

Marine CSEM survey on a methane hydrate area, Nankai Trough off the Tokai area, Japan

Noriaki Sakurai[1]; Tada-nori Goto[2]; Takafumi Kasaya[3]; Masataka Kinoshita[3]; Yasushi Harada[4]

[1] Tokyo Univ.; [2] Kyoto Univ.; [3] JAMSTEC; [4] School of Marine Sci. and Tech., Tokai Univ.

This is the first survey in Japan using the marine controlled source electromagnetic (CSEM) sounding method with a horizontal source dipole and an ocean bottom receiver. It finally aims at imaging methane hydrate zones below seafloor with deeper and wider ranges than marine deep-towed DC resistivity survey, already developed (Goto et al., 2008). In this study, our first purpose is to estimate the resistivity of sediments including the methane hydrate and compare it with the logging data.

Three-dimensional forward modeling was performed where sea water, sediment and a high resistivity zone were set up as layers. First, we seek the optimal resistivity of sediment. As a result, the inferred resistivity of the sedimentary layers is 1-2ohmm, consistent with the measured resistivity values by the resistivity logging. Note that the resistivity value is enough higher than the value of sea water. We conclude that this technique can properly obtain the information of sedimentary layers.

Numerical computation was performed how our marine CSEM data is sensitive to a deep resistive layer simulating the methane hydrate zone. Our calculations tell that the resistive layer with depth shallower than 100m can be detectable by our CSEM experiment.