

IODP Expedition 329: South Pacific Gyre Microbiology

Week 6 Report (13-20 November 2010)

OPERATIONS

The sixth week of IODP Expedition 329 began running into Hole U1368F at 747.73 mbrf. After reaching 3741 mbrf, the top drive was picked up and the drill string was spaced out to spud Hole U1368F. Water depth was recorded at 3751.9 mbrf using an offset depth from Hole U1368E. Rotary coring began at the seafloor when Hole U1368F was spudded at 0520 hours on 14 November. Core U1368F-2R crossed the sediment/basalt interface at 11.8 mbsf. RCB coring continued from 11.8 mbsf to 115.1 mbsf. A total of 115.1 m were cored with a recovery of 31.74 meters or 27.6%. PFT was mixed in with the drilling fluid (sea water) and pumped on all cores for contamination testing. Microspheres were also deployed on all RCB cores after Core U1368F-2R. After reaching a total depth of 115.1 mbsf, the center bit was deployed and the hole was conditioned for logging. The mechanical bit release was activated, dropping the RCB bit at the bottom of the hole. The drill string was tripped to ~30 mbsf and the logging tools were rigged up and deployed. Four logging runs, two with the triple combo and the other two with the FMS tools string (no Sonic) were performed successfully. At the end of logging activities the tools were rigged down and the drill string was then tripped back to the rig floor and secured for the 1073 nm transit to the next site, ending Hole U1368F and Site U1368 at 1233 hours on 18 November. The vessel continued its sea voyage to Site U1369 through the end of the week, finishing Week 6 405 nm from the site.

SCIENCE RESULTS

During Week 6 of Expedition 329, scientists processed, described and analyzed core and interstitial water samples from Site U1368 (Scientific Prospectus Site SPG-6A). They presented the highlights of the scientific results of Site U1368 at the science meeting and discussed them in the shipboard reports. The co-chief scientists presented an overview of the scientific objectives for Site U1369.

The sedimentary record at Site U1368 spans a ~16 m section of pelagic clay, clay-bearing nanofossil ooze with foraminifers, and basaltic sand deposited over a 13.4 to 13.6 Ma basement. The basaltic rocks recovered from the upper 100 m of basement vary from microcrystalline to glassy sparsely phyric pillow basalt, to microcrystalline aphyric vesicular basalt, to cryptocrystalline pillow basalt, to coarse-grained breccia with clasts of basaltic glass and basalt fragments.

Hole U1368F was successfully wireline logged using the triple combo and FMS tools. The data collected were sent to LDEO for processing. Downhole measurements, in combination with physical properties measurements made in the petrophysics laboratory, will be used for characterization of stratigraphic sequences, assessment of alteration, and reconstruction of the basement stratigraphy at Site U1368.

A broad range of microbiology experiments were initiated onboard the *JOIDES Resolution*. These included experiments on major microbial processes and microbial cell enumeration at selected depths ranging from near the sediment/water interface and into the basaltic basement. Likewise, a broad suite of chemical species was measured on samples of interstitial water and solid phase. Onboard measurements and sample processing continued to focus on understanding microbially mediated chemical processes, chemical fluxes between the sediment and the underlying basalt, and the potential of radiolysis to support microbial metabolism.

The main scientific objectives for our next site, U1369, are to determine the nature of subseafloor microbial communities in this organic-poor sediment and how habitability, microbial activity and community composition vary from gyre center (Site U1368) to midway to the southern edge of the gyre (at Site U1369), as well as with basement age. Scientists will be able to answer these questions by verifying if oxygen, dissolved nitrate, phosphate, total nitrogen and organic carbon extend through all ~21 m of sediment, and by finding out if living microbes persist in this sediment for 58 m.y.

By week's end, hard rock cores from Sites U1365 and U1367 were unpacked and displayed in the Core Laboratory where scientists interested in sampling the basaltic rocks began to examine the cores and prepare for the hard rock sampling party. All expedition participants gathered at the bow of the ship for the customary expedition group photo.

TECHNICAL SUPPORT AND HSE ACTIVITIES

This week the technical staff supported the processing and data collection for the cores recovered from Site U1368. A fire and boat drill was held on Sunday 21 November.