

Expedition 320: Pacific Equatorial Age Transect (PEAT I)
Week 1 Report (5-13 March 2009)

15 March 2009

OPERATIONS

Expedition 320 officially began when the first line was passed ashore to Pier 29 of Honolulu harbor at 1042 HST on 5 March 2009. Following the routine U.S. customs and immigration formalities, port call activities were initiated with the changing and crossover of ODL and IODP personnel. The expedition scientists boarded the ship on 6 March.

During the ~5 day port call, the usual food stocks and provisions were loaded and off-going freight disembarked. Items of note that were loaded in Honolulu included approximately 707 MT of marine gasoil, 147 short tons of bulk attapulgit, 7 joints of 20" casing, 16 joints of 16" casing, and 46 joints of 10 3/4" casing. Other significant items were comprised of two boxes of core liners and two reentry cone assemblies.

In accordance with the port call plan, customer service representatives came on the vessel to perform maintenance and repair on the ship's elevator and the HVAC system. A Siemens engineer also performed upgrades to the throttle system program.

A number of shipboard tours were conducted for the IODP Science and Technology Panel (STP), several classes from the University of Hawaii, and for NSF visitors.

Of the unplanned events, a replacement refrigerated food container had to be leased at the last moment because the 10-foot auxiliary unit located on the accommodation roof could not be repaired in the time available. The U.S. Coast Guard interrupted the loading of compressed gas cylinders on 9 March for nearly an hour to address concerns relating to the handling of these items at this facility.

Following the release of the last line from the pier at 1500 hr on 10 March, the *JOIDES Resolution* exited the harbor and rendezvoused with a small vessel in the pilotage area. Once the vessels were alongside each other, a radioactive source and two neutron tools required for the logging effort were lifted aboard. The vessel then departed at full speed to the first site (PEAT-1C) with an expected arrival the evening of 14 March.

SCIENCE

As the world's largest ocean, the Pacific is intricately linked to major changes in the global climate system. Throughout the Cenozoic, Pacific plate motion has had a northward component. Thus, the Pacific is unique in that the thick sediment bulge of biogenic-rich deposits from the currently narrowly focused zone of equatorial up-welling is slowly moving away from the Equator. Previous drilling in this area during Ocean Drilling Program (ODP) Legs 138 and 199 was remarkably successful in giving us new insights into the workings of the climate and carbon system, productivity changes across the zone of divergence, time-dependent calcium carbonate dissolution, bio- and magnetostratigraphy, the location of the Intertropical Convergence Zone (ITCZ), and evolutionary patterns for times of climatic change and upheaval. Together with older Deep Sea Drilling Project drilling in the eastern equatorial Pacific, both legs also helped to delineate the position of the paleoequator and variations in sediment thickness from ~150°W to 110°W. The Pacific equatorial age transect (PEAT) science program is based on Integrated Ocean Drilling Program (IODP) Proposal 626 and consists of Expeditions 320 and 321, grouped into one science program. The goal is to recover a continuous Cenozoic record of the equatorial Pacific by drilling at the paleoposition of the Equator at successive crustal ages on the Pacific plate. Records collected from Expeditions 320 and 321 are to be joined with records of previous drilling during ODP Legs 138 and 199 to make a complete equatorial Pacific record from 0 to 55 Ma. Previously, ODP Legs 138 and 199 were designed as transects across the paleoequator in order to study the changing patterns of sediment deposition across equatorial regions at critical time intervals. As we have gained more information about the past movement of plates and when in Earth's history "critical" climate events took place, it becomes possible to drill an age transect ("flow-line") along the position of the Pacific paleoequator. The goal of this transect is to

target important time slices where calcareous sediments have been best preserved and the sedimentary archive will allow us to reconstruct past climatic and tectonic conditions. Leg 199 enhanced our understanding of extreme changes of the calcium carbonate compensation depth (CCD) across major geological boundaries during the last 55 m.y. A very shallow CCD during most of the Paleogene makes it difficult to obtain well-preserved sediments during these stratigraphic intervals, but the strategy of site locations for the current two expeditions is designed to occupy the most promising sites and to obtain a unique sedimentary biogenic sediment archive for time periods from the early Eocene Climatic Optimum (EECO), Eocene cooling, the Eocene–Oligocene transition, the “one cold pole” Oligocene, the Oligocene–Miocene transition, and the Miocene. These new cores and data will significantly contribute to the objectives of the IODP Extreme Climates Initiative and will provide material that the previous legs were not able to recover. For logistical reasons, the PEAT science program is composed of two expeditions but is being implemented as a single science program to best achieve the overall objectives of Proposal 626. Participants on both expeditions will comprise a single science party with equal access to data and materials from both cruises. Sampling aboard the ship will be minimal, and the bulk of the sampling will be completed postcruise. The operational plan is to occupy eight sites along the age transect with the goal of recovering as complete a sedimentary succession as possible. This will probably require three holes to be cored at each site with wireline logging operations in one hole. Basement will be tagged in at least one of the holes. Expedition 320 will primarily core the Paleogene sites (Sites PEAT-1C, 2C, 3C, 4C, and 6C). Expedition 321 will primarily core the Neogene sites (Sites PEAT-5C, 7C, and 8C).

The scientists spent the first week of the expedition learning their labs, documenting the methods they will use, developing their shipboard sampling plans, and learning what they must accomplish during the expedition.

HSE AND TECHNICAL SUPPORT ACTIVITIES

The Expedition 320 technical staff boarded the vessel on March 5 at 1400 hrs. An intensive crossover and training with the off coming crew began March 6 and continued

throughout the remainder of port call. Representatives from the Texas A&M Health, Safety, and Environment Department conducted an audit of the new laboratories. A SyQwest company representative commissioned the new SyQwest depth sounder.

On March 6 an introductory meeting was held with the science crew. All trash was collected and offloaded before departure. Equipment and laboratory spaces were secured for sea prior to sailing. On March 8, all scientists and USIO staff attended the Captain's introduction and initial safety orientation including lifeboat tours. A fire and boat drill was conducted on 11 March for the entire crew.

During the ~4 day transit to the first site the technical crew continued preparing the shipboard laboratories and introduced the scientific participants to the laboratory procedures and methods.