Geophysical and litho-mineralogical investigation on the seafloor massive sulfides (SMSs) mound

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The geophysical investigations, mainly by the reflection seismology and the electromagnetism, were conducted on known SMSs areas such as the Izena cauldron and the Iheya knoll in the Okinawa Trough. Especially, investigations by the vertical cable seismic (VCS) system and Time-domain electromagnetic method (TDEM) has been conducted by J-MARES on the known SMSs areas. Litho-mineralogical analysis using the massive sulfide rock, recovered around the massive sulfide deposit (Hakurei site in Izena cauldron) during the ROV dive, were also conducted to interpret relation between geophysical and litho-mineralogical characteristics. Especially, some useful metals and some rare-earth elements were qualitatively and quantitatively analyzed, and the mineral composition of the massive sulfides also estimated by QEMSCAN (Quantitative Evaluation of Minerals by Scanning Electron Microscopy developed by CSIRO). In addition, the research and development about the operational efficiency improvement on the seismological and electromagnetic exploration methods has been conducted by J-MARES. The high resolution 2D and 3D imaging technologies on the VCS survey and the high efficiency operation system on the EM survey were improving in this project. Some of the results about research and development on the multi-stage and integrated exploration method for the SMSs will be introduced in this presentation.

Keywords: SMSs, seismology, electromagnetism, Litho-mineralogy, QEMSCAN, J-MARES