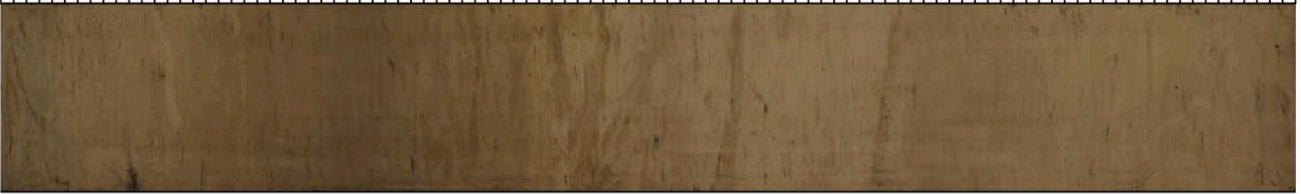
575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675



675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775



775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875



880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975



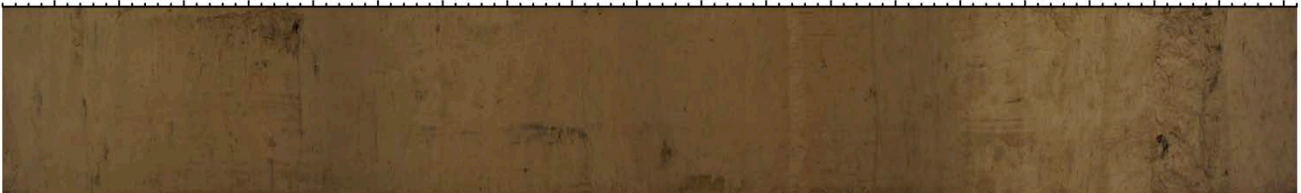
SO257 18570

cm

980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075



1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175



1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265 1270 1275



1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365 1370 1375



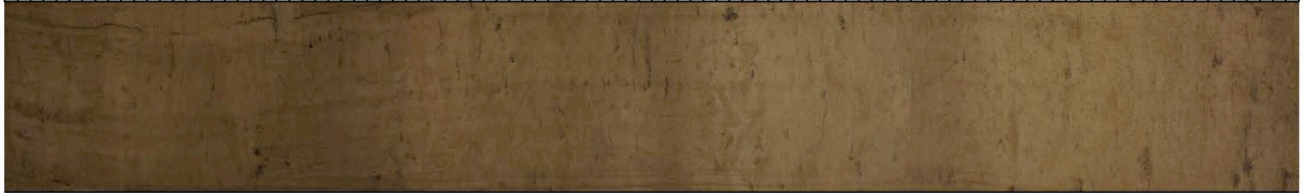
SO257 18570

cm

1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470 1475



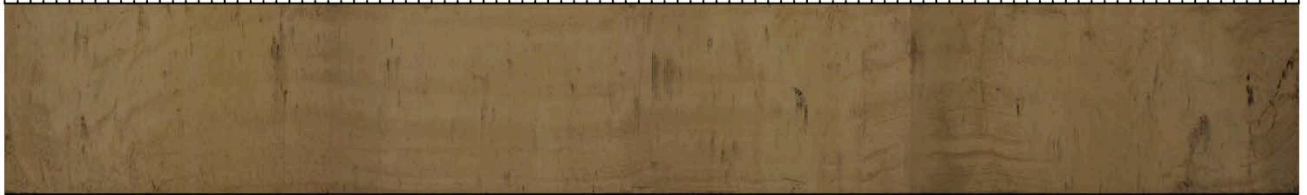
1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570 1575



1580 1585 1590 1595 1600 1605 1610 1615 1620 1625 1630 1635 1640 1645 1650 1655 1660 1665 1670 1675



1680 1685 1690 1695 1700 1705 1710 1715 1720 1725 1730 1735 1740 1745 1750 1755 1760 1765 1770 1775



SO257 18570

cm

1780 1785 1790 1795 1800 1805 1810 1815 1820 1825 1830 1835 1840 1845 1850 1855 1860 1865 1870 1875



Station SO257-5-8,9**SO257-18571**

	18571		MUC-1		SL-2
Date	2017 05 27	-	2017 05 27	-	2017 05 27
Start (UTC)	01:20	-	01:22	-	02:15
Latitude (S)	22° 6,666'	-	22° 6,674'	-	22° 6,685'
Longitude (E)	113° 29,688'	-	113° 29,677'	-	113° 29,663'
Waterdepth (m)	1048,1	-	1049,3	-	1049,4

MUC 18571-1

12 of 12 tubes recovered

Recovery: 27-29 cm

SL 18571-2 (20 m)

Total length: 20,10 m

Number of sections: 20

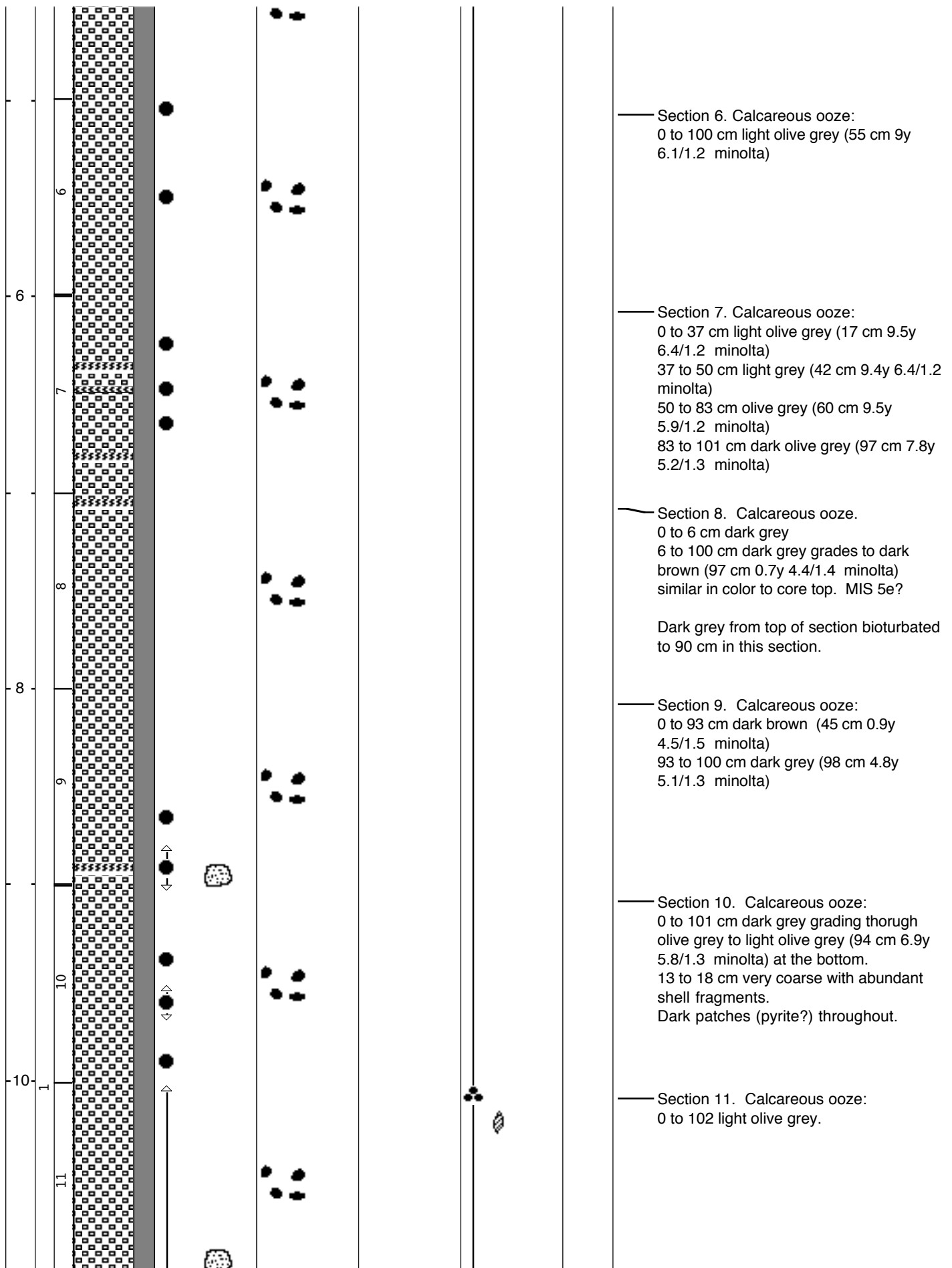
SL-Sections 1	0-100 cm
SL-Sections 2	100-201 cm
SL-Sections 3	201-302 cm
SL-Sections 4	302-402 cm
SL-Sections 5	402-499 cm
SL-Sections 6	499-599 cm
SL-Sections 7	599-700 cm
SL-Sections 8	700-800 cm
SL-Sections 9	800-900 cm
SL-Sections 10	900-1001 cm
SL-Sections 11	1001-1103 cm
SL-Sections 12	1103-1204 cm
SL-Sections 13	1204-1305 cm
SL-Sections 14	1305-1405 cm
SL-Sections 15	1405-1507 cm
SL-Sections 16	1507-1608 cm
SL-Sections 17	1608-1709 cm
SL-Sections 18	1709-1809 cm
SL-Sections 19	1809-1909 cm
SL-Sections 20	1909-2010 cm

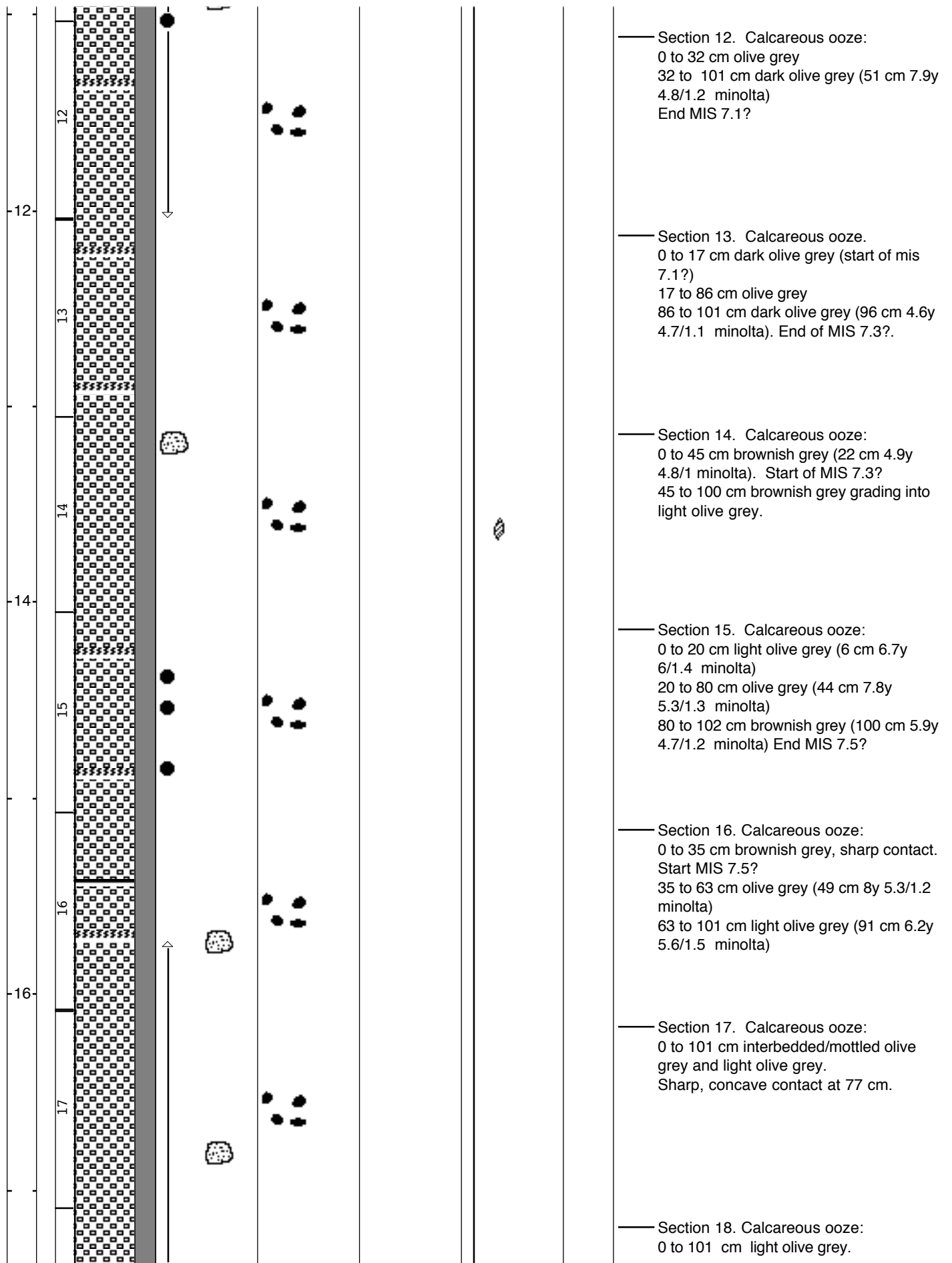
SO257 18571 GC
22°6.6870'S, 113°29.6670'E

Date logged: May 27, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1052.00 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>4</p> <p>5</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>								<p>— Section 1. Carbonate ooze: 0 to 100 cm brown (49 cm 2.2y 54.5/2.1 minolta). Small shell fragments, forams visible on core face.</p> <p>— Section 2. Calcareous ooze: 0 to 24 cm brown . 23 to 81 cm light olive grey (64 cm 5.9y 5.7/1.6 minolta) 81 to 101 cm light grey (91 cm 6.6y 5.9/1.4 minolta) Evidence of brown layer bioturbated to 84 cm.</p> <p>— Section 3. Calcareous ooze: 0 to 100 cm interbedded light grey and light olive grey calcareous ooze. Last visible evidence of brown layer is at 15 cm, over 90 cm below the brown to light olive grey contact.</p> <p>— Section 4. Calcareous ooze: 0 to 43 cm olive grey (28 cm 6.6y 5.7/1.6 minolta). 43 to 101 cm (light olive grey (71 cm 7.6y 5.7/1.6 minolta). 59 to 61 cm coarse sandy layer (smear slide indicates siliciclastic).</p> <p>— Section 5. Calcareous ooze: 0 to 97 light olive grey (81 cm 9.3y 6/1.3 minolta).</p>
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Section 12. Calcareous ooze:
 0 to 32 cm olive grey
 32 to 101 cm dark olive grey (51 cm 7.9y 4.8/1.2 minolta)
 End MIS 7.1?

Section 13. Calcareous ooze.
 0 to 17 cm dark olive grey (start of mis 7.1?)
 17 to 86 cm olive grey
 86 to 101 cm dark olive grey (96 cm 4.6y 4.7/1.1 minolta). End of MIS 7.3?.

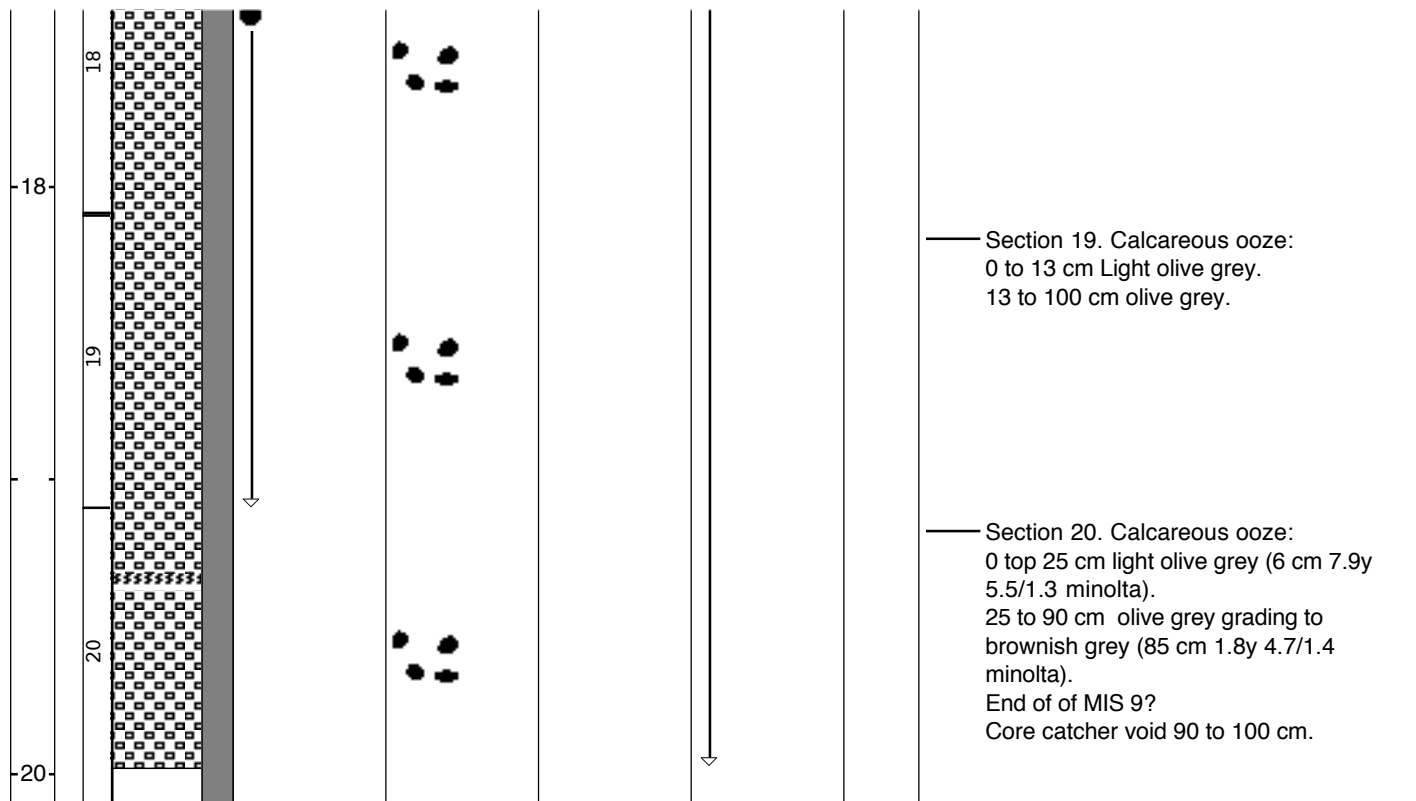
Section 14. Calcareous ooze:
 0 to 45 cm brownish grey (22 cm 4.9y 4.8/1 minolta). Start of MIS 7.3?
 45 to 100 cm brownish grey grading into light olive grey.

Section 15. Calcareous ooze:
 0 to 20 cm light olive grey (6 cm 6.7y 6/1.4 minolta)
 20 to 80 cm olive grey (44 cm 7.8y 5.3/1.3 minolta)
 80 to 102 cm brownish grey (100 cm 5.9y 4.7/1.2 minolta) End MIS 7.5?

Section 16. Calcareous ooze:
 0 to 35 cm brownish grey, sharp contact. Start MIS 7.5?
 35 to 63 cm olive grey (49 cm 8y 5.3/1.2 minolta)
 63 to 101 cm light olive grey (91 cm 6.2y 5.6/1.5 minolta)

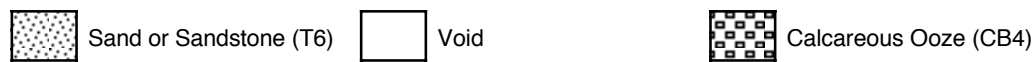
Section 17. Calcareous ooze:
 0 to 101 cm interbedded/mottled olive grey and light olive grey.
 Sharp, concave contact at 77 cm.

Section 18. Calcareous ooze:
 0 to 101 cm light olive grey.



LEGEND

LITHOLOGY



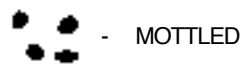
CONTACTS



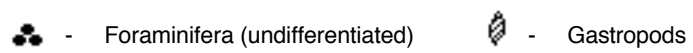
PHYSICAL STRUCTURES



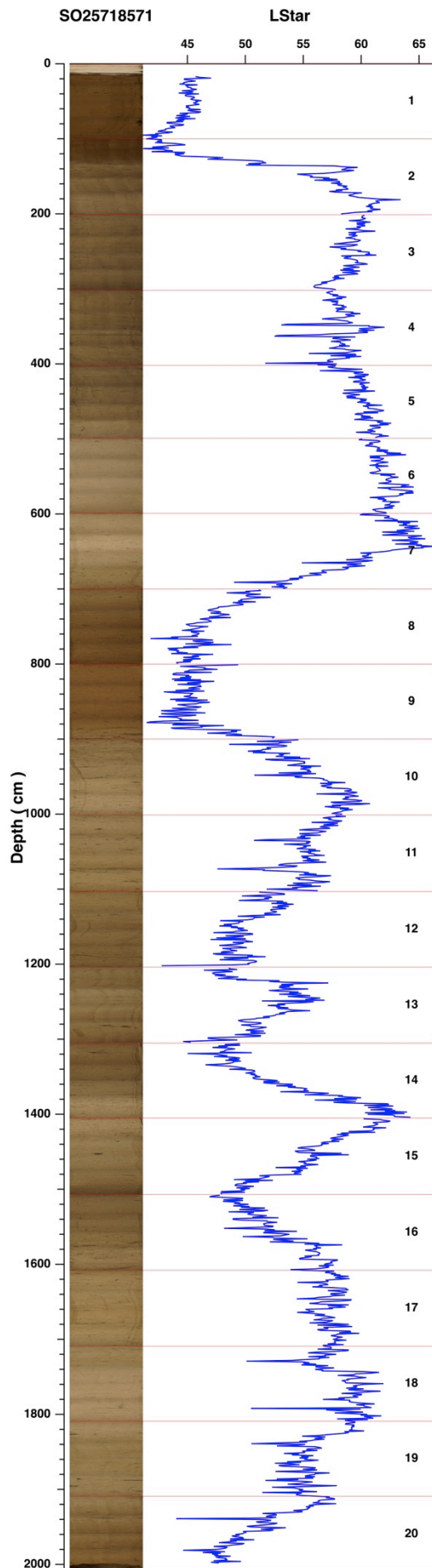
LITHOLOGIC ACCESSORIES



FOSSILS



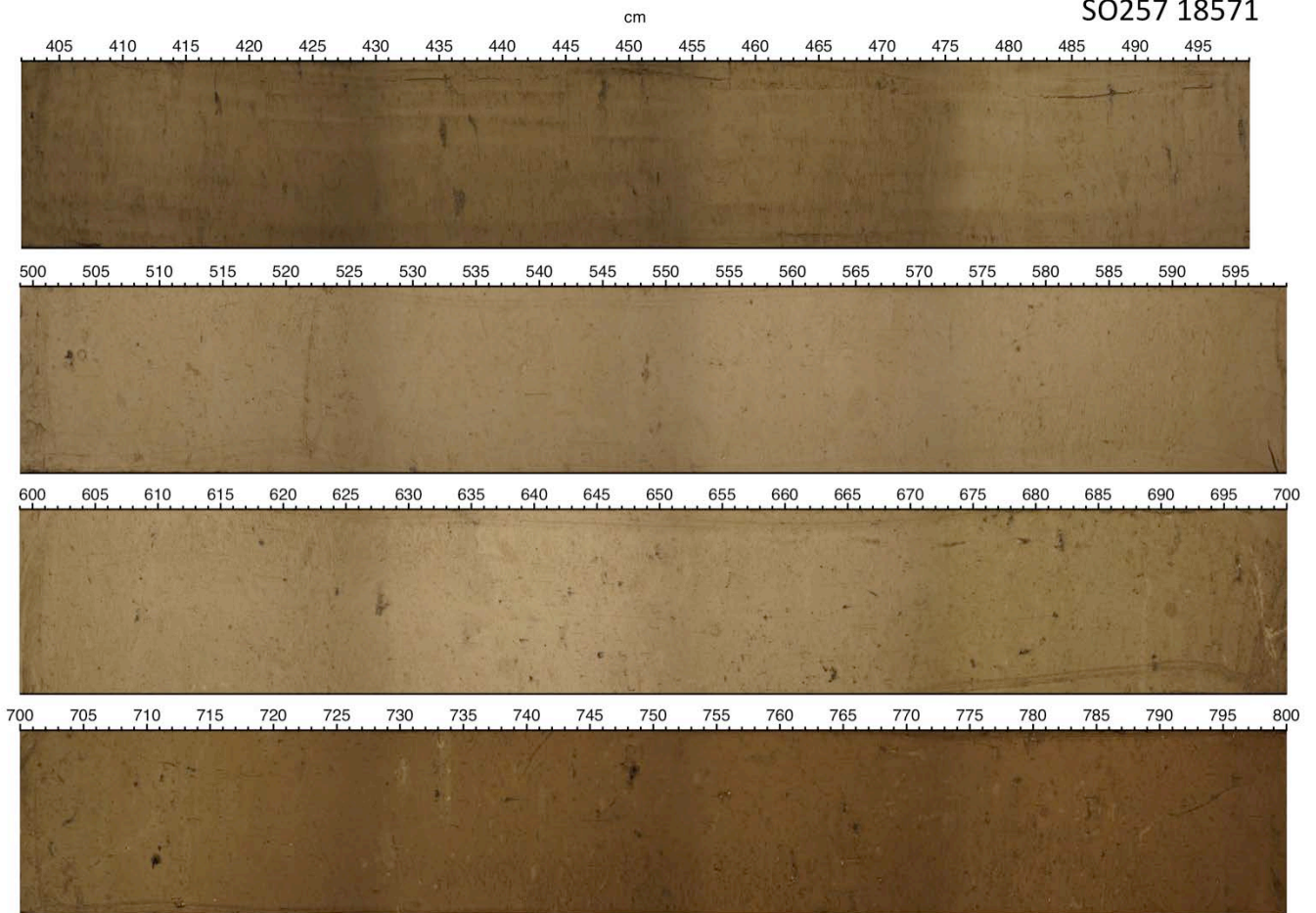
CORE DISTURBANCE



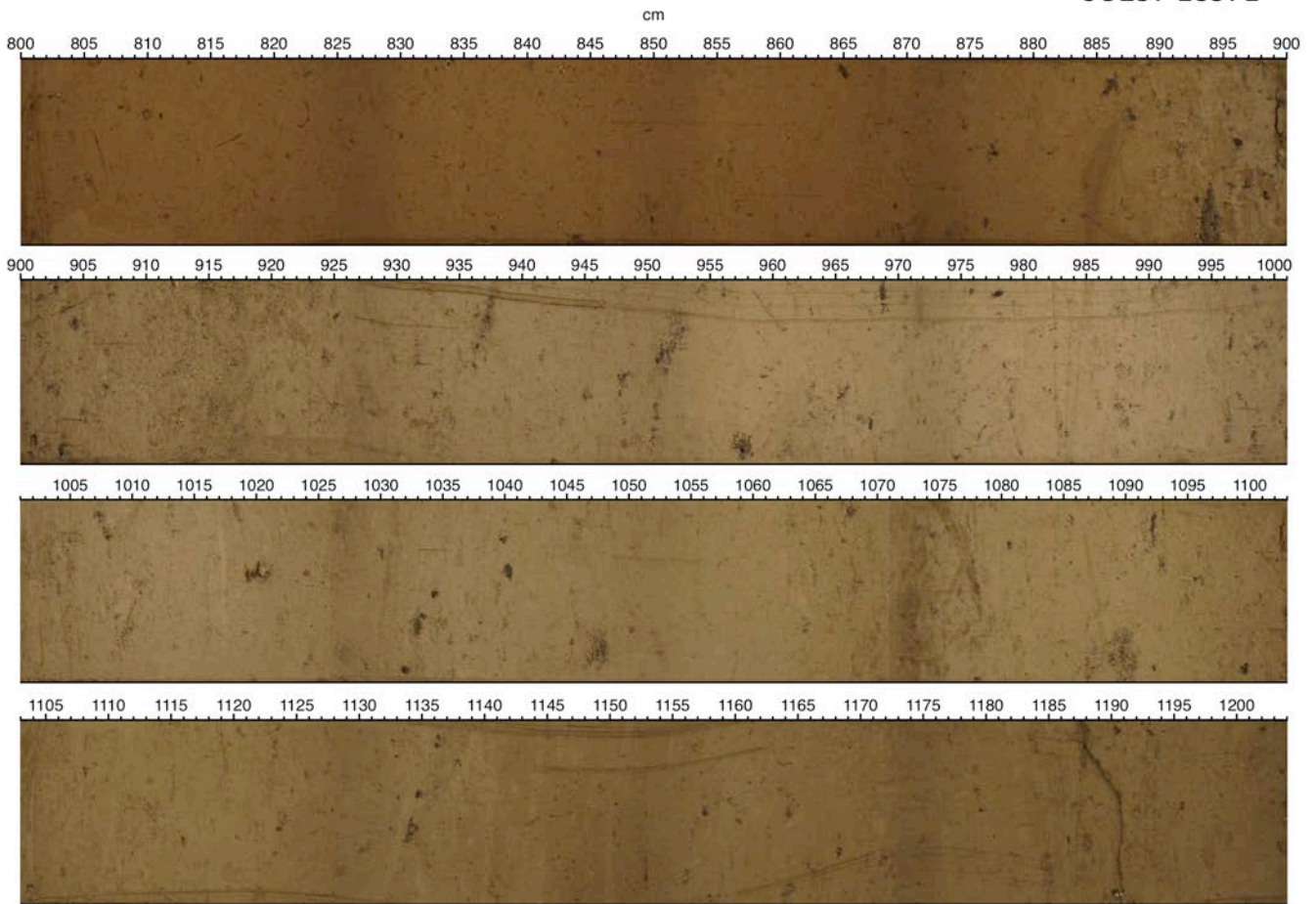
SO257 18571



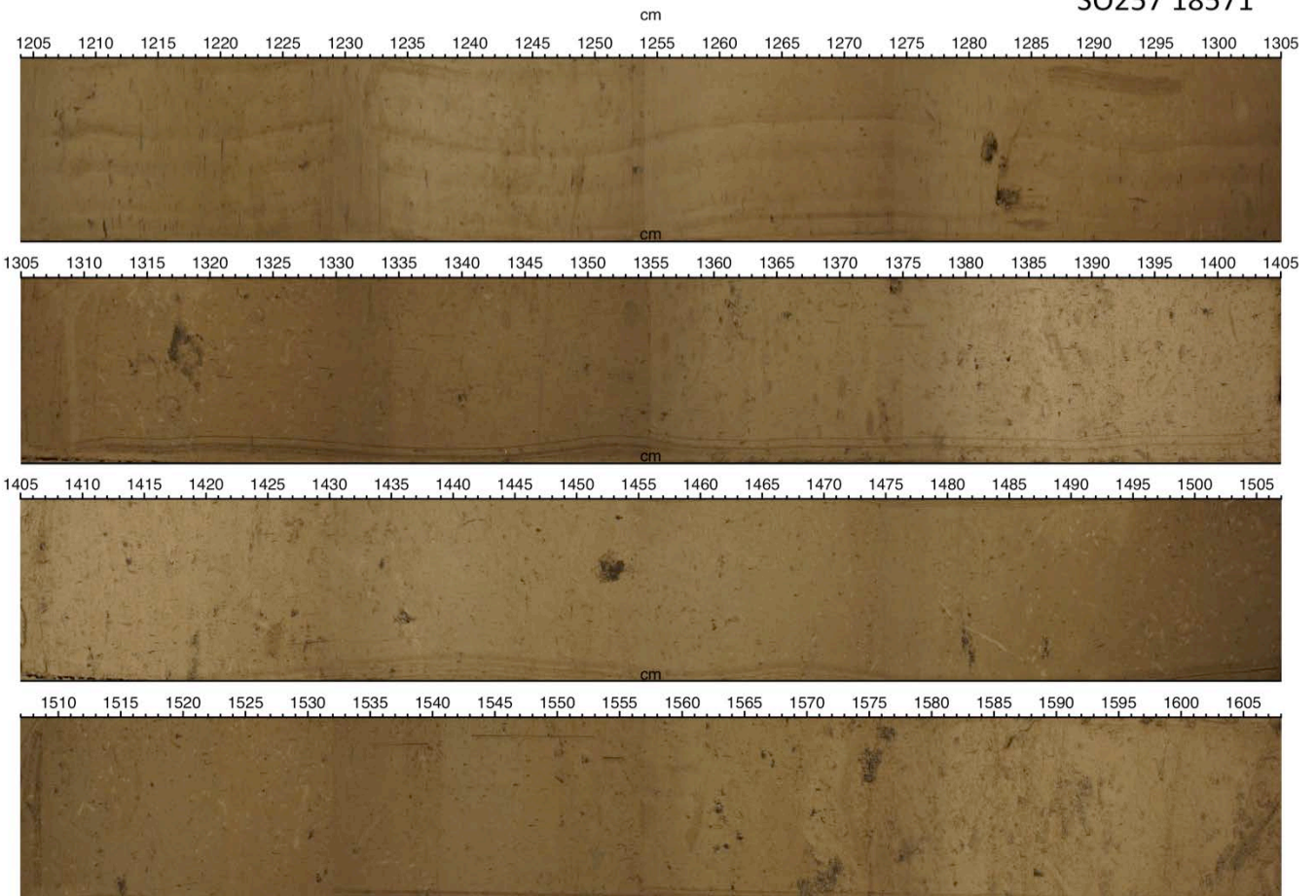
SO257 18571



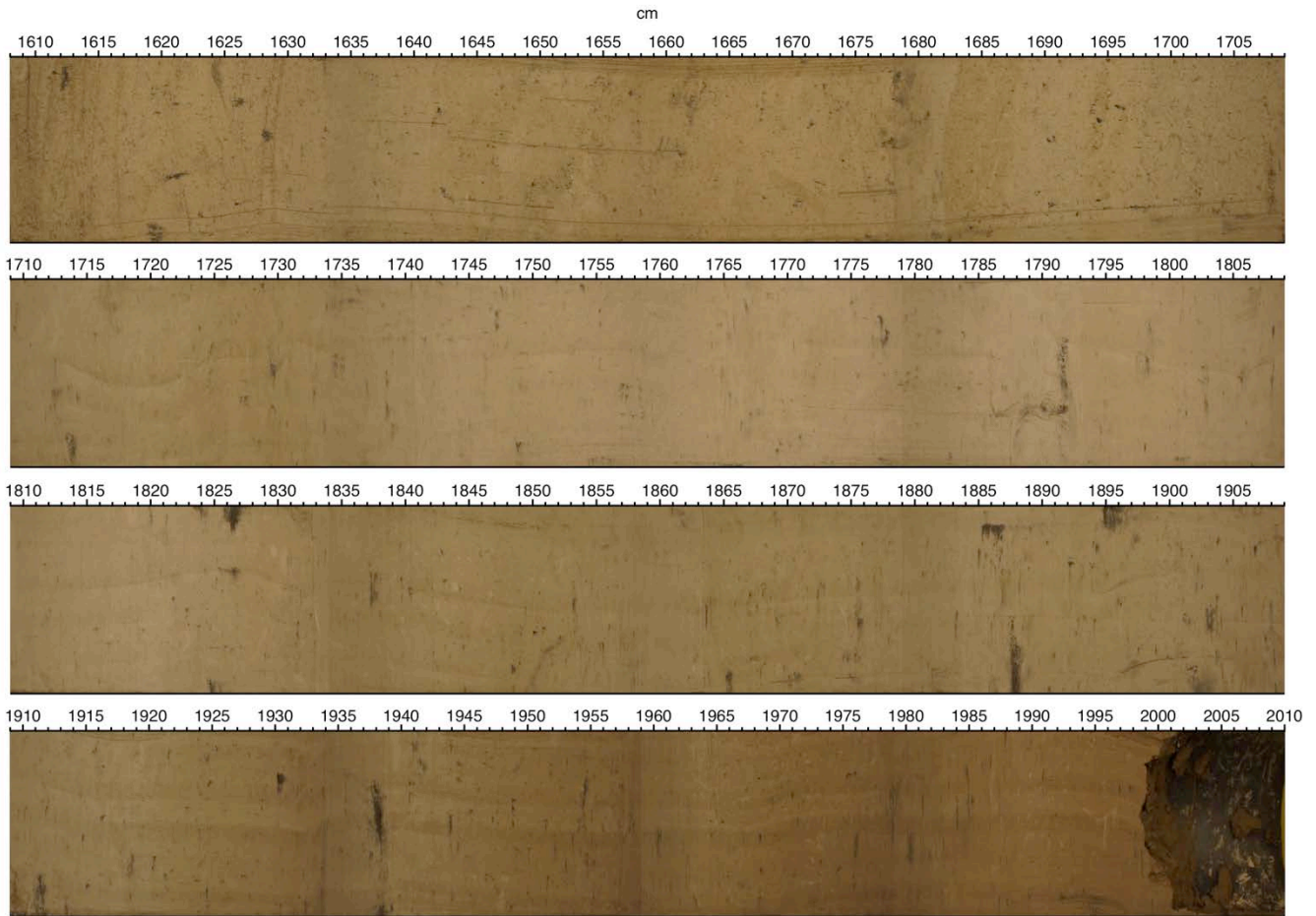
SO257 18571



SO257 18571



SO257 18571



	18572		MUC-1		SL-2
Date	2017 05 27	-	2017 05 27	-	2017 05 27
Start (UTC)	05:07	-	05:09	-	06:11
Latitude (S)	22° 4,576'	-	22° 4,585'	-	22° 4,697'
Longitude (E)	113° 13,806'	-	113° 13,798'	-	113° 13,715'
Waterdepth (m)	1329,2	-	1327,9	-	1325,4

MUC 18572-1

12 of 12 tubes recovered

Recovery: 27,5-33 cm

SL 18572-2 (20 m)

Total length: 16,72 m

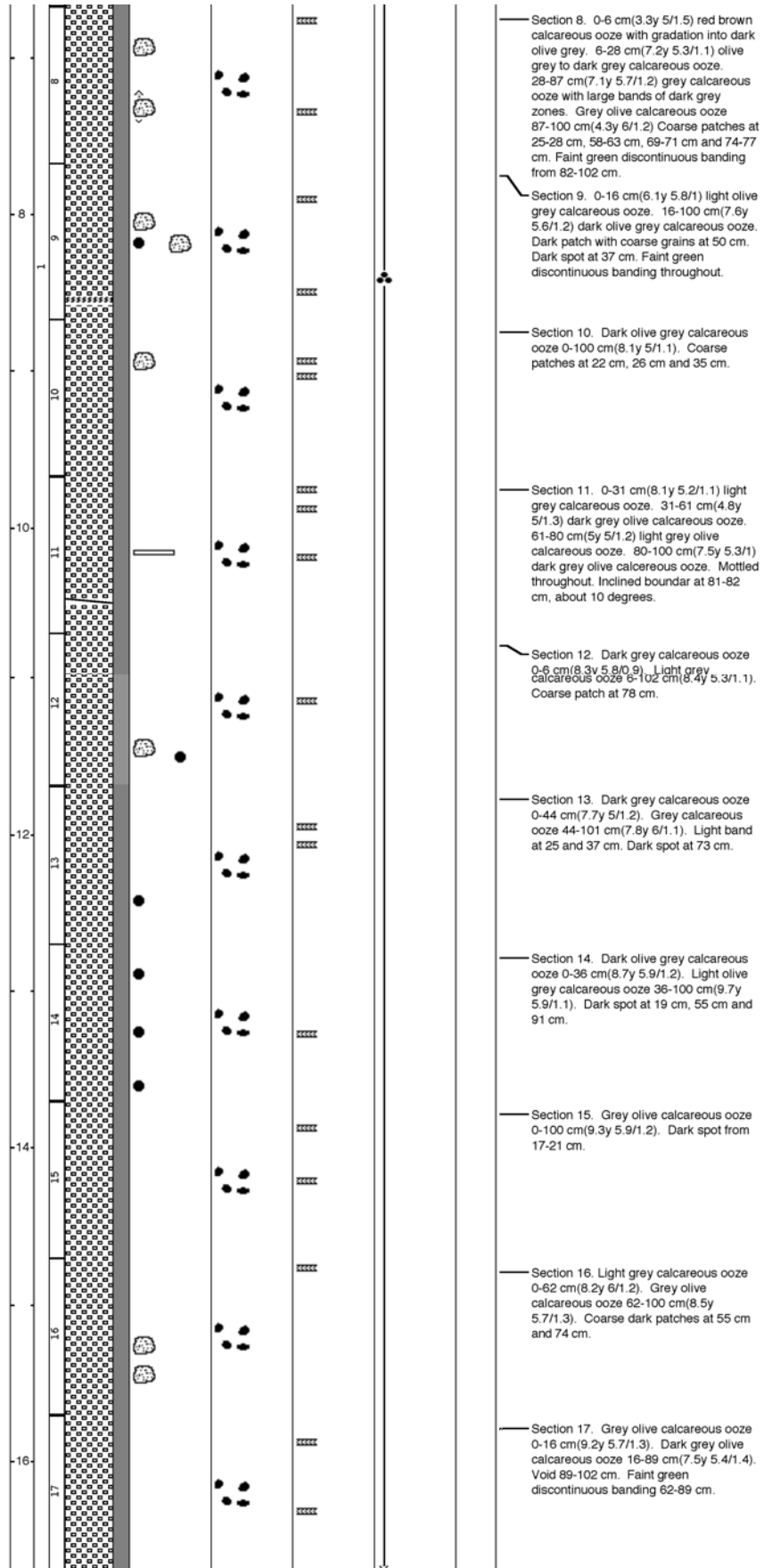
Number of sections: 17

SL-Sections 1	0-83 cm
SL-Sections 2	83-166 cm
SL-Sections 3	166-265 cm
SL-Sections 4	265-365 cm
SL-Sections 5	365-465 cm
SL-Sections 6	465-565 cm
SL-Sections 7	565-667 cm
SL-Sections 8	667-767 cm
SL-Sections 9	767-867 cm
SL-Sections 10	867-967 cm
SL-Sections 11	967-1067 cm
SL-Sections 12	1067-1169 cm
SL-Sections 13	1169-1270 cm
SL-Sections 14	1270-1370 cm
SL-Sections 15	1370-1470 cm
SL-Sections 16	1470-1570 cm
SL-Sections 17	1570-1672 cm

SO257 18572 GC
 22°4.7000'S, 113°13.7110'E



Date logged: May 27, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 1325.50 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHO.	FOSSILS	DISTURB.	DESCRIPTION
1									Section 1. 0-10 cm void. Dark red brown calcareous ooze 10-12 cm(9.5y 4.7/3.5). Brown with red tint 12-78 cm(1.2y 4.7/2.2). Brown with grey tint 78-83 cm(2.7y 5/1.9). Faint sub-cm band at 17 cm.
2									Section 2. 0-2 cm(2.5y 5.3/1.7) grey with brown spots. Light grey calcareous ooze 2-83 cm(4.5y 5.9/1.3). Core disturbance from 16-19 cm. Prominant burrow at 36 cm. Coarse patch at 73 cm. Brown spotting 46-51 cm.
3									Section 3. Light grey calcareous ooze 0-99 cm(6.4y 5.8/1.2). Red brown spots at 4 cm, 8 cm and 15 cm.
4									Section 4. Light grey calcareous ooze 0-26 cm(7y 5.9/1.3). Grey calcareous ooze 26-100 cm(8.6Y 5.8/1.1). Prominant burrow at 19 cm. Coarse patches at 58 cm and 64 cm.
5									Section 5. 0-48 cm(9.4y 6/1.1) dark grey olive calcareous ooze. 48-71 cm(9.4y 6.2/1) light grey calcareous ooze. 71-100 cm(9.2y 6.3/0.8) dark grey calcareous ooze. Inclined contact about 30 degrees from 0-6 cm, darker color relative to contacts above and below. Contact is coarse and has shell fragments. Coarse patches at 26 cm, 35 cm and 41 cm.
6									Section 6. Light grey calcareous ooze 0-72 cm(9.1y 6.3/1). Dark grey calcareous ooze 72-100 cm(8.2y 5.3/1.2). Coarse patch at 4 cm and 44 cm. Light band cm thick at 77-78 cm. Faint green discontinuous bands throughout.
7									Section 7. 0-18 cm(6.3y 5/1.3) olive grey calcareous ooze. Brown red calcareous ooze 18-102 cm(2.1y 4.5/1.7). Light cm thick band at 8-9 cm and 36-37 cm.





LEGEND





LITHOLOGY

 Void	 Calcareous ooze (CB4)
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CONTACTS

 Bioturbated	 Inclined
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PHYSICAL STRUCTURES

 - Dark spots	 - Light spot	 - light band
 - coarser patch		


LITHOLOGIC ACCESSORIES

 - Shell Fragments	 - MOTTLED
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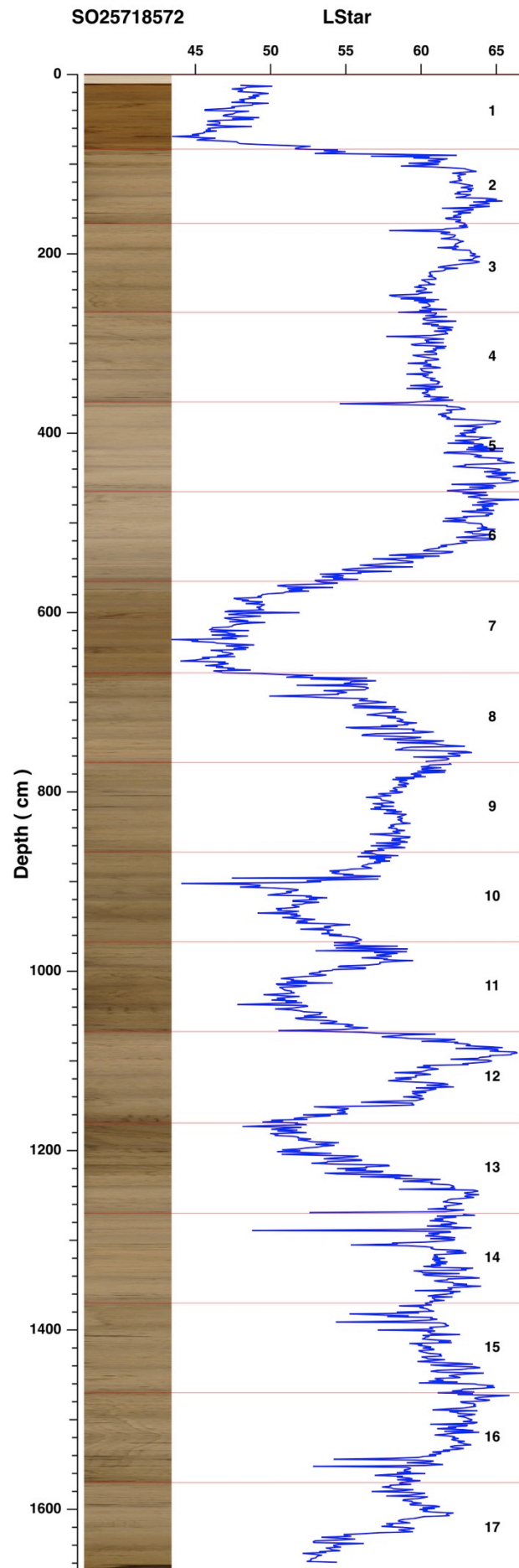
ICHNOFOSSILS

 - Chondrites	 - Zoophycos
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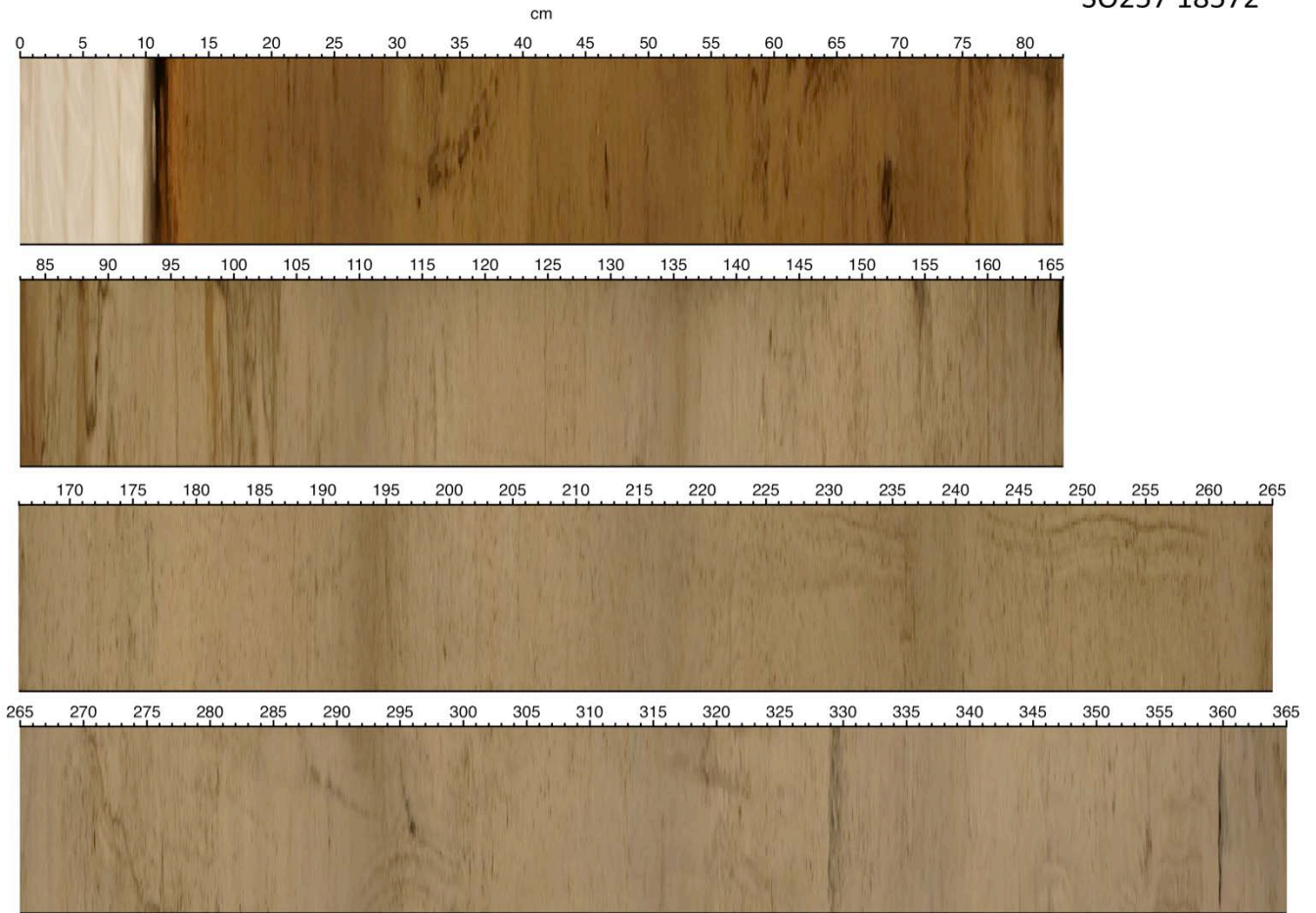
FOSSILS

 - Foraminifera (undifferentiated)

CORE DISTURBANCE



SO257 18572

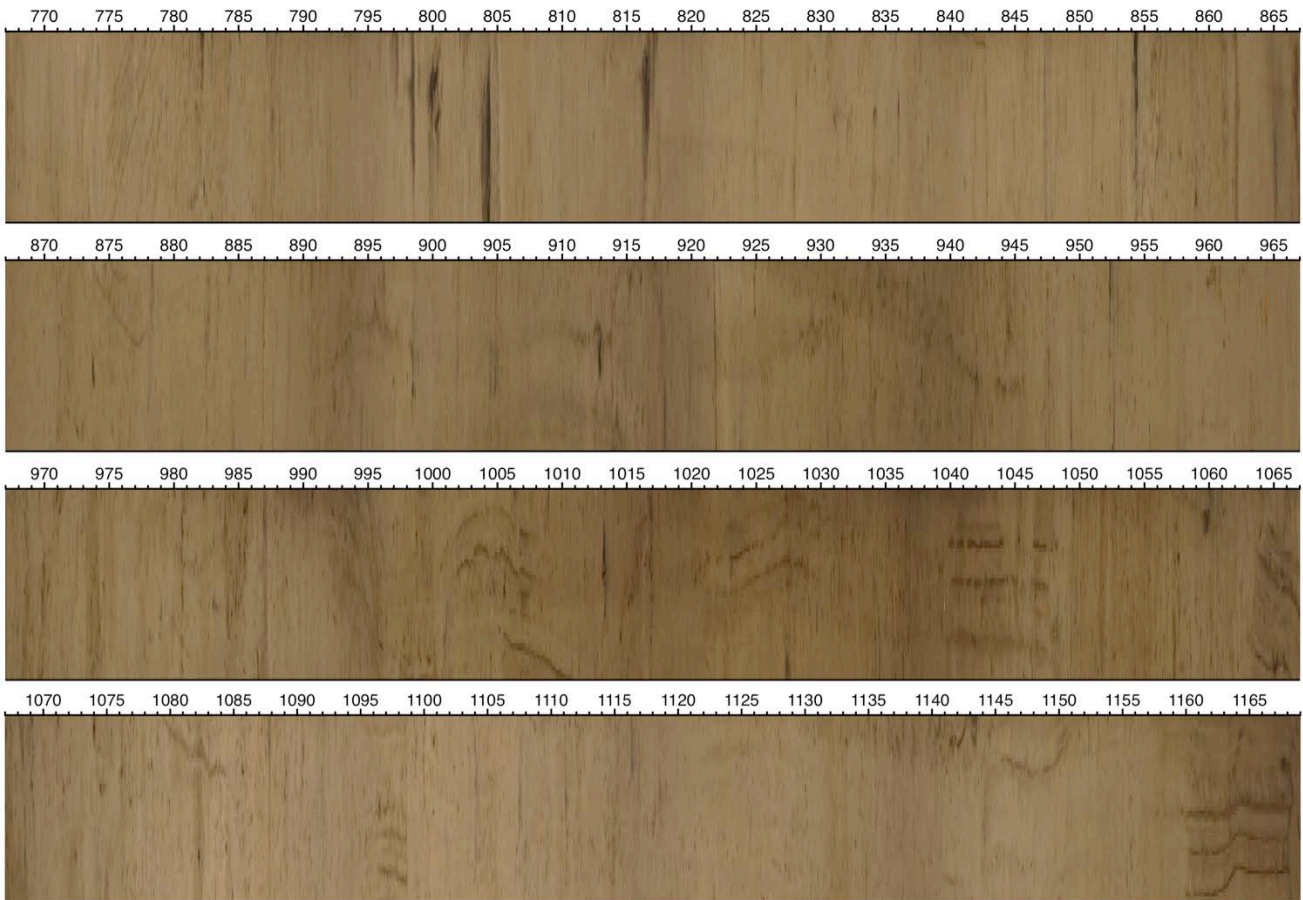


SO257 18572



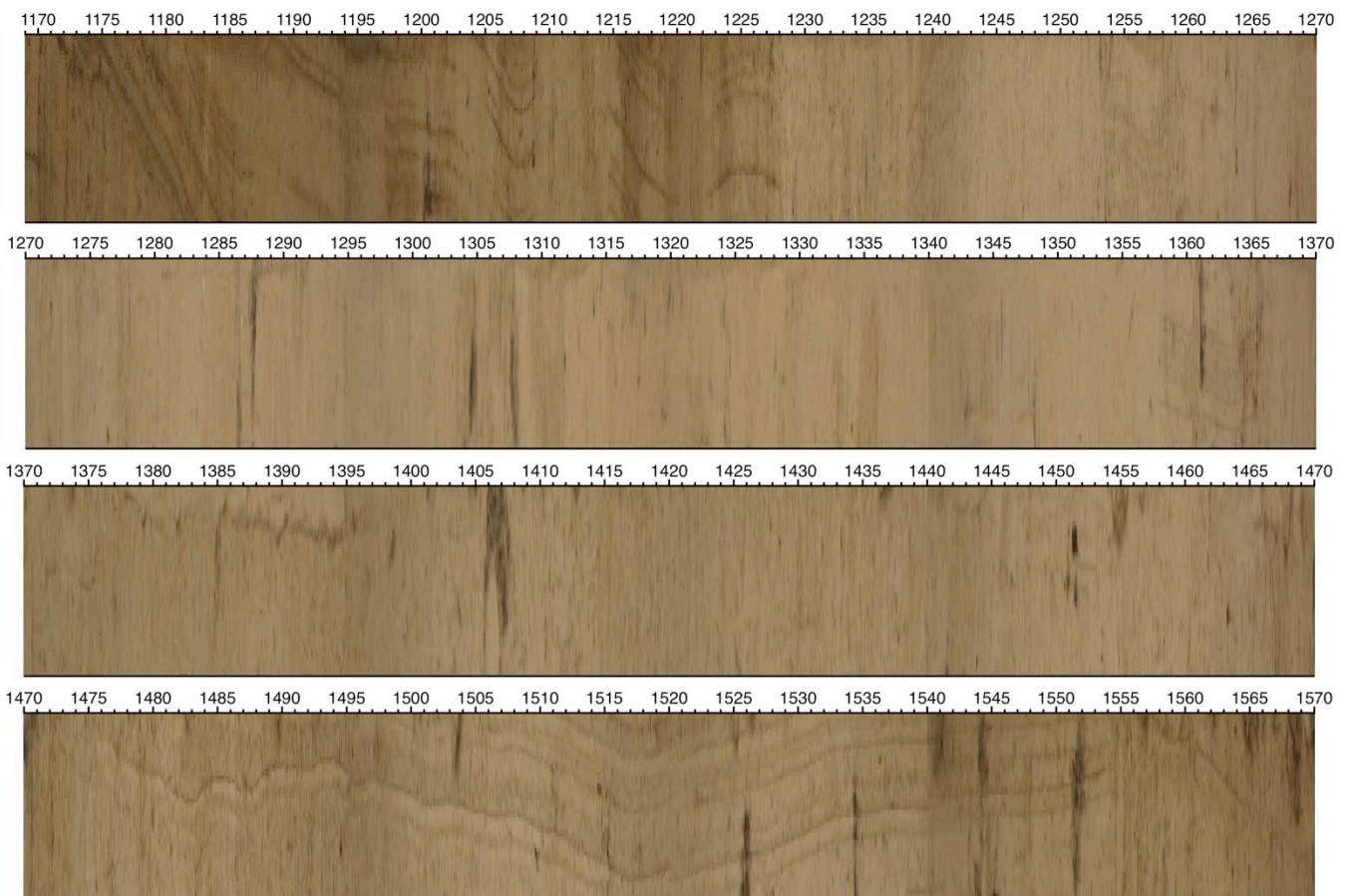
SO257 18572

cm



SO257 18572

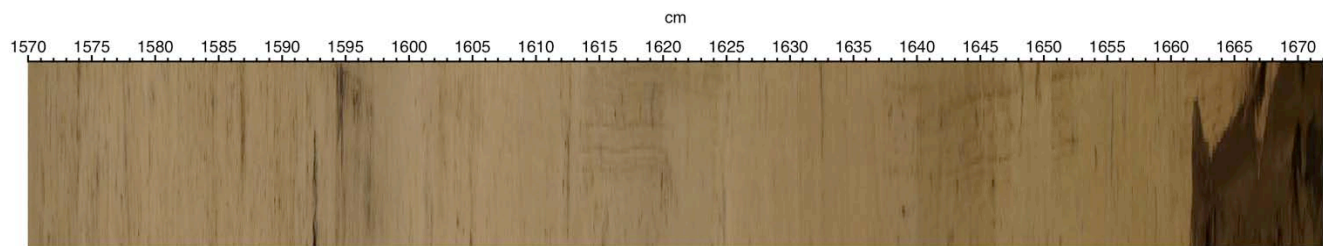
cm



Station SO257-5-10,11

SO257-18572

SO257 18572



Station SO257-5-12**SO257-18573**

	18573		MUC-1		
Date	2017 05 27	-	2017 05 27	-	-
Start (UTC)	10:35	-	10:36	-	-
Latitude (S)	22° 37,246'	-	22° 37,245'	-	-
Longitude (E)	112° 50,209'	-	112° 50,209'	-	-
Waterdepth (m)	1249,9	-	1250,5	-	-

MUC 18573-1

10 of 12 tubes recovered

Recovery: 8-12,5 cm

Station SO257-6-1**SO257-18574**

	18574	CTD-1	MUC-1		
Date	2017 05 28	-	2017 05 28		
Start (UTC)	01:48	-	01:50		
Latitude (S)	24° 13,893'	-	24° 13,892'		
Longitude (E)	112° 22,117'	-	112° 22,114'		
Waterdepth (m)	504,5	-	501,9		

MUC 18574-1

8 of 12 tubes recovered

Recovery: 9,5-11 cm

Station SO257-6-2**SO257-18575**

	18575		MUC-1		
Date	2017 05 28	-	2017 05 28	-	-
Start (UTC)	06:30	-	06:32	-	-
Latitude (S)	24° 13,798'	-	24° 13,811'	-	-
Longitude (E)	111° 51,184'	-	111° 51,181'	-	-
Waterdepth (m)	1033,7	-	1032,0	-	-

MUC 18575-1

12 of 12 tubes recovered

Recovery: 13,5-19,5 cm

	18576		MUC-1		SL-2
Date	2017 05 28	-	2017 05 28	-	2017 05 28
Start (UTC)	11:13	-	11:15	-	12:36
Latitude (S)	24° 8,404'	-	24° 8,401'	-	24° 8,390'
Longitude (E)	111° 20,502'	-	111° 20,499'	-	111° 20,451'
Waterdepth (m)	1724,8	-	1725,9	-	1726,4

MUC 18576-1

12 of 12 tubes recovered

Recovery: 21,5-23,5 cm

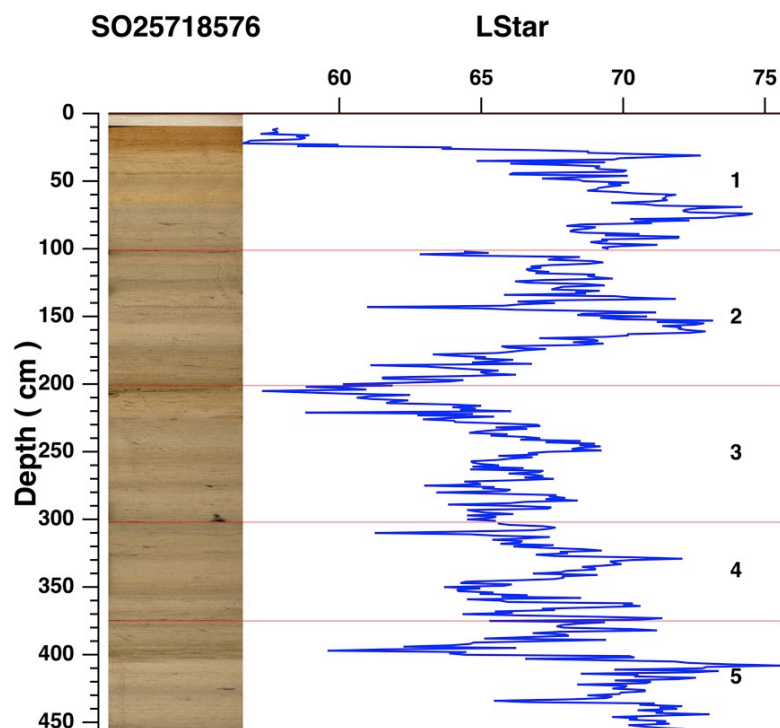
SL 18576-2 (15m)

Total length: 4,59 m

Number of sections: 5

Core bend on seafloor

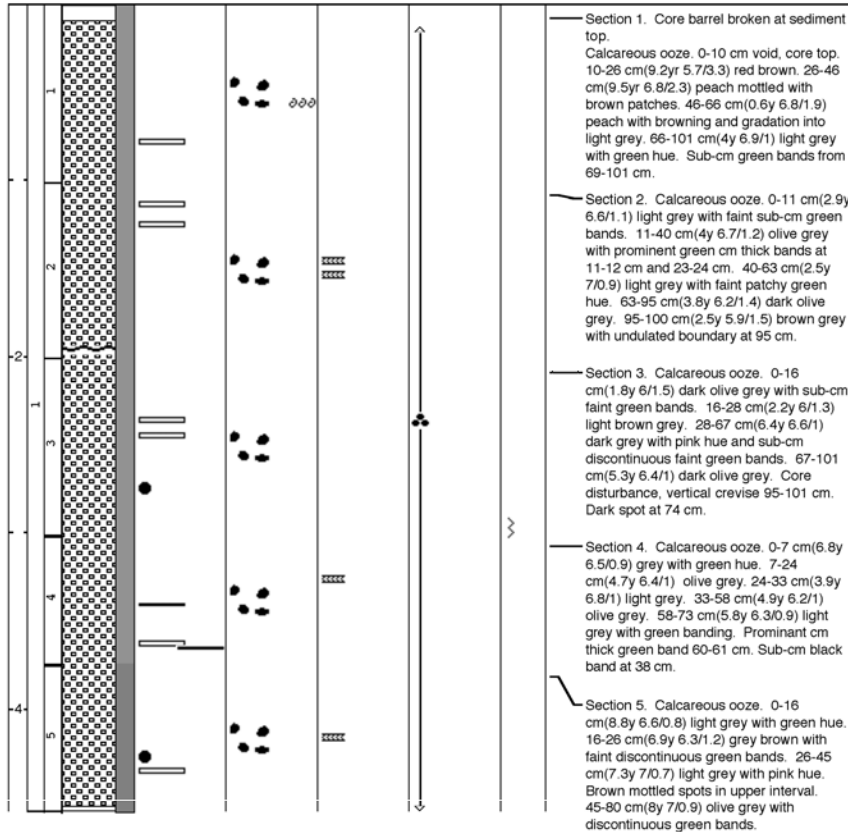
SL-Sections 1	0-101 cm
SL-Sections 2	101-201 cm
SL-Sections 3	201-302 cm
SL-Sections 4	302-375 cm
SL-Sections 5	375-459 cm



SO257 18576 GC
 24°8.3950'S, 111°20.4600'E

Date logged: May 28, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 1725.80 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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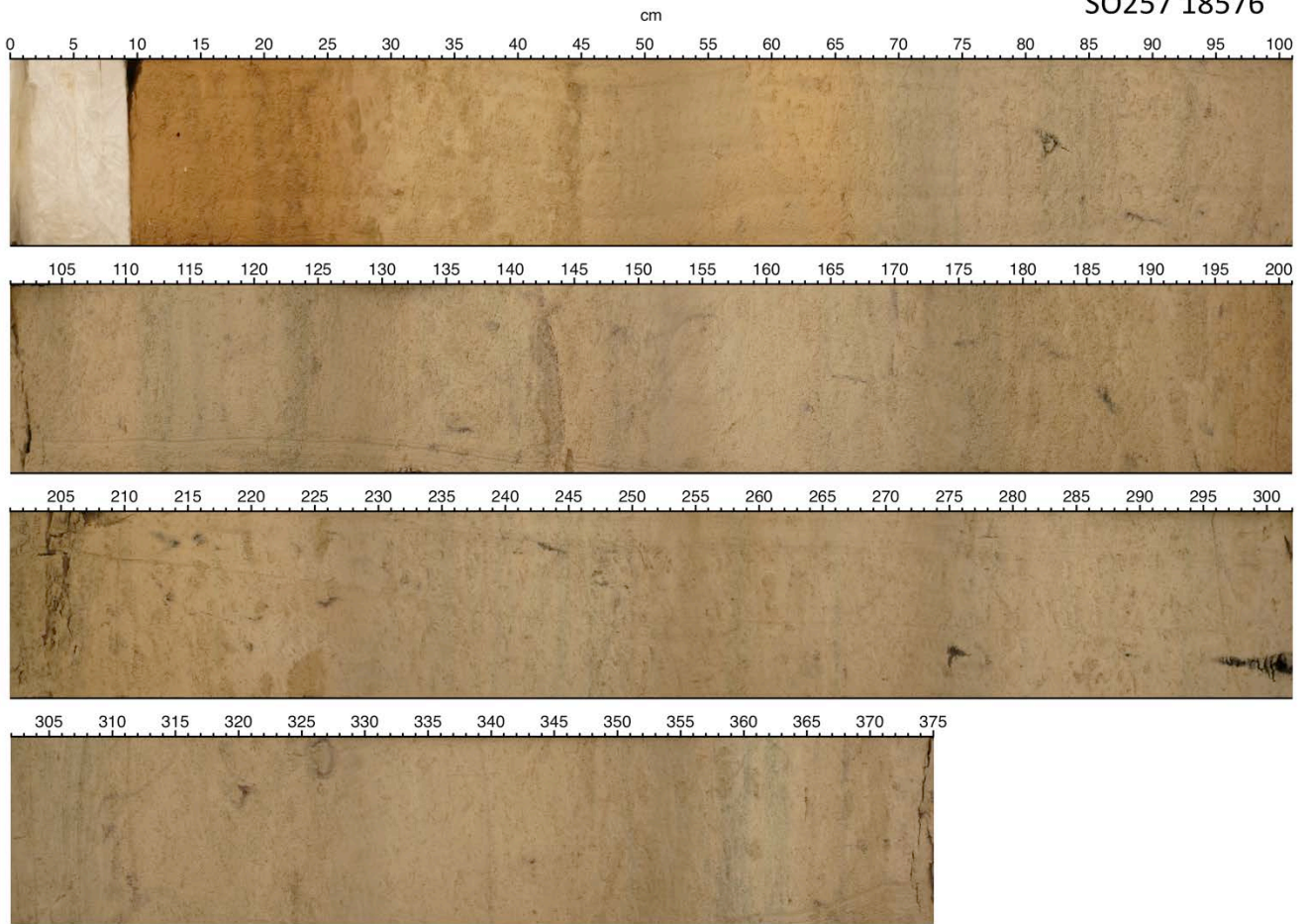
LEGEND

LITHOLOGY	
Void	Calcareous Ooze (CB4)
CONTACTS	
Undulating	
PHYSICAL STRUCTURES	
Dark spots	dark band
	light band
LITHOLOGIC ACCESSORIES	
Shell Fragments	MOTTLED
ICHOFOSSILS	
Zoophycos	
FOSSILS	
Foraminifera (undifferentiated)	
CORE DISTURBANCE	
Disturbed	

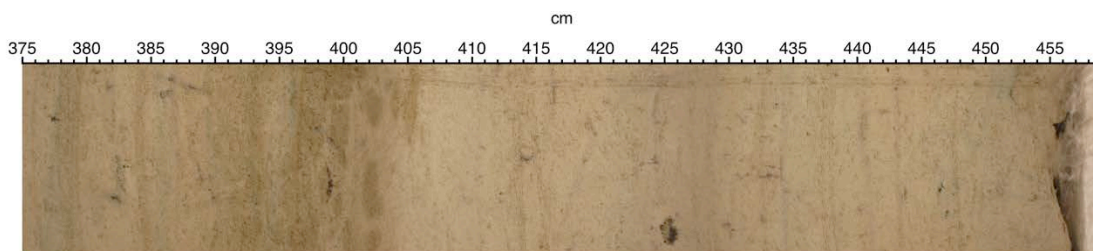
Station SO257-6-3,4

SO257-18576

SO257 18576



SO257 18576



Station SO257-6-5**SO257-18577**

	18577	CTD-1	MUC-2	KL-3	SL-4
Date	2017 05 28	2017 05 28	-	-	-
Start (UTC)	22:44	22:45	-	-	-
Latitude (S)	25° 25,796'	25° 25,800'	-	-	-
Longitude (E)	111° 4,991'	111° 4,983'	-	-	-
Waterdepth (m)	1795,8	1793,4	-	-	-

CTD 18577-1

Water samples taken at (m): 1790, 1500, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 1790, 1100, 720, 450, 180, 10

Station SO257-6-6,7**SO257-18578**

	18578		MUC-1		SL-2
Date	2017 05 29	-	2017 05 29	-	2017 05 29
Start (UTC)	01:45	-	01:48	-	03:05
Latitude (S)	25° 22,257'	-	25° 22,258'	-	25° 22,262'
Longitude (E)	111° 5,712'	-	111° 5,708'	-	111° 5,705'
Waterdepth (m)	1677,5	-	1678,9	-	1680,5

MUC 18578-1

12 of 12 tubes recovered

Recovery: 13-15,5 cm

SL 18578-2 (15m)

Total length: 2,62 m

Number of sections: 3

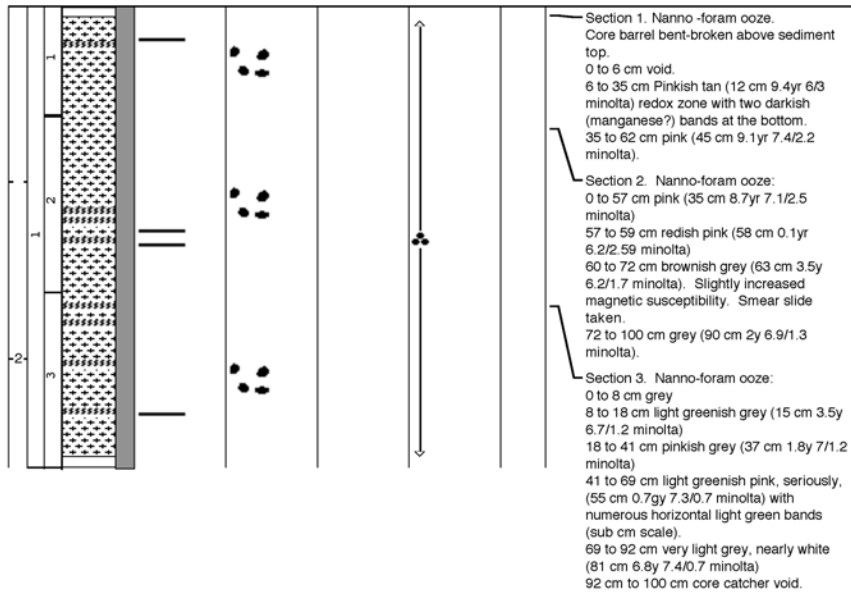
Liner got damaged on the seafloor

SL-Sections 1	0-62 cm
SL-Sections 2	62-162 cm
SL-Sections 3	162-262 cm

SO257 18578 GC
 25°22.2570'S, 111°5.7140'E

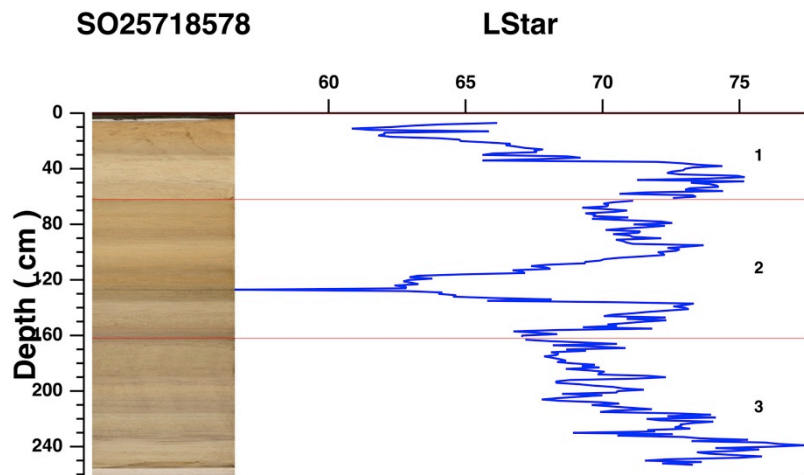
Date logged: May 29, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1680.00 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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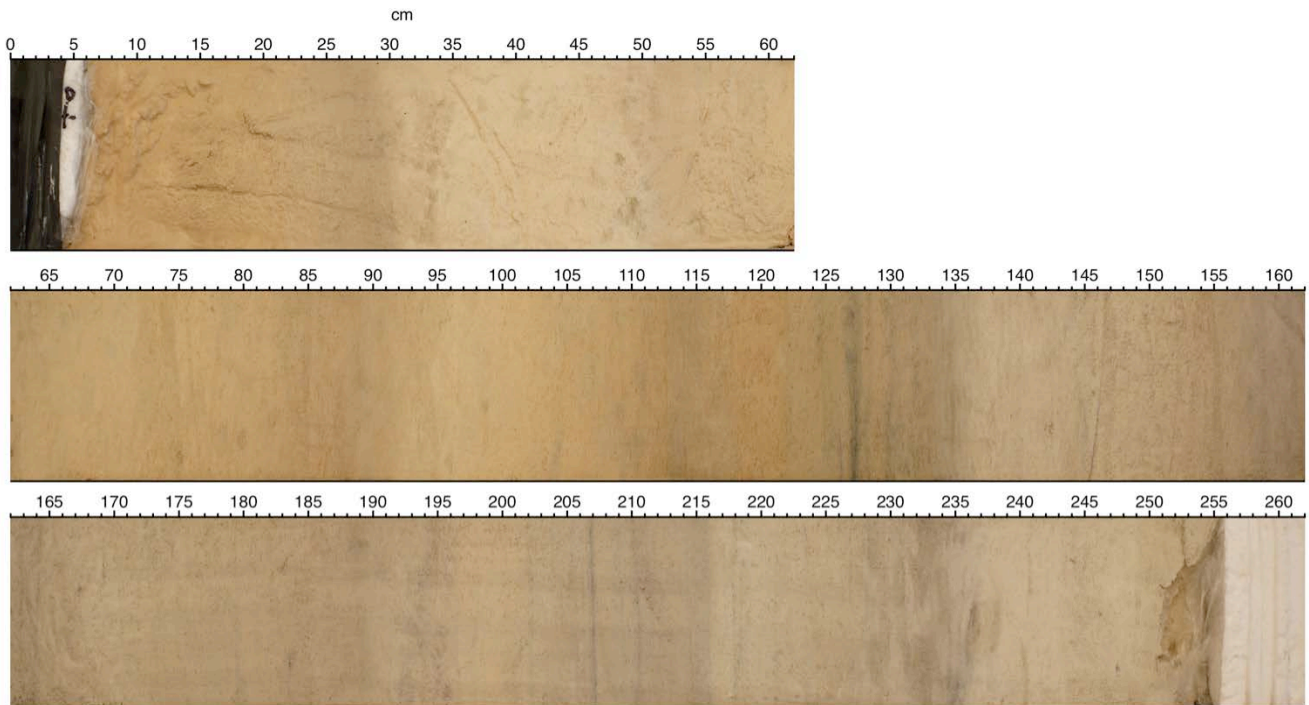


LEGEND

LITHOLOGY	
	Void
	Nanno-Foram Ooze (CB3)
CONTACTS	
	Bioturbated
PHYSICAL STRUCTURES	
	dark band
LITHOLOGIC ACCESSORIES	
	MOTTLED
FOSSILS	
	Foraminifera (undifferentiated)
CORE DISTURBANCE	



SO257 18578



Station SO257-6-8**SO257-18579**

	18579		MUC-1		
Date	2017 05 29	-	2017 05 29	-	-
Start (UTC)	08:46	-	08:47	-	-
Latitude (S)	25° 6,112'	-	25° 6,114'	-	-
Longitude (E)	111° 50,924'	-	111° 50,925'	-	-
Waterdepth (m)	716,3	-	715,1	-	-

MUC 18579-1

9 of 12 tubes recovered

Recovery: 8,5-12 cm

	18580		MUC-1	KL-2	
Date	2017 05 29	-	2017 05 29	2017 05 29	-
Start (UTC)	22:28	-	22:31	23:46	-
Latitude (S)	24° 34,159'	-	24° 34,161'	24° 34,138'	-
Longitude (E)	111° 14,786'	-	111° 14,790'	111° 14,759'	-
Waterdepth (m)	1369,7	-	1369,1	1372,5	-

MUC 18580-1

10 of 12 tubes recovered

Recovery: 10,5-11,5 cm

KL 18580-2 (10 m)

Total length: 6,67 m

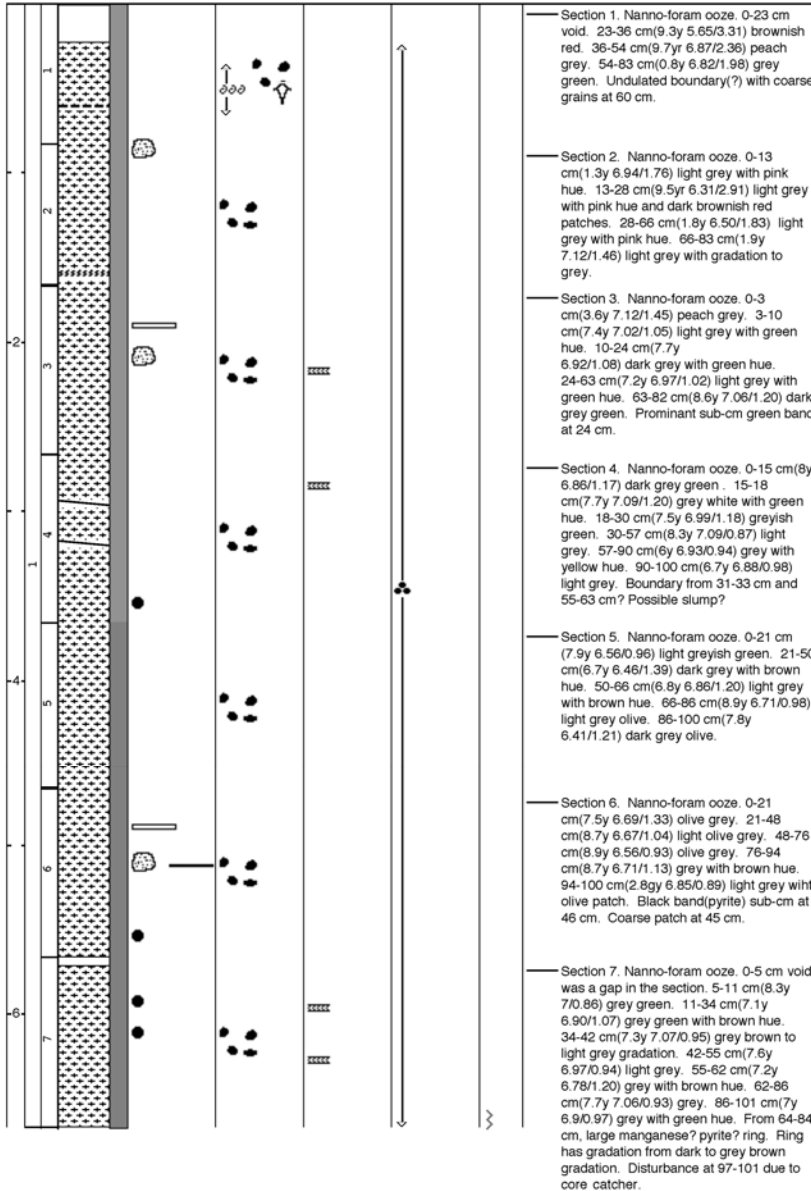
Number of sections: 7

KL-Sections 1	0-83 cm
KL-Sections 2	83-166 cm
KL-Sections 3	166-266 cm
KL-Sections 4	266-366 cm
KL-Sections 5	366-466 cm
KL-Sections 6	466-566 cm
KL-Sections 7	566-667 cm

SO257 18580 PC
24°34.1360'S, 111°14.7510'E

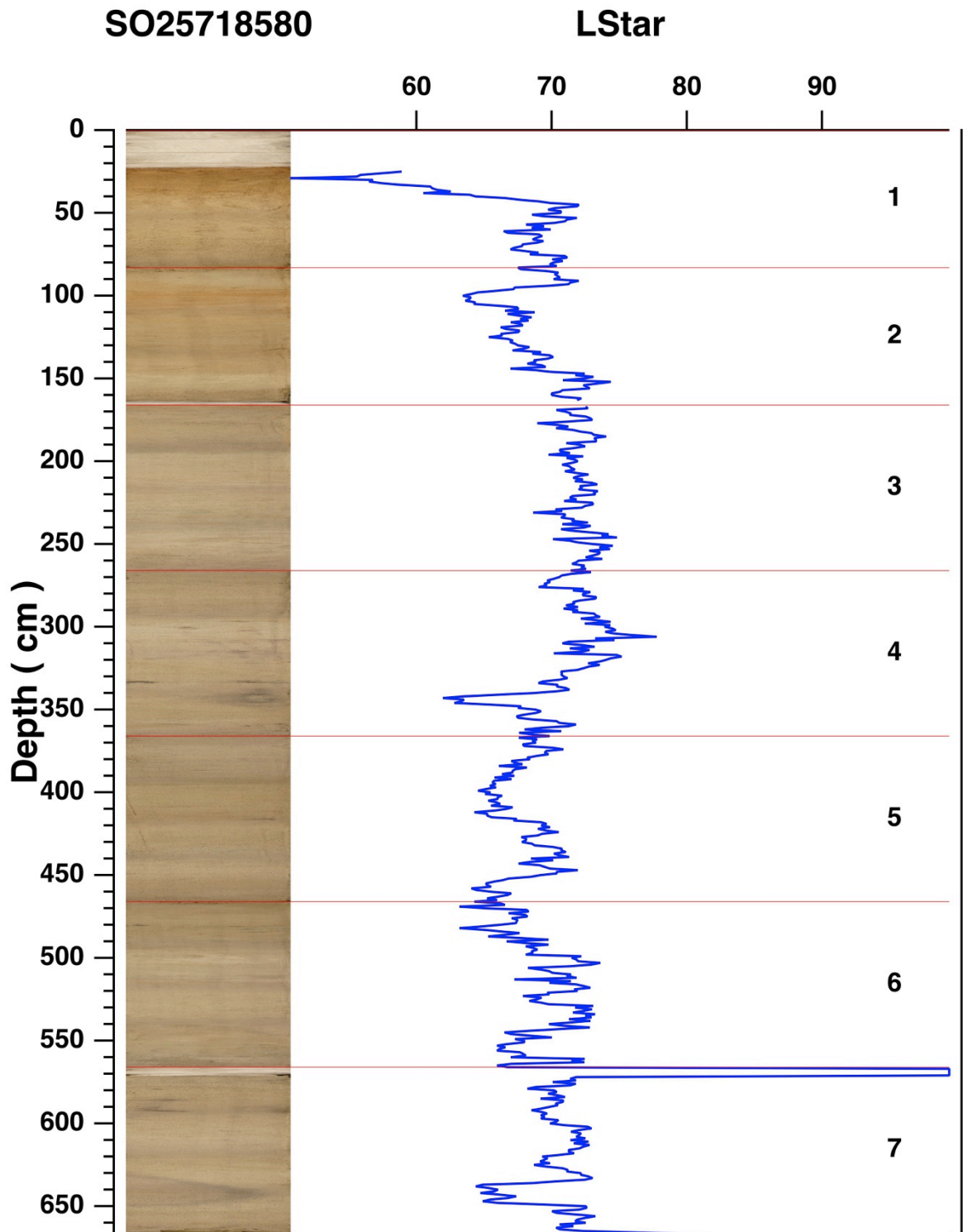
Date logged: May 30, 2017
Logged by: Alan Dillon, Steve Clemens
Ground: 1371.00 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSILLS	DISTURB.	DESCRIPTION
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LEGEND

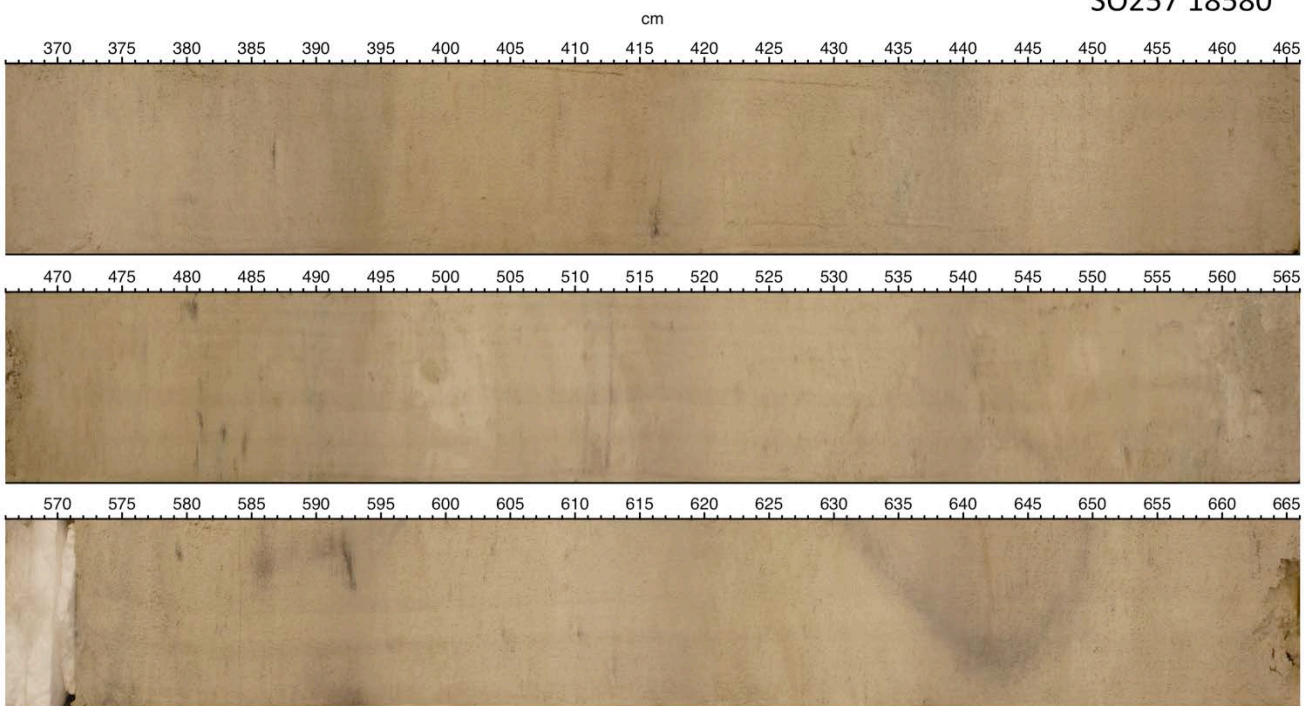
LITHOLOGY		
	Void	
	Nanno-Foram Ooze (CB3)	
CONTACTS		
	Bioturbated	
	Uncertain	
	Inclined	
PHYSICAL STRUCTURES		
	Dark spots	
	coarser patch	
	dark band	
	light band	
LITHOLOGIC ACCESSORIES		
	Shell Fragments	
	Pteropods	
	MOTTLED	
ICHTNOFOSSILS		
	Zoophycos	



SO257 18580



SO257 18580



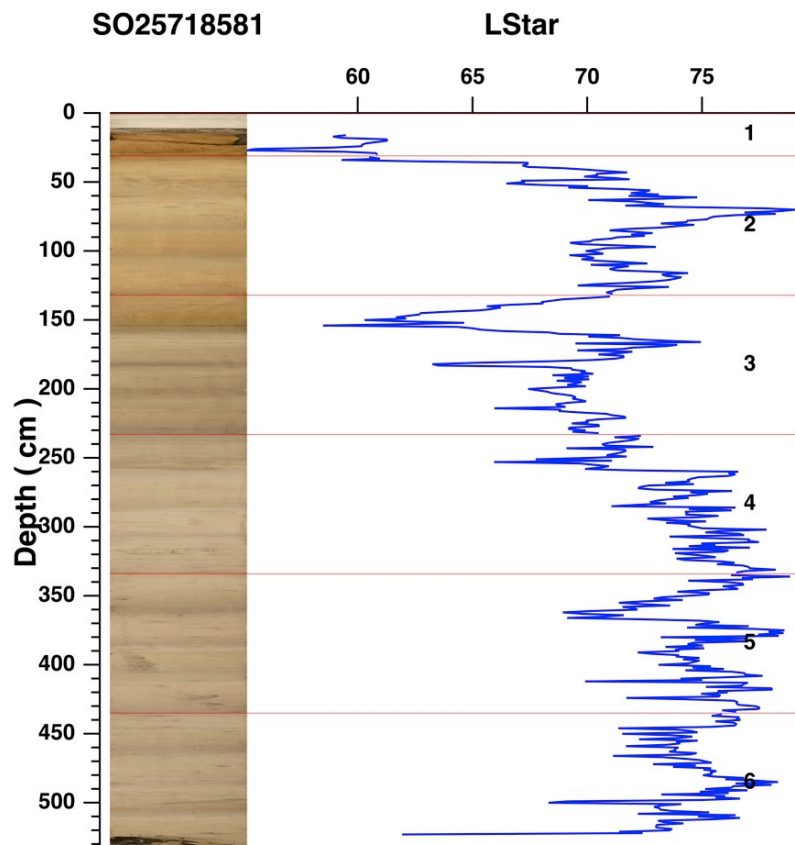
	18581			KL-1	
Date	2017 05 30	-	-	2017 05 30	-
Start (UTC)	06:20	-	-	06:36	-
Latitude (S)	25° 22,246'	-	-	25° 22,257'	-
Longitude (E)	111° 5,729'	-	-	111° 5,710'	-
Waterdepth (m)	1678,2	-	-	1680,8	-

KL 18581-1 (10 m)

Total length: 5,36 m

Number of sections: 6

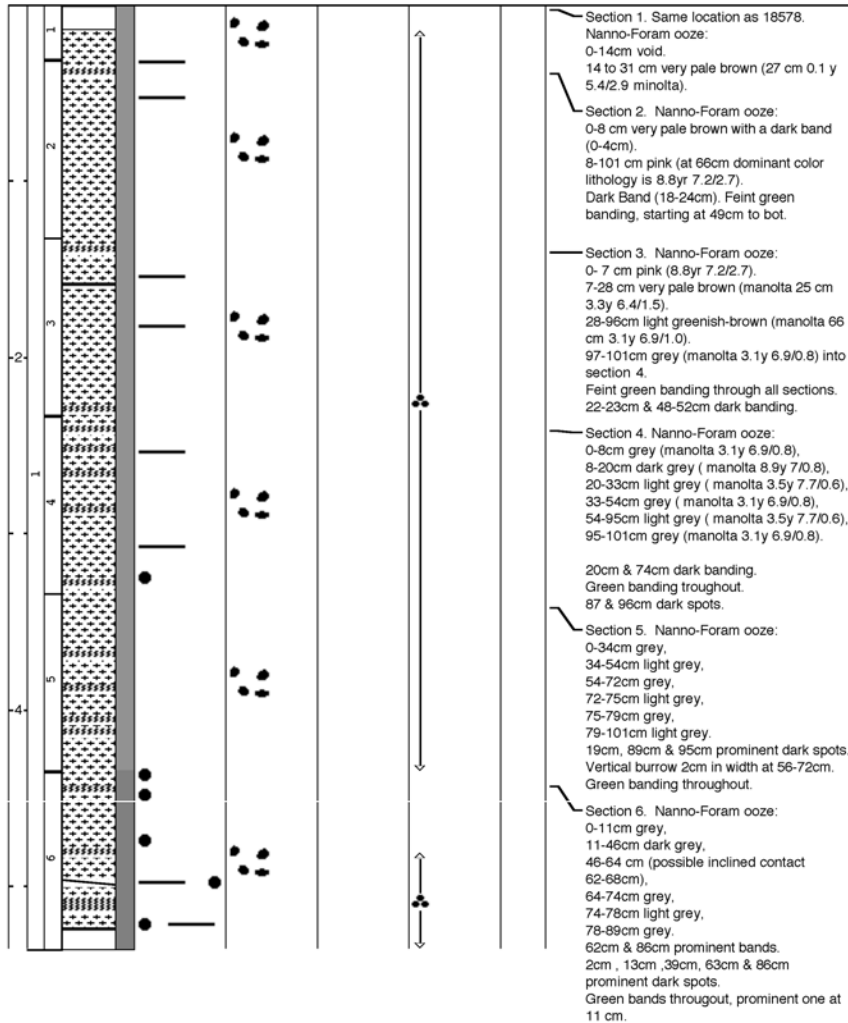
KL-Sections 1	0-31 cm
KL-Sections 2	31-132 cm
KL-Sections 3	132-233 cm
KL-Sections 4	233-334 cm
KL-Sections 5	334-435 cm
KL-Sections 6	435-536 cm



SO257 18581 PC
 25°22.2580'S, 111°5.7190'E

Date logged: May 30, 2017
 Logged by: Jan Schultz, Steve Clemens, Alan Dillon
 Ground: 1675.00 m KB: 0.00 m

METERS	CORE AND SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	DESCRIPTION
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LEGEND

LITHOLOGY

- Void
- ▨ Nanno-Foram Ooze (CB3)

CONTACTS

- Sharp
- ***** Bioturbated
- Inclined

PHYSICAL STRUCTURES

- - Dark spots
- - dark band

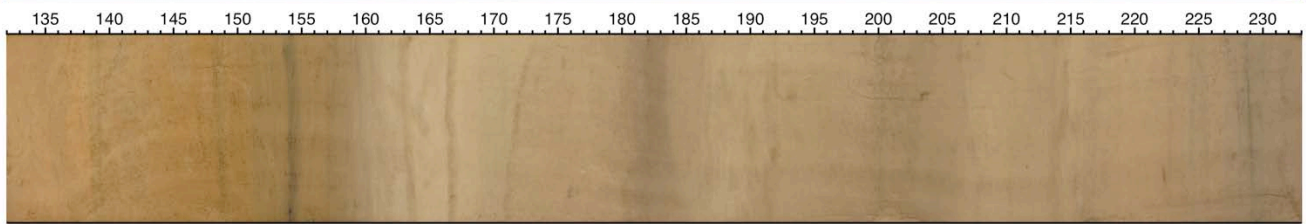
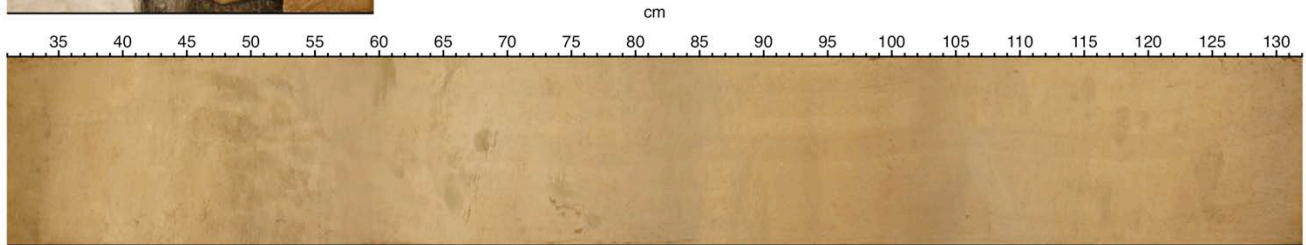
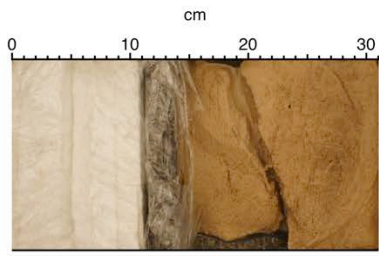
LITHOLOGIC ACCESSORIES

- ▨ - MOTTLED

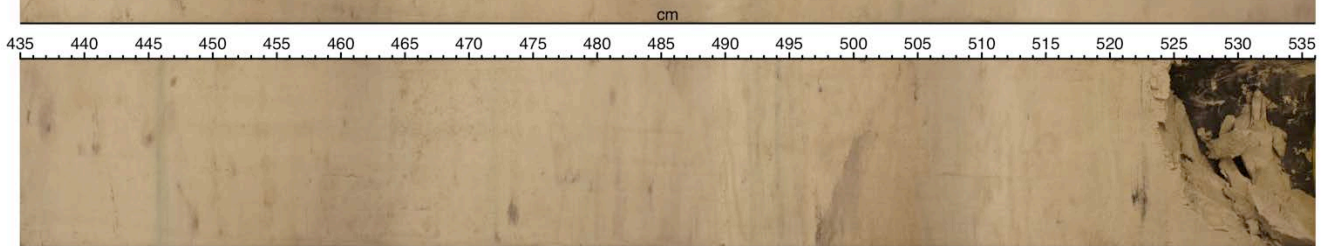
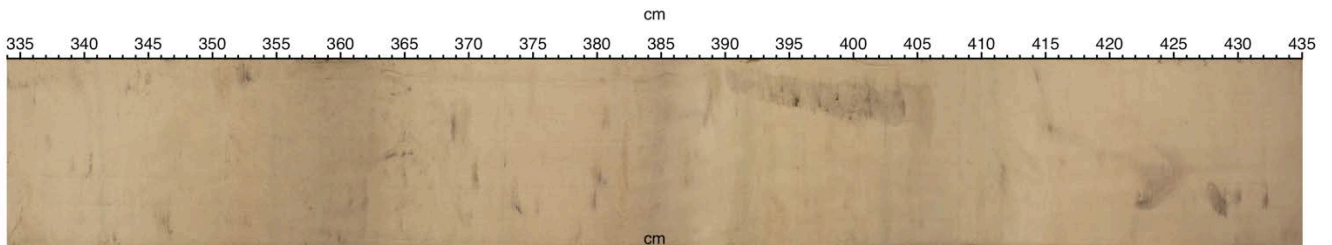
FOSSILS

- - Foraminifera (undifferentiated)

SO257 18581



SO257 18581



Station SO257-6-13**SO257-18582**

	18582		MUC-1		
Date	2017 05 30	-	2017 05 30	-	-
Start (UTC)	10:56	-	10:58	-	-
Latitude (S)	25° 53,894'	-	25° 53,896'	-	-
Longitude (E)	111° 22,327'	-	111° 22,325'	-	-
Waterdepth (m)	1548,5	-	1571,5	-	-

MUC 18582-1

9 of 12 tubes recovered

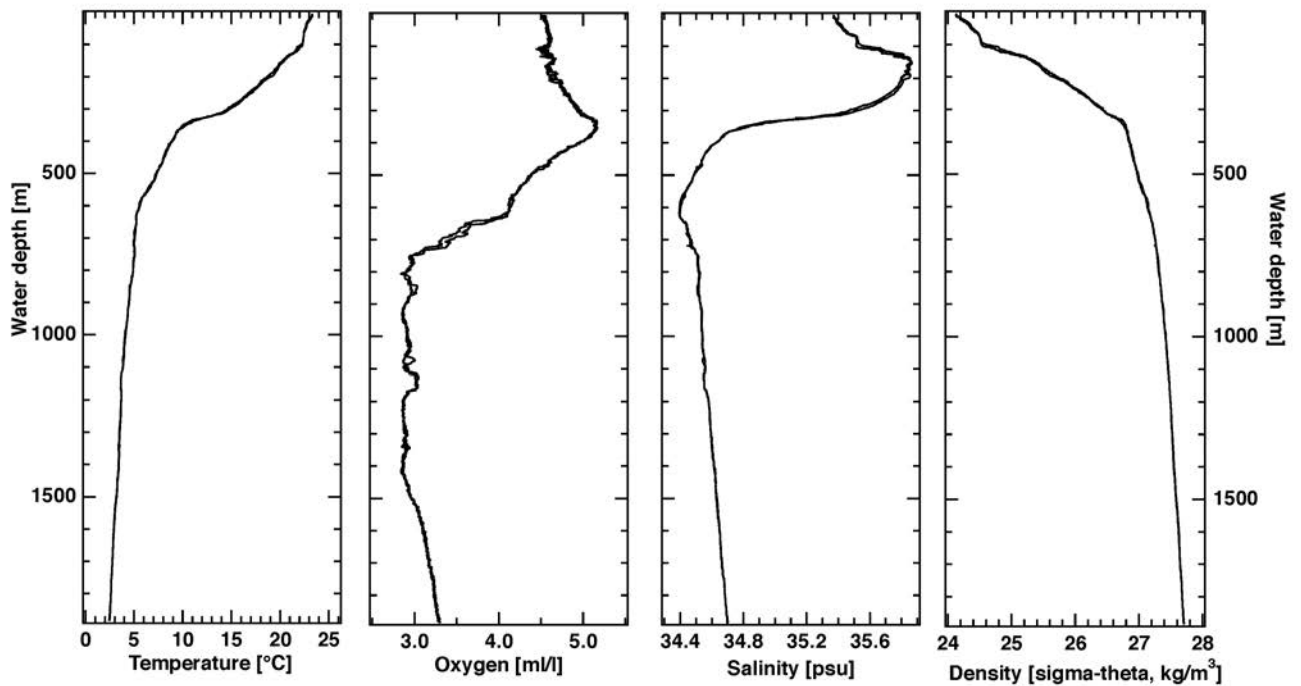
Recovery: 8-12,5 cm

	18583	CTD-1			
Date	2017 05 30	2017 05 30	-	-	-
Start (UTC)	21:57	21:58	-	-	-
Latitude (S)	27° 48,773'	27° 48,779'	-	-	-
Longitude (E)	112° 19,408'	112° 19,396'	-	-	-
Waterdepth (m)	1866,6	1873,3	-	-	-

CTD 18583-1

Water samples taken at (m): 1886, 1500, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 1886, 625, 150, 10



CTD profiles of station 18583

Station SO257-7-2**SO257-18584**

	18584		MUC-1		
Date	2017 05 31	-	2017 05 31		
Start (UTC)	01:17	-	01:20		
Latitude (S)	27° 46,188'	-	27° 46,182'		
Longitude (E)	112° 25,222'	-	112° 25,228'		
Waterdepth (m)	1122,0	-	1121,1		

MUC 18584-1

8 of 12 tubes recovered

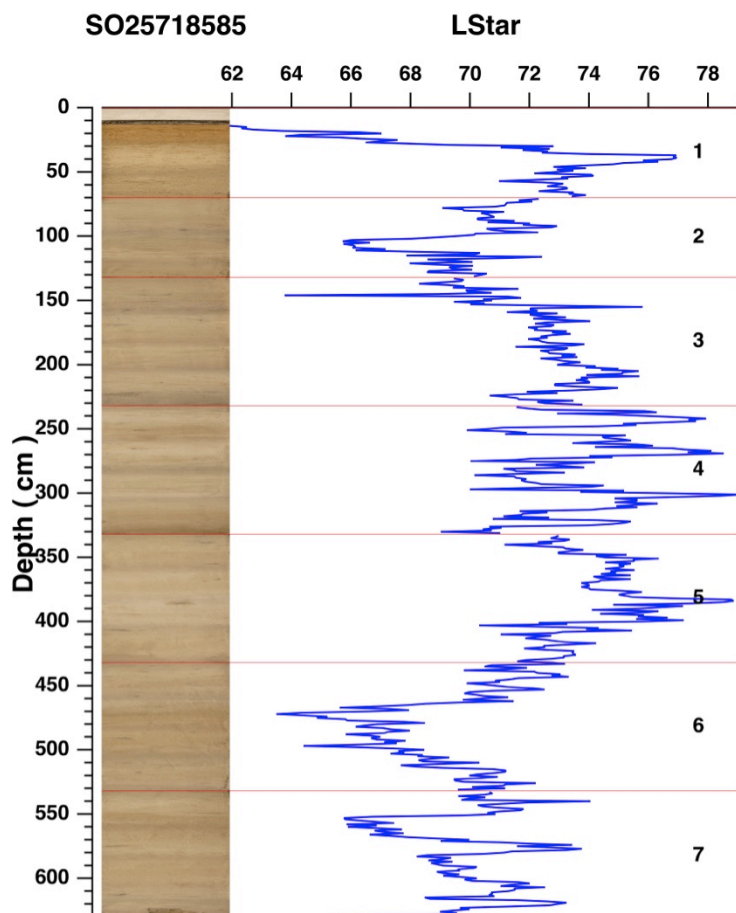
Recovery: 4-12 cm

	18585		MUC-1	KL-2	
Date	2017 05 31	-	2017 05 31	2017 05 31	-
Start (UTC)	07:20	-	07:22	08:36	-
Latitude (S)	27° 15,375'	-	27° 15,369'	27° 15,323'	-
Longitude (E)	112° 2,214'	-	112° 2,210'	112° 2,175'	-
Waterdepth (m)	1180,4	-	1182,7	1181,8	-

MUC 18585-1, 12 of 12 tubes recovered, Recovery: 9-12 cm

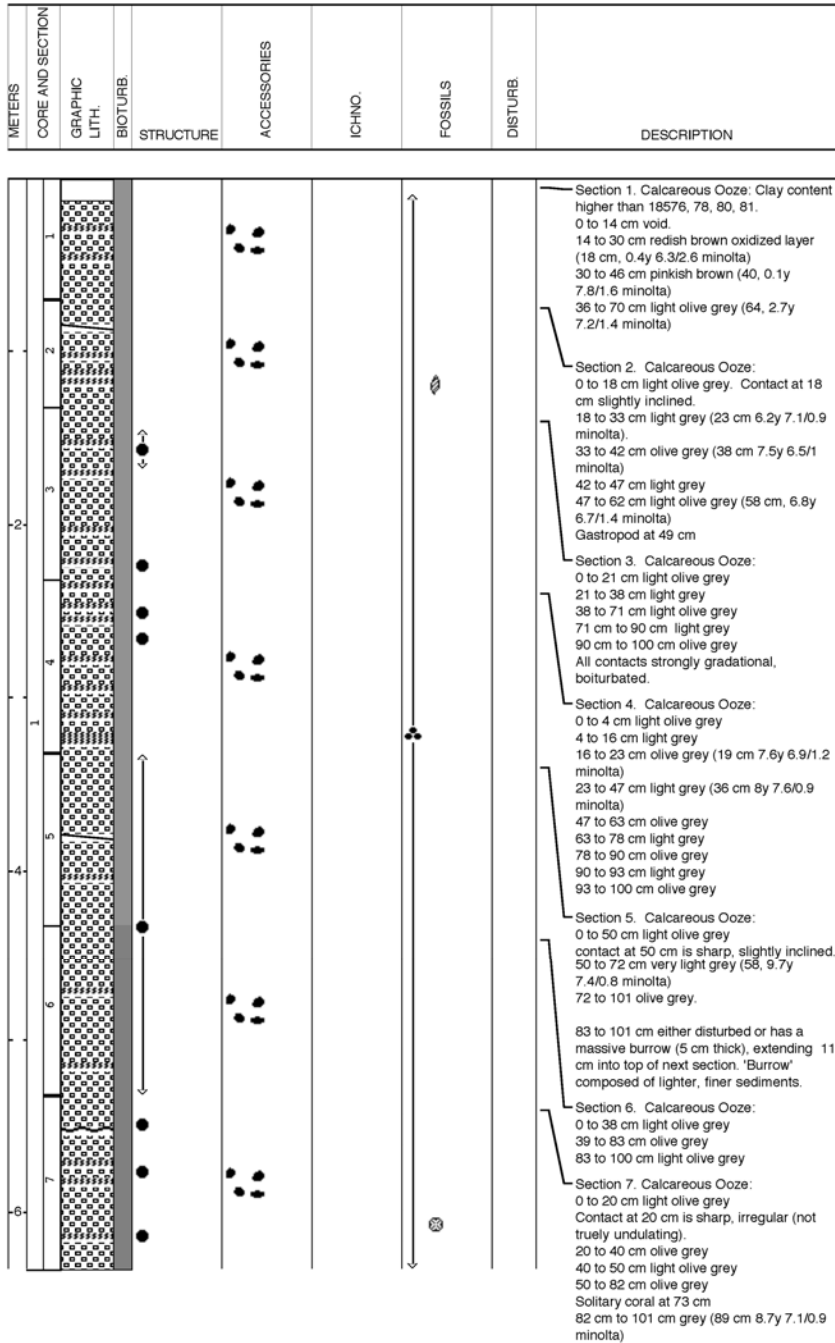
KL 18583-2 (10 m), Total length: 6,33 m, Number of sections: 7

KL-Sections 1	0-70 cm
KL-Sections 2	70-132 cm
KL-Sections 3	132-232 cm
KL-Sections 4	232-332 cm
KL-Sections 5	332-432 cm
KL-Sections 6	432-532 cm
KL-Sections 7	532-633 cm



SO257 18585 PC
 27°15.3250'S, 112°2.1770'E

Date logged: May 31, 2017
 Logged by: Steve Clemens, Alan Dillon
 Ground: 1179.70 m KB: 0.00 m



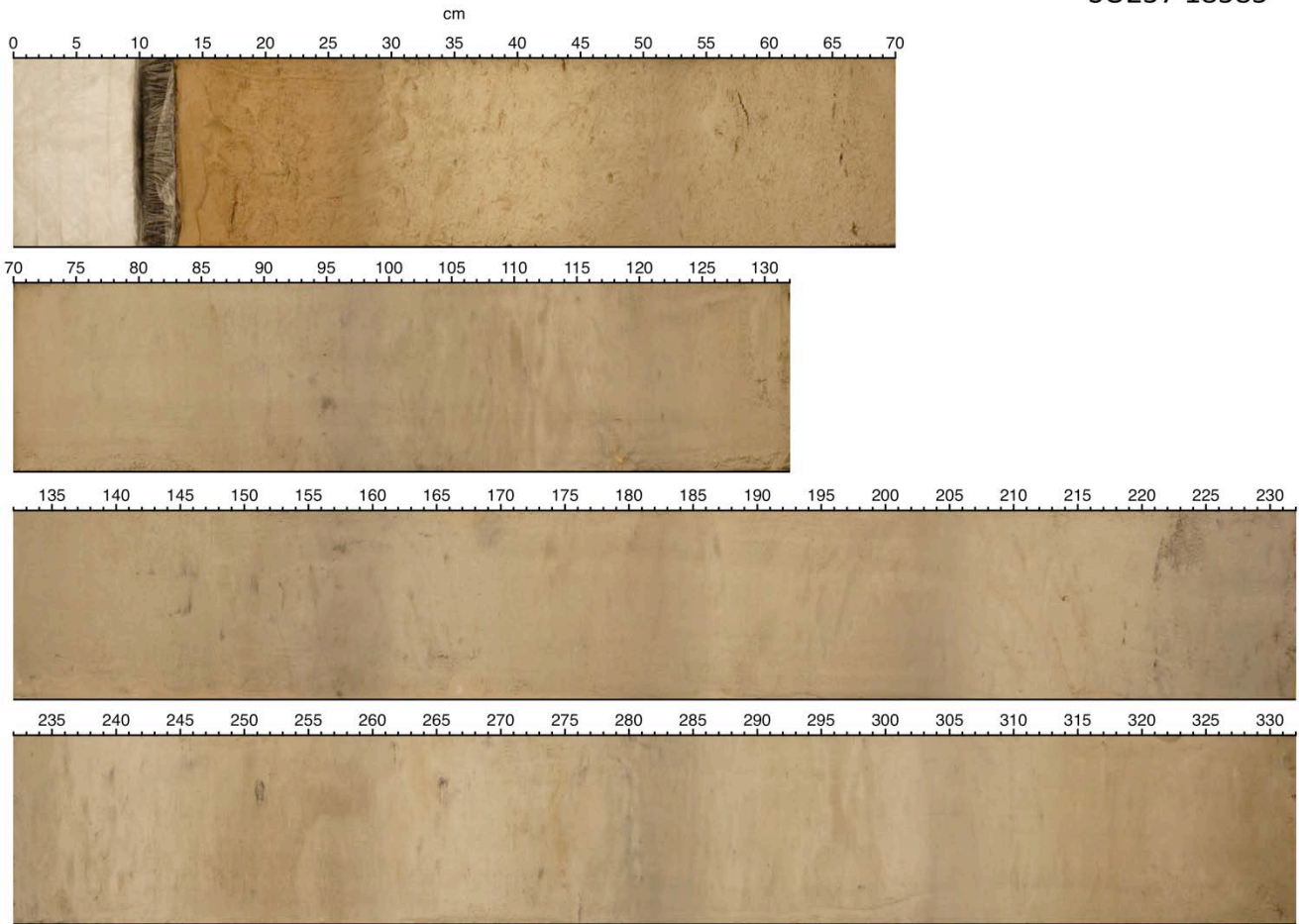
LEGEND

LITHOLOGY	
[Box] Void	[Pattern] Calcareous Ooze (CB4)
CONTACTS	
***** Bioturbated	~ Undulating
	— Inclined
PHYSICAL STRUCTURES	
• Dark spots	
LITHOLOGIC ACCESSORIES	
•• MOTTLED	
FOSSILS	
⊗ Corals (solitary)	•• Foraminifera (undifferentiated)
	☐ Gastropods

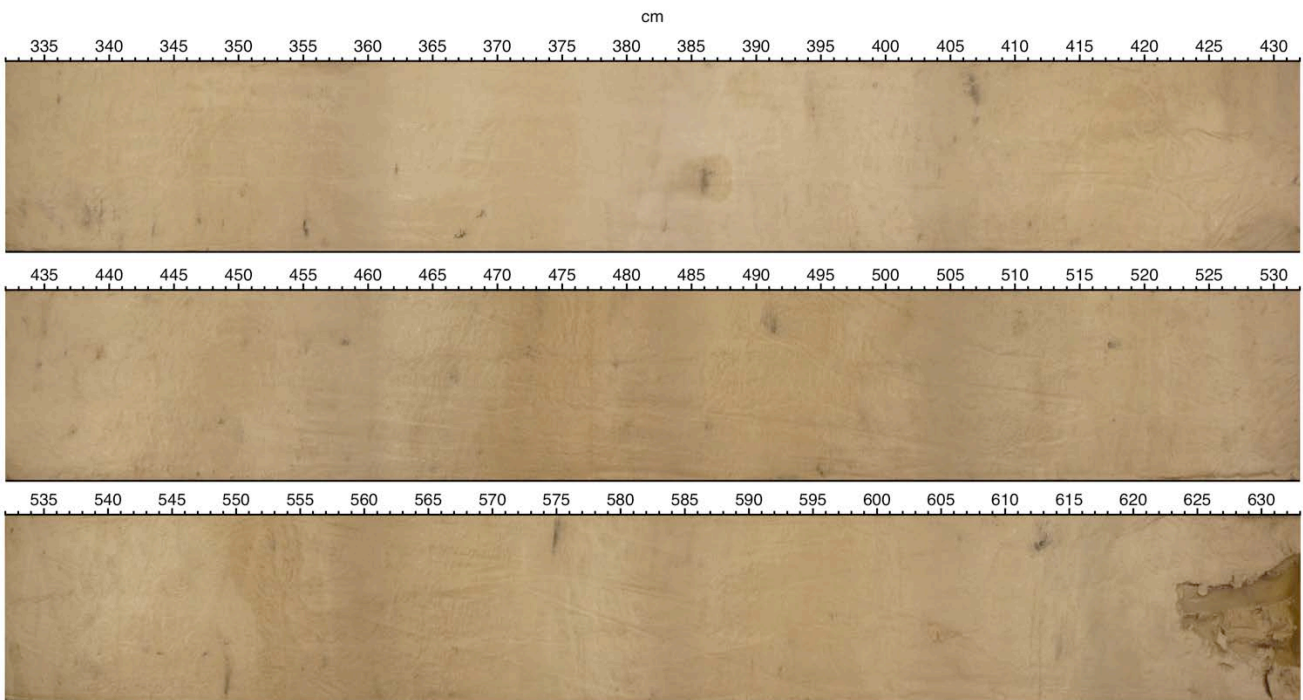
Station SO257-7-3,4

SO257-18585

SO257 18585



SO257 18585



Station SO257-7-6**SO257-18586**

	18586		MUC-1		
Date	2017 06 01	-	2017 06 01	-	-
Start (UTC)	02:00	-	02:22	-	-
Latitude (S)	28° 8,508'	-	28° 8,509'	-	-
Longitude (E)	112° 38,036'	-	112° 38,035'	-	-
Waterdepth (m)	1011,9	-	1014,6	-	-

MUC 18586-1

6 of 12 tubes recovered

Recovery: 6,5-10,5 cm

Station SO257-7-7**SO257-18587**

	18587		MUC-1		
Date	2017 06 01	-	2017 06 01	-	-
Start (UTC)	07:16	-	07:18	-	-
Latitude (S)	28° 7,700'	-	28° 7,712'	-	-
Longitude (E)	112° 56,273'	-	112° 56,258'	-	-
Waterdepth (m)	799,7	-	797,8	-	-

MUC 18587-1

12 of 12 tubes recovered

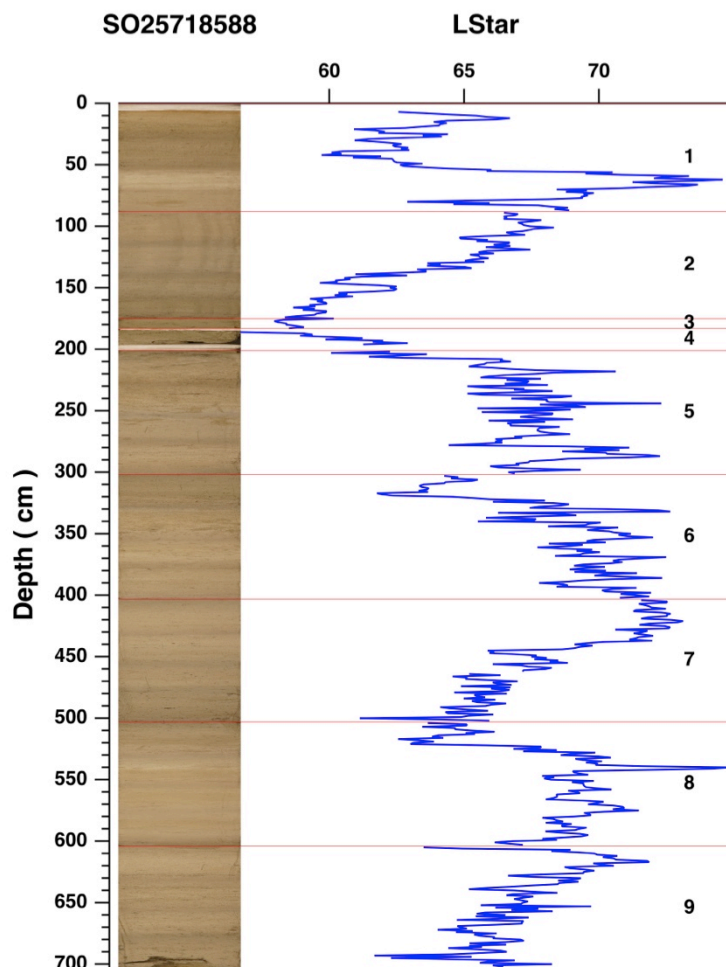
Recovery: 12-14 cm

	18588		MUC-1	KL-2	
Date	2017 06 02	-	*	*	-
Start (UTC)	00:27	-	00:28	01:32	-
Latitude (S)	28°23,082'	-	28°23,085'	28°23,080'	-
Longitude (E)	113°0,996'	-	113°0,992'	113°0,993'	-
Waterdepth (m)	811,4	-	810,2	810,1	-

MUC 18588-1, 7 of 12 tubes recovered, Recovery: 7-11 cm

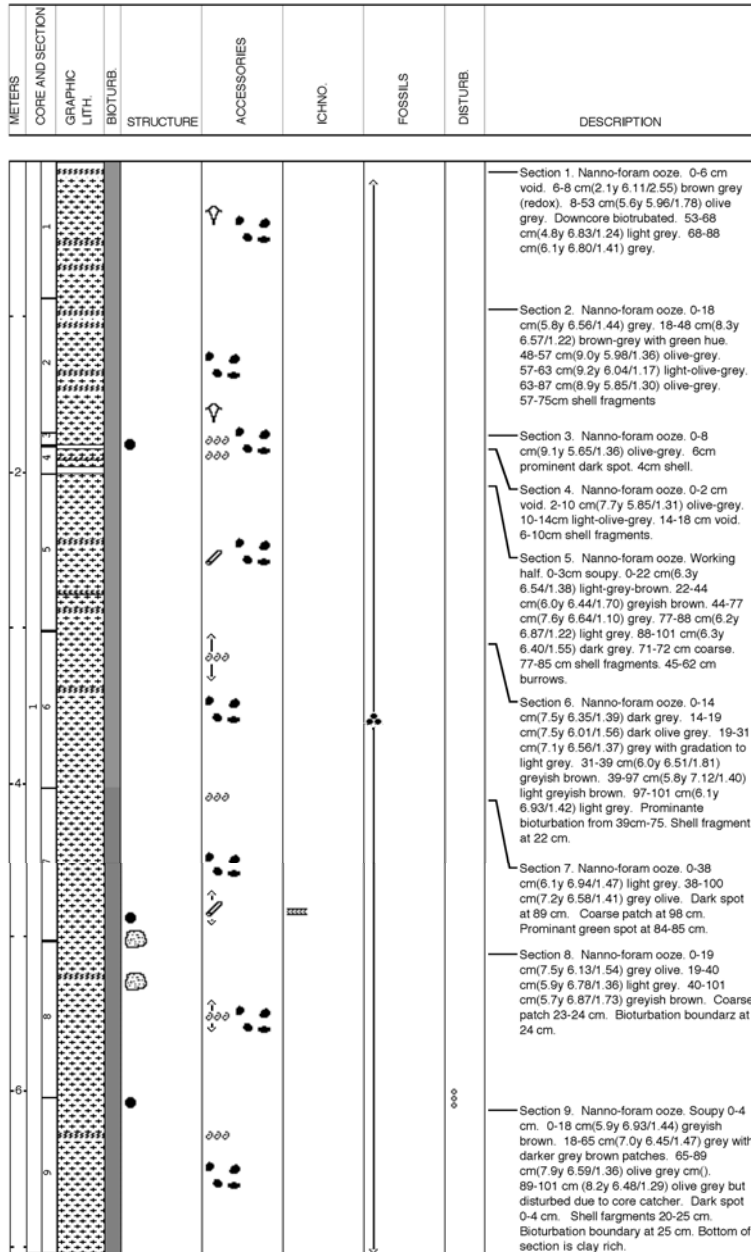
KL 18588-2 (10 m), Total length: 7,05 m, Number of sections: 9

KL-Sections 1	0-88 cm
KL-Sections 2	88-175 cm
KL-Sections 3	175-183 cm
KL-Sections 4	183-201 cm
KL-Sections 5	201-302 cm
KL-Sections 6	302-403 cm
KL-Sections 7	403-503 cm
KL-Sections 8	503-604 cm
KL-Sections 9	604-705 cm



SO257 18588 PC
 28°23.0800'S, 113°0.9960'E

Date logged: June 2, 2017
 Logged by: Alan Dillon, Steve Clemens
 Ground: 812.10 m KB: 0.00 m



LEGEND

LITHOLOGY

- ☐ Void
- [Pattern] Nanno-Foram Ooze (CB3)
- [Pattern] Calcareous Ooze (CB4)

CONTACTS

***** Bioturbated

PHYSICAL STRUCTURES

- - Dark spots
- [Pattern] - coarser patch

LITHOLOGIC ACCESSORIES

- ☐☐☐ - Shell Fragments
- ☐☐☐ - MOTTLED
- [Pattern] - Undefined burrow
- ☐ - Pteropods

ICHOFOSSILS

||||| - Zoophycos

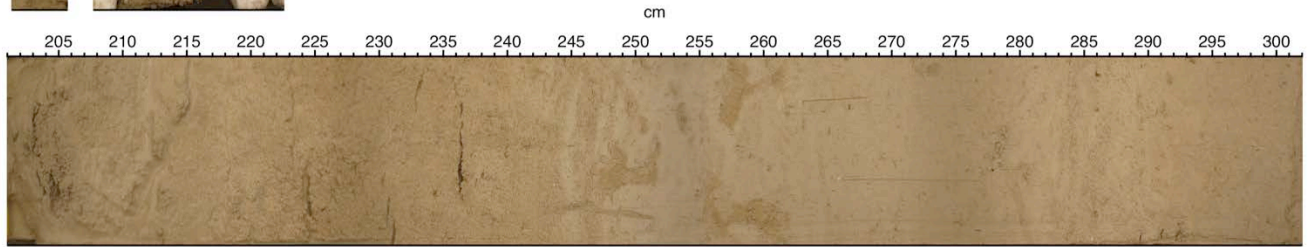
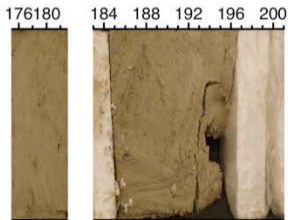
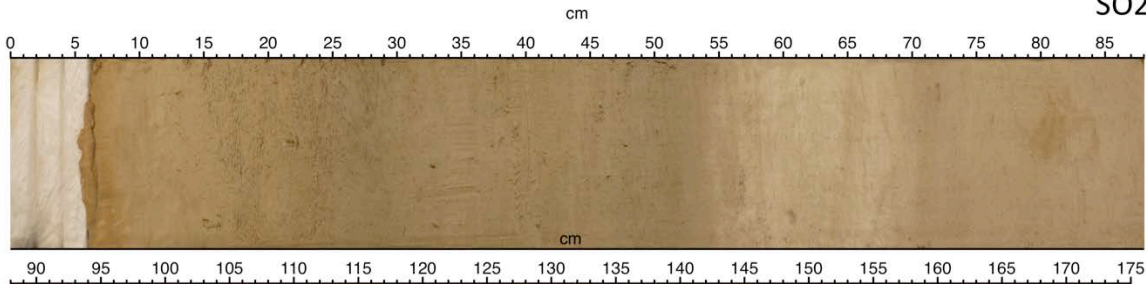
FOSSILS

☐☐☐ - Foraminifera (undifferentiated)

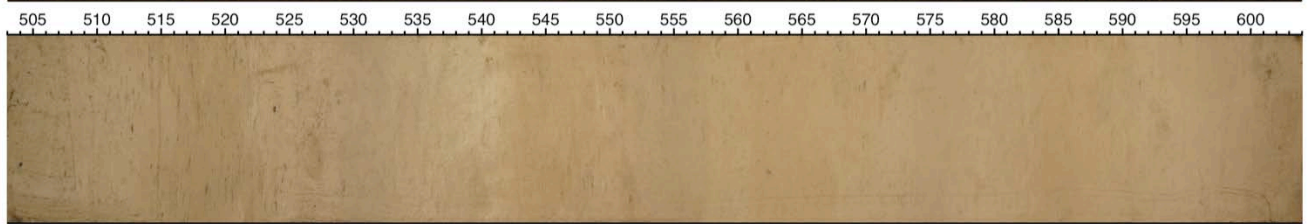
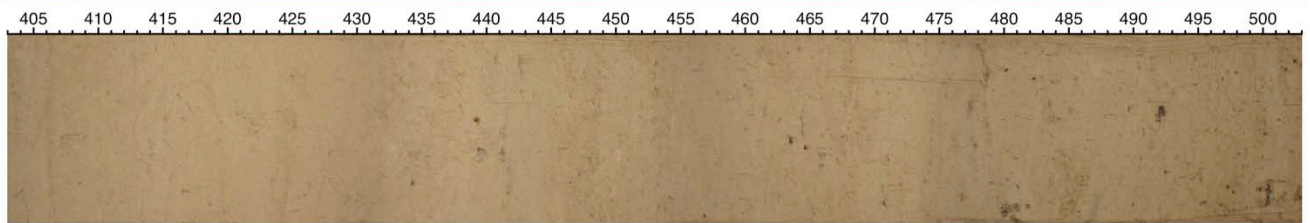
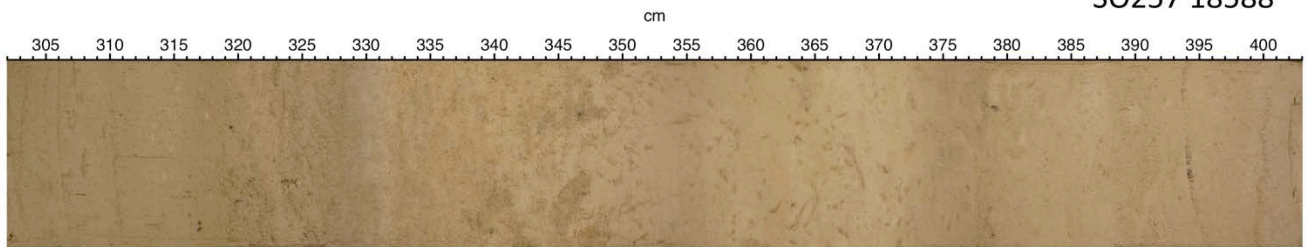
CORE DISTURBANCE

☐☐☐ - Soupy

SO257 18588



SO257 18588

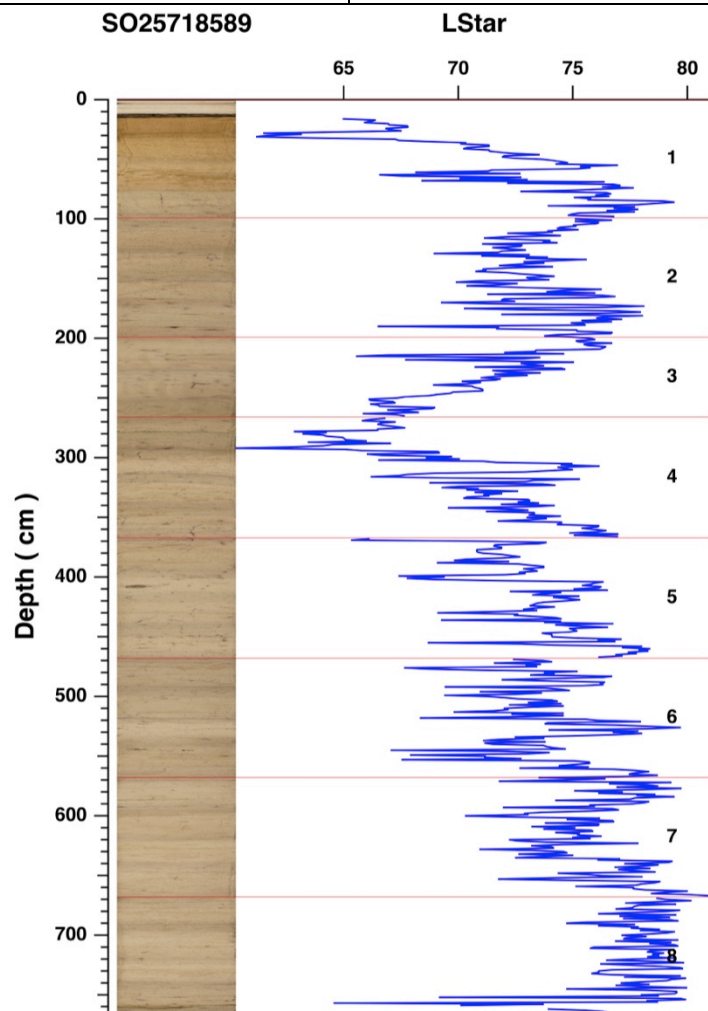


	18589		MUC-1	KL-2	
Date	2017 06 02	-	*	*	-
Start (UTC)	06:47	-	06:49	08:39	-
Latitude (S)	28°58,025'	-	28°58,032'	28°58,073'	-
Longitude (E)	112°52,621'	-	112°52,602'	112°52,564'	-
Waterdepth (m)	2484,6	-	2485,8	2732,1	-

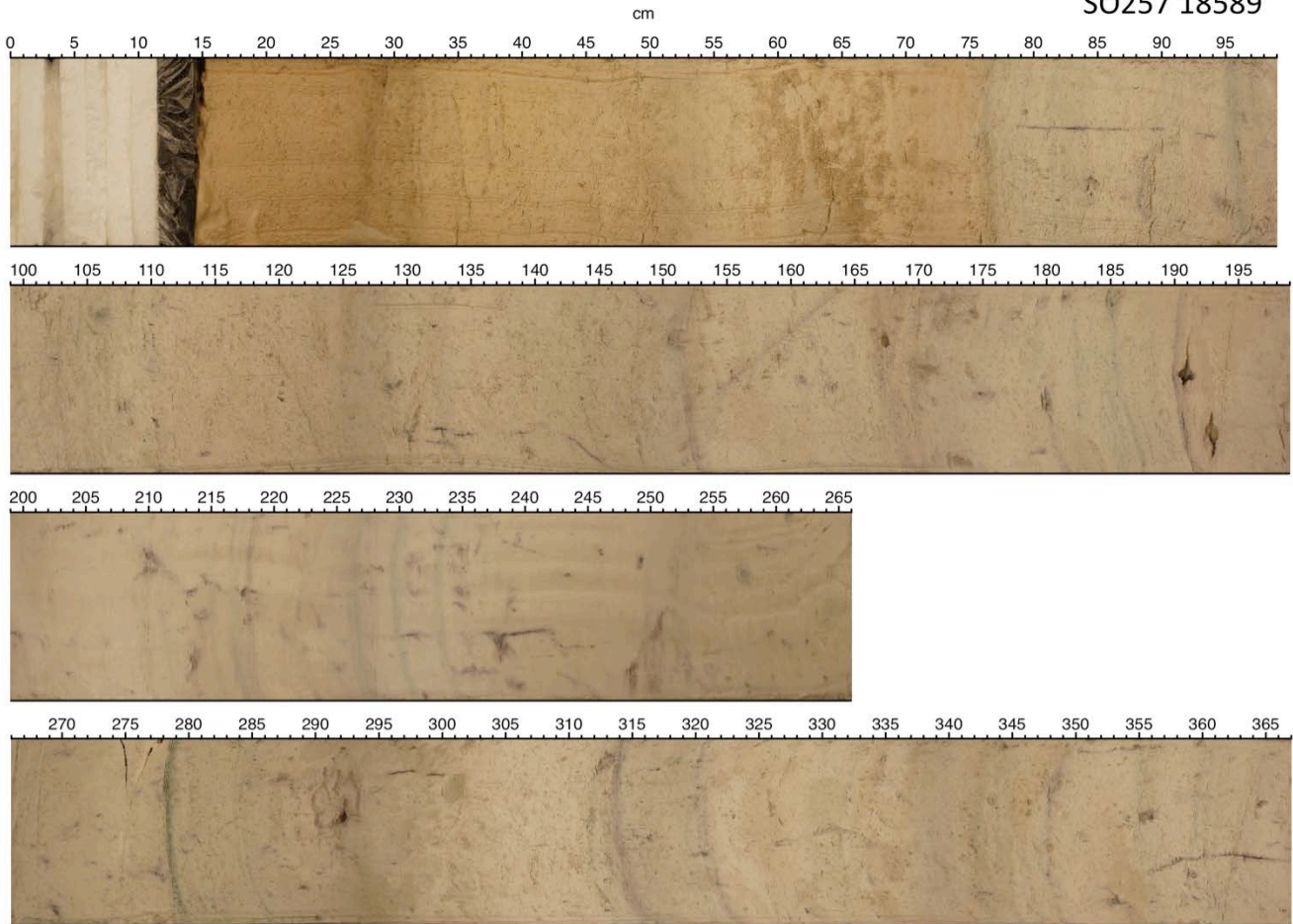
MUC 18589-1, 9 of 12 tubes recovered, Recovery: 7,5-11,5 cm

KL 18589-2 (10 m), Total length: 7,69 m, Number of sections: 8

KL-Sections 1	0-99cm
KL-Sections 2	99-199 cm
KL-Sections 3	199-266 cm
KL-Sections 4	266-367 cm
KL-Sections 5	367-468 cm
KL-Sections 6	468-568 cm
KL-Sections 7	568-668 cm
KL-Sections 8	668-769 cm



SO257 18589



SO257 18589

cm

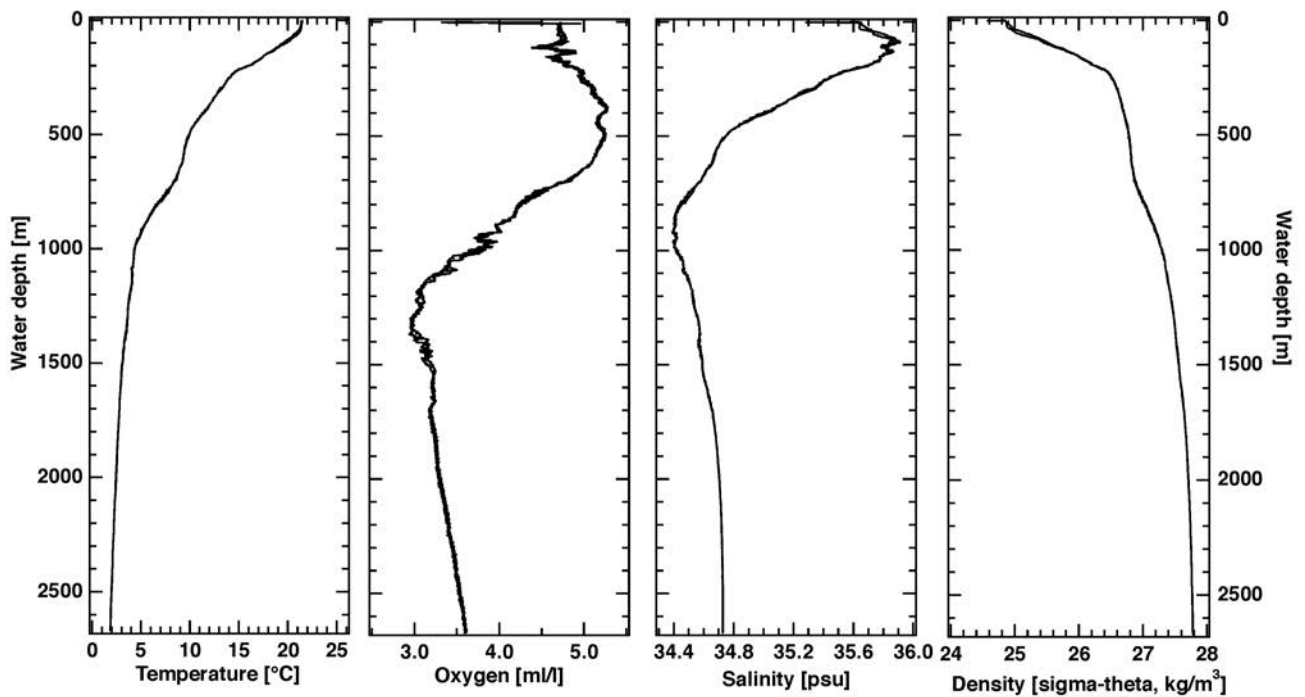


	18590	CTD-1			
Date	2017 06 02	*	-	-	-
Start (UTC)	13:14	13:18	-	-	-
Latitude (S)	29°18,686'	29°18,700'	-	-	-
Longitude (E)	113°6,282'	113°6,289'	-	-	-
Waterdepth (m)	2648,6	2642,6	-	-	-

CTD 18590-1

Water samples taken at (m): 2665, 1500, 900, 500, 300, 250, 200, 150, 100, 50, 20, 10, 5

Water samples for Neodymium taken at (m): 2665, 900, 100, 10

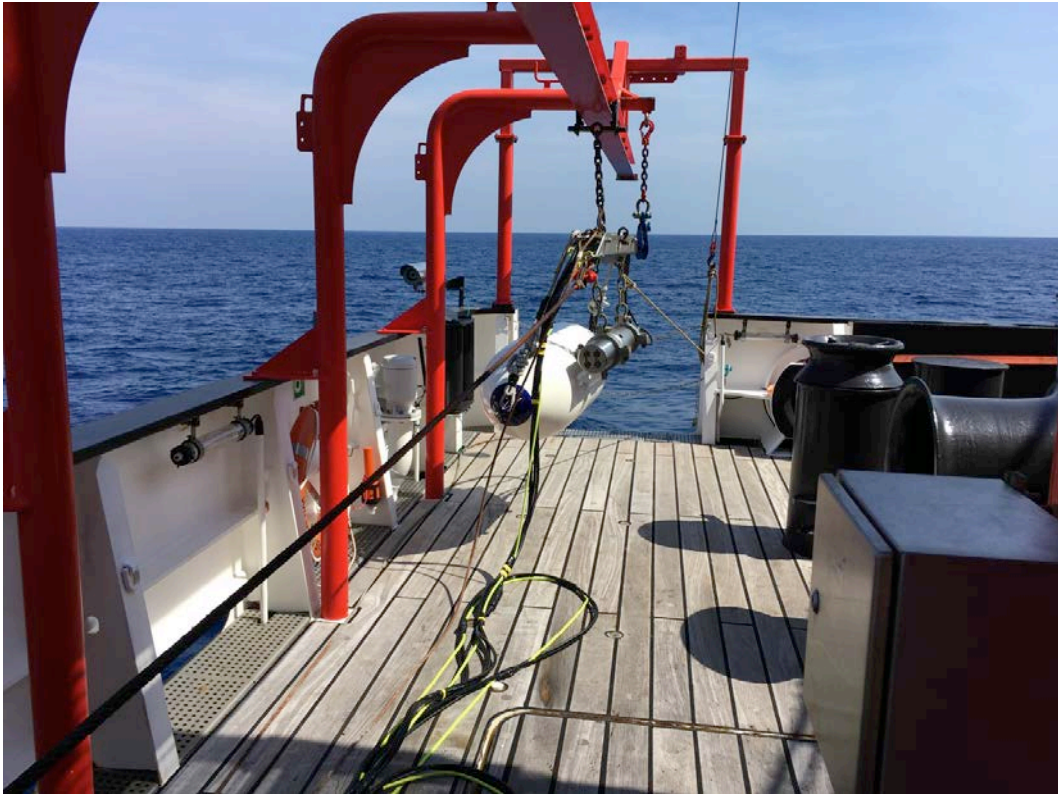


CTD profiles of station 18590

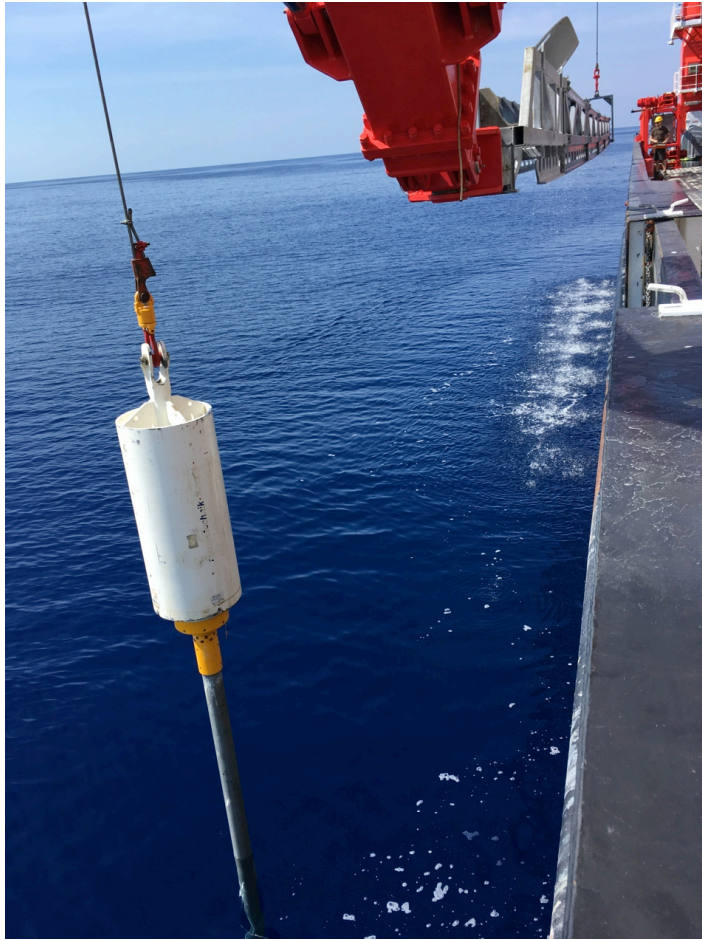
Appendix F

***Selected pictures from Shipboard Operations / ausgewähltes
Bildmaterial von Bord***





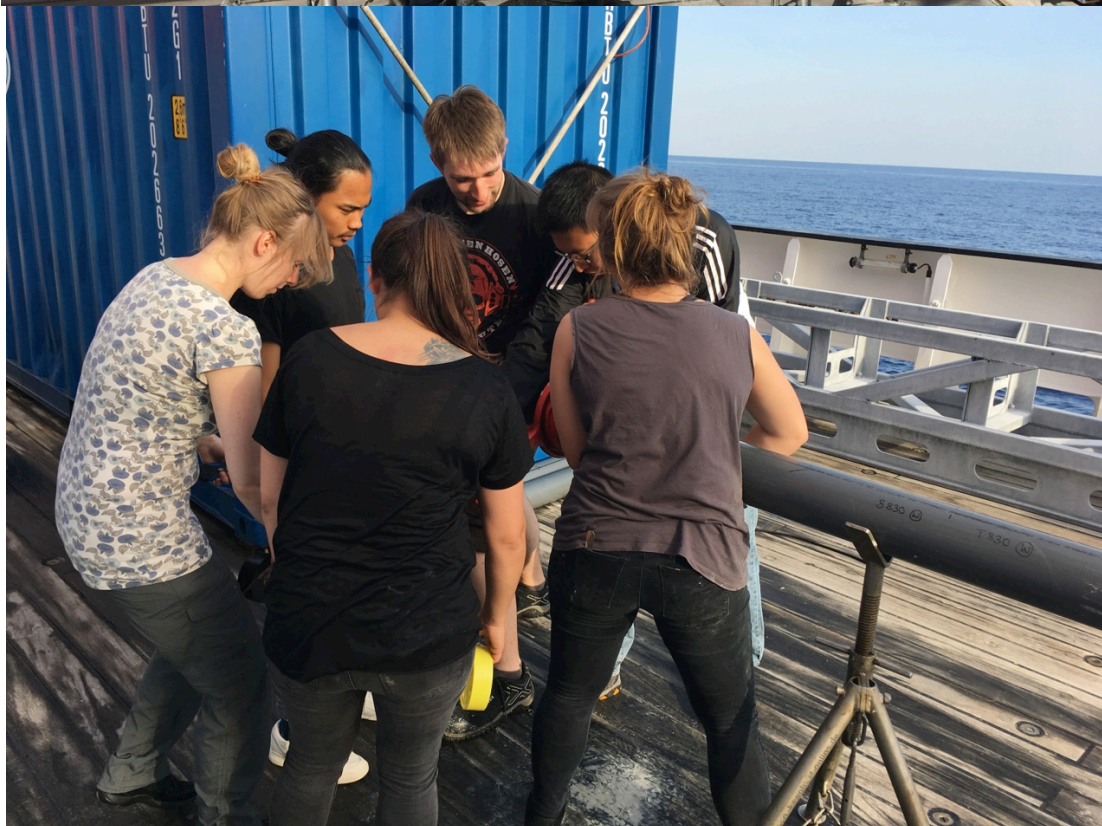
Airgun before deployment at the heck of R/V Sonne



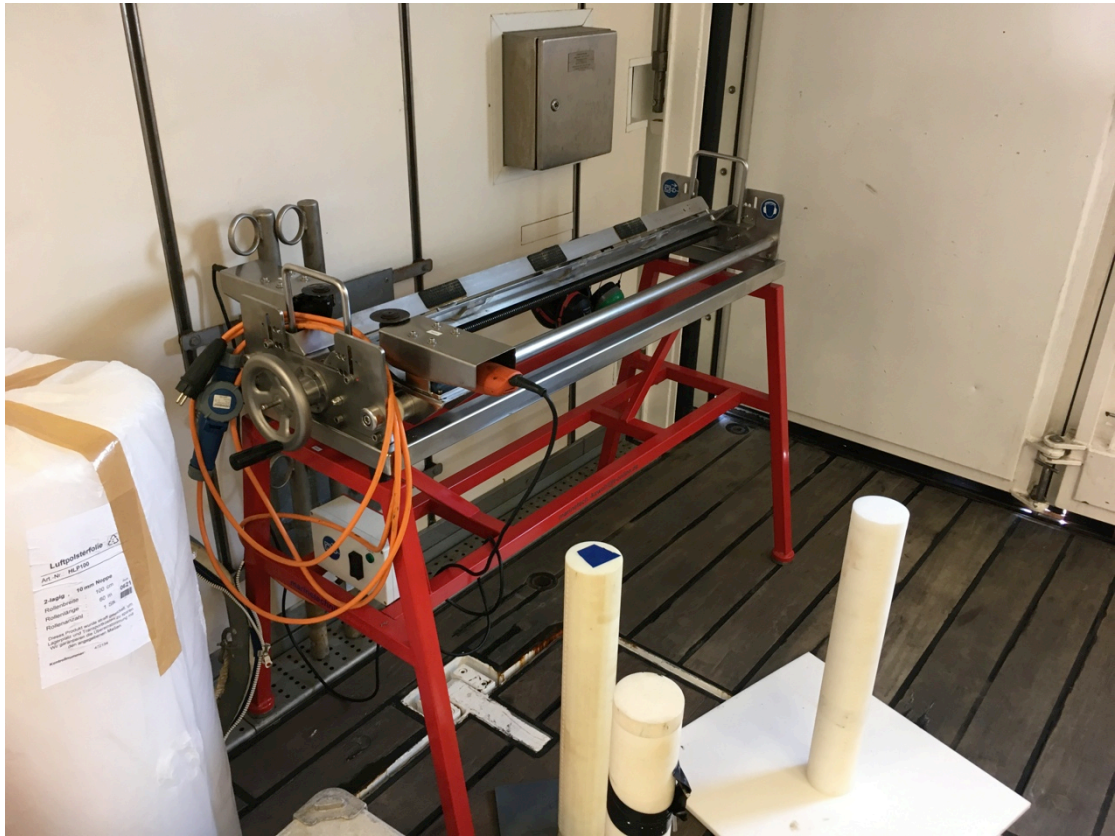
Deployment gravity corer



Pilot core of piston coring system. Gravity corer after retrieval with insufficient penetration resulting in bent core barrel ("banana")



Cutting of gravity and piston core liners on working deck of R/V Sonne

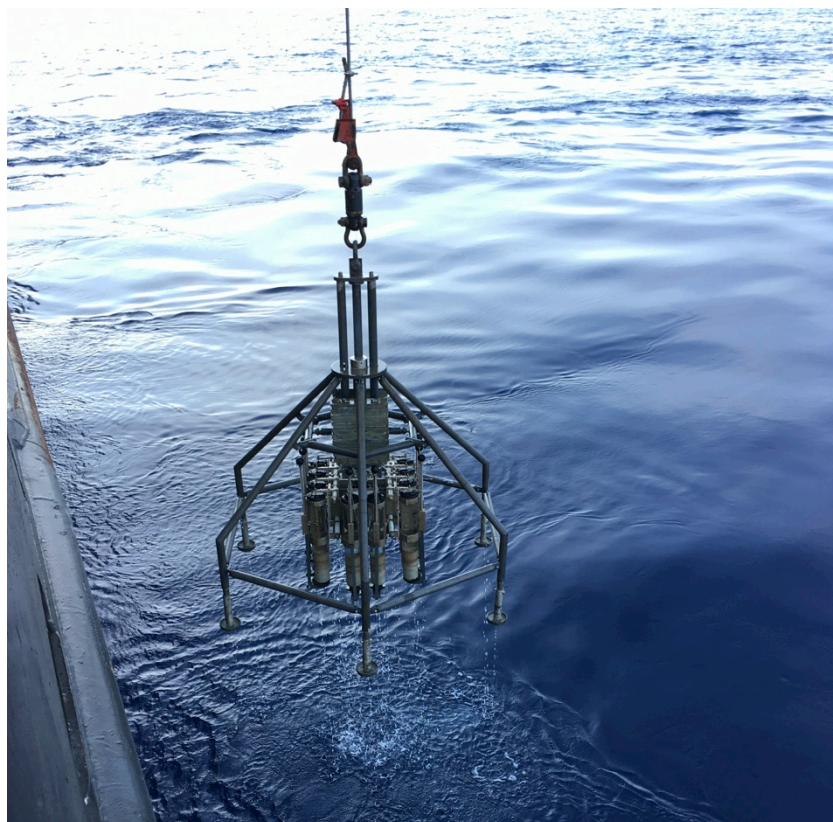




Core splitting



Multicorer and spade box corer ready for deployment on working deck



Multicorer retrieval





Harvesting the multicorer



The multicore processing "factory"



Spade box corer ready for deployment



Visual core description and smear slide sampling



Manual measuring of spectrophotometry



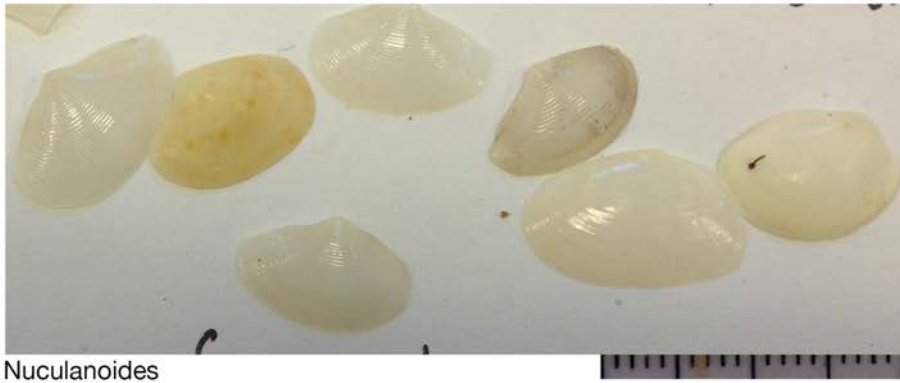
Setup of core description and correlation lab

Appendix E

**Selected Pictures of samples / ausgewähltes Bildmaterial der
Beprobung**



Box core 18563-1 surface



Nuculanoides



Pectinidae



Turritinellidae



Fascioliidae



Cassidae

Figure 7-5-1. Typical mollusk shells in box core 18563-1