

First riser-drilling research operations undertaken in Nankai Trough Seismogenic Zone

June 29 2009

Deepsea Drilling Vessel CHIKYU has resumed IODP drilling operations in the Nankai Trough Seismogenic Zone off the Kii Peninsula of Japan. The scientific drilling expedition's first target is located in water depths of 2,054 meters. Following sea floor surveys, the crew began fitting riser pipe and a blow-out prevention (BOP) system into an upper section of the first borehole to be drilled.

The riser pipe and BOP (the blow-out preventer) was successfully connected to the wellhead. After testing the circulation of the [drilling](#) fluid, the first riser-drilling operations for CHIKYU in the history of scientific ocean drilling began. The British Broadcasting Corporation (BBC) chronicled the lead-in to this historic activity, the first media organization outside Japan to broadcast live from aboard CHIKYU.

The target drilling depth at the first borehole is 1,600 meters below the seafloor. Following drilling operations, vertical seismic profiling (VSP) is expected to begin as part of geophysical logging.

Riser-drilling involves a large marine riser pipe that connects the CHIKYU to the seafloor. The riser pipe guides the drill pipe as it reenters the well. Drilling fluid is pumped up and down between the riser pipe and the drill pipe. Fluid circulation and use of the blow-out preventer (BOP) help to maintain pressure balance within the borehole and prevent it from collapsing, enabling safer and deeper drilling.

CHIKYU is the world's first scientific drilling vessel capable of riser-drilling deep beneath the ocean floor and in seismogenic (earthquake-producing) zones that have never been reached before.

The Nankai Trough subduction zone, located southwest of Japan, is one of the most active earthquake zones on the planet, with complex geological formations caused by tectonic plate thrusts. The scheduled drill site, the Kumano Basin, is a fore-arc basin of the Nankai Trough under the influence of the strong Kuroshio ocean current. In combination with inclement weather expected, due to passing typhoons, and riser drilling down to depths of more than 2,000 meters below surface, this phase of NanTroSEIZE is considered one of the most challenging tasks in ocean-drilling history.

The average speed of the Kuroshio current in the surveyed area is about 1.0 knots, relatively slow for the current speed usually observed in the Kumano Basin. Yet, fairings are to be mounted onto to a riser pipe to smooth the hydrodynamic flow behind the riser pipe (to reduce riser drag) and suppress the vortex-induced vibration under high current conditions. The motion of the riser also will be monitored for analysis, in order to use the results in future operations.

Source: Integrated Ocean Drilling Program Management International

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