

IODP EXP 358 Daily Geomechanics Report

Report #052 20181231

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)	Toby Colson

Well Status

Site Name:	C0002	Hole Name:	R
Water Depth:	1,939.0 m	RT-MSL:	28.5 m
0600h Depth:	4,971.0 mBRT (4,969.0) (mTVD)	Section TD:	5,667.5 mBRT (5,664.5) (mTVD)
Section #:	0	CSG Depth/Size:	4757.0 mBRT 11-3/4 inches
Static MW:	1.39 sg	Current ECD:	(1.41) sg
FIT/LOT/ XLOT:	1.46sg FIT @ 4,757mBRT.		
Current formation/ lithology:	Shale		
Sensor Offsets from the Bit:	TeleScope 675: (Direction + Inclination: 18.00 m)		
Other BHA Offsets from the Bit:	8-1/2" Mill Tool Bit: 0~0.24 m Motor with 1.5 deg bend: 0.24~8.09 m 8.125" Stabilizer: 8.09~9.76 m 2 x 6-3/4" Non-Magnetic Drill Collar + TeleScope 675: 10.54~32.21 m 9 x 6-3/4" Drill Collar: 32.21~116.80 m 6-1/2" Hydraulic Jar: 116.80~126.73 m 2 x 6-3/4" Drill Collar: 127.73~145.39 m 12 x 5.68" Heavy Weight Drill Pipe: 146.19~257.14 m Top of BHA: 258.14 m		
Current Operations:	RIH, washed and reamed to 4963 mBRT. Recommended drilling and sliding down the 8-1/2" hole.		

Geomechanics Alert

GREEN	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
Basis for Alert Level + Recommendations	1.39 sg remains recommended MW for Section 1. Observation suggests hole cleaning remains a key factor in current wellbore condition.

Principal Findings

N/A

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Observations Summary

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

Fracture Gradient	N/A
Pore Pressure	No indications of overpressure observed.
Wellbore Breakout	N/A
Tensile Failure	N/A
Drilling Parameters	N/A
Other	N/A

Analysis

Drilling Experience Analysis

RIH and washed and reamed down to 4960 mBRT while experiencing three pack-off events. Recommended drilling from 4963 mBRT and then sliding from 4965 mBRT, increasing the flow rate from ~400 gpm to ~480 gpm. Washing and reaming down resulted in a large % of rounded/reworked cuttings suggesting inefficient hole cleaning at these 400-480 gpm flow rates. It is likely that fill was encountered near the TD of the previous run.

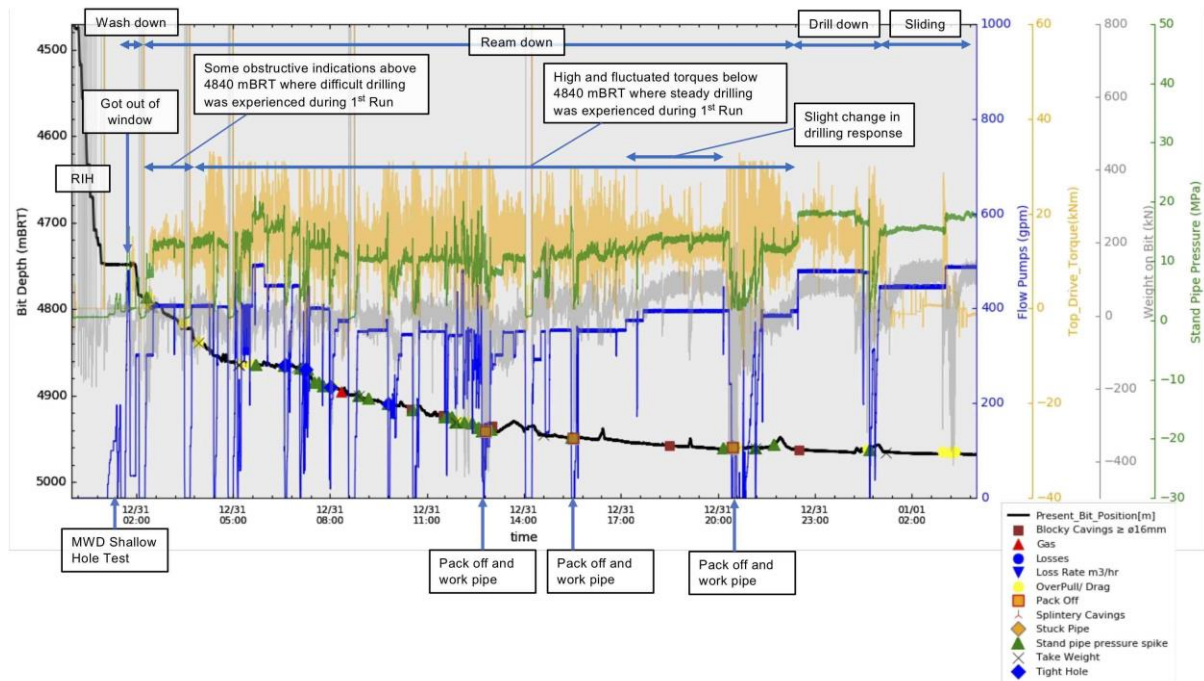


Figure 1: Drilling experiences over the last 28 hrs (~04:00 Jan. 1). Drilling cemented at about 2100 hrs from 4963 mBRT

Cuttings and Cavings Analysis

Coarser shale/mudstone fragments > ϕ 4mm with sharp edges were typically blocky. Samples approximately $\sim\phi$ 10 mm likely reflect cuttings using the tri-cone bit. However, half of the coarser fragments were well-rounded. No obvious indications of wellbore instability were seen in the shale/mudstone fragments that could not be explained by the tri-cone bit cutters. Tuff grains still remained present throughout. Large tuff fragments are well- rounded ($\sim\phi$ 35 mm), comprising \sim 10% of coarser fragments $\geq \phi$ 4mm. These tuff samples may be fresh blocky cavings derived from tuff layers within the 4840-4843 mBRT interval or tuff layers elsewhere. It is possible that the weak boundaries between the tuff and claystone/siltstone are inducing small scale and local anisotropic failure.

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EXP 358 - C2R - Section #0 - RTG 400cc Samples - 28 hour Cuttings & Cavings Report

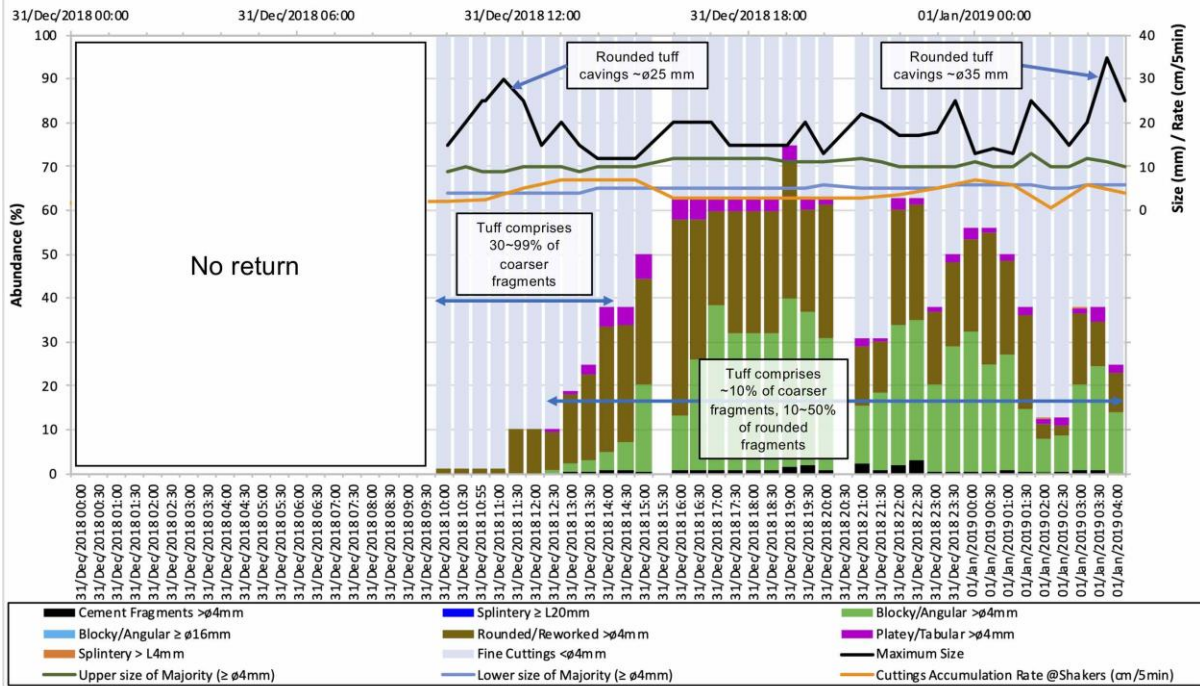


Figure 2: Analysis of cuttings/cavings > ø 4mm (taken from 400cc RTG Samples) over last 28 hrs (~04:00 Jan.1). Not corrected for lag-time.

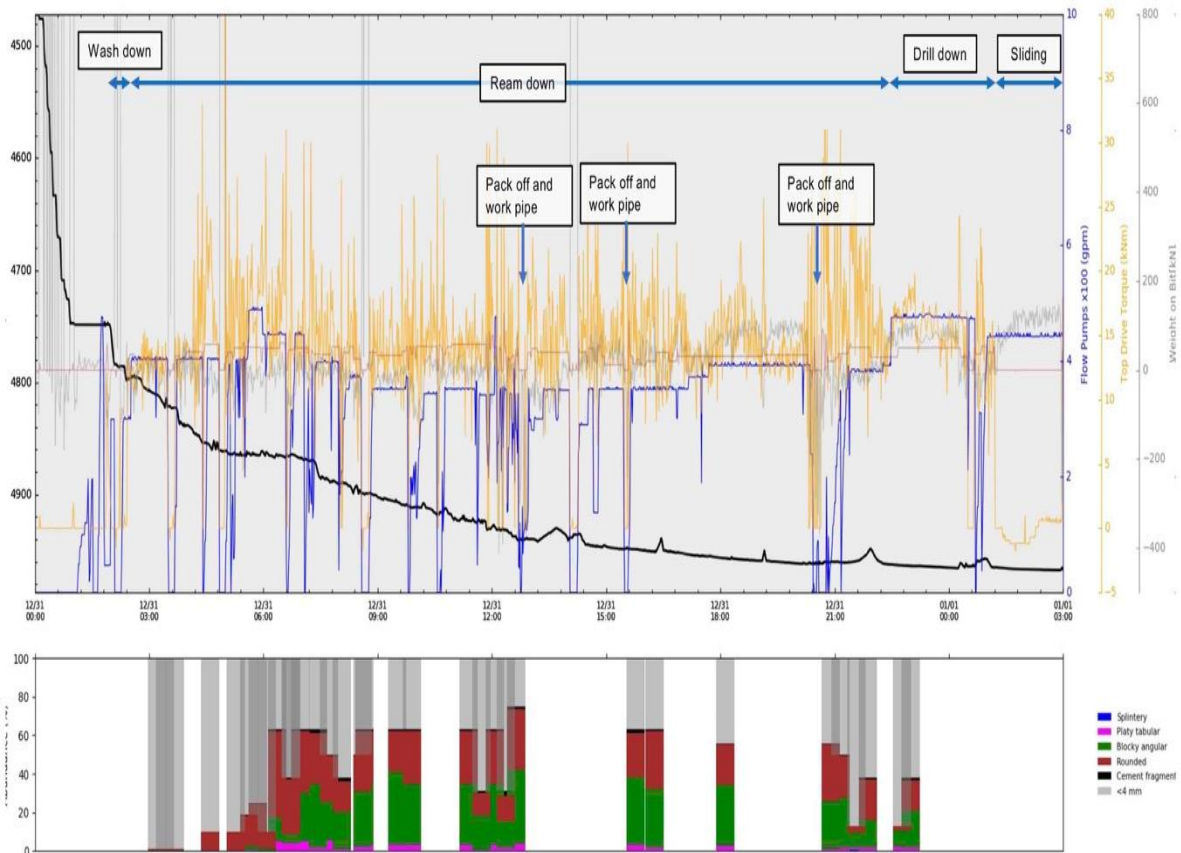


Figure 3. Correlation between drilling events and lag-time corrected cuttings/cavings occurrences over last 24 hrs (00:00~24:00 Dec.31). Sliding drilling started about 2200 hrs.

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Figure 4: Example of cuttings/cavings > \varnothing 4mm (taken from 400cc RTG Samples). Rounded shale fragments $\leq \varnothing$ 10 mm dominants. Light gray rounded to sub-rounded grains are tuff fragments, probably formed as fresh blocky cavings and with edges worn-down either by up-down circulating in the hole during pumps on/off periods and also further erosion while being transported to the surface.

LWD Data Analysis

N/A

SFIB Analysis

No further updates

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Geomechanical Model Review

No change in the current stress model.

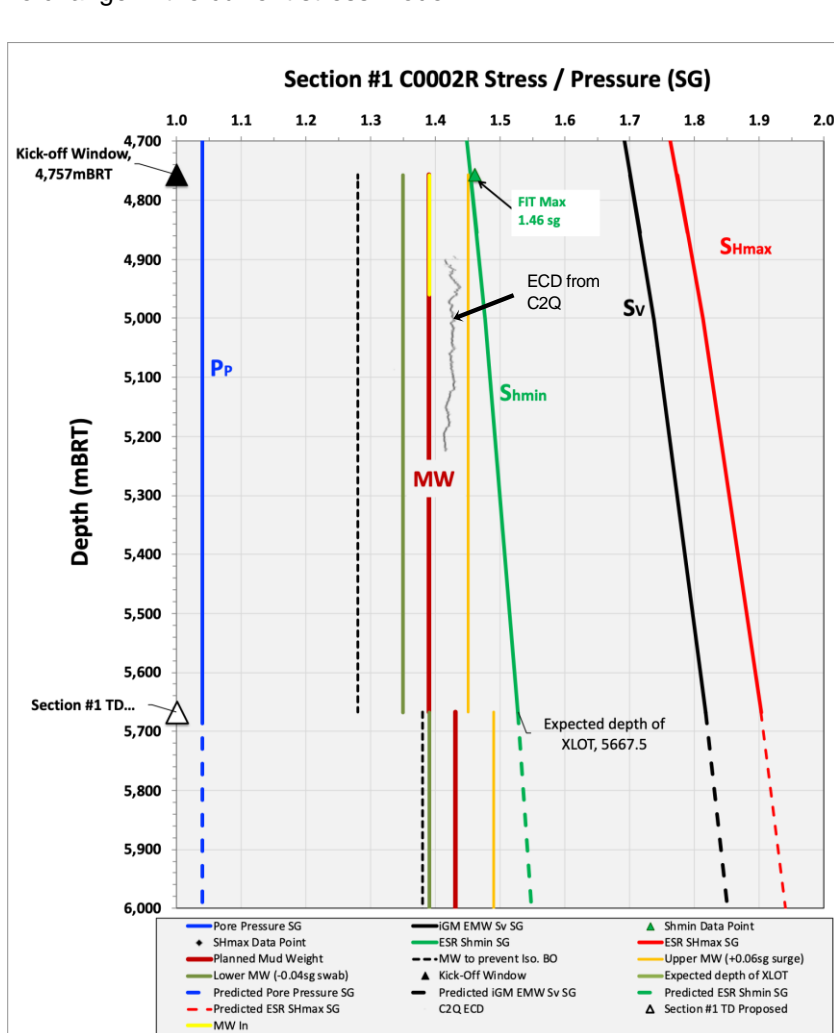


Figure 5: Current stress model for Section #1

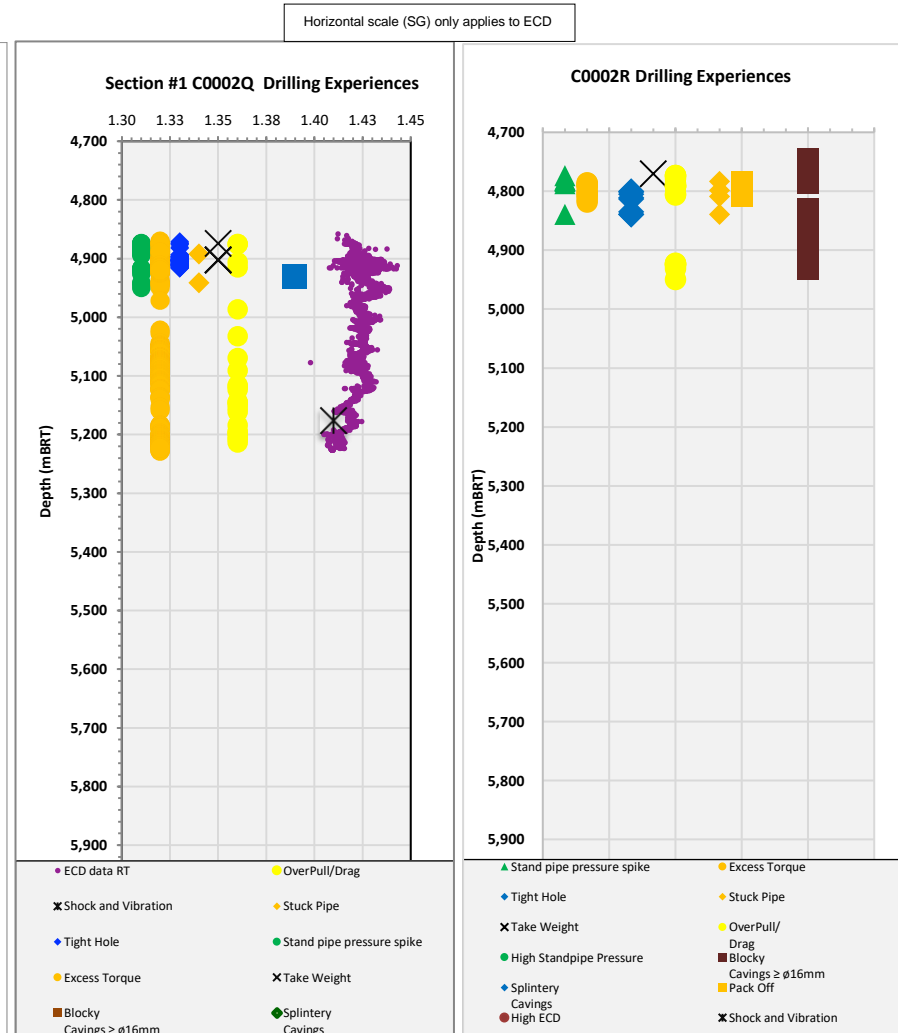


Figure 6: C0002Q Drilling Experiences

Figure 7: C0002R Drilling Experiences