Operation summary

Hole C0006B

Latitude: 33°01.6350’N

Longitude: 136°47.6390’E

Seafloor (drill pipe measurement from rig floor, m): 3900

Distance between rig floor and sea level (m): 28.5

Water depth (drill pipe measurement from sea level, m): 3871.5

Logging run

LWD(geoVISION-sonicVISION-adnVISION(caliper-only mode)-seismicVISION)-MWD-APWD

Available data

Hole C0006B was drilled with LWD-MWD-APWD tools. As in Hole C0004A, the adnVISION tool was deployed to obtain ultrasonic caliper data. Despite the loss of real-time communication with the LWD tools (1500 h on 13 November 2007; 345.2 m LSF), drilling operations were conducted to TD (885.5 m LSF) and memory data were successfully downloaded.

Depth shift

For Hole C0006B, the mudline (seafloor) was identified from the first break in the gamma ray log (GR) and resistivity logs (RES_RING, RES_BIT, RES_BD, RES_BM, RES_BS) at 3899.5 m DRF, showing a discrepancy with drillers depth by 0.5 m (3900.0 m DRF) (Fig. **F2**). Uncertainty in picking the mudline is clearly within ± 1 m because of the washing out of the top few meters of the unconsolidated formation by drilling fluid and the resultant mixing (formation suspension) at the mudline interface, blurring gamma ray and resistivity readings. For Hole C0006B, the depth-shifted version of the main drilling data and geophysical logs are given in Figures **F1** and **F3,** respectively. Figure **F4** presents the time-depth relationship linking the time (Fig. **F2**) and depth (Figs. **F1, F3**) version of the data in Hole C0006B.

Logging data quality

Figures **F1** and **F3** show the quality control logs for Hole C0006B LWD data. The target ROP of 30 m/h (±5 m/h) was generally achieved to TD (see **“Hole C0006B”** in “Operations”). This ROP was sufficient to record 1 sample every 4 cm over the majority of the hole. SPPA increased with depth from 10 to 18 MPa, and no noticeable change in APRS and ECD was observed until the loss of the real-time communication with the LWD-APWD tools. Hole deviation quickly reached 5° (250 m LSF), but memory data show that hole deviation stabilized with depth, remaining close to 5° at 885.5 m LSF. Hole conditions are highly variable with depth. Sonic caliper values from the adnVISION tool that should be 8.5 inches (21.6 cm) for a perfect in-gauge hole instead show values >10 inches (25.4 cm) for the upper depth interval (0–200 m LSF), the lower depth interval (710–855 m LSF [last caliper reading]), and a few localized (approximately meter scale) washouts. All these depth intervals are characterized by low gamma ray counts suggesting caving in sandrich layers. Comparison between deep button (RES_BD) and shallow button (RES_BS) resistivity values shows that drilling fluid invasion is concomitant with low gamma ray depth intervals in spite of the short time after bit measurements. Combined with hole conditions and caliper information, these layers can possibly be interpreted as permeable sand-rich layers. Because of the limited time available before the end of the cruise, sonicVISION data for Hole C0006B were processed postcruise by the Schlumberger Data Consulting Specialist. The depth interval of usable processed data was limited by the failure of real-time communication and powering of the sonic tool (1500 h on 13 November

2007; 345.2 m LSF) and the possible damage of the transmitter. At the time realtime communication failed, the sonic tool switched from turbine mode to battery mode. Because of the low downhole temperature (~3°C), the batteries did not provide enough voltage to the transmitter, therefore limiting the available energy to excite the formation. Possible damage of the transmitter resulting from improper stabilization of the tool and/or severe drilling conditions (stick-slip or shocks) may have also impaired data quality. As a result, only the uppermost 160 m has been processed by combining the results of wide and leaky-P processing, attempting to select wide results when available. Quality control analysis of sonic data is based on examination of plots showing sonic waveforms and slowness coherence images for common receiver data and common source data. From 36 to 160 m LSF, sonic data quality is moderate; discontinuous transit times have been picked using mostly wide processed data. Above 36 m LSF, formation arrival cannot be distinguished from mud arrival (Table **T3**). Overall quality of the resistivity images used in structural interpretation is very good (Fig. **F3;** Table **T4**). The following descriptions of logging units include areas of apparent artifacts probably reflecting hole or tool conditions and not real geology. This assessment was based on the shallow level of investigation of the GVR tool, displayed as a static, not a dynamically renormalized, image.

This note is extracted from
Kinoshita, M., Tobin, H., Ashi, J., Kimura, G., Lallement, S., Screaton, E.J., Curewitz, D.,Masago, H., Moe, K.T., and the Expedition 314/315/316 Scientists, Proceedings of the Integrated Ocean Drilling Program, Volume 314/315/316.

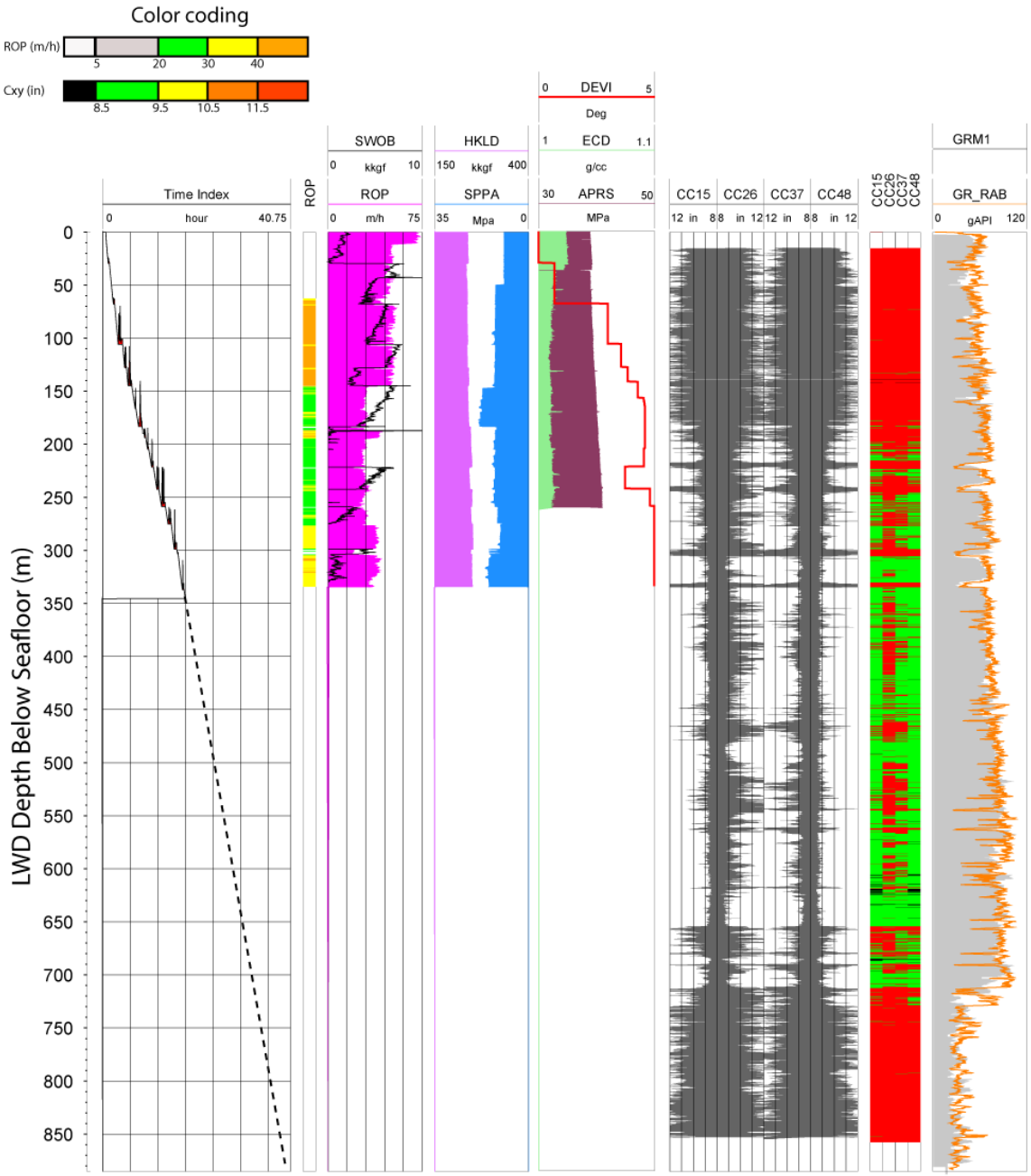

Figure F1. Control logs, Hole C0006B. LSF = LWD depth below seafloor; ROP = rate of penetration; SWOB = surface weight on bit; HKLD = hook load; SPPA = standpipe pressure; DEVI = hole deviation; ECD = equivalent circulating density; APRS = average annular pressure; CC15, CC26, CC37, and CC48 = ADN ultrasonic calipers and color coded borehole condition indicators based on ADN calipers (Cxy = C15, C26, C37, and C48); GR_RAB = Hole C0006B gamma ray log (geoVISION resistivity tool memory data) compared with Hole C0006A gamma ray log (GRM1; MWD real-time data).

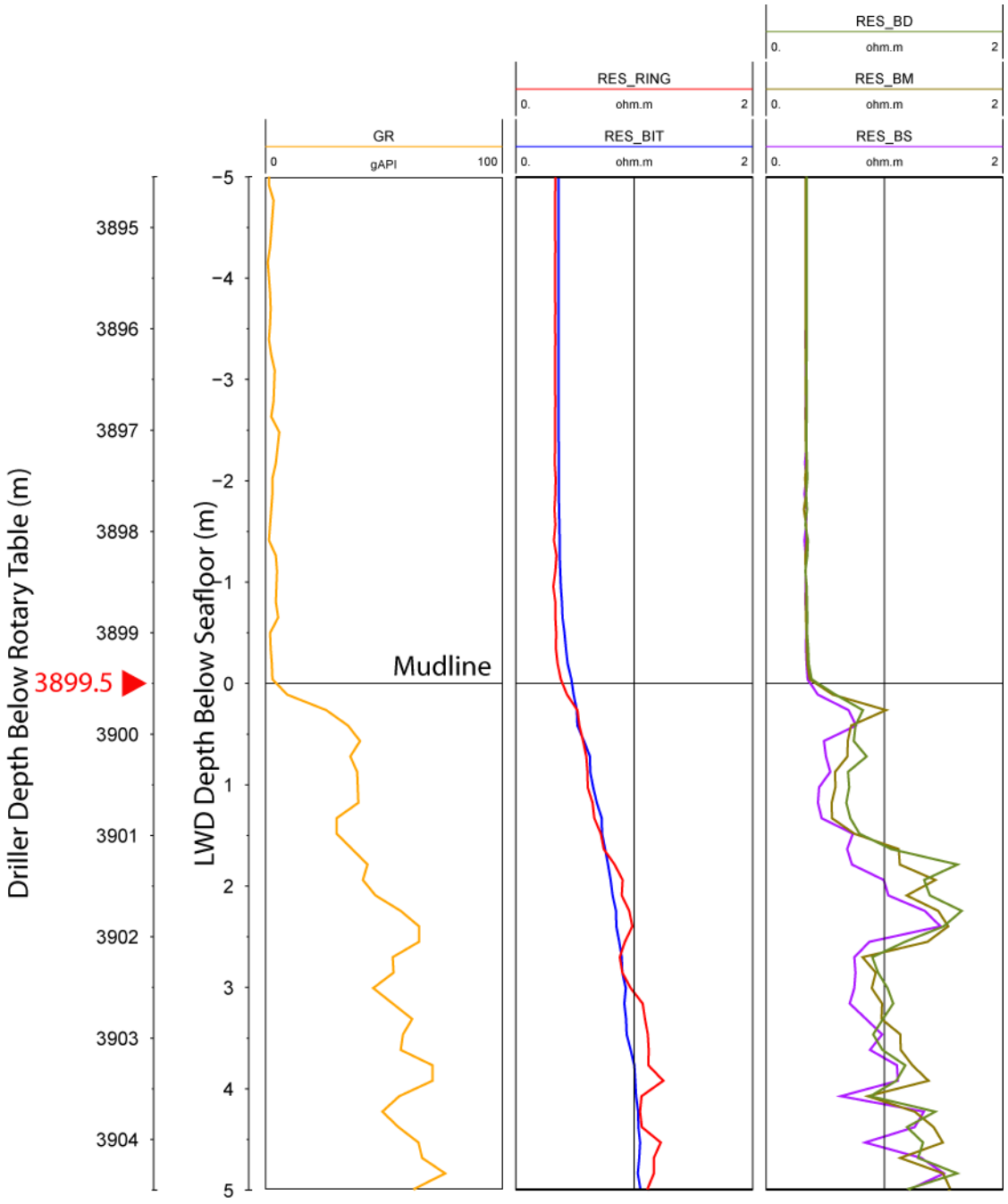

Figure F2. Mudline identification using geoVISION tool gamma ray and resistivity log (memory data, Hole C0006B. Mudline is identified by a break in gamma ray and resistivity logs at 3899.5 m drillers depth below rig floor (DRF). Note that resistivity data are plotted on a linear scale. LSF = LWD depth below seafloor.

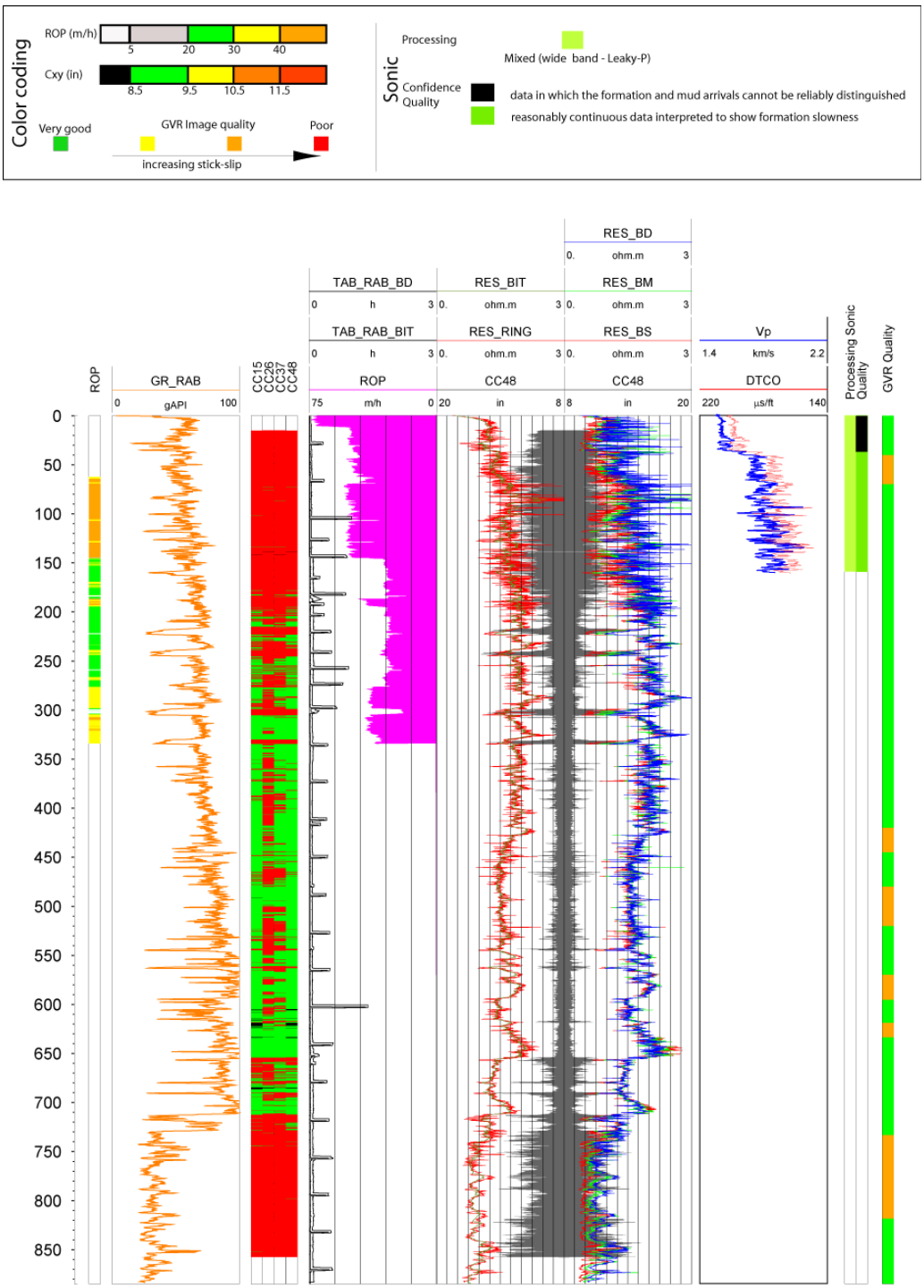

Figure F3. Geophysical logs, Hole C0006B. LSF = LWD depth below seafloor. ROP = rate of penetration; GR_RAB = gamma ray log (geoVISION resistivity [GVR] tool memory data); Cxy = ADN ultrasonic calipers C15, C26, C37, and C48; TAB_RAB_BD = time after bit of GVR deep button resistivity; TAB_RAB_BIT = time after bit of GVR bit resistivity; RES_BIT = bit resistivity; RES_RING = ring resistivity; RES_BD = deep button resistivity; RES_BM = medium button resistivity; RES_BS = shallow button resistivity; V_P = sonic compressional velocity (*P*wave), DTCO = ΔT compressional.

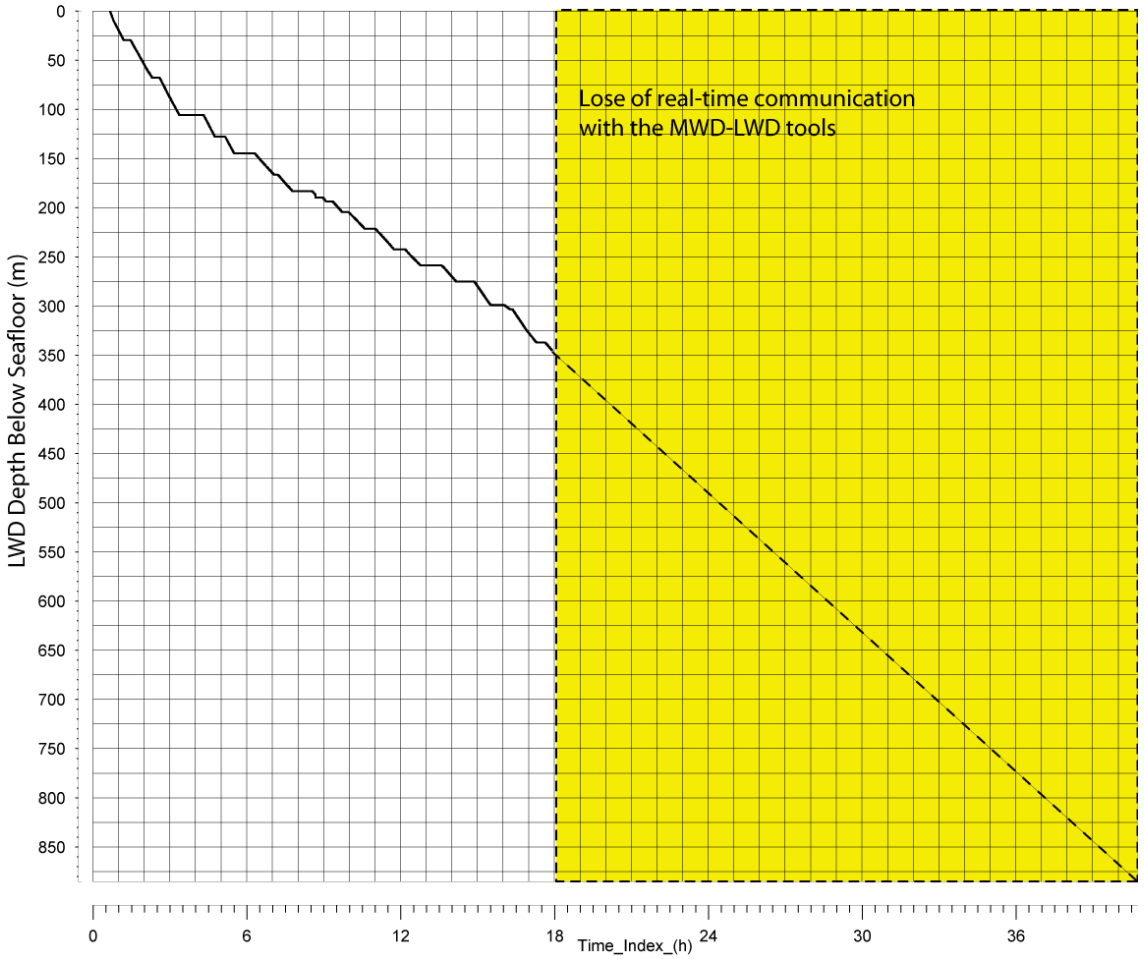

Figure F4. Time-depth relationship, Hole C0006B. LSF = LWD depth below seafloor. LWD = logging while drilling, MWD = measurement while drilling.

Table T1. Operations summary, Site C0006.

Hole C0006B
Latitude: 33° 01.6350'N
Longitude: 136° 47.6390'E
Seafloor (drill pipe measurement from rig floor, mBRF): 3900
Distance between rig floor and sea level (m): 28.5m
Water depth (drill pipe measurement from sea level, m): 3871.5

Operation	Start		End		Depth (mbsf)		Drilled	Comments
	Date	Time	Date	Time	Top	Bottom	(mbsf)	
C0006B-LWD hole	12-Nov		15-Nov		0	885.5	885.5	8.5″ LWD (GVR-SWD-SVWD-MWD-APWD)
ROV Survey								
Spud-in	13-Nov	0:45						Jet-in to 40 m and rotary drilling continued to TD
Rig floor maintenance	13-Nov	14:00						No realtime data due to lossing communication from MWD tool
Reaming and	14-Nov	3:30	14-Nov	4:15				Wiper trip between 4502m and 4350m
Reach Total Depth	14-Nov	16:45				885.5	885.5	Pumped sweep and spot kill mud.
Pull Tools out of Hole	14-Nov	19:00	15-Nov	17:15				Pump and backream due to hole sticky condition.
Recover tools on the	15-Nov	17:15						
Recover Data	15-Nov	19:00						Downloaded all data.

Notes: LSF = LWD depth below seafloor. ROV = remotely operated vehicle. MWD = measurement while drilling, GR = gamma ray, APWD = annular pressure while drilling. TD = total depth. DRF = drillers depth below rig floor. LWD = logging while drilling, GVR = geoVISION resistivity tool, sonic = sonic while drilling (sonicVISION), SVWD = seismicVISION while drilling, MWD = measurement while drilling.

Table T2. Bottom-hole assembly, Hole C0006B.

Description	Length (m)	Cumulated Length from Bit (m)
PDC bit	0.350	0.350
Stabilizer / float sub	0.610	0.960
Cross-over sub	0.615	1.575
GVR-VISION	3.084	4.659
Sonic-VISION	7.624	12.283
Power Pulse	8.496	20.779
Seismic-VISION	4.640	25.419
ADN-VISION	6.098	31.517
Cross-over sub	0.610	32.127
6 3/4 Drilling collar	9.310	41.437
6 3/4 Drilling collar	9.313	50.750
6 3/4 Drilling collar	9.310	60.060
6 3/4 Drilling collar	9.292	69.352
6 3/4 Drilling collar	9.312	78.664
6 3/4 Drilling collar	9.314	87.978
6 3/4 Drilling collar	9.310	97.288
6 3/4 Drilling collar	9.316	106.604
Jar	10.215	116.819
6 3/4 Drilling collar	9.310	126.129
Cross-over sub	0.611	126.740
Cross-over sub	0.605	127.345

Note: BHA = bottom-hole assembly, PDC = polycrystalline diamond compact.

Table T3. Quality control characteristics and sonic log data, Hole C0006B.

Intervals (m LSF)				
Top	Base	Zone	Quality	Comments
0	36	1	0	Formation arrival can not be distinguished from the mud arrival
36	160	1	1	Fairly intermittent arrivals with zones of clear arrivals and zones hard to pick on MP Wide.

Notes: LSF = LWD depth below seafloor. MP = mixed processing

Table T4. Quality control characteristics and resistivity image data, Hole C0006B.

Depth Interval (m LSF)		
top	bottom	Comments
40	69	Resistivity variation on 180° frequency, probably due to hole enlargement and
420	445	m-scale spiral banding, suspected tool artifact
480	520	m-scale spiral banding, suspected tool artifact
520	595	m-scale spiral banding, suspected tool artifact
619	633	m-scale spiral banding, suspected tool artifact
733	819	Resistivity variation on 180° frequency, probably due to hole enlargement and
40	885	cm-scale horizontal banding, suspected tool artefact, tends to obscure

Note: LSF = LWD depth below seafloor.