Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

MIS22-P02 会場:3 階ポスター会場 時間:4 月 29 日 18:15-19:30

Depicting Thermal History of the Forearc Basin Pleistocene Turbiditic Sedimentary Sequences around Daini Atsumi Knoll

Depicting Thermal History of the Forearc Basin Pleistocene Turbiditic Sedimentary Sequences around Daini Atsumi Knoll

AUNG, Than tin[1*] ; FUJII, Tetsuya[1] ; UKITA, Toshiyasu[1] ; KOMATSU, Yuhei[1] ; SUZUKI, Kiyofumi[1]
AUNG, Than tin[1*] ; FUJII, Tetsuya[1] ; UKITA, Toshiyasu[1] ; KOMATSU, Yuhei[1] ; SUZUKI, Kiyofumi[1]

[1]Methane Hydrate R&D Division, Technology & Research Center, JOGMEC
[1]Methane Hydrate R&D Division, Technology & Research Center, JOGMEC

Thermal history of sedimentary basin is a key to understand hydrocarbon maturation and generation of the source rock within the basin. In terms of gas hydrate accumulation, high pressure and low temperature boundaries, the gas hydrate stability zone, is mandatory to simulate in order to understand accumulation mechanisms of gas hydrate in the studied basin. We have determined heat flow history of Pleistocene sedimentary sequences in the forearc basin round the Daini Atsumi knoll, along the eastern Nankai Trough, Japan, by simulating gas hydrate stability zone. World first offshore production test of gas hydrate was successfully done in the vicinity area of Daini Atsumi knoll during March 2013.

Simulation in 3D gas hydrate petroleum systems of the forearc basin filling with Pleistocene turbiditic sedimentary sequences around the Daini Atsumi knoll was firstly performed by applying assumed heat flow of 45 mW/m2. Temperature at seabed is applied as 3.5 C throughout the model area and depositional period. Simulated sedimentary sequences consist of Pleistocene Ogasa Group of sand and shale alternative turbiditic sedimentary layers. Older upper Kakegawa Group is also included between the model basement and Ogasa group. Lithologies are interpreted from grain size analysis of cores data. Lateral facies distribution are based on seismic facies analysis. Global sea level changes are considered in applying paleo-water depths of the geologic horizons.

Simulated hydrostatic pressure matches hydrostatic pressure calculated from XPT data at well A1-L. Simulated temperature was calibrated by DTS (distributed temperature sensor) Temperature of gas hydrate reservoir zone at well AT1-MC. Calibration result reveals that heat flow has to low down to 32 mW/m2 in order to fit pressure and temperature at well. Result of simulated temperature using calibrated heat flow matches with a resolution of ˜1C of the well data. This heat flow value is lower than the reported value (˜50 mW/m2, Harris et al., 2014) around the vicinity of the studied area. Validation of this heat flow value requires 1) to reanalyze model layer thickness and total thickness of model, and 2) to reanalyze thermal conductivity of applied lithology.

In addition to above works, model is planned to update with paleo-water depth based on paleo-bathymetry from structural restoration, and reported depth from foraminiferal measurement of core samples at A1-L well. Because mass and lateral distribution of gas hydrate accumulation are considerably affected by tectonic uplift at Daini Atsumi Knoll.

This study is a part of the program of the Research Consortium for Methane Hydrate Resources in Japan (MH21 Research Consortium).

キーワード: Gas Hydrate Petroleum Systems, Daini Atsumi Knoll, Heat Flow, Pleistocene Ogasa Group, 3D, Simulation
Keywords: Gas Hydrate Petroleum Systems, Daini Atsumi Knoll, Heat Flow, Pleistocene Ogasa Group, 3D, Simulation