Week 7 Drilling and Scientific Report for IODP Expedition 325
Great Barrier Reef Environmental Changes

26th March – 1st April 2010

1. Operations

40 minutes into the 27th March, the 1st core run (an EXN) returned with little recovery and a damaged bit as the heave had lifted the barrel out of hole M0052A. Hole M0052B began at the same location with an ALN long nose bit. A high swell and hole caving resulted in the ALN bit returning damaged and unusable. Several core runs were completed with little recovery in the very loose sediment. The 4th core run ended with the barrel stuck, resulting in tripping the string. Upon recovery the bit was found to be bent and jammed in the BHA. Hole M0052C began, again at the same location. However the barrel for run 2 arrived on deck minus the bit. Consequently the string had to be tripped to see if the bit had lodged in the string. With the bit missing downhole, a new hole (M0053A) was started 6m away. With an improving sea state, HQ coring was attempted utilising a bumper sub on the API string. By late afternoon the wind and sea state had increased again and coring operations were suspended for a while. On resuming operations the bumper sub was set below the drill floor with a 1.5m pup, the drill string washed into the seabed and the seabed template clamped around the API string. Problems ensued with this arrangement with the bumper sub not compensating. After several attempts the bumper sub was removed and API coring commenced. By midnight the seabed template was being recovered.

Tripping and removing the bumper sub and adding API pipe followed through the early morning of March 28th. Coring commenced at 2am and continued with short 1 and 1.5m core runs and at midnight the hole had reached a depth of 30.6 mbsf. The recovery for this type of formation was excellent.

Excellent coring continued with runs 30-33R, until the hole was completed at 3am on March 29th, at 37mbsf. After pulling the pipes to just above seabed and completing a post hole camera survey, the vessel moved to the next site (M0054A) in 110m WD. With the pre hole camera survey completed, the API string was modified by removing the API BHA and replacing it with a TC drag bit, 2 collars and a bumper sub, followed by the rest of the API string. This setup allowed the guide wires to be used on the seabed template, which could not be used with the API BHA due to the smaller diameter OD of the API bit. Once the API string had been set several metres below seabed, the HQ string was prepared and run in the API string. During the 1st core run the HQ popped out at the cross over sub joint due to misalignment between the top drive and where the API had been set. Several core runs later the HQ pipe slipped off the pipe clamp. This was successfully recovered but probably resulted in the next 3 runs returning without core. By midnight the HQ string was being tripped to inspect the HQ BHA.

During the early part of March 30th, the HQ drill string was tripped to investigate the lack of core recovered in a succession of core runs. This took longer than anticipated as the drilling platform is not setup to run and trip HQ efficiently with the API clamped at the drill floor. Core was found inside the BHA and confirmed that the core barrel had not been latching into the BHA. The HQ was run back in the hole. Due to infill, TD was not reached and the string was washed down the last 8m. Coring started and produced the best results so far with a 3m run and almost 100% recovery, with other core runs producing similar results. The recovery was assisted by the rigid carbonate framework, which was consistent with the excellent results from the previous hole, cored using API. After core run 12, 33 mbsf, the hole was complete and setup for through pipe gamma log, with the logging starting just before midnight.

After completion of the through pipe gamma log early on March 31st, the HQ string was tripped to remove the BHA and replace with a shoe thus allowing the logging tools to pass through. The HQ string was run back down the hole and reamed to within 6m of TD. Infill and blocking stopped the HQ reaching the final hole TD. The hole was flushed with fresh water for an hour to attempt to remove the mud for the optical log. The HQ was then lifted and a rod removed. Various manoeuvres with pipes, crossovers, pull through of HQ and locking above the mud pipe were then carried out, finally clamping the HQ at the top of mud valve. With the API connected to the top drive and clamped in the seabed template and the bumper sub lowered to its end stop, the API and hence HQ are in compensation and open hole logging could commence. This whole process was very time consuming and risked swabbing the hole. Infill was experienced when the HQ was lifted off TD. Logging continued for the remainder of the day.

Wireline logging continued for the first few hours of April 1st, with the full suite of tools deployed being the Conductivity, ABI, OBI, spectral gamma, sonic, Idronaut and caliper sondes. This was followed by the

demobilisation of the logging equipment from the rooster box. Through a set of manoeuvres between the HQ and API strings and the top drive similar but in reverse to yesterdays setup, the HQ string was tripped. The post hole camera survey was abandoned after the light failed when the base of the camera frame abruptly stopped on the lip of the bumper sub. With the HQ tripped, the API was recovered to the top of bumper sub for inspection and the seabed template recovered to 20m below sea surface, the vessel then moved to the next site (M0055A). The seabed template was lowered to 10m above seabed, the API string lowered to just above seabed and a pre hole camera survey completed which showed a featureless sandy seabed and no live corals. The seabed template was then lowered to the seabed, the API string lowered and washed 3.29m into the seabed and set in an elevator at the drill floor and the HQ string run. Coring started at just after 7pm and continued for the rest of the day recovering excellent cores.

2. Hole summary

Hole	**M0052A**	**M0052B**	**M0052C**	**M0053A**
Latitude	17° 06.06655 S	17° 06.06653 S	17° 06.0669 S	17° 06.07036 S
Longitude	146° 34.57903 E	146° 34.57996 E	146° 34.57963 E	146° 34.57966 E
First core	27/03/2010 00:30	27/03/2010 02:00	27/03/2010 10:20	28/03/2010 02:10
Cores recovered	1X	1R – 4R	1R – 2R	1X – 33R
Drilled length	1.4m	6.9m	1.9m	37.3m
Recovered length	1.3m	0.46m	0.1m	12.18m
Core recovery	92.86%	6.67%	5.26%	32.65%
Depth reached	1.4 mbsf (final depth)	6.9 mbsf (final depth)	8.8 mbsf (final depth)	37.3 mbsf (final depth)

Hole	**M0054A**	**M0054B**	**M0055A**
Latitude	17° 06.042 S	17° 06.042 S	17° 06.11325 S
Longitude	146° 34.60458 E	146° 34.60458 E	146° 34.48198 E
First core	29/03/2010 19:15	30/03/2010 09:15	01/04/2010 20:15
Cores recovered	1R – 6R	1W – 12R	1R – 4R
Drilled length	9.3m	27.84m	10m
Recovered length	2.23m	8.25m	6.22m
Core recovery	23.98%	29.63%	62.2%
Depth reached	18.72 mbsf (final depth)	33.2 mbsf (final depth)	13.29 mbsf

3. Science summary

Hole	Core	Sediment Description	Comments
M0052A	1X	Light grey carbonate sands with benthic forams and Halimeda	
Significant sea swell pulled pipe out of the hole. Re-started as M0052B			
M0052B	1R	Carbonate sediments with broken coral	*Acropora, Pocillopora, Pachyseris,* Favid, Seriatopora
	2R	No recovery	
	3R	Carbonate sediments and broken coral fragments	
	4R	No recovery	
Core barrel became stuck so API pipe was tripped. Re-started hole as M0052C			
M0052C	1R	Carbonate sediments with rubble including some coral fragments	
	2R	No recovery	
M0053A	1X	Grey carbonate sands, gravels and pebbles consisting of broken corals and coralline algal bindstones	
	2R	Carbonate sediments with benthic forams, molluscs, Halimeda and orange grains	
	3R & 4R	Broken coral framestone with fragments of coralgal bindstones	massive Acropora palifera/cuneata, Favids
	5R – 7R	Well cored sequences of coralgal framestones composed of massive *Acropora palifera/cuneata* and Favids and branching Acropora and Pocillipora, with thick cm scale crusts of coralline algae containing abundant vermetid gastropods	Indicative of shallow water high energy reef environments

	8R – 11R	Coralgal framestones composed of corals (massive and tabula *Acropora).* Thick coralline algal crusts with vermetid gastropods.	Light brown lithified sediments (microbialite) coating some of the tabular Acorpora colonies.
	12R	Coralgal and microbialite framestone	
	13R	Coral framestone with microbialite	
	14R	Coral framestone with thick microbialite and Favid corals	
	15R & 16R	Coral framestone and Tubipora and microbialite in the core catcher	
	17R & 18R	Framestone with few corals	
	19R & 20R	Framestone with almost all the framework containing microbialite	
	21R	Favid with microbialite framestone	
	22R	Framestone again, but some rubble in the lower part of section 1	
	23R	Framestone	Limited recovery
	24R	Angular rubble fragments	Limited recovery
	25R	Core catcher contained Acropora (?) whilst section 1 was broken Halimeda sand	
	26X	Grainstone	
	27R	Grainstone in the upper section moving into lime sand	
	28R	Coralline algae in the core catcher but no other recovery	Possible that any sand had washed away on recovery
	29R & 30R	Carbonate sands with coral fragments, coralline algal crusts, bivalves, benthic forams and Halimeda	
	31R	Carbonate sands with a massive in-situ coral	Possibly an older Pleistocene coral?
	32R & 33R	Carbonate sands with Halimeda, large benthic forams and echinoderm spines.	
M0054A	1R	Wash material (hole open holed to set API)	
	2R	Continuous coralgal / microbialite framestones	
	3R	Continuous coralgal / microbialite framestones. Corals massive and branching *Acropora*, encrusted with coralline crusts that were in turn covered in microbialite	
	4R	Continuous coralgal / microbialite framestones	
	5R & 6R	No recovery	
Pipe tripped to investigate lack of recovery. BHA found to be blocked by ca. 70cm cored coral material – assigned to 4R			
M0054B	1W	Wash core recovering infill	
	2W	Wash core with no recovery	
	3R	Coralgal-microbialite framestone and carbonate sands and gravels	Drillers logs suggest coring of the reef and not infill started at @14.8 mbsf
	4R	Framework	
	5R	Microbialite framework	
	6R & 7R	Microbialite dominated framestone	
	8R	Microbialite dominated framestone with some corals	
	9R	Massive coral at the top of the section, with lime sand, grainstone and partially unconsolidated Halimeda	
	10R	Lime sand and grainstone	
	11R	Lime sand and gravel	
	12R	Lime sand	
M0055A	1R	Silty sand including planktonic forams, radiolarians, ostracods and benthic forams. Massive Favid coral at the base of the section	
	2R	Framestone containing coral, coralline crust and microbialite	
	3R	Framestone with microbialite	
	4R		

4. HSE Activities / Environmental

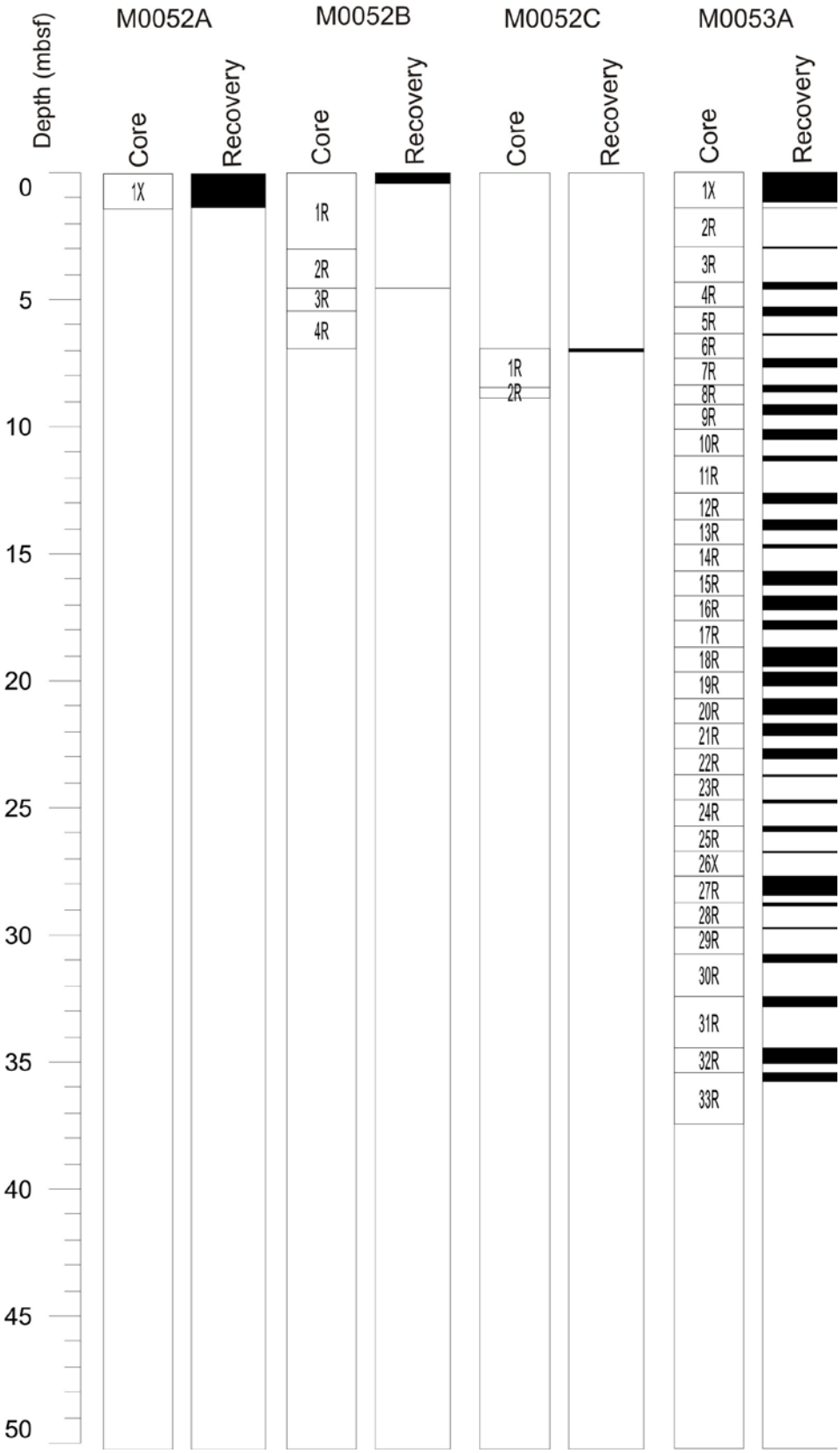
Poor weather conditions prevented transfer of equipment between the supply boat “Acheron” and the “Greatship Maya” whilst on location at Noggin Pass on March 26th. Therefore both vessels moved into Flora Passage to enable a safe ship-to-ship transfer to occur.

The “Greatship Maya”’s crew underwent ISBS training on March 28th.
On March 30th, a member of the science party slipped when walking to the containers along the main deck. Bluestone H&S were notified, and the incident investigated.
Two near miss incidents occurred on the drill floor on March 31st. These were reported to Bluestone H&S, and an investigation was conducted. There was also an oil leak from the main hydraulic power pack . This was rapidly dealt with by Bluestone and GC Rieber personnel, and contained without any impact on the marine park.
On April 1st, a member of the science party slipped after water from cleaning the mezzanine drill floor leaked down onto the main deck. The Bluestone H&S officer closed the walkway, and identified alternative safe routes for personnel to get to the science containers.

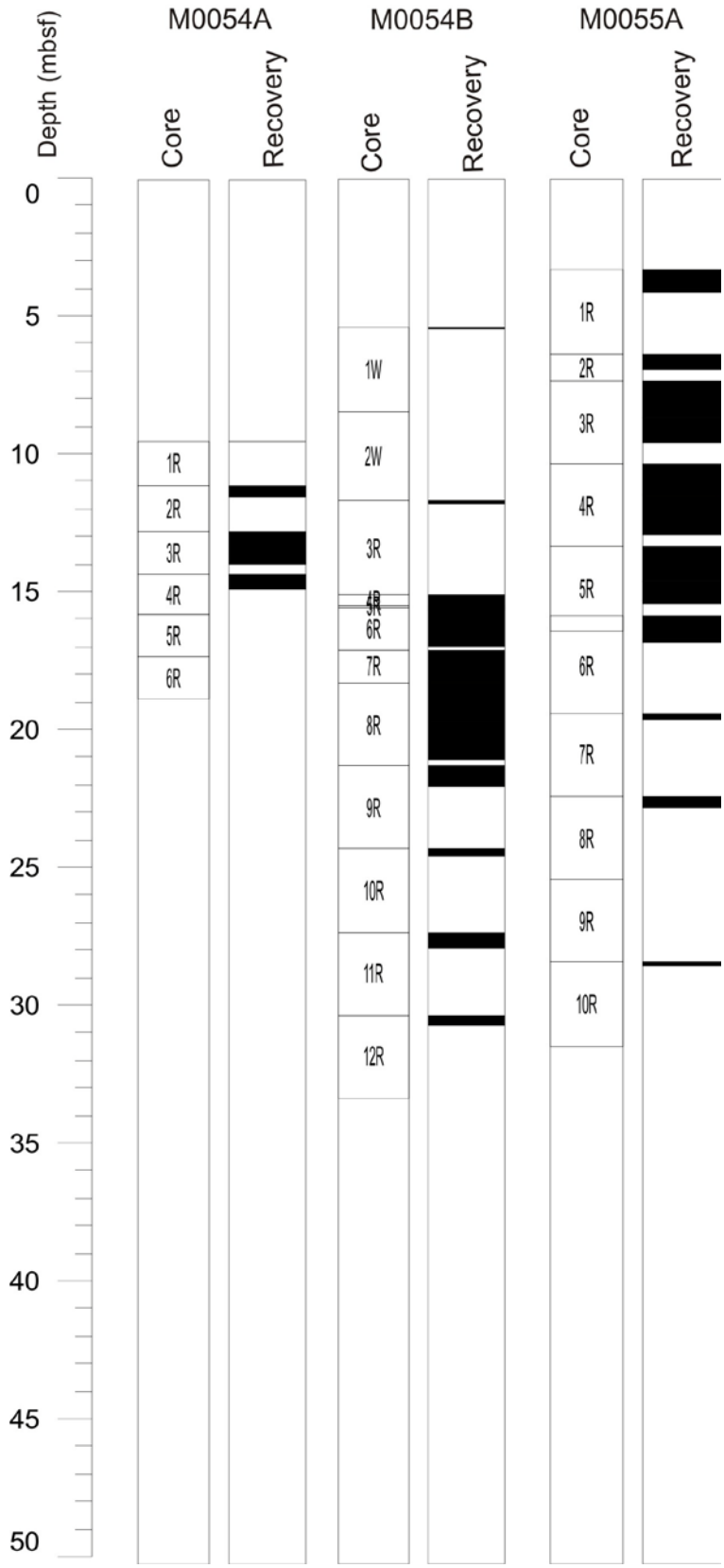
5. Figures

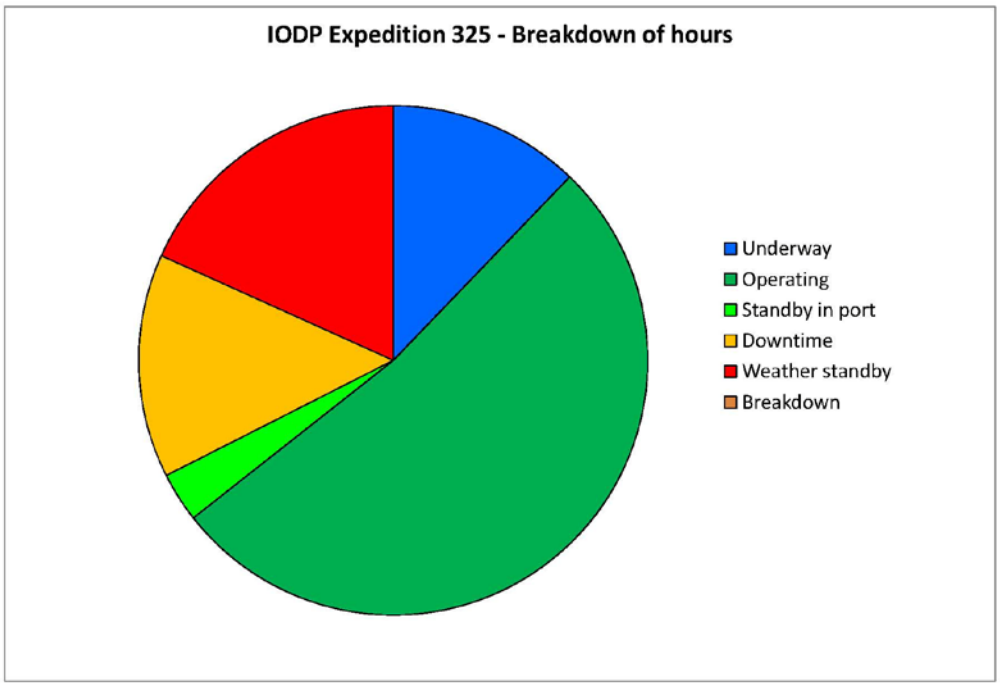
On next three pages:
Figure 1 – Recovery and depth plot for Holes M0052A – M0055A
Figure 2 – Breakdown of hours up to 2400 hrs on 1st April. No contractual implications can be made from this summary.

Expedition 325
Week 7
NOG_01B
Site 6



Expedition 325
Week 7
NOG_01B
Sites 5 and 7





Note on Figure 2. The diagram above includes an estimated “downtime” of 14 hours, “standby in port” of 13.5 hours, “underway” of 45.75 hours and “weather standby” on a named cyclone of 149 hours that occurred off contract.