

Methane hydrate resource development: Approach of the MH-21 research consortium, objectives and research issues

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The program of the MH21 research consortium that started in 2012 for the development of methane hydrate resources continued for 18 years and has concluded with some measure achievements such as the discovery of outcomes "methane hydrate concentrated zones (MHCZ)" in deepwater turbidite sediments and establishment and onshore and offshore field verifications of the concept of depressurization technique as a production method. There are, however, still many issues to reach the final target of the project; the economical gas production from the methane hydrate deposits. To solve such issues, the new consortium named MH21-S was founded and will conduct research and development tasks for four years until March 2023.

The objectives of the new research program is to show that the methane hydrates can satisfy two quantitative economical criteria for the commercialization; the sufficient production rate from a single borehole can be achieved and a candidate site for the production test in the next phase (FY2023 and later) should be discovered in MHCZs zones with enough amount of gas in place in the Japanese water. Through two major paths; marine resource surveys including environmental impact studies and development of the production techniques, the research team should show that those criteria can be satisfied, and then the decision for the next production test will be made.

The two important subjects in the plan are to improve the reliability of the production behavior prediction and to find out solutions for the issues that have prevented the stable gas production. In fact, the production and pressure/temperature data obtained during the past production tests had some discrepancy from the model predictions, and the facts showed that some phenomena have interfered the stability of the gas production. Therefore, to improve the reliability of the model, it is necessary to understand the reservoir characters and the physical processes in the reservoir (hydraulic, thermal, and mechanical), and reflect them on the models. Furthermore, measures to improve the production rate and commercial value of the gas hydrate resources are necessary to be studied.

Keywords: methane hydrates, Reservoir characterization, commercialization