

Geological Conceptual Model Based on Integrated Analysis Using Some Geological data obtained in the Kitakyusyu Site.

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The Kitakyushu site, western Japan, is one of the most promising CCS demonstration candidate sites. The Kitakyushu is also the unique site where Paleogene formations are considered as a target of CO₂ storage. A series of basic surveys, consisting of a gravity survey, drilling of a survey well, and a 2D seismic survey were carried out by Japan CCS Co., Ltd. (JCCS) for a geological evaluation of the site. Observation of the core samples, analyses of the log data for a survey well "Kitakyusyu CCS-1(TD=1180m)", and a field survey of surface geology were also carried out for a facies analysis. Some geological information to estimate facies environments around the well was extracted by the analysis. This study was performed to construct a preliminary geological conceptual model based on the geological information, sedimentary environments and distribution patterns of the Paleogene sedimentary rocks in the site.

It was presumed from the observation of the boring cores that the Tenraiji and Kamiitozu members which are members of the Ideyama formation and are overlying the basement rock (Cretaceous granites), are likely to be consisted of terrigenous sedimentary rocks accumulated in the channel and inter-channel environments.

The sandstones in the Tenraiji and Kamiitozu members were classified into two categories, i.e., channel-fill sandstone (often contains conglomerates) and sandstone derived from overflow sediments which are interbedded in mudstones by the geophysical properties obtained from the well logs.

Seismic data acquired near the well were interpreted to infer depositional environments in this area. Strong waves seen in the seismic sections are interpreted as the reflections from the geological formation corresponding to the Tenraiji member, suggesting that these strong waves can be reflected from the conglomerates interbedded at the base of channel-fill sandstones. Mapping of these reflections shows an elongated shape in the NE-SW direction. The major axis of the elongated structure may indicate the axis of channels deposits.

Gravity data also indicate the shape of sedimentary basin that is half-graben elongated in the north to south direction. The half-graben basin is accompanied with steep slope at the east wall whereas gentle slope to the west.

To deepen the regional geological concept, a surface geological survey was supplementarily carried out on the islands in Hibiki-nada Bay which is thought to be located on the western slope of the basin. The result of the geological survey suggests that geological structure in this area shows a gentle anticline plunging into the N-S direction which is consistent to the shape of the sedimentary basin deduced from the gravity data.

The sedimentary environments of the Tenraiji and Kamiitozu members can be concluded that the terrigenous channel and inter-channel sediments deposited at the beginning of formation of the half-graben which is elongated in the north to south direction by these various geological analyses.

Based on the integrated analysis using various geological data, a preliminary geological conceptual model which is expected to contribute to future reservoir evaluation has been successfully established in this site.

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