Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

SCG059-19 会場:105 時間:5 月 26 日 17:00-17:15

音響ビデオカメラを利用した中央海嶺系海底の観測
Observation of mid-oceanic ridge floor using acoustic video camera

望月 将志 [1*], 浅田 昭 [1], 玉木 賢策 [2], 韓 軍 [1], 吉田 善吾 [1]
Masashi Mochizuki[1*], Akira Asada[1], Kensaku Tamaki[2], Jun Han[1], Zengo Yoshida[1]

[1] 東京大学生産技術研究所, [2] 東京大学大学院工学系研究科
[1]IIS, Univ. of Tokyo, [2]Graduate School of Eng. Univ. of Tokyo

DIDSON (Dual-Frequency IDentification SONar) is acoustic lens-based sonar. It has sufficiently high resolution and rapid refresh rate that it can substitute for optical system in turbid or dark water where optical systems fail.

Institute of Industrial Science, University of Tokyo (IIS) has understood DIDSON's superior performance and tried to find new method for utilization of it. The observation systems that IIS has ever developed based on DIDSON are waterside surveillance system, automatic measurement system for fish length, automatic system for fish counting, diagnosis system for deterioration of underwater structure and so on. A next challenge is to develop an observation method based on DIDSON for hydrothermal discharging from seafloor vent. We expected DIDSON to reveal whole image of hydrothermal plume as well as detail inside the plume.

We had a chance to participate the cruise YK09-13 (JAMSTEC Shinkai6500 / RV Yokosuka) to Rodriguez segment of Central Indian Ridge, where hydrothermal plume signatures were previously perceived. Several experimental trials based on DIDSON in tank and sea had been done in order to confirm whether flows in water can be detected by acoustical method. These trials showed that DIDSON could detect flow of water even if there was no clear thermal difference between the flow and its surrounding. Observation system based on DIDSON was prepared and equipped on the top of Shinkai6500 in order to get acoustic video images of hydrothermal plumes. In YK09-13 Leg.1 cruise, seven dives of Shinkai6500 were conducted. The acoustic video images of the hydrothermal plumes had been captured in three of seven dives.

Low-quality wire connection between DIDSON and Shinkai6500 limited on data transmission. Only low frequency mode was available, and average frame rate was lower than 1 frame per second. Acoustic image data captured by DIDSON in YK09-13 indicate capability of tool for seafloor observation, even though the data was low-quality and low-quantity ones.

Contrasting density inside the acoustic image of the hydrothermal flow could be distinguished. DIDSON showed its possibility of observation tool that can delineate spatial and temporal change of internal structure of the hydrothermal flows. Mosaic acoustic images showed bottom features of ridge axis. This indicates that DIDSON has a possibility of bottom observation tool, especially on the occasions of turbid or dark water.

キーワード: 音響ビデオカメラ, 海底熱水活動, 海底地形観測
Keywords: acoustic video camera, seafloor hydrothermal flow, seafloor terrain observation