

Borehole stability discussion of NanTroSEIZE main-site, C0002

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Three IODP expeditions run for the Nankai subduction zone had accomplished in 2014. Chikyu carried out the drilling operations and collected much valuable data including LWD, core samples and wireline loggings. This site is planned to drill 7 kilometers recovering the fault zone material and on-site experiments data. In the beginning, C0002A borehole was drilled from 1964.5mbrf (0 mbsf) to 3336 mbrf without any problem. The drilling was complete in one week on 18th October 2007. This riser-less drilling used seawater (1.03S.G) for drilling mud. In this riser-less drilling, we can observe the clear breakout in entire borehole from shallow to deep. Due to the difficulties of drillings in the following expeditions, next stage of drilling in this site, exp.338, was started in the first of October 2010, C0002F kept drilling 12.24-inch LWD borehole to 3973 mbt (20005.5 mbsf) and changed to drill in riser-less due to the BOP line leakage, C0002F was abandoned at this depth by suddenly increasing wind. Exp.348 faced the difficulties in very early stage (in the C000F cementing section). The sidetrack borehole, C0002P, overcame the high fractures zones and highly tilted structure to reach the center of inner accretionary wedge. Very few breakout occurred in both riser drillings, the big amount of cutting recovered indicated the weak formation collapsed and enlargement of borehole radius. However, these drillings could not pass through the fault zone yet. In this research we listed the related drilling parameters in these boreholes and construct the borehole stability model to explain the possible reason of drilling difficulties. Depending on 2-D stress model in each borehole. The major reason maybe the high and over mud weights apply on the borehole in the low principal stress environments.

Keywords: IODP, NanTroSEIZE, LWD, borehole stability, stress