

Investigation of seafloor methane hydrates by marine controlled source electromagnetic method in offshore Joetsu areas

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We have conducted an investigation of seafloor methane hydrates by towing-type marine controlled source electromagnetic method in offshore Joetsu areas. The MCSEM system, owned by Scripps Institution of Oceanography, is composed of one transmitter and four receivers installed with 100m space, which are connected with a cable. The system was towed at the height of about 50m from the seafloor. The transmitter transmitted electrical current with the particular wave form containing various frequency components. The combinations of the transmitter and four receivers at each frequency have the information on sub-seafloor resistivity structure at different depths. The maximum depth of investigation was about 100m. The investigation was carried out for about three weeks, from the middle of August to the beginning of September, 2014. We used the survey ship, Shinnichmaru operated by Fukada Salvage & Marine Works construction Co., Ltd., and the operation of MCSEM system was mainly conducted by Ocean Floor Geophysics Inc. (OFG) Corporation.

The plane views and sections of apparent resistivity values show some resistive anomalies consistent with those of the sub-bottom profiling results. Moreover, three-dimensional inversion of MCSEM data was applied to illustrate more detailed sub-seafloor resistivity structure, and we compared the resultant structure with some features of submarine topography.

Keywords: seafloor methane hydrates, marine controlled source electromagnetic method, offshore Joetsu areas