

IODP Expedition 328: Cascadia Subduction Zone ACORK Observatory

Week 1 Report (5–11 September)

OPERATIONS

Expedition 328 began at 0836 hr on 5 September 2010 when the first line was passed ashore at Ogden Point Pier A in Victoria, B.C. After quickly clearing customs and immigration formalities, the normal crossover activities began with the IODP crew change.

The routine handling of on-going and off-going shipments included the disposition of hardware from Expedition 327 and loading of Expedition 328 ACORK-related equipment. Maintenance activities included replacement of the inboard logging sheave in the derrick. During the procedure it was discovered that the new shaft was too short. The old shaft was inspected and deployed with the new sheave and will be replaced when the vessel returns to Victoria. At that time the outboard sheave will be also be replaced. This work is being done in accordance with the Schlumberger maintenance requirements.

The vessel departed Victoria for Site U1364 (CAS-01CORK) when the last line was released at 1606 hr on 9 September. After maneuvering away from the pier, the vessel began the short 145 nmi transit to the site at 1700 hr. The ship arrived on location at 0600 hr on 10 September concluding a transit that averaged 11.2 knots.

The initial operational objective was to perform a jet-in test to verify the water depth and establish the conductor casing length to be deployed with the re-entry cone. The VIT was deployed to observe the bit contacting the seafloor at 1329.0 mbrf, and the jet-in test was conducted reaching 55 mbsf. The re-entry cone and 53 m of 16 inch casing were then successfully jetted in.

SCIENCE

The operational objective of Expedition 328 is the installation of a new permanent hydrologic borehole observatory near Ocean Drilling Program Site 889. The format of the new installation will follow the Advanced CORK (ACORK) design, which will facilitate pressure monitoring at multiple formation levels on the outside of a 10³/₄ inch casing string. The casing will be sealed at the bottom, leaving the inside available for future installation of additional monitoring instruments. The successful installation of the observatory will allow documentation of the average state of pressure in the frontal part of the Cascadia accretionary prism, the pressure gradients driving flow from the consolidating sediments, the mode of formation of gas hydrates, the influence of gas hydrates and free gas on the mechanical properties of their host lithology, the response of the material to seismic ground motion, and the magnitude of strain at the site caused by episodic seismic and aseismic slip in this subduction setting. At a later date, the observatory will be connected to the NEPTUNE fiber-optic cable for power and real-time communications from land.

Portcall activities included introductory and operational/engineering meetings. Pressure instrumentation was installed on the ACORK and the plumbing was pressure tested.

OUTREACH AND SCHOOL OF ROCK

During port call, a press conference and nine ships tours were conducted for the public, IODP-Canada, and the US National Research Council Committee on Scientific Ocean Drilling. Several media hits from the press conference beyond those in attendance have resulted. IODP-Canada sponsored lectures and a reception on scientific ocean drilling the evening of 7 September.

The Expedition 328 School of Rock participants have been spending their busy 12 hour shifts in a variety of ways that take advantage of the unique expertise and resources on board the ship. From a selection of cores shipped from the Gulf Coast Repository, participants have been recording observations and describing sediment smear slides that they will use to make inferences about the past sedimentation history of the Pacific Ocean. Through daily Science Cafes and “field trips” facilitated by a range of ship personnel, instructors, staff scientist, laboratory technicians, ship staff and participants themselves, the group has explored a range of topics that relate to the current expedition, scientific ocean drilling, and communicating science. The 18 participants are developing their education and outreach plans that will involve taking various aspects of their experience and translating it into usable programming and/or activities for different audience. These products will be hosted from the Deep Earth Academy website.

TECHNICAL SUPPORT AND HSE ACTIVITIES

The weekly fire and boat drill was held as scheduled.

Staff provided support for science, education and engineering projects. Laboratory projects in progress included receiving and stowing shipments from the port call. Supplies are being sorted in preparation for the South Pacific Gyre expedition. The Liquid Scintillation Counter (LSC) was installed in the microbiology isotope van and all equipment in the van was tested. A new towed magnetometer was temporarily installed on the fantail, the supporting electronics were installed in the underway laboratory and the software was configured and tested. Permanent installation is ongoing.