



## **Conceptual design and life cycle assessment of a new utilization technology of seafloor methane gas venting**

Hiroaki Watanabe (1), Chiharu Aoyama (2), Daiki Aoyama (3), and Yasushi Kawagishi (4)

(1) Department of Mechanical Engineering, Kyushu University, Fukuoka, Japan (whiroaki@mech.kyushu-u.ac.jp), (2) Tokyo University of Marine Science and Technology, Tokyo, Japan (caoyama0@kaiyodai.ac.jp), (3) Japan's Independent Institute, Inc., Tokyo, Japan (aoyamad@dokken.co.jp), (4) Taiyo Kogyo Corporation, Tokyo, Japan (ky002994@mb.taiyokogyo.co.jp)

A new technology for utilization of seafloor methane gas venting was conceptually designed and discussed in terms of a life cycle energy profit ratio (EPR) and costs in this study. It has been reported that methane gas seeping from the sea floor significantly affects the global warming in the ocean science community. The system examined in this study consisted of a collector of methane gas bubbles seeping from the seafloor, a riser tube, a clean-up facilities on a platform on the surface of the sea and a pipeline transportation to a land. Methane gas was expected to be used in an industrial plant with CCS, such as a semi-closed type gas turbine - fuel cell hybrid power generation. The present system showed great potential in terms of EPR and costs, in addition to the reduction of the global warming gas emission, with comparing to the conventional natural gas mining and transportation. Moreover, even if a conventional power plant without CCS was employed to use methane gas collected by the presented system, the advantage was still shown due to difference in global warming potential between methane and carbon dioxide.