Week 3 Drilling and Scientific Report for IODP/ICDP
Expedition 364 Chicxulub Impact Crater 2016

23rd April 2016 – 28th April 2016

1. Operations

At the start of April 23rd, maintenance of the drilling rig continued. Once the drill was operational, attempts to clear the borehole of debris continued by advancing the borehole 3 m through open hole drilling. Towards the end of the day the borehole was clear and tripping pipe commenced.

Tripping pipe continued into April 24th. The BHA was recovered and changed to a coring assembly. After running in pipe to the base of the hole, coring commenced, slowly at first to ensure the hole was clear. Coring continued throughout the day and into April 25th. The resulting cores were of excellent quality with 100% recovery, virtually no disturbance, breaks or reduction in size. Coring was intermittently interrupted to carry out essential maintenance on the rig.

On April 26th, coring continued with no interruptions throughout the day. An average coring rate of 4-5 cm/min was achieved. Again, core quality was exceptional and core recovery was 100%. The crew vessel *Linda F* visited to platform to deliver supplies. A journalist from Discover magazine came aboard to interview scientists and view drilling operations.

Coring continued through April 27th maintaining 100% recovery, high quality and few breaks. A film crew came aboard to start a 4 day shoot. On April 28th coring continued throughout the day until the early hours of April 29th until drilling parameters indicated the bit was not cutting efficiently. The pipe was tripped to change the bit. After running pipe back into the base of the hole, coring commenced. However, due to a change in lithology, coring runs were much shorter and rates decreased. Despite difficult lithology, recovery remained high at 98%.

2. Hole summary

Hole	M0077A
Latitude	21°26.996' N
Longitude	89°56.968'W
First core	1R
Last core	61R
Cores recovered	61
Drilled length (Coring)	175. 84
Drilled Length (Open Hole)	3 m
Recovered length	177.45
Depth in hole	681.54 m
Hole recovery	100%

3. Science

The week ending April 29th included our first coring of the expedition. Cores are of exceptional quality although fully indurated and coring rates reached 40-50 m a day during our best intervals. Core logging and microbiological sampling are being done routinely on the cores, but they have proved too lithified for pore water sampling. Science party is being careful in the operations to monitor using micropaleontology to minimize sampling near critical boundaries such as the Paleocene-Eocene Thermal Maximum (PETM) and Cretaceous-Paleogene (K-Pg) to avoid sampling those boundaries for microbiology/geochemistry. Cores are being identified through the liner for lithology. During April 24-26th, we sampled 50 m of largely laminated Marlstone with some ash layers, that are of early Eocene age based nannofossils and foraminifera. Preservation for microfossils varies from moderate to very poor. Plantic assemblage stays fairly constant; benthics are rare and often absent. Within the upper unit there were some cores with evidence of gravity flows with erosional bases but remainder appears to be a complete recovery of parallel laminated strata. Early Eocene section appears

to be expanded. During April 27th some limestones were present and we transitioned through two major changes. Because of either 1 or 2 unconformities we transitioned from Eocene to Paleocene in Cores 36 and 37. Then in Core 40 we transitioned from a limestone to a marlstone to a sandstone. Within the sandstone clast sizes increased down core for core after core with at least one cycle of becoming finer again before coarsening again down section. By Core 50 we have angular clasts that are a mix of lithologies and many are larger than 1 cm and thus suggestive of a breccia. April 28th we cored entirely polymict lithic breccias with angular clasts up to a couple centimeters in size and including a range of lithologies. The cores continue to be near perfect and the microbiologists where given samples every two cores given the interest in the role of these different lithologies in the subsurface biosphere. The multi-sensor core logger showed some evidence of cycles within the breccias based on magnetic susceptibility. By Core 58 we observe increasing average clast sizes. By the end of the week, we were continuing to core into polymict lithic breccias with some evidence of basement clasts now present. At Core 60, ~30 cm altered zone with an orange red mineral was observed and smear slides from this interval showed there are a large range of minerals present with the most abundant being clear and fibrous in structure. Increasing clast sizes present within the polymict lithic breccias with some up to several cm in width and evidence for a few basement clasts.

4. HSE Activity

N/A

5. Outreach Activity

During the week a journalist from Discover magazine visited the platform to interview scientists and view operations. A film crew were aboard for three days to film the expedition for a documentary. Expedition participants continued to blog at; esoexpedition364chicxulubimpact crater.wordpress.

6. Figures

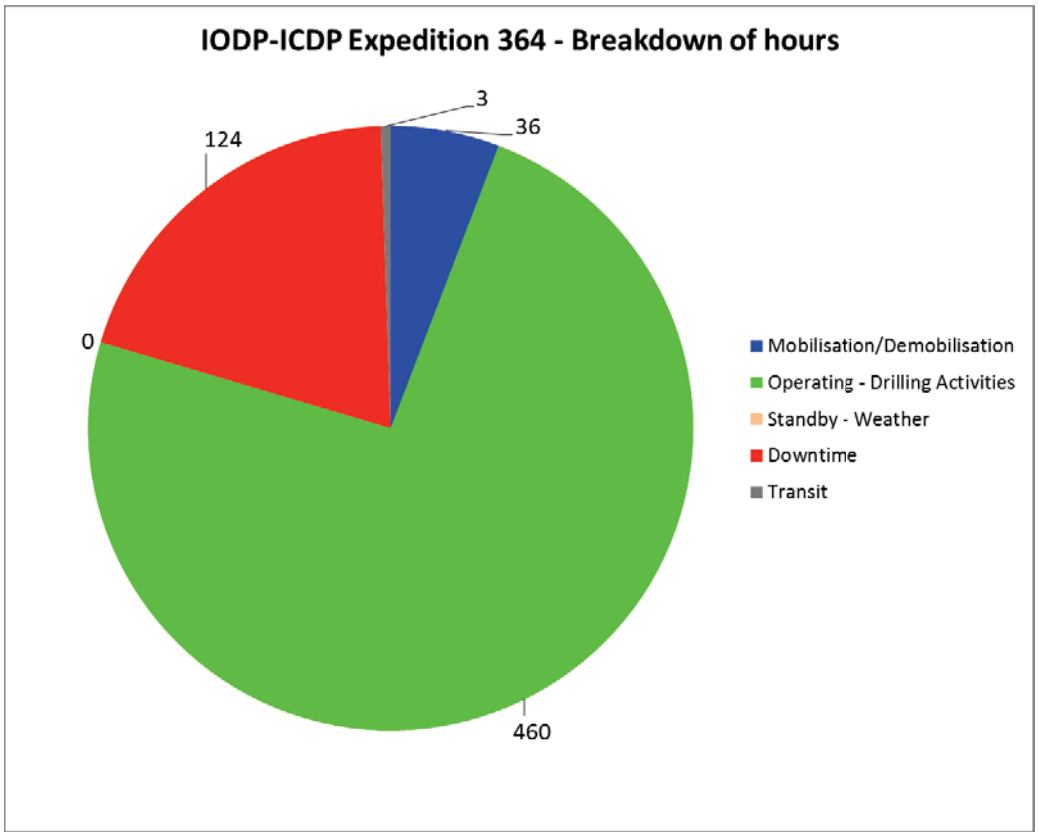

Figure1: Breakdown of hours from 00:00 April 23rd to 24:00 April 29th.

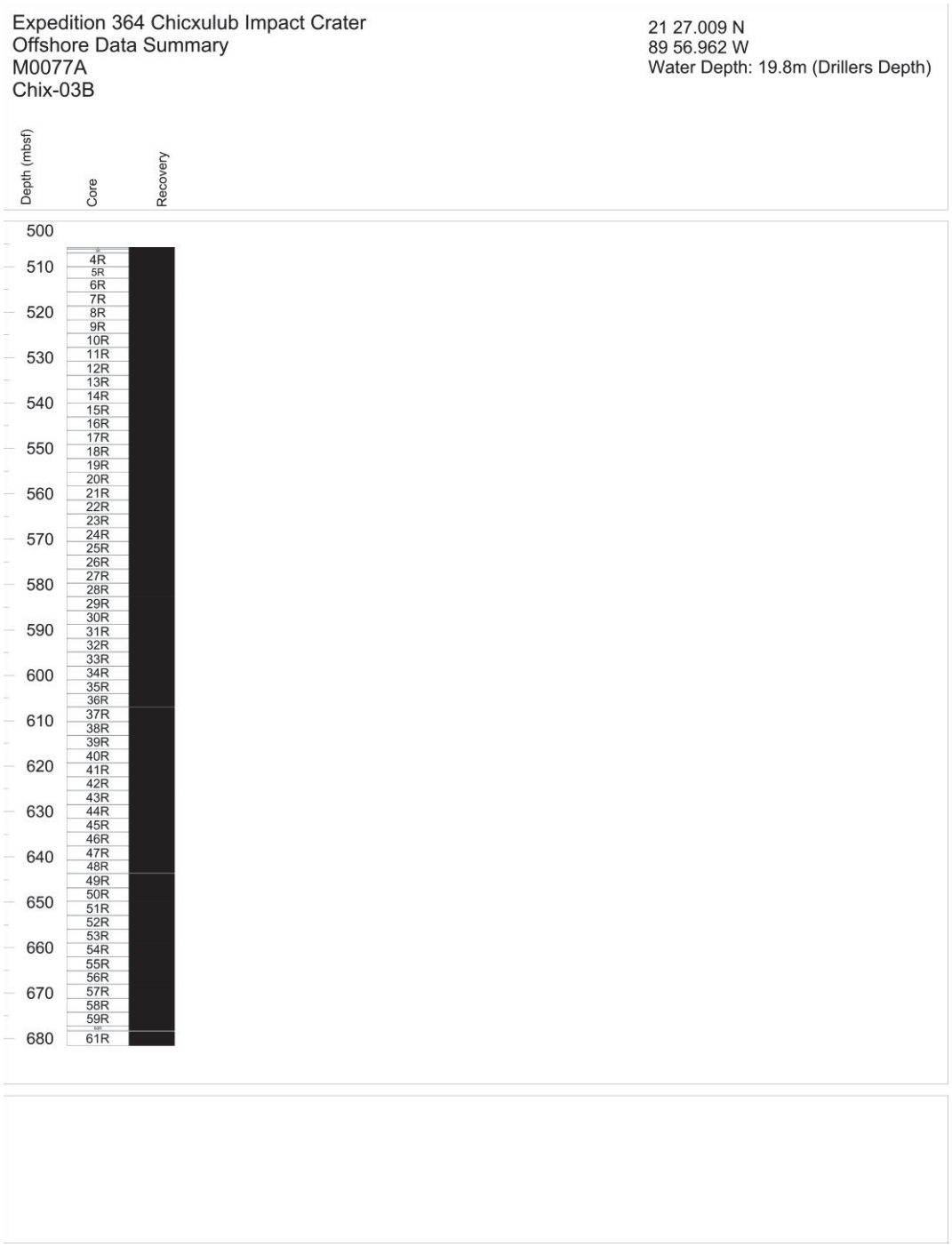

Figure 2: Recovery

7. Photographs

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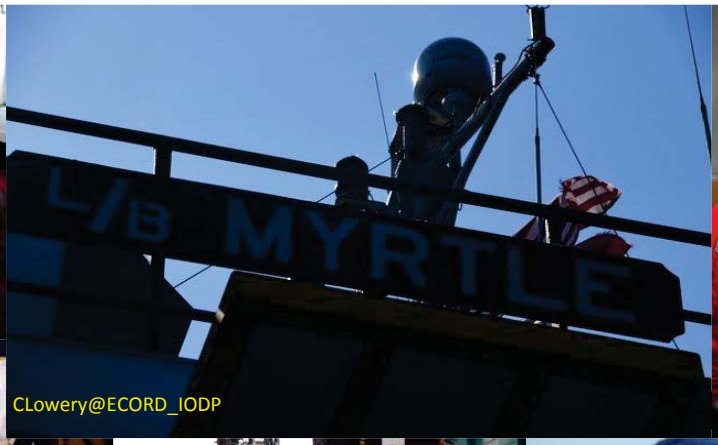

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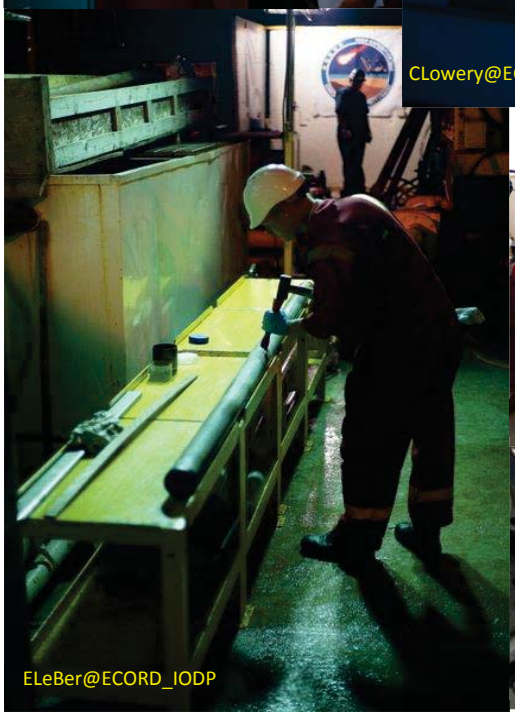
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