

**IODP EXPEDITION 307 DAILY SCIENCE REPORTS
29 April–15 May 2005**

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JA Daily Science Report for Expedition 307, 29 April 2005.

LOCATION: Underway to Site U1316 (PORC-4A)

JA Daily Science Report for Expedition 307, 30 April 2005

LOCATION: Site U1316

SCIENCE UPDATE: We arrived on site at 0415 hr, and the first core was on deck at 1120 hr. The upper 50 m of Holes U1316A consists of late Pleistocene (Brunhes) silty clay with dropstones, underlain by a 3 m layer of coral rudstone and floatstone and a further 5 m of silty clay. Below this are Early Miocene sandy siltstones. XCB coring in the siltstones is going slowly, and this may require the addition of RCB coring to the original operations plan.

JA Daily Science Report for Expedition 307, 1 May 2005

LOCATION: Site U1316

SCIENCE UPDATE: Cores U1316A-12X to 21X are lower Miocene greenish grey colored siltstones, with grain size generally decreasing downhole. The siltstone is rich in glauconite and yields microfossils (calcareous nannofossils and foraminifers) and mollusks. Hole U1316A was terminated at 134 mbsf with Core 21X on deck at 20:00 hr, and was prepared for wireline logging.

JA Daily Science Report for Expedition 307, 2 May 2005

LOCATION: Site U1316 (PORC-4A) and Site U1317 (PORC-3A)

SCIENCE UPDATE:

The downhole logging operation in Hole U1316 was started, but the first tool string was prevented from descending more than 5m out of the pipe by an obstruction in the hole. Logging operations were terminated at this point because if the pipe was lowered, there would be very little hole left to log (TD is 134 m), and because we will have the opportunity to revisit the site and log the C hole if time permits.

Cores U1316B-1H to 6H repeated the late Pleistocene silty clay section from U1316A. Core U1316B-7H contains coral rudstone. It was cut into 1.2-m-sections and, after whole-core measurements, was placed in one of the freezers at -50°C so that it could be split while frozen 1-2 days hence, with the aim of retaining the internal

structure of the core on splitting. Hole U1316B was terminated with Core U1316B-8H (18 cm recovery).

Core U1317A-1H (100% recovery) is unconsolidated calcareous mud with coral debris.

JA Daily Science Report for Expedition 307, 3 May 2005

LOCATION: Site U1317 (PORC-3A)

SCIENCE UPDATE:

Cores U1317A-2H to 16H (6.5-130.8 mbsf, >100% recovery) and U1317B-1H to 9H (0-81.5 mbsf, >100% recovery) are coral-bearing floatstone, which shows alternation of light-green calcareous layers and darker less calcareous layers. Cores U1317A-17X and 18X (130.8-137.95 mbsf) are green-grey siltstone. For cores U1317A-2H to 16H, preliminary nannofossil biostratigraphy indicates late Miocene/early Pliocene to early Pleistocene ages.

From headspace gas analysis, methane is very low (1.8-2.4 ppm) in the coral-bearing floatstone (0-130.8 mbsf), and varies irregularly between 30-575 ppm in the green-grey siltstone (130.8-137.95 mbsf). Ethane is absent except for trace quantities below 130.8 mbsf. Sulfate decreases with depth fairly linearly from 26 mmol/l to 5 mmol/l.

JA Daily Science Report for Expedition 307, 4 May 2005

LOCATION: Site U1317 (PORC-3A)

SCIENCE UPDATE:

Cores U1317B-10H to 16H and U1317C-1H to 17H are coral-bearing floatstone, which shows alternation of light-green calcareous layers and darker less calcareous layers. Cores U1317B-17X and U1317C-18X are green-grey siltstone. A major depositional gap separates the coral-bearing unit from the siltstone. Biostratigraphic ages are being updated.

One core (U1316B-7H) was split while frozen with the saw, leading to superior preservation of the structure and corals in the split core face compared to the equivalent core from U1316A, which was split by saw without freezing, as normal.

JA Daily Science Report for Expedition 307, 5 May 2005

LOCATION: Site U1317 (PORC-3A)

SCIENCE UPDATE:

Cores U1317D-4R to 15R (136.2-241.9 mbsf), are calcareous green-grey siltstones, increasing in lithification downhole. RCB coring has proved to be faster and produce less core disturbance than XCB in this material. Cores U1317D-1R to 3R (110.0-136.2 mbsf) had only limited recovery.

JA Daily Science Report for Expedition 307, 6 May 2005

LOCATION: Site U1317 (PORC-3A)

SCIENCE UPDATE: Cores U1317D-16R to 18R (241.9-270.0 mbsf) are calcareous green-grey siltstones. Downhole logging tool strings run in Hole U1317D were the Triple Combo, WST (well seismic tool), and FMS-Sonic. All tool strings reached to within 20m of the base of the hole, and the pipe was set at 90 mbsf. The WST was run as the second tool string so that the air gun would be operated during the daylight hours. A marine mammal watch was in effect, and none were seen.

A science meeting was held to discuss the results and initial interpretation of Site U1316.

JA Daily Science Report for Expedition 307, 7 May 2005

LOCATION: Site U1316 (PORC-4A)

SCIENCE UPDATE: After completing downhole logging operations at Hole 1317D, we returned to Site U1316 to recover the lower part of the section by RCB coring (40.0-143.1 mbsf, 68% recovery). Core U1316C-2R contained the coral rudstone and mound-base-equivalent horizon previously seen in the first two holes at the site. Cores U1316C-3R to 11R are bioturbated calcareous green-grey siltstones.

Cores U1317C-1H to 5H were split with the saw after being frozen to approximately -50°C for 2 days. This resulted in a good preservation of the internal core structure (coral floatstone and rudstone) and a marked improvement over orthodox core splitting. Short ice expansion cracks (<1cm long) were observed in many of the cores.

Methods: After splitting, the half-cores had to be lifted into new liners because, despite the use of core patches, the liners were shattered and fragile from the freezing process. They were then placed in the walk-in freezer to equilibrate to approximately -10°C, after which the split-core surface could be cleaned by scraping. From previous experience among the science party with non-IODP cores, a saw blade with a fine diamond edge produces a cleaner cut-surface than the notched saw blade in the corelab core splitting room.

JA Daily Science Report for Expedition 307, 8 May 2005

LOCATION: Site U1316 (PORC-4A), Site U1318 (PORC-2A)

SCIENCE UPDATE: Downhole logging at Hole U1316C included the Triple Combo and FMS-sonic tool strings, which both reached that bottom of the hole at 143 mbsf. The pipe was set at 58 mbsf and raised by 15m for the final FMS-sonic pass. Several thin (<2m) high density, high velocity, low porosity beds interrupt a steady compaction trend with depth, and it is likely that they can be linked to reflectors on the seismic section.

Cores U1318A-1H to 4H are late Pleistocene silty clay.

JA Daily Science Report for Expedition 307, 9 May 2005

LOCATION: Site U1318 (PORC-2A)

SCIENCE UPDATE: Cores U1318A-5H to 10H (37-87 mbsf) and U1318B-1H to 10H (0-87 mbsf) are late Pleistocene gray-brown laminated silty clay. Cores U1318A-10H to 15H (87-140 mbsf) and U1318B-10H to 21X (87-195 mbsf) are pale greenish nannofossil-rich siltstone. The silty clay is separated from the nannofossil siltstone by a 40-cm-thick oyster bed in Core U1318A-10H (87 mbsf).

JA Daily Science Report for Expedition 307, 10 May 2005

LOCATION: Site U1318 (PORC-2A)

SCIENCE UPDATE: Cores U1318B-10H to 21X (195.0-244.6 mbsf) are greenish nannofossil-rich siltstone. Downhole logging in Hole U1318B comprised the Triple Combo and FMS-Sonic tool strings, both of which reached the base of the hole. The pipe was set at 70 mbsf.

A science meeting was held to discuss the results from Site U1317.

JA Daily Science Report for Expedition 307, 11 May 2005

LOCATION: Site U1318 (PORC-2A), Site U1317 (PORC-3A)

SCIENCE UPDATE: Cores U1318B-1H to 3H (0-86 mbsf) (the interval between 1H and 2H (2.9-70 mbsf) was drilled without coring) are late Pleistocene gray-brown laminated silty clay. Cores U1318B-3H to 10X (86-144.9 mbsf) are greenish nannofossil-rich siltstone. The silty clay is separated from the nannofossil siltstone by an oyster bed in Core U1318C-3H.

The ship then returned to Challenger Mound for Hole U1317E. Cores U1317E-1H to 17H (0-155.3 mbsf, 103.1% recovery) are predominantly floatstone, wackestone, and rudstone. A lithified layer immediately underlying the mound sediments was recovered in the core-catcher sample of U1317E-17H. Core U1317E-18H (155.3-158.6 mbsf) is greenish gray clayey silt, and was the final core before starting the transit to the Azores.

Expedition 307 recovered a total of 1393 m of core from eleven holes at three sites.

JA Daily Science Report for Expedition 307, 12 May 2005

UPDATE: Underway from Site U1318 to Ponta Delgada, the Azores.

JA Daily Science Report for Expedition 307, 13–15 May 2005

UPDATE: Underway to Ponta Delgada, the Azores.
