Daily Drilling and Scientific Report for IODP Expedition 325, Great Barrier Reef Environmental Change

6th March 2010 (0000-2400, local time)

1. Location

HYD_02A Site 10 (M0040A and M0041A) and HYD_02A Site 2 (M0042A)

Time zone: Brisbane Australia Time, UTC +10

Position at midnight (drill string):
Latitude: 19° 50.6388 S
Longitude: 150° 26.8818 E

2. Activity summary

Coring operations continued at site M00040A until the target depth of 21.5m was achieved. The vessel then moved approximately 10m to commence operations at M0041A. This hole was completed at 16:50 at a maximum depth of 22.1m. The post coring camera was deployed and unfortunately became stuck in the pipe. It was recovered at 21:10 and the vessel readied for transit to the next site, HYD_02A Site 2 (M0042A), settling on position at 23:30.

3. Science report

Core 3R in M0040A encountered a hard layer with broken fragments of microbialite recovered from 3-5mbsf. Thin coralline algal crusts and encrusting corals were also observed within the microbialite. Core 4R advanced to 6.5mbsf and recovered broken framestones composed of encrusting corals (Faviid, Acropora?, Goniopora) and thick crusts of microbialite. Core 5R recovered a 70 cm continuous sequence of massive microbialite and coral (Acropora) framestones down to 8.5mbsf. 1-2 cm crusts of bryozoans were observed on top of the microbialite surface. Core 6R advanced to 9.0mbsf and we recovered a 98 cm sequence of continuous framestones – several massive corals clearly observed through the liner, with possibly more internal lithified sediments. Similar material was recovered from Core 7R to a depth of 11.0mbsf. Core 8R recovered 143 cm of coral and microbial framestones. Numerous thin encrusting (and foliaceous?) and massive corals (*Porites*) were observed. A major change in lithology was recorded in Core 9R with a transition from framestones to a cemented grainstone/rudstone(??) to unlithified fine carbonate sands at the base of the section at 14mbsf. Drilling logs confirm a rapid drop at about 13mbsf consistent with a sand layer. This boundary likely represents the base of the upper framestone unit at ~ 139 m below present sea level. The main reef section appears to be about 10 m thick. Cores 10R-13R continued to 21.5 m

with 100% recovery of similar light grey, fine carbonate sands with visible large benthic forams.

Cores 1R from M0041A recovered 2.5 m of unlithified light grey/green carbonate mud or fine sand. The core catcher contained broken fragments of dark well lithified material (microbialite?) Core 2R advanced to 5.4mbsf and recovered about 40 cm of broken framestone? composed of visible corals and microbialite. Core 3R recovered about 38 cm of broken microbialite, corals (*Porites* observed in the core catcher) and some unlithified carbonate sediments between 5.4 and 6.9mbsf. Core 4R advanced to 7.19mbsf and consisted of lime pebbles with fractured framestone in section 1 and solid framestone in the core catcher. Pieces of coral were coated with calcareous algal crusts. Core 5R also seems to have a similar structure, with section 1 containing lime pebbles and the core catcher capturing framestone. Core 6R contained framestone with coral fragments and forams. The facies changed at Core 7R with lime gravel and sand with benthic foraminifers, radiorarian, molluscs and echinoids observed. Core 8R was lime mud and sand. Many types of benthic forams were seen in the core catcher. Section 1 of Core 8R contained fragments of Faviid corals. Core 9R did not recover any sediments, and it appears that penetration was through a very soft sand subsurface. Cores 10R and 11R both contained silty sand with benthic foraminifers. Core 12R, the final core of M0041A, consisted of silty clay with benthic forams.

4. Core recovery details

Hole	M0040A	M0041A
LAT water depth	126.01	126.01
Cores recovered	10	12
Drilled length	18.5m	22.1m
Recovered length	9.64m	10.06m
Recovery	52.11%	45.52%
Depth at midnight	21.5mbsf (final depth)	22.1mbsf (final depth)

5. Weather

Sea state: Slight (3) becoming smooth (2) with swell of <1m; wind direction WSW becoming W force 2 (<6 knots) by mid afternoon; partly cloudy; 30°C.

Next 24 hrs: Sea state slight with swell of ~1m; wind direction variable 5 - 10 knots becoming E/NE in the afternoon; scattered showers.