

**News and Highlights**

## **Reserves of Natural Gas Hydrates Equivalent to 100–150 Billion m<sup>3</sup> Natural Gas Has Been Discovered in the Pearl Mouth Basin of the South China Sea**

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Scientists have suggested that combustible ice in global marginal seas, deep trough areas and ocean basins covers an area of 400 million km<sup>2</sup>, and its total reserve is twice the amount of the global proven oil, coal and gas reserves, equivalent to 50 times the amount of conventional natural gas reserves. Only this global submarine combustible ice resource could be available for human use within 1000 years. China Geological Survey (CGS) has conducted integrated geological investigations of natural gas hydrates in the Pearl River Mouth basin of Guangdong Province through time, and has completed 40 geological survey voyages, 45,800 km<sup>2</sup> of high-resolution multi-channel seismic surveys, 36,800 km of multi-beam measurements, 7,100 km of shallow stratigraphic section measurements, 1,480 stations for sampling submarine geological samples and 222 stations for submarine heat-flow measurements.

From June to September in 2013 through exploration drilling, CGS first obtained high-purity natural gas hydrate samples in the eastern sea of the Pearl River Mouth basin, and suggested considerable controlled reserves. Here we report that these samples represent shallow burial, great thickness, various types and high purity. The natural gas hydrates are hosted in two ore horizons 220 m below the sea floor at depths of 600–1100 m: the upper ore horizon is 15 m thick, and the lower one is 30 m thick; both ore horizons display bedded, massive, nodular or veined textures, and can be distinguished with the naked eye. The ore rate of natural gas hydrates from the drill cores is 45%–55% on average, and the methane content in the samples can reach up to 99%. Overall there were 23 wells drilled to forecast natural gas hydrates over an area of 55 km<sup>2</sup> with controlled reserves of the equivalent of 100–150 billion m<sup>3</sup> natural gas, equal to a super-large conventional gas field.

China's Ministry of Land and Resources reports that Chinese geologists have developed a set of integrated exploration technique systems favorable for hydrate exploration in the China Seas. Key techniques such as integrated target detection of high-resolution multi-channel seismic with seafloor seismic, detection of submarine topography and heat flow and sampling of submarine in-situ pore water, proposed controlling factors and gas hydrate accumulation models, and established duplex accumulation theory for hydrates in quasi-passive continental margins have been developed through ten years or more of investigations since 2004 when China started basic research on hydrate exploitation. Since 2011, the Chinese government has implemented an official 20-year national hydrate program implemented in two phases. The first phase lasting from 2011 to 2020 aims to seek exploitable hydrate locations, and the second phase from 2012 to 2030 is devoted to overcoming technical barriers and realizing their industrial use.

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