



## **Generation and Migration of Natural Gas in Miocene Strata, Offshore Southeastern Korea**

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Natural gas and condensate are produced from Miocene strata of the Tertiary marine basin, called Ulleung Basin, which is located offshore southeastern Korea. Petroleum system in the basin has not been fully understood, because effective source rocks have not been identified in the area. However, 1-D petroleum system modelling and isotope data indicate that the source rock of the natural gas and condensate might be present at deeper strata than 5,000 m in the basin. In addition, the analysis of diamondoids in the condensate shows that the gas was transformed from type II kerogen. Based on this source rock information and other geological data, 2-D petroleum system modelling was conducted on two cross sections in the southwestern margin of the basin.

The 2-D models show two phase generation and migration, which are caused by the geometry of source bed and the maturity level of each pod of the bed. In addition, the accumulation of hydrocarbon is constrained greatly by the timing of development of the regional seal. The first generation and migration of oil and gas begins with a high rate of sedimentation at a deeply and early buried pod of the source bed at 15 Ma. The hydrocarbon, however, migrates upward and diffuses toward the surface. The second generation and migration occurs at around 11 Ma from the other pod of the source bed. This hydrocarbon migrates updip toward anticlines and accumulates into the traps of anticlines. On the other hand, the model shows that the generation and migration is dominated by gas, rather than oil.

This model indicates that the accumulation of hydrocarbon can be completed only by the proper and sophisticated combination of the geological elements and the timing of hydrocarbon migration in time and space. This 2-D feature of generation and migration is supported by additional 1-D models of two pseudo-wells drilled on the 2-D section.