

## **Gas Hydrate R&D Activities of Korea**

*Tai-Sup Lee, Ho-Young Lee and Keun-Pil Park*  
Korea Institute of Geoscience and Mineral Resources  
Daejeon, Korea

### **ABSTRACT**

From the 5 year preliminary study, BSR was found in the East Sea, Korea. 1<sup>st</sup> phase of the national gas hydrate program has been conducted for three years from 2005. During this phase, 2-D and 3-D seismic surveys and sedimentary core sampling were carried out. After processing and interpretation of the acquired data, prospective area and drilling sites were selected. In 2007, KIGAM research team successfully sampled natural gas hydrate at the selected drilling sites using piston corer. Massive and disseminated gas hydrate samples were also found during the drilling of around 200 m depth.

**KEY WORDS:** Gas hydrate; BSR; seismic; sampling; coring; LWD; drilling.

### **INTRODUCTION**

Gas hydrates are solid, ice-like materials containing molecules of gas bound in a lattice of water molecules. Gas hydrates are stable under conditions of low temperature and high pressure and thus, are found in sub-oceanic sediments in the polar regions and in continental slope sediments (Sloan, 1998). Gas hydrates draw a great attention for the last 20 years as a new clean energy resource substituting conventional oil and gas. Many countries including U.S., Japan, Canada, Germany, China and India have launched extensive research programs to study the characterization of gas hydrates and eventually to produce them from the ocean.

Preliminary Korea gas hydrates study was carried out during the period from 2000 to 2004 and bottom simulating reflector (BSR) was found in the East Sea, Korea (Lee and Im, 2005), thereafter intensive gas hydrate study has begun from 2005. During the 1<sup>st</sup> phase of the program from 2005 to 2007, the extensive 2-D seismic survey, 3-D seismic survey and sedimentary core sampling were carried out and evidences indicating the possibility of presence of gas hydrates were secured. The geophysical evidences, such as BSR, chimney structure, gas seepage structure, enhanced reflector and acoustic blanking zone,

and the geological and geochemical evidences like total organic contents and sedimentation rate were collected (Ryu, Riedel, Chung, Hyndman, Kim, Lee, Park, and Cheong, 2004; Lee, 2007; Kwon, 2007).

Five drilling sites were selected considering interpreted seismic indicators for gas hydrate occurrence and high velocities derived from the detailed velocity analysis in the gas hydrate stability zone. In June, 2007, KIGAM research team successfully sampled first natural gas hydrate at the candidate drilling site in the East Sea, Korea using piston corer. During the deep sea drilling of around 200 m depth, logging while drilling (LWD) and coring were conducted. Massive and disseminated gas hydrates were recovered. According as the gas hydrates were found, the importance of the development of production technology has been getting higher.

In this paper, we describe gas hydrate R&D activities during the 1<sup>st</sup> phase of Korea gas hydrate program.

### **GAS HYDRATE R&D ORGANIZATION**

Results of preliminary study by Korea Institute of Geoscience and Mineral Resources (KIGAM) showed that gas hydrates could be present in deep sea area over 1,000 m water depth in the East Sea.

From this optimistic conclusion, Ministry of Commerce, Industry and Energy (MOCIE) of Korea initiated gas hydrates development program by establishing Gas Hydrates R&D Organization (GHDO) in 2005. GHDO cooperates with KIGAM, the main research organization, Korea National Oil Corporation (KNOC), and Korea Gas Corporation (KOGAS) (Fig. 1). KIGAM conducts main R&D projects and KNOC is in charge of field survey and drilling.

### **NATIONAL GAS HYDRATE PROGRAM**

Gas hydrates development program consists of three phases. The goal of the first phase is to identify the potential area of gas hydrates in the