IODP Wilkes Land Expedition (318)
Week 1 Report; 3-9 January 2010

OPERATIONS

The Wilkes Land Expedition (318) began when the first line was secured to Aotea Quay, Centre Port, Berth 5 in Wellington, New Zealand at 1420 hr on 3 January 2010. As soon as the routine customs and immigration formalities were concluded, the off-loading of surface freight was initiated.

The Wilkes Expedition USIO staff and Co-Chief Scientists boarded the ship on 4 January. In addition to the routine replenishment of expendables and the offloading of the previous expedition's cores and returning freight, we loaded 740 MT of marine gasoil, repaired one of the thrusters and a propulsion motor, conducted lab/ship tours for guests and visiting dignitaries, mounted the wind wall on the core receiving platform, and installed a new touch screen rig instrumentation monitor in the drillers console.

Because this is a high-latitude expedition that will operate in the challenging environment off the coast of Wilkes Land, Antarctica, two critical specialists were added to the shipboard team. A senior weather forecaster with previous IODP expedition experience, joined the vessel to provide timely analysis of the complex weather environment of the Southern Ocean. A seasoned ice observer with extensive familiarity in both the Arctic and Antarctic regions also joined the expedition. The combined skill-set provided by these participants enhances the safety of the vessel and will optimize the ability of the crew to maximize on-site operational flexibility.

The vessel departed on the 1847 nmi journey to the first site when the last line was released from the dock at 1045 hr on 9 January. The vessel sailed at full speed, except a short time during which the brushes on a propulsion motor (16A) had to be replaced. By midnight on 9 January, the ship had sailed 116 nmi at an average speed of 9.3 kts.

The ship is transiting a SSW course off the east coast of the east coast of New Zealand's South Island with an estimated arrival at our first site on 17 January. Preliminary analysis of ice coverage appears promising for our first site (WLRIS-09B) with weather in the region is currently 0.2° C with winds from the ESE increasing to 35-40 knots; cloudy with occasional snow or sleet.

SCIENCE

The first week of the Wilkes Land expedition was dominated by port call and scientist orientation activities. The scientists boarded the ship on 6 January and we conducted laboratory tours and held numerous meetings covering introductions, lab safety, life on board, computer resources, and expedition scientific objectives.

The Wilkes Land expedition focuses on understanding the evolution and dynamics of the Antarctic cryosphere, from its inception during the Eocene–Oligocene transition (~33 Ma) through the significant periods of climate change during the Cenozoic. This is not only of major scientific interest but also is of great importance for society. The transition from Greenhouse to Icehouse Earth conceivably was the most significant step in large-scale planetary change, impacting global sea level, albedo, and oceanographic and biotic evolution, among other changes. State-of-the-art climate models combined with paleo-climatic proxy data suggest that the main triggering mechanism for initial inception and development of the Antarctic glaciation was the decreasing levels of CO_2 concentration in the atmosphere. With current rising atmospheric greenhouse gases resulting in rapidly rising global temperatures, studies of polar climates, and the Antarctic cryosphere behavior in particular, are prominent on the research agenda.

Drilling the Antarctic Wilkes Land margin is designed to provide a long-term record, obtained from sedimentary archives along an inshore to offshore transect, of Antarctic glaciation and its intimate relationships with global climatic and oceanographic change. Stratigraphic interpretations indicate that the Wilkes Land record will include the critical periods in Cenozoic Earth climate evolution when the cryosphere formed, likely in step-wise fashion, and subsequently evolved to assume its present day configuration.

The principal goals are (1) to obtain the timing and nature of the first arrival of ice at the Wilkes Land margin (referred to as the "onset of glaciation") inferred to have occurred during the earliest Oligocene (Oligocene isotope event-1), (2) to obtain the nature and age of the changes in the geometry of the progradational wedge interpreted to correspond with large fluctuations in the extent of the East Antarctic Ice Sheet (EAIS) and possibly coinciding with the transition from a wet-based to a cold-based glacial regime (late Miocene–Pliocene?), (3) to obtain a high-resolution record of Antarctic climate variability during the late Neogene and Quaternary, and (4) to obtain an unprecedented, ultrahigh resolution (i.e., annual to decadal) Holocene record of climate variability.

TECHNICAL SUPPORT AND HSE ACTIVITIES

The Wilkes Land Expedition technical staff boarded the vessel at 0900 hrs on 4 January. Crossover and training with the off coming crew extended through the entire port call. Cores were off loaded on January 4 and 5 to be shipped to the GCR. Off going freight was sent to College Station. Surface freight and airfreight were loaded.

The technical staff provided introductions to the shipboard laboratories as well as safety. Before departure, all trash and equipment were secured for sea. During the transit to the first site the technical crew continues to work with the scientists to prepare the labs for coring operations. A boat and fire drill was held for all hands on January 10.