

IODP EXP 358 Daily Geomechanics Report

Report #016 20181125 Final 4990

RTG Team

RTG Supervisor(s)	David Castillo / Thomas Finkbeiner / Demian Saffer
RTG Watch Lead (00:00-12:00)	Kan Aoike
RTG Watch Lead (12:00-24:00)	Adam Wspanialy
RTG Office Support	N/A

Well Status (as of 06:00 Nov.26 2018)

Site Name:	C0002	Hole Name:	Q
Water Depth:	1,939.0 m	RT-MSL:	28.5 m
Current Depth:	4,990.0 mBRT (4,988.0) mTVD	Section TD:	4,990 mBRT (4,988.0) mTVD
Section #:	1	CSG Depth / Size:	(4855.0) mBRT 11-3/4 "
Static MW:	1.37 sg	Current ECD:	1.41 sg
FIT/LOT/XLOT:	FIT maximum pressure = 1.45 sg, Possible "LOP" = 1.43 sg @4855 mBRT		
Current formation/ lithology:	Shale		
Sensor Offsets from the Bit:	PDC Bit: 0 m arcVision 675: (APWD: 2.55 m, Resistivity: 3.26 m, GR: 3.31 m) TeleScope 675: (IWOB: 7.43 m, GR: 10.15 m, Direction + Inclination: 10.80 m)		
Current Operations:	Continued POOH 8-1/2" x 12-1/4" LWD BHA. Bit on deck at 07:50. Confirmed minor damages on the bit, sonicScope and Z-reamer. Made up a short length 8-1/2" x 12-1/4" LWD BHA with arcVISION and TeleScope only. Commenced RIH BHA at 16:30. 4368 mBRT as of 06:00 Nov.26.		

Geomechanics Alert

GREEN	<p>Green = Projected model remains accurate White = Unanticipated deviation from model which <i>should not</i> affect drilling Yellow = Unanticipated deviation from model which <i>may</i> affect drilling Red = Imminent requirement to stop drilling</p>
Basis for Alert Level + Recommendations	No issue with 1.37 sg MW for Section 1.

Principal Findings

N/A

Observations Summary

Use this space to discuss any observations while drilling, running casing etc.

Fracture Gradient	N/A
Pore Pressure	N/A
Wellbore Breakout	N/A
Tensile Failure	N/A
Drilling Parameters	N/A
Other	

Analysis

LWD Log Memory Data Review

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LWD memory data (resistivity image of MicroScope, resistivities and e-calipers of MicroScope and arcVISION, and gamma ray of MicroScope) taken in the interval below the 11-3/4" CSG window while POOH. Memory data was delivered after midnight and plotted below along with the real-time resistivity image for comparison (however, the real-time image is ultra-high resolution in dynamic view while the memory data image is extra-deep in static view). In the future, real-time should continue to be plotted in ultra-high resolution in dynamic view, and all depths of investigation from the memory data should be plotted in ultra-high resolution in dynamic view.

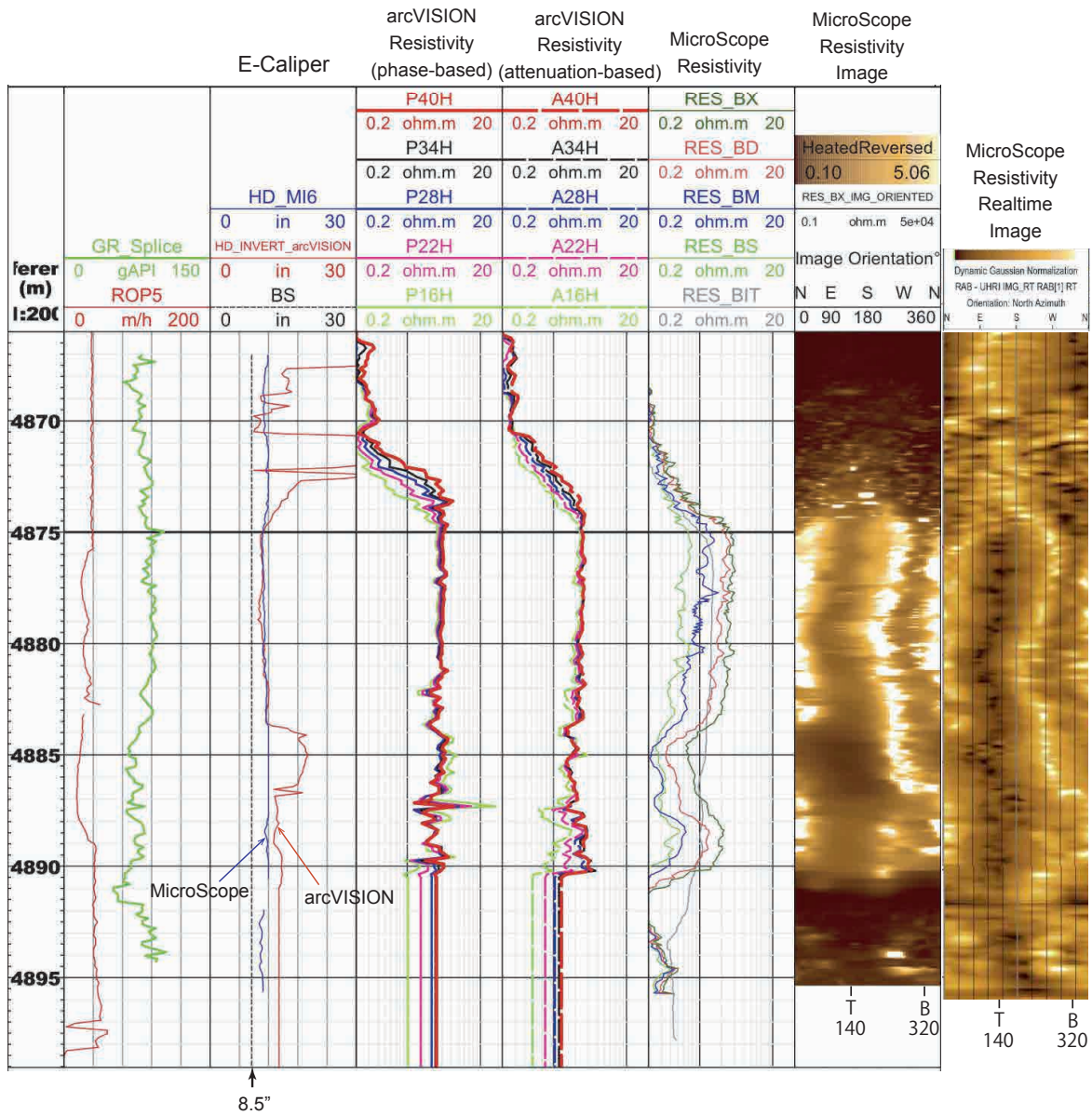
Both e-calipers in the interval of 4875~4883 mBRT give near identical values and suggest that the hole size, originally 8-1/2", could be enlarged to 11~11.5", maybe more. In the interval of 4889~4887 mBRT where only arcVISION e-caliper is available (MicroScope e-caliper appears to be out of calculation range in this interval), the hole sizes could be further enlarged.

The arcVISION resistivity curves in the interval of 4875~4882 mBRT show no separation among sensors with a range of 1-4 ohm·m, comparable with those of the C2P hole at the same interval (2~3 ohm·m). This result could indicate little to no mud invasion in this interval or no cracking of at the borehole wall. Below this interval, there is some separation between the various depths of investigation. On the other hand, the MicroScope resistivities indicate clear separations. As the MicroScope675 only covers holes ranging 8-1/2"~8-7/8" in diameters, these resistivities may not be as reliable in large diameter boreholes.

Since the borehole in this section is inclined 4.4° southeastward (139.5°N based on the azimuth survey), the southwest and northeast azimuths approximate the lower (bottom) and the upper (top) sides, respectively (revised from DGEM #015). The azimuthal variation of the wider dark zone (low resistivity) near SW probably indicates that the upper side of the tool was largely separated from the borehole wall. Similarly, the azimuthal variation of the narrower dark zone with two bright zones (high resistivity) along the opposite azimuth (upper side of the tool) likely reflects that the lower side was in contact with the borehole wall. In addition, if this interpretation is correct, the lower side narrower dark zone is considered to reveal the actual widths of borehole breakouts occurring in the northwest azimuths, based primarily on the real-time data.

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Drilling Experience Analysis

N/A

Cuttings Analysis

N/A

Cavings Analysis

N/A

SFIB Analysis

N/A

Geomechanical Model Review (a review of the FIT results)

Potentially no changes to the pre-drill geomechanical model because FIT (Formation Integrity Test) does not directly contribute sufficient information for constraining or refining subsurface earth

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stresses. By design, FIT is intended to determine whether the planned mud weight can be supported by the formation.

The planned mud weight of 1.37 sg with an operational safety upper margin of +0.06 sg (surge pressure), required a formation pressure integrity up to 1.43 sg. The FIT in the C0002Q rat-hole achieved that objective. It is possible that a leak-off pressure of 1.43 sg may have occurred, but a maximum pressure of 1.45 sg was achieved before the pumps were shut-in. If a leak-off pressure of 1.43 sg did occur, this implies a leak-off-test (LOT) had occurred (no longer a FIT). A leak-off-pressure of 1.43 sg may be interpreted as a possible approximation of S3 or Shmin stress magnitudes.

This interpretation would require a pass of the LWD image log across the rat-hole section to identify whether a new tensile was created, or drilling fluids leaked into a pre-existing bedding plane or natural fracture. The former would have direct implications of S3, while the latter would require further information such as bedding plane orientation.

However, since no LWD data acquisition is planned for the rat hole section, we will have no chance to confirm which case occurred. Therefore, we continue to call this test a FIT.

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