Contribution ID: **3** Type: **Oral**

Antarctic movable drilling rig: General concept and test results

Tuesday, October 1, 2019 2:20 PM (20 minutes)

To drill through ice and bedrock, Antarctic Subglacial Drilling Rig (ASDR) with a new, modified version of the cable-suspended Ice and Bedrock Electromechanical Drill (IBED) have been developed in Jilin University. The drilling facilities are divided into two groups: those associated with the movable drilling shelter and those associated with the movable workshop. The drilling winch, control desk, drilling fluid station and other auxiliaries are installed inside a movable sledge-mounted warm-keeping and wind-protecting drilling shelter. Mast has two positions: horizontal for transportation and vertical working position. Movable workshop has basically the same design as drilling shelter and serves for keeping two generators, logging service, workshop for repairing and maintaining of drilling equipment, core processing. Drilling shelter and workshop are transported to the chosen site with crawler tractors together with habitable unit and three sledges with drilling fluid, fuel and auxiliary drilling equipment. All equipment would be ready to start drilling in 2-3 days upon arrival to the site. The IBED drill can drill in firn, ice, debris-containing ice and bedrock by changing different module that permits the accomplishment of three different tasks: (1) augering in the upper snow–firn layers with three sequential reamings for casing installation; (2) coring in solid and debris-containing ice with near-bottom fluid circulation; and (3) bedrock-core drilling using teeth diamond bit and standard core barrel from conventional diamond drill string. IBED was firstly tested in the lab, and during 2018-2019 season the whole ASDR was assembled and tested just outside Zhongshan Station near Antarctic coast. As a result, a 7-cm length of rock core with 41.5-mm in diameter was recovered from the bottom of 198-m deep borehole.

Primary authors: Prof. TALALAY, Pavel (Polar Research Center, Jilin University, Changchun, China); Prof. SUN, Youhong (Polar Research Center, Jilin University, Changchun, China); Dr ZHANG, Nan (Polar Research Center, Jilin University, Changchun, China); Dr FAN, Xiaopeng (Polar Research Center, Jilin University, Changchun, China); Prof. MARKOV, Alexey (Polar Research Center, Jilin University, Changchun, China); Prof. WANG, Rusheng (Polar Research Center, Jilin University, Changchun, China); Dr YANG, Yang (Polar Research Center, Jilin University, Changchun, China); Mr LIU, Yongwen (Polar Research Center, Jilin University, Changchun, China); Mr LIU, Yunchen (Polar Research Center, Jilin University, Changchun, China); Dr GONG, Da (Polar Research Center, Jilin University, Changchun, China); Dr HONG, Jialin (Polar Research Center, Jilin University, Changchun, China); Mr LI, Xingchen (Polar Research Center, Jilin University, Changchun, China); Mr SYSOEV, Michail (Polar Research Center, Jilin University, Changchun, China); Mr LI, Xiao (Polar Research Center, Jilin University, Changchun, China); Mr LIU, An (Polar Research Center, Jilin University, Changchun, China)

Presenter: Prof. TALALAY, Pavel (Polar Research Center, Jilin University, Changchun, China)

Session Classification: Session 4