

IODP Expedition 329: South Pacific Gyre Microbiology

Week 9 Report (5–12 December 2010)

OPERATIONS

Week 9 of Expedition 329 began with the vessel coring on Core U1371E-7H. The APC coring system was used to take 14 cores to 128.2 mbsf with 118.16 m recovery for a recovery percent of 92.2%. Non-magnetic core barrels were used for the first 12 cores. PFT was mixed in with the drilling fluid (sea water) and pumped on all cores for contamination testing. After Core U1371E-14H, the bit was advanced and rotated into basement to verify basement depth and then the bit was tripped back to just above the seafloor ending Hole U1371E at 1100 hr on 5 December.

Three more holes were cored at Site U1371. Hole U1371F was offset 20 m south of Hole U1371E. The mudline core established a seafloor depth of 5308.3 mbrf. 14 cores were taken with the APC system to 130.6 mbsf with 118.44 m core recovery (90.7 %). After Core U1371F-14H, the bit was advanced and rotated into basement to verify basement depth and APC advance. Hole U1371G was offset 20 m south of Hole U1371F. The mudline core established a seafloor depth of 5314.1 mbrf. The APC system was used to take a single core to 1.4 mbsf with 1.37 m recovery. After taking mudline Core U1371G-1H, a second core, Test Core U1371G-2H was taken for training purposes for the next expedition scientific party. Hole U1371H was offset 20 m west of Hole U1371G. Seafloor depth was established with a mudline core at 5310.3 mbrf. The APC system was used to take a single core to 6.2 mbsf with 6.19 m recovery (99.8%). PFT was mixed in with the drilling fluid (sea water) and pumped on all cores for contamination testing. After taking mudline Core U1371H-1H the drill string was then tripped to the surface, clearing the rotary table at 2326 hours on 6 December. The rig floor was secured for the 1172 nm transit to Auckland, NZ, ending Site U1371 operations at 2326 hr on 6 December.

At the end of week nine, the vessel was still underway to Auckland, NZ, having transited 875 nmi at an average speed of 9.0 knots. The distance remaining to Auckland is 298 nmi and the ETA as of midnight on 11 December is 0500 hours on 13 December at the pilot station, and 0700 alongside Wynyard Wharf in Auckland.

SCIENCE RESULTS

During the last week of Expedition 329, the scientific party processed, described and analyzed core samples and data from Site U1371 (Scientific Prospectus Site SPG-12A). Expedition scientists presented the highlights of the Site U1371 results at the science meeting and documented them in the site reports. All expedition reports, including the Preliminary Report, were finalized.

Site U1371 is located in the southwestern edge of the South Pacific Gyre at a water depth of ~5310 m, in a region of abyssal hill topography. The closest previous drilling site is ODP Site 276,

800 nautical miles away. The site location lies within magnetic polarity Chron 32n.2n. Therefore, the crustal age may range from 71.5 Ma to 72.9 Ma. The principal objective at the last site of the expedition is to determine the habitability, activity and microbial community composition in the seafloor sediments just outside the southernmost edge of the South Pacific Gyre.

The sedimentary section at Site U1371 was recovered by advanced piston coring in Holes U1371D, U1371E and U1371F. Additional mudline cores were recovered in Holes U1371B, U1371C, U1371G and U1371H. The sediment at Site U1371 consists of ~130 m of diatom ooze and pelagic clay, divided into two units based on their sharply contrasting mineralogy. Unit I is clay-bearing diatom ooze. It is 104-107 m thick. It contains numerous ash layers and multiple thin hardgrounds. Unit II is a blend of clay, zeolite and red-brown to yellow-brown semi-opaque iron-manganese oxyhydroxides. Altered basaltic fragments were recovered from the basal core of Hole U1371F.

All cores from the biogeochemistry and microbiology assigned holes were sampled initially in low resolution on the catwalk soon after core recovery, and later in high resolution in the hold deck's core refrigerator for a broad range of biogeochemical experiments and microbiological studies. Microbiology experiments on major microbial processes and cultivations of viable microbes were initiated shipboard with samples taken at selected depths ranging from near the sediment-water interface to the sediment-basalt interface. Subsamples were routinely taken from all of the distinct lithologic units for post-cruise molecular experiments.

All Site U1371 and all Expedition 329 reports were completed and submitted to the shipboard Publication Specialist. The official Expedition 329 logo was selected and posted along side of the official logos of the previous IODP expeditions.

TECHNICAL SUPPORT & HSE ACTIVITIES

This week the technical staff supported the processing and data collection for the cores recovered from Site U1371. All measurements were completed on all cores recovered at the last site of Expedition 329. All samples and third party instrumentation are being packed up and prepared for shipping. All shipboard laboratories are being cleaned and readied for the next expedition.