Table S1

Lithofacies association	Depth (mbs)	Description
LFa-1	18.47-16.47	Lowermost facies comprising irregular laminations of carbonates and detritus this lithofacies association can be divided into three subfacies (LFa-1a, 1b and 1c)
LFa-1a and	18.47-17.00	Characterized by irregular laminations and beds of dark grey (2.5Y/4/1) and grey (2.5Y/5/1) silty clay and occasional carbonate-rich laminations. Thicker laminations and beds appear massive and have sharp upper and lower contacts. The interval is characterised by average values of total organic carbon (TOC) and calcium carbonate ($CaCO_3$) of 7.3% (1σ = 1.93) 30.7% (1σ = 14.5) respectively; $CaCO_3$ exhibits an increasing trend through the interval (30-60%).
LFa-1b moderately-sparitic	17.00-16.90	Comprised of grey silt-clay (5Y/5/1) with a massive structure and sharp upper and lower contacts. It is characterised by decreases in average values of TOC to 1-2% and increase in the clay-sized particle size fraction. At the microscale, the sub-facies is massive, poorly sorted clay to very-fine sand sized quartz grains with inclusions of reworked calcite crystals
LFa-1c (<1mm) 7.5% (1σ regular organic sized mineral	16.90-16.47	Similar in nature to LFa-1a, however the laminations become more regular and finer and carbonate-rich laminations become more frequent. Average values of TOC are = 1.4) and $CaCO_3$ are 52.0% (1σ = 7.48). At the microscale, the sub-facies exhibit alternations of organo-clastic laminations comprising particulate/fine-grained material, micritic and microspar calcite crystals and fine-sand to medium-silt grains, and pure micritic calcite laminations, with sharp upper and lower contacts.
LFa-2 alternations silt-clay contacts is	16.47-12.00	Characterised by thin regular laminations comprising at the macroscale of distinct of light yellowish brown (2.5Y/6/3) carbonate-rich and greyish brown (10YR/5/2) laminations. Laminations appear massive and the nature of the upper and lower indiscernible. Average TOC is 7.1% (1σ = 1.74) and $CaCO_3$ is 49.3% (1σ = 9.22).
LFa-3	12.00-4.10	LFa-3 is comprised of deformed and rotated blocks of laminated sediments with a similar sedimentary structure to LFa-2, ranging from mm to cm scale in size, with the matrix

between continuous thicker than (1σ =		blocks composed of massive dark grey (2.5Y/4/1) silty-clay. There are sections of carbonate-rich, laminated sediments (7.50 – 6.67m and 5.20 – 4.10m), which are LFa-2, and faulted, convoluted and discontinuous in places. Average TOC is 10.64% 1.42) and $CaCO_3$ is 49.6% (1σ = 5.64).
LFa-4 (a-c)	4.10-1.35	*LFa-4a (4.10-3.15m)* represents a return to in-situ laminated sediments. It comprises massive laminations of grey (2.5Y/6/1) and dark-grey (2.5Y/4/1) silt clay with sharp upper and lower contacts, with thin yellow-brown (2.5Y/6/3) carbonate-rich laminations. TOC (average = 4.8%) and $CaCO_3$ (average = 22.2%) are lower than the underlying lithofacies. *LFa-4b (3.15-2.11m)* is comparable to LFA-4a but with beds of compacted silty-clay, carbonate and particulate organic material fragments. These beds exhibit increases in both TOC (7-10%) and $CaCO_3$ (25-30%). LFa-*4c (2.11-1.35m)* is characterised by the presence heavily iron-stained laminations and the decrease in frequency of calcitic laminations; these are absent above 1.6m.
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LFa-5	1.35-0.98	Comprised of regular alternating laminations and beds of dark-grey silt (2.5Y/4/2) and olive grey silt-clay (5Y 5/2), with either massive- normally graded structures with sharp upper contacts and frequently loaded lower contacts. These continue with increasing altitude as distinct sets of thick graded silt laminations succeeded by very fine, medium to fine silt laminations and capped by a distinctive black (2.5Y 2.5/1) clay lamination. The structures, where observed in the brickpit, dip ENE at 8°. Rare pods (10 x 10mm) of organic material within the laminated sediments. Average $CaCO_3$ is 18.2% (decreasing through the unit) and TOC is 1.3%.
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