

Operation summary

Hole C0004B

Latitude: 33°13.2264'N

Longitude: 136°43.3461'E

Seafloor (drill pipe measurement from rig floor, m): 2666.0

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

Water depth (drill pipe measurement from sea level, m): 2637.5

Logging run

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

Available data

Hole C0004B was drilled with LWD-MWD-APWD tools. MWD-APWD data was transmitted in real time with a limited set of LWD data. Because the only radioactive source on board was cemented with the BHA at the previous site, density and porosity measurements could not be made. However, the adnVISION tool was deployed without the radioactive source to obtain ultrasonic caliper data. When LWD tools were recovered on the rig floor, memory data were successfully downloaded and processed according to the data flow.

Depth shift

The mudline (seafloor) was identified from the first break in the gamma ray and resistivity logs (Fig. **F2**). In Hole C0004B, a mudline was picked at 2666 m DRF, showing a discrepancy of 0.5 m with drillers depth (2666.5 m DRF; 2637 m mud depth below sea level [MSL]). The depth-shifted versions of the main drilling data and geophysical logs are given in Figures **F3** and **F4**, respectively. Figure **F5** presents the time-depth relationship linking the time (Fig. **F1**) and the depth version (Figs. **F3**, **F4**) of the data in Hole C0004B.

Logging data quality

Figure **F3** shows the drilling control logs. After jet-in to 60.5 m LSF, the initial target ROP of 40 m/h was generally achieved to ~100 m LSF where it was then reduced to 30 m/h to TD of 400 m LSF. SWOB was set to minimal value (<5 kkgf for most of the drilled interval). SPPA was maintained at constant value (~15–18 MPa) for the entire drilling period, and a normal (hydrostatic) increasing trend in APRS and ECD was observed. The four ultrasonic azimuthal calipers (C15, C26, C37, and C48) showed bad borehole condition with washouts exceeding 2 inches (5.08 cm) in most places, except between 60 and 80 m and below 290 m LSF (last caliper reading at 370 m LSF). Because no density and porosity data were available, these washouts are of minor concern regarding the quality of the available logs. The geophysical logs are shown in Figure **F4**. Time after bit (TAB) measurements for ultrasonic caliper logs are always <45 min. TAB measurements were ~5–10 min for the natural gamma ray log, except in a short depth interval corresponding to pipe connections and the wiper trip (234–99 m LSF; 0330 to 0430 h on 3 November) where they exceeded 2 h. TAB measurements for resistivity were between 5 and 10 min. Comparison between deep button (RES_BD) and shallow button (RES_BS) resistivity values showed a larger separation, suggesting possible drilling fluid invasion. The sonicVISION data for Hole C0004B were processed by the Schlumberger Data Consulting Specialist onboard the *Chikyu*. As a result of the processing, two products were delivered. The first product relies on a broad band-pass filter (10–16 kHz) on the data acquired during drilling, referred to as “wide.” The second product relies on a very

narrow band-pass filter (6–7 kHz) designed to pass only the “leaky-P” arrival applied to the data acquired during drilling. The composite sonic velocity curve prepared for this hole included data from both processed logs (Table **T3**). In the upper part of the hole (0–94.5 m LSF), the results of the leaky-P processed data were used. The leaky-P processed data were also used for intervals where the formation arrival could not be distinguished from the mud arrival. The wide data were the most reliable in the rest of the hole; therefore, these data were used to assemble the composite log from 94.5 to 389.5 m LSF (last sonicVISION value). The quality control analysis of the sonic data is based on examination of the plots showing the sonic waveforms and the slowness coherence images for the common receiver data and the common source data. The full versions of these quality control plots are available as picture description standard format files in the raw data for the expedition.. As stated above, the uppermost 60.5 m LSF was jetted-in without tool rotation resulting in the lack of resistivity images for this interval. To ~100 m LSF, the ROP was significantly higher than in previous holes (40 versus 30 m/h). The images initially showed some pixel effect that was removed by postprocessing (3 · 3 pixels up to 9 · 9 pixels smoothing filtering). The smoothing of the image did not blur the geological features. Unlike previous image data, no depth mismatches have been observed at this hole. Resistivity images are of very good quality. The resistivity image log from Hole C0004A extends from 129 to 1398 m LSF (Table **T4**). Overall, the quality of the image data is excellent. The log is marked by three 1 m intervals of poor quality where the image is smeared, perhaps resulting from lack of rotation. A short interval of variable resistivity around the hole circumference occurs from 129 to 197 m, probably caused by hole eccentricity. Two features, absolutely horizontal with respect to the borehole, are suspected artifacts. Sharp changes in resistivity along knife-edge planar horizontal surfaces typically bound decimeter or thicker domains. Centimeterscale horizontal variations in resistivity are also suspected to be artifacts because of their thinness, regularity, and horizontal orientation.

This note is extracted from

Kinoshita, M., Tobin, H., Ashi, J., Kimura, G., Lallement, S., Sreaton, 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.

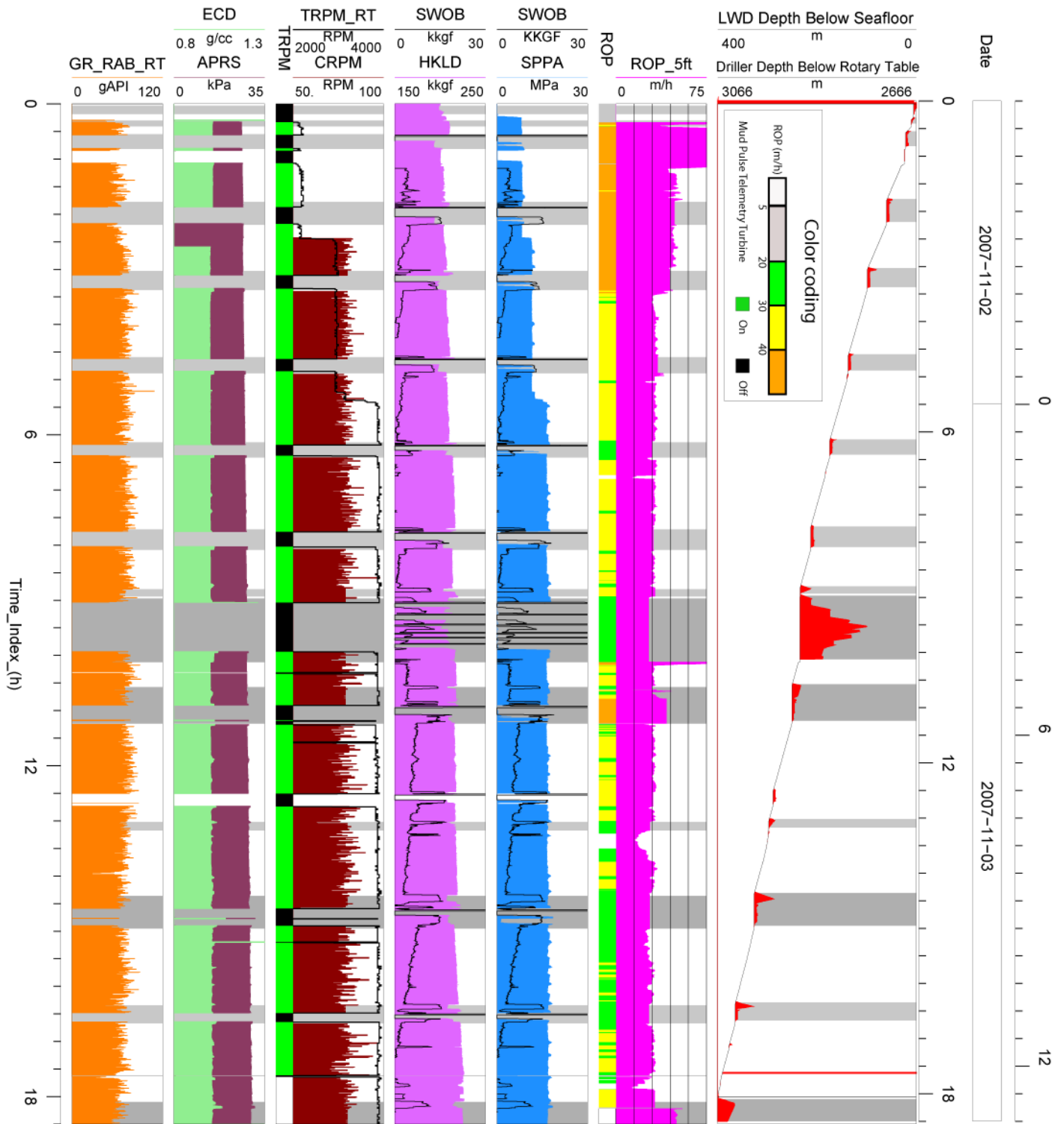


Figure F1. Drilling parameters and gamma ray log plotted vs. time for MWD-APWD operations in Hole C0003A. GR_RAB_RT = gamma ray resistivity at bit (real time), ECD = equivalent circulating density, APRS = average annular pressure, TRPM = MWD turbine rotation speed, TRPM_RT = TRPM (real time), CRPM = collar rotation, SWOB = surface weight on bit, HKLD = hook load, SPPA = standpipe pressure, ROP = rate of penetration, ROP_5ft = 5 feet averaged ROP, LSF = LWD depth below seafloor, DRF = drillers depth below rig floor.

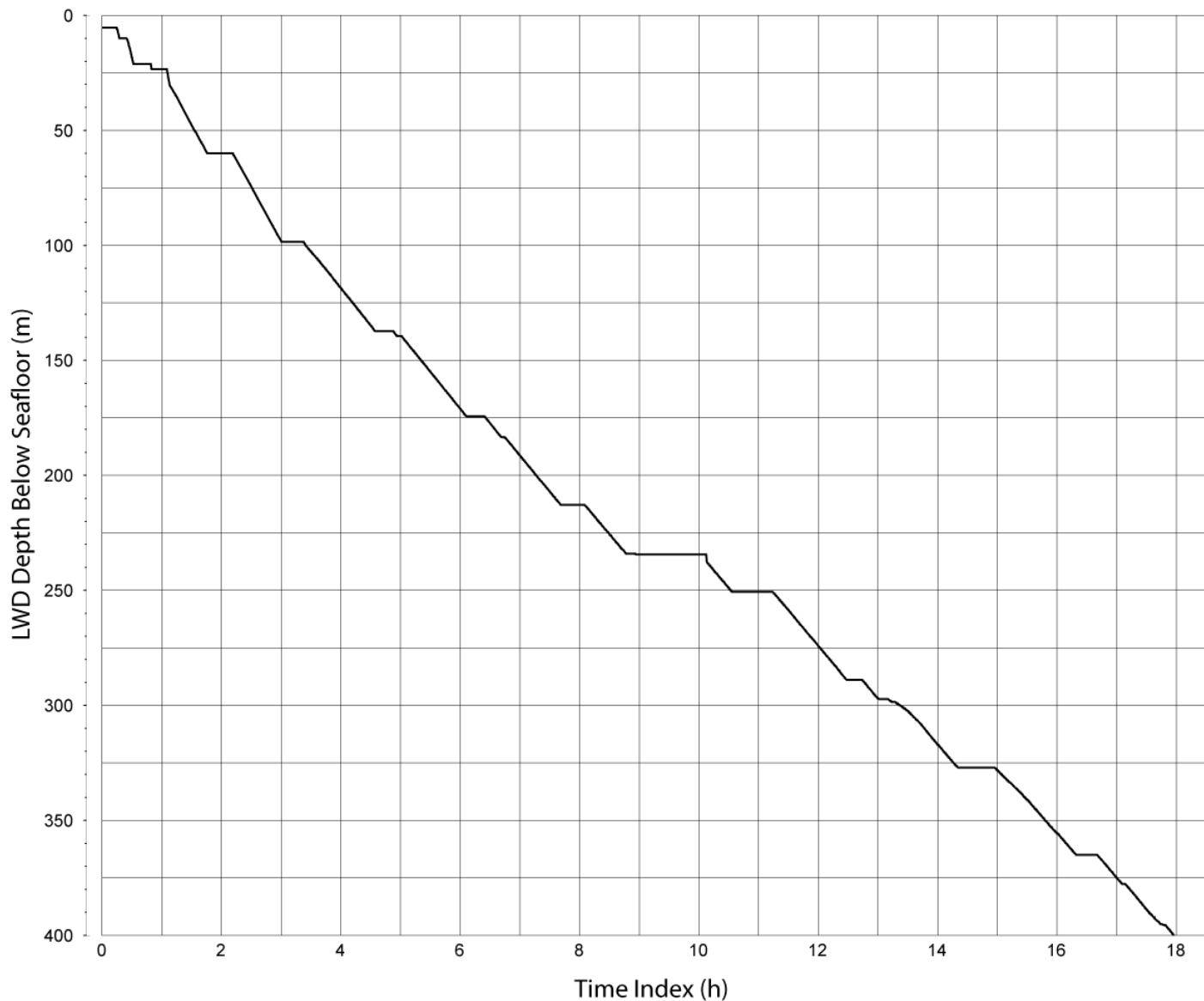


Figure F2. Mudline (seafloor) identification in Hole C0004B using gamma ray and resistivity logs from the geoVISION resistivity tool (memory data). The seafloor is defined by a break in the gamma ray and resistivity logs at 2666 m drillers depth below rig floor (DRF). Resistivity data are plotted on a linear scale. LSF = LWD depth below seafloor.

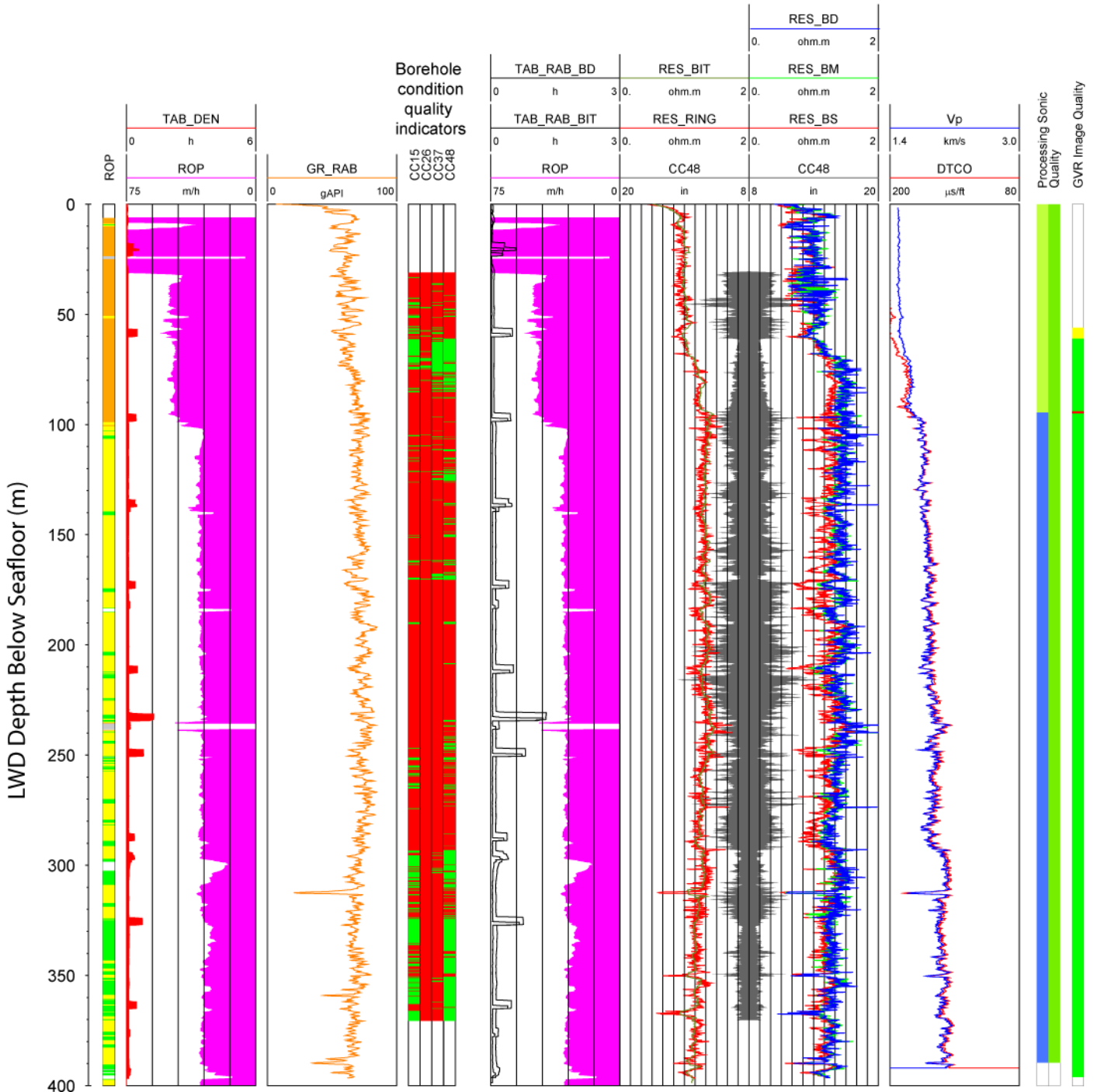
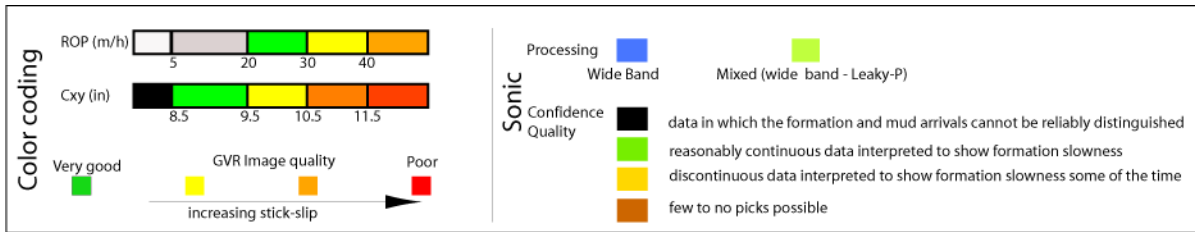


Figure F3. Control logs in Hole C0004B. LSF = LWD depth below seafloor; ROP = rate of penetration; SWOB = surface weight on bit; HKLD = hook load; SPPA = standpipe pressure; ECD = equivalent circulating density; APRS = average annular pressure; CC15, CC26, CC37, and CC48 = Azimuthal Density Neutron (ADN) tool ultrasonic calipers; GR_RAB = gamma ray (geoVISION tool).

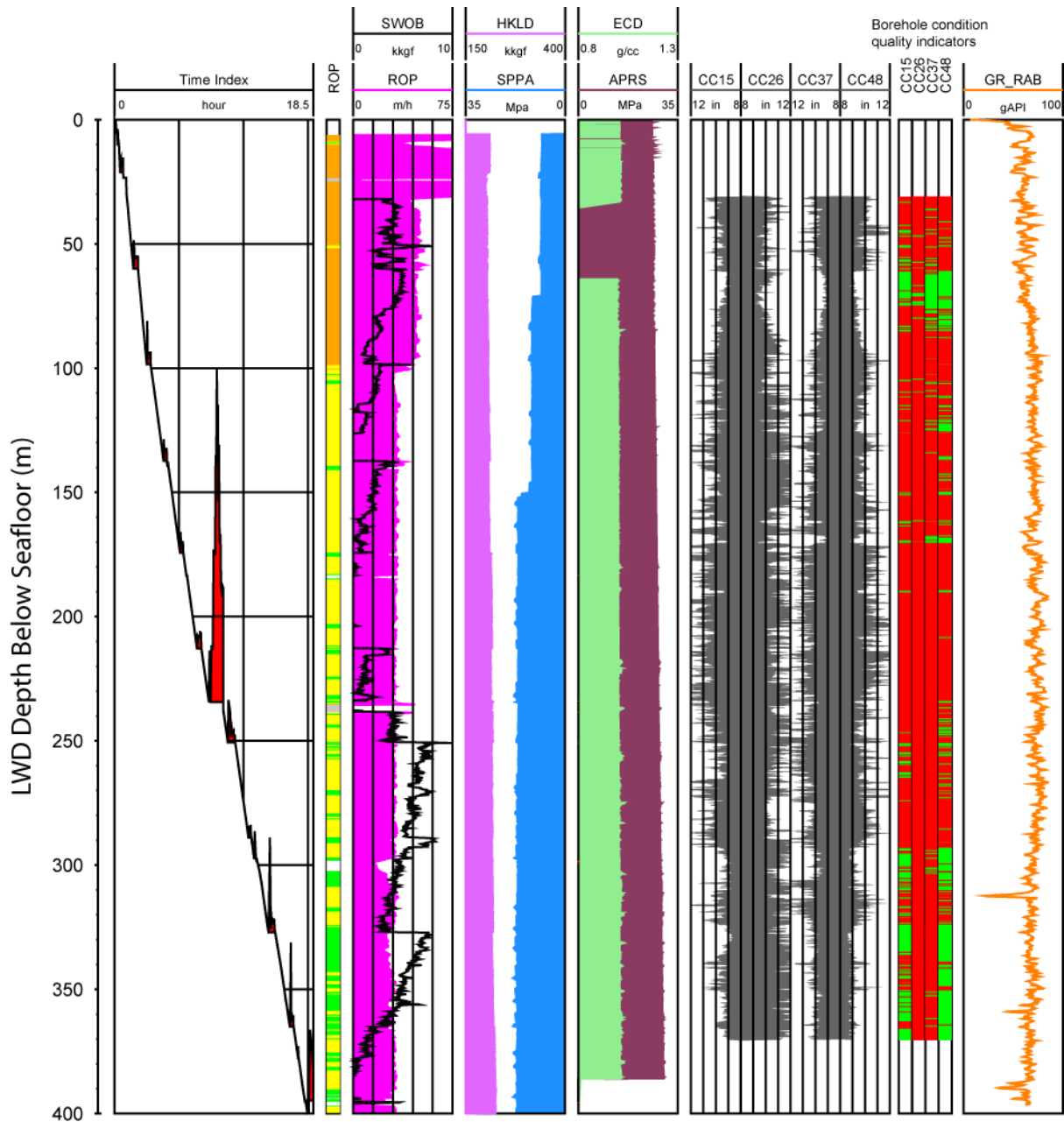


Figure F4. Geophysical logs in Hole C0004B. LSF = LWD depth below seafloor, ROP = rate of penetration, TAB_DEN = time after bit (TAB) of ADN density measurement, GR_RAB = gamma ray log (geoVISION resistivity [GVR] memory data), TAB_RAB_GR = TAB of gamma ray measurement by the GVR tool, color coded borehole condition indicators based on ADN ultrasonic calipers (Cxy = CC15, CC26, CC37, and CC48), TAB_RAB_BD = TAB of GVR deep button resistivity, TAB_RAB_BIT = TAB of GVR bit resistivity, V_P = sonic compressional velocity

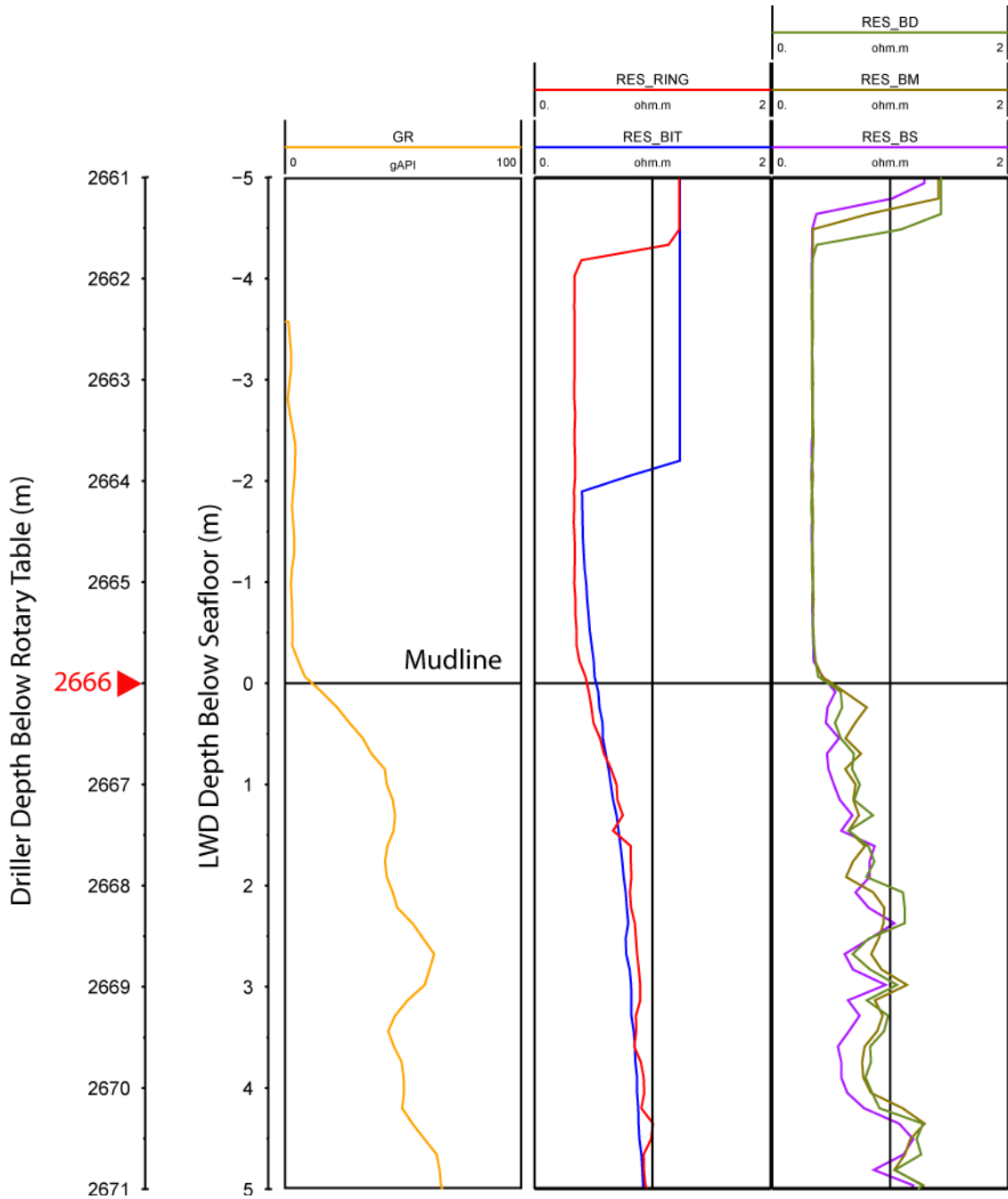


Figure F5. Time-depth relationship in Hole C0004B.

Table T1. Operations summary, Site C0004.

Hole C0004B

Latitude: 33° 13.2264'N

Longitude: 136° 43.3461'E

Seafloor (drill pipe measurement from rig floor, mBRF): 2665.5

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

Water depth (drill pipe measurement from sea level, m): 2637

Operation	Start		End		Depth (mbsf)		Drilled (mbsf)	Comments
	Date	Time	Date	Time	Top	Bottom		
C0004B-LWD hole	2-Nov		3-Nov		0	400	400	8.5" LWD (GVR-SWD-SVWD-MWD-APWD)
ROV Survey	2-Nov	16:00						
Seafloor Tagging	2-Nov	18:30						
Spud-in	2-Nov	18:45						
Back reaming and seeping								
Rig floor maintenance								
Reaming and Sweeping	3-Nov	3:45	3-Nov	4:30				Wiper trip between 2900m and 2765m
Reach Total Depth	3-Nov	12:30				400	400	Pull back 1 stand, relog to TD, pumped kill mud.
Pull Tools out of Hole	3-Nov	15:30	3-Nov	23:30				
Recover tools on the rig-floor	3-Nov	5:15						
Recover Data	3-Nov	0:00						Downloaded all data.

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

Table T2. Bottom-hole assembly, Hole C0004B.

Description	Length	Cumulated Length
	(m)	from Bit (m)
PDC bit	0.350	0.350
Stabilizer / float sub	1.500	1.850
Cross-over sub	0.615	2.465
GVR-VISION	3.084	5.549
Sonic-VISION	7.624	13.173
Power Pulse	8.496	21.669
Seismic-VISION	4.640	26.309
ADN-VISION	6.098	32.407
Cross-over sub	0.610	33.017
6 3/4 Drilling collar	9.310	42.327
6 3/4 Drilling collar	9.313	51.640
6 3/4 Drilling collar	9.310	60.950
6 3/4 Drilling collar	9.292	70.242
6 3/4 Drilling collar	9.312	79.554
6 3/4 Drilling collar	9.314	88.868
6 3/4 Drilling collar	9.310	98.178
6 3/4 Drilling collar	9.316	107.494
Jar	10.215	117.709
6 3/4 Drilling collar	9.310	127.019
Cross-over sub	0.611	127.630
Cross-over sub	0.605	128.235
Heavy Pipe	37.856	166.091
Heavy Pipe	37.876	203.967
Heavy Pipe	37.884	241.851
Heavy Pipe	37.846	279.697
Cross-over sub	0.910	280.607

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

Table T3. Quality control characteristics and sonic log data, Hole C0004B

Intervals (m LSF)				
Top	Base	Zone	Quality	Comments
0	94.5	2	1	Formation arrival can not be distinguished from the mud arrival using the MPS Wide processed data.
94.5	389.5	1	1	High quality, continuous data, picked using the Wide processed data.

Note: LSF = LWD depth below seafloor, MP = mixed processing.

Table T4. Quality control characteristics and resistivity image data, Hole C0004B.

Depth Interval (m LSF)		
top	bottom	Comments
	56	Start GVR rotation: Beginning of image log
56	61	Good, but lateral stripes of missing pixels are common
61	94	Very good quality with locally missing pixels
94	95	Vertical stripping of data, loss of image
95	396	Excellent
	396	End of GVR image log

Note: LSF = LWD depth below seafloor, GVR = geoVISION resistivity tool.